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THE

Pharmaceutical Journal

AND

Transactions.

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THIRD SERIES.

VOLUME IV.

1873–1874.

LONDON:

J. AND A. CHURCHILL, NEW BURLINGTON STREET;

MACLACHLAN & STEWART, EDINBURGH; FANNIN & Co., DUBLIN.

ALPHONS DÜRR, LEIPZIG.

1874.

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5, GREAT QUEEN STREET, LINCOLN'S INN FIELDS, LONDON, W.C.

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VOL. IV.—JULY 5, 1873.

PEPSINE.

BY CHARLES SYMES, PH.D.

There are few medicines, perhaps, which have received so extensive a trial, and yet respecting which such differences of opinion exist, as pepsine. It cannot be doubted that this arises chiefly from the fact that it has not been recognized by the Pharmacopœia, and hence no standard tests of quality exist in this country. Chemists purchase the kind they think best, influenced perhaps by the advertisements of manufacturers or the report of some experimenter who may have used very carefully prepared samples, and not the commercial article; or it might be they are guided by price, the best qualities being usually attributed to the highest priced article of its kind, and this, indeed, should be a correct guide. But I have also heard of orders for pepsine in which the only condition stipulated for was its low price. It occasionally occurs that extremes meet, and my experience indicates that they are not so wide apart as would be supposed, even in this instance. It will not be surprising, however, under such circumstances, that pepsine might mean anything possessing more or less digestive power, an appearance varying from that of decorticated liquorice to pulv. doveri, and an odour from almost nil to the strong smell of bacon. Variable as it might be, it has stood the test of time, and at last asserted its right to recognition and admission to at least the outer circle, viz., to the Appendix.

For some time past I have been conducting a series of experiments on pepsine, first with a view of ascertaining the quality of commercial specimens by different makers; and secondly, of testing the various processes which have been proposed for its preparation as a medicinal or restorative agent. My results under the first head somewhat surprised me, and might do others who have not made this subject one of experimental inquiry; one or two examples will perhaps serve as illustrations. It will be seen that I have used a minimum quantity of acid, so as to test the full peptic power of the various samples—the amount of acid often recommended in a given quantity of fluid being much larger than can possibly exist in the human stomach. In each instance, the white portion of hard-boiled eggs chopped in small pieces was used, and after digestion the undissolved portions, before weighing, were brought to as nearly as possible the same condition of dryness as they were in previously; 100 grains were introduced into each of six vials—to five of these ten drachms distilled water, ten minims dilute hydrochloric acid, and ten grains of pepsine of various kinds were added; in the sixth four drachms of the distilled water were replaced by the same quantity of pepsine wine, each drachm of which should have represented two-and-a-half grains of Pepsina Porci; all were digested under precisely the same conditions at a temperature of 100° for 12 hours. The following gives the amount by weight of undissolved albumen in each vial:—

No.	1	left undissolved	1½	gr.
„	2	„ „	2½	„
„	3	„ „	24	„
„	4	„ „	28	„
„	5	„ „	41	„
„	6	„ „	56	„

Now, the medical man who is desirous of testing the value of pepsine as a remedial agent, in one or more cases where he considers it ought to be of service, if there is any good in it, will be perfectly satisfied of its efficacy should Nos. 1 or 2 be dispensed, more or less so if No. 3; but what if No. 5? or if he should have prescribed pepsine wine, as No. 6? It might be said that this latter is largely prescribed, and also taken by invalids without prescription, frequently with good results. I can only reply that, according to the above statement, it possesses about one-half the peptic power that it should do, and that as the stomach is a laboratory whose operations are somewhat obscure even to the closest observer, in imitating its processes in a vial where we lack the vital agency, the activity of any samples operated on is almost sure to be underrated. Nevertheless, experiments conducted carefully under the same conditions are valuable as affording comparative results; and certain is it that wine or any alcoholic fluid is a most unsatisfactory vehicle for pepsine, also that, when taken with food, it unquestionably retards digestion. The above experiment was several times repeated, first with portions of precisely the same samples, and also with samples by the same makers, but obtained from different sources; the results varied slightly, but bore the same relation to each other. It was thought desirable not to obtain the samples from the manufacturers direct, informing them of the purpose for which they were required, but all were obtained from authentic sources. The pepsine Nos. 1 and 2 were both by the same manufacturer, and, as it will be seen, were of good quality, but it is somewhat anomalous that according to the dose given the former should have been about five times the strength of the latter, whereas it would appear that there is little difference between them. The catalytic action seems to be much more vigorous in the early part of the process of digestion than towards the end; therefore, had a larger amount of albumen been present in the vial No. 1, it is possible a larger amount might have been dissolved, and the residue have been but slightly greater than it actually was. Nevertheless, this could not have been

sufficient to account for the great similarity in activity of the two specimens.

Of the processes for its preparation as a medicinal agent, that of precipitating its solution by acetate of lead, and subsequent separation of the lead by hydrosulphuric acid, has probably been longest in use, but its activity appears to be more or less injured by the chemical treatment. The process of M. Brucke, consisting of solution in dilute phosphoric acid, neutralization with lime-water, re-solution in dilute hydrochloric acid, and final treatment with cholesterine, rectified spirit, and ether, yields a product possessing active peptic properties, but is more suitable as a laboratory experiment than for the purpose of manufacture on a commercial scale. Tannin and alcohol have both been proposed as precipitants for pepsine, but I am not aware of any definite process in which these are used for its preparation on a large scale. Next in order is the somewhat primitive process of Dr. Beale. It is given in the PHARMACEUTICAL JOURNAL, N.S., Vol. II., p. 684, and is as follows :—

"The mucous membrane of a perfectly fresh pig's stomach was carefully dissected from the muscular coat, and placed on a flat board. It was then lightly cleansed with a sponge and a little water, and much of the mucus, remains of food, etc., carefully removed. With the back of a knife or ivory paper knife, the surface was scraped very hard in order that the glands might be squeezed, and their contents pressed out. The viscid mucus thus obtained contains the pure gastric juice, with much epithelium from the glands and surface of the mucous membrane. It is to be spread out on a piece of glass, so as to form a very thin layer, which is to be dried at a temperature of 100° over hot water or *in vacuo* over sulphuric acid. Care must be taken that the temperature does not rise much above 100°, because the action of the solvent would be completely destroyed. When dry, the mucus is scraped from the glass, powdered in a mortar, and transferred to a well-stoppered bottle."

Several persons who have performed experiments with this (so called) pure digestive powder, including Dr. Beale himself, have spoken highly of its peptic properties ; and from their position we cannot doubt the accuracy of their experiments or statements. In my own hands, however, I cannot say the results were so satisfactory as I had anticipated. The process, too, if carried out strictly according to Dr. Beale's instructions, is a very wasteful one, more pepsine being lost than is obtained ; if, on the other hand, it is attempted to obtain a larger quantity, the quality is reduced. The mucus which is directed to be sponged off, and which is usually considerable in quantity, possesses about one-third to one-half the activity of the mucus which is afterwards directed to be *scraped* off ; then, after this scraping, a considerable amount of perspine remains, which can be demonstrated by dissolving it out.

Lastly, we have the process of Mr. E. Scheffer, the most satisfactory as regards uniformity of excellence and economy in working of any I have tried. It is detailed in this Journal so recently as May 31st, I need not therefore even recapitulate here. It can be made to answer strictly to the tests given ; it keeps well ; is soluble in an acidulated fluid, and hence might be prescribed in solution of almost any strength. Amongst other experiments one was performed in which a given quantity of the moist mucus scraped from fresh, cleansed pigs' stomachs, was divided into equal portions, one of which was retained moist, another dried in a thin layer at a temperature not exceeding 100° ; from a third portion the pure pepsine was separated by Mr. Scheffer's process, but adding sufficient sugar of milk to bring it to the exact weight of the portion simply dried.

Into each of four vials 100 grains of coagulated albumen, 10 drops dilute hydrochloric acid, and 10 drachms of water were placed ; to the first 10 grains of the dried mucus, to the second 80 grains of the moist (it requires this quantity to produce 10 grains of the dry), to the third 10 grains of the purified saccharated, to the fourth 10 grains of the same, and two drachms of the water were replaced by sherry wine. After twelve hours' digestion, at a temperature of 100°, the results were as follows :—

No.	1	left undissolved	31 grs.
„	2	„ „	22 „
„	3	„ „	12 „
„	4	„ „	52 „

From this we learn that undried mucus is more active than the same substance after drying ; that the pure pepsine diffused through sugar of milk is more active than the mucus from which it is obtained ; and finally, prove the truth of the statement before made, that wine partially destroys the activity of pepsine and is an unsuitable vehicle for its administration.

I propose, therefore, to substitute for pepsine wine an *elixir*, made by dissolving the purified moist pepsine in raspberry vinegar, so that 1 fluid drachm shall be capable of dissolving 100 grains of coagulated albumen. This keeps well, and is perfectly palatable.

THE PHARMACY OF THE UNITED STATES' PHARMACOPŒIA.

BY WILLIAM MARTINDALE, F.C.S.,

Demonstrator of Materia Medica in University College, London.

(*Continued from Vol. III., p.* 990.)

Extracta fluida.—On account of the novelty of most of these preparations, and the use of new menstrua for exhausting many of the drugs from which they are prepared, the fluid extracts have attracted a great deal of attention on both sides of the Atlantic. There are forty-six official formulæ for them, twenty-two of which are entirely new to the Pharmacopœia. The list is preceded by this head-note, which in general terms gives a model process for making them :—

"Unless otherwise directed, the fluid extracts should be prepared according to the following process :—

"The quantity of powdered material directed to be used in each of the following formulas, with one exception, is sixteen troyounces. This powder is to be moistened with a specified quantity of menstruum, and properly packed in a suitable percolator. The surface of the powder is then to be covered with a disc of paper, and the remaining portion of sixteen fluidounces of menstruum is to be poured upon it. When the liquid begins to drop from the percolator, close the lower orifice with a cork, and, having closely covered the percolator, to prevent evaporation, set it aside in a moderately warm place for four days.

"The cork is then to be removed, more menstruum is to be gradually poured on, and the percolation continued until twenty-four fluidounces have been obtained. Of these the first fourteen fluidounces are to be reserved, and the remainder, having been carefully evaporated to two fluidounces, is to be mixed with the reserved portion, and filtered through paper if necessary."

In all except two of them, sixteen troyounces produce exactly sixteen fluid ounces of fluid extract. The exceptions are, *extractum sarsaparillæ compositum fluidum*—in which the yield is slightly less—and *extractum spigeliæ et sennæ fluidum*—this is made by mixing 10 fluid ounces of fluid extract of spigelia with 6 fluid ounces of fluid extract of senna, and 20 minims each of the oils of anise and caraway.

The following table enumerates the official preparations of this class, the fineness of powder in which the drug is ordered to be used, and the proportion of glycerine in the product obtained :—

Fluid Extract of	Fineness of Powder.	Proportion of Glycerine in the product.
Belladonna	50*	¼
Buchu	50	0†
Calumba	60	⅛
Chimaphila	50	¼
Cimicifuga	80	0‡
Cinchona	80	¼
Colchicum (root)	50	¼
„ (seeds)	60	¼
Conium („)	60	¼
Cornus florida	60	¼
Cubeba	50	0‡
Digitalis	50	¼
Dulcamara	40	¼
Ergota	50	¼
Erigeron canadense	40	0†
Gelsemium	80	0†
Gentiana	40	¼
Geranium	50	¼
Glycyrrhiza	60	¼
Gossypium (root)	80	¼
Hydrastis	80	⅛
Hyoscyamus	50	¼
Ipecacuanha	60	½
Krameria	60	¼
Lupulina	—	0‡
Matico	50	¼
Mezereum	40	0‡
Pareira	60	¼
Prunus virginiana	60	¼
Rheum	50	⅛
Rubus	60	¼
Sabina	50	0‡
Sarsaparilla, Compound :—		
Sarsaparilla	50	½
Glycyrrhiza	50	
Sassafras	50	
Mezereum	50	
Sarsaparilla	50	½
Scilla	40	⅛
Senega	60	¼
Senna	60	½
Serpentaria	60	0†
Spigelia et senna	—	½
Spigelia	60	½
Stillingia	60	¼
Taraxacum	50	¼
Uva ursi	50	¼
Valeriana	50	0‡
Veratrum viride	60	0‡
Zingiber	50	0†

* These figures indicate the number of meshes in the linear inch of the sieve the drug must be passed through.

† The only solvent directed to be used for these is alcohol sp. gr. 0·835.

‡ Stronger alcohol, sp. gr. 0·817, alone is ordered for these.

It will be observed that for most of the drugs the quantity of glycerine used is one-fourth of the product obtained. In making sixteen fluid ounces of about one-half of these extracts, three fluid ounces of glycerine are mixed with five fluid ounces of water and eight fluid ounces of alcohol (sp. gr. 0·835), thus making the solvent the same strength in spirit as diluted alcohol. The powdered drug is moistened with one-fourth of it, packed in a percolator, the remainder of this solvent is now added, and it is macerated "in a moderately warm place for four days," as directed above. Percolation is then carried on by adding diluted alcohol until fourteen fluid ounces of percolate are obtained. This portion is set aside, and percolation continued until ten fluid ounces more of percolate have been passed. To the latter is added the remaining fluid ounce of glycerine, previous to evaporation down to the bulk of two fluid ounces. After concentration this is mixed with the fourteen ounces set aside, thus producing sixteen fluid ounces, and lastly, the whole is filtered, if necessary. The proportion of alcohol, glycerine, and water is varied to suit each particular case, thus the menstruum first used in making *extractum belladonnæ radicis fluidum*, is a mixture of twelve volumes of alcohol, three of glycerine, and one of water.

In the directions for making *extractum conii fructûs fluidum*, 180 grains of muriatic acid are ordered to be added to the second portion of percolate, along with the remaining ounce of glycerine, before evaporation, to prevent the loss of the volatile alkaloid this contains, but it is difficult to conceive that much of it will be left in conium "seed" when it has been dried and reduced to a *fine* powder. A similar addition of half-an-ounce of acetic acid is directed to be made to the second percolate in making *extractum ergotæ fluidum*. The process for *extractum ipecacuanhæ fluidum* is exceptional — one volume of water is mixed with two of stronger alcohol (why stronger alcohol should be ordered when it has to be thus diluted is not very evident), the ipecacuanha is moistened and macerated with this in a percolator for four days, percolation is then continued with the remainder of the mixture of spirit and water, and finally with diluted alcohol, until two pints of tincture have been slowly passed. This tincture is to be mixed with the glycerine, and the mixture evaporated, at a temperature not exceeding 140°, to one pint. By experiment I found that sixteen troyounces of ipecacuanha absorbed the whole of the twenty-four fluid ounces ordered for macerating and commencing the percolation—no fluid dropped through, as I anticipated by the directions given. The drug was fairly exhausted by the percolation. Half the volume of the resulting product consists of glycerine, and some difficulty is experienced in evaporating it to the required bulk at a temperature not exceeding that mentioned. It is not directed to be filtered like most of the others, and, as I expected, the preparation as made by myself is of a thick syrupy consistence and opaque brownish colour, but little or no sediment has formed in it; mixed with water it deposits, and the supernatant liquor is entirely free from colour. It mixes better with, and is more soluble in, diluted acetic acid.

The following table shows the density of the first menstruum employed—of the first and second percolates—as obtained before further treatment—of the next three fluid ounces percolated as waste, and of, generally, sixteen fluid ounces of the finished pro-

duct, in making the fluid extracts of the drugs named :—

Name of Drug.	Specific Gravity.				
	Of 1st menstruum.	Of 1st percolate.	Of 2nd percolate.	Following 3 oz. percolated.	16 oz. of product.
Belladonna.....	——	1·001	0·997	0·980	1·050
Cinchona.....	0·982	1·060	0·996	0·976	1·106
Ergota.....	0·982	1·037	0·980	0·959	1·060
Ipecacuanha.....	0·907	0·944	0·927	——	1·260
Senega.....	0·982	1·060	1·010	1·006	1·094
Valeriana.....	0·817	0·850	0·855?	——	0·878

No general conclusions can be drawn from the above table as to the approximation to complete exhaustion of the drugs of their soluble principles, because generally two solvents of different density are employed in making each preparation. When percolating with a uniform solvent, proximity to exhaustion may be judged by the fractional percolates approaching in density that of the solvent.

In making the above experiments I found a difficulty in evaporating the second percolate to the bulk of two fluid ounces, especially when it had to be previously mixed with one fluid ounce more of glycerine, on account of, in most cases, its containing so much extractive matter, and also some of the glycerine which had been used as a menstruum and had percolated more slowly than the less viscid fluid added afterwards, although in each case the percolation was carefully conducted. I am unable to explain how the second percolate of *extractum valerianæ fluidum* comes to be of greater density than the first. In evaporating the second percolate of this, as the stronger alcohol volatilized, a resinous or oily separation was found in the fluid which was not entirely dissolved when added to the first percolate. With regard to the other fluid extracts I have tried, those of cinchona, ergot, and senega much more represent the medicinal virtues of the drugs they are prepared from than any preparations I have seen. That of cinchona is excellent ; although the first percolate was a little muddy before the addition of the other portion, yet the finished product is bright and clear, and has not deposited any sediment, although it has been prepared two months. The marc of the bark also was apparently well exhausted. The fluid extract of ergot is also a good preparation ; much superior to extractum ergotæ liquidum, B. P.

As I have stated, they are all directed to be prepared of such strength that one minim should contain the medical virtues of one grain of the drug. This is done as above described, by means of fractional percolation, concentration of the second percolate, and mixing it with the first. This degree of concentration is perhaps in most cases carried further than is practically necessary. If ordered that one grain should be represented by two minims, this class of preparations would much more completely have represented the drugs they are intended. In some, too, the compilers seem to have had the desire to get out of the drug all that was soluble, rather than what alone was medicinally active, as in the case of *extractum belladonnæ radicis fluidum*, in which, probably, much merely inert extractive matter of the root is dissolved.

Careful analyses of extracts prepared from fractional percolates would yield valuable information for guidance in making these preparations. One might rationally infer that supposing the drug to be in a state of fine powder, alkaloids in combination with their vegetable acids, being probably crystallizable, would undergo liquid diffusion, and become dissolved much more quickly and readily than such colloid substances as mucilaginous, extractive, or albuminous matter, and therefore the first portion of percolate would be much the most active.

There is the same waste of alcohol in this class that I mentioned under the head of *Extracta*, the second percolates are all ordered to be *evaporated*, not distilled. Great care and skill will be required to prepare these fluid extracts well, and the manufacture of them will almost necessarily form a special trade.

Therapeutics cannot yet afford to discard these chemically indefinite Galenical preparations, else what is to take the place of such drugs as rhubarb and senna ? And although chemistry has made great advances in this direction, it has not yet either defined such active principles as veratria, aconitia, and digitaline to be simple bodies, or made them always reliable preparations. Sometimes they may be crystallized, but double and triple salts crystallized are not unknown.

(*To be continued.*)

THE ADMINISTRATION OF PHOSPHATE OF LIME.*

BY M. COIRRE.

The importance which during recent years has been attributed to the therapeutic use of the phosphates has induced the author to consider the question of the best mode of administration, with especial reference to the phosphate of lime, a compound which is too insoluble to be employed in suitable doses in most menstrua. In the stomach it is dissolved in small quantity by the hydrochloric acid of the gastric juice ; it exists also in a state of solution in the blood, urine, and other fluids of the body. When, however, it is administered in the natural state, the greater part passes into the fæces, and is lost. Satisfactory results can be obtained only by giving it in solution, and the best solvent is the one it meets with in the stomach, namely, hydrochloric acid. If chemically pure bibasic phosphate be used, a few drops of hydrochloric acid will dissolve one gram in a tablespoonful of water.

By introducing phosphate of lime into the stomach under this form, the author considers its absorption is facilitated in the highest degree, without impoverishing the gastric juice to the detriment of digestion. At the same time the hydrochloric acid aids in producing by other ways the results sought by administering phosphate of lime. It is now known, in fact, that hydrochloric acid is the acid of the gastric juice, and not lactic acid, as was long thought to be the case, and M. Coirre considers it to be a eupeptic medicine *par excellence*. Dr. Rabuteau has shown also that it is transformed in the body into chloride of sodium, the advantages of this latter agent being obtained thereby, to which fact must be attributed the remarkable results sometimes obtained from the use of hydrochloric acid in affections of the digestive canal and cases of consumption.

THE PREPARATION OF IODIDES AND BROMIDES.†

BY CHARLES RICE.

It is a curious fact that iodides and bromides, especially the former, prepared by the intervention of iron, are rather prone to develop, in the course of time, free hydracids and halogens, unless the salt has been exposed

* Abstracted from a paper in *L'Abeille Médicale*.

† *American Journal of Pharmacy*, June, 1873.

to a high degree of temperature, which is, of course, inadmissible in the case of ammonium salts. One explanation of this fact is suggested by the results observed in following another well-known process, formerly much used, and even yet practised, in the preparation of iodides and bromides, namely, to convert the iodine and bromine into hydrobromic acid and hydriodic acid by means of sulphuretted hydrogen, either in the presence of the base or its carbonate, or previous to coming in contact therewith. This process yields a product, in the case of iodine, of very feeble stability, and obstinately retaining traces of sulphur, which it is next to impossible to get rid of. In the case of bromine, the durability is longer, but decomposition frequently ensues after some time. The presence of sulphur, even in most minute proportions, appears to lead to such a result, and traces of it, present in the iron employed, are, I believe, the cause of like effects in the first-mentioned process. Photographers can make no use whatever of such iodides and bromides; the faint trace of sulphur still remaining produces at once a peculiar fogginess and spots upon the film, and there is scarcely a more sensitive test for the detection of minute traces of sulphur than the silvered collodion-film.

I annex a working formula for bromide of ammonium.

Dissolve 4 troy-ounces of bromide of potassium in 6 fluid-ounces of boiling water, and 3 troy-ounces of sulphate of ammonia in 4½ fluid ounces of boiling water. Mix the solutions while hot, and allow to cool. Then add 1½ ounces of alcohol, and set it aside for twenty-four hours. Pour off the clear liquid, wash the precipitate with a small quantity of a mixture of 1 part alcohol and 4 parts water, and concentrate to the point of crystallization. In working upon a larger scale, it is advisable to redissolve the first crop of crystals of bromide of ammonium in a small quantity of very cold water, and allowing as short a time as possible for the solution. The greater part of the accompanying sulphate of potash, which has crystallized out at the same time, will remain undissolved at first, and may be removed, when the solution may be again concentrated, until a pellicle forms. The successive crops of crystals are first drained, then dried on blotting paper laid upon porous bricks with a very gentle heat.

ANNUAL REPORT OF THE DEPUTY MASTER OF THE MINT.

The third annual report of Mr. C. W. Fremantle, Deputy-Master of the Mint, has just been issued. It states that the year 1872 has been remarkable for an extraordinary and unceasing demand for all denominations of gold, silver, and bronze coin. An idea of the magnitude of the coinage executed during the year may be gathered from the statement of the weight of metal issued, namely, gold, 119 tons; silver, 137 tons; bronze, 114 tons; total, 370 tons. The coins struck at the Mint were of thirteen denominations, and the total number of pieces struck was 52,841,048, as against 30,022,404 during 1871, and their value, real or nominal £16,426,663 10s. Of the British coins struck during the year the gold amounted to £15,111,021 10s.; the silver (of which more than half were florins) to £1,265,780; and the bronze to £47,341. The gold coinage in 1871 was £10,500,000, and in previous years averaged only £5,000,000.

Notwithstanding the unusually large amount of silver coin issued during the year 1871, and the efforts made during the first three months of last year to meet the increasing demand, the scarcity of all denominations of that coin continued to be severely felt throughout the spring and summer. But for the necessity of continuing without intermission the delivery of gold coin to the Bank of England, in order to provide against the sudden and abnormal demand which might at any time have been made upon that establishment, the Mint would have had no difficulty in issuing, in the course of a few weeks, such an amount of silver coin as would not only have met the immediate demand. As, however, the continued drain upon the resources of the Bank of England rendered necessary the maintenance of a large and constant supply of gold coin, it was impossible for the Mint to devote itself, except for occasional periods of a few days, to the coinage of silver; and, after consultation with the governors of the Bank of England, the Master of the Mint was reluctantly compelled, in the month of July, to obtain authority for the execution by contract of those processes of the silver coinage which it is impossible to carry on in the Mint simultaneously with the coinage of gold. A contract was made with Messrs. Ralph Heaton and Sons, of Birmingham, to receive bars melted at the Mint, and under the supervision of an officer of the Mint, and from them to manufacture "blanks" for a coinage of the nominal value of £1,000,000. The contract has been completed, and has been instrumental in fully satisfying not only the requirements of the home circulation, but also the numerous and heavy demands of the colonies, and in creating a fund sufficient to meet all probable demands from Scotland, Ireland, and colonial governments until a renewed withdrawal of silver coin from the Bank of England renders the resumption of the silver coinage necessary. In the rapid execution of so large an amount of silver coinage, however, difficulty has been experienced in maintaining the scrupulous examination to which all coins are subjected before they are allowed to leave the operative department, and a consequent risk incurred of issuing defective pieces.

The silver coin delivered to the public in 1872 reached the unprecedented amount of £1,238,000, of which £972,000 was issued to the Bank of England, £180,000 to Scotch banks, and £76,000 to the Colonies, besides £10,000 in threepences issued direct to the public. An extraordinary increase has taken place in the amounts of silver coin issued by the Mint to the Bank of England, from £87,000 in 1867 to £972,000 in 1872.

The nominal value of the bronze coin issued during the year 1872 was £48,000. This amount exceeds by more than £16,000 the amount issued in 1871, which itself far exceeded the average. The demand for bronze coin will appear the more extraordinary when it is considered that no issues have been made for the London district, in which a sufficient supply has existed, nor for Ireland, and that the shipments for the Colonies, with the exception of one amount of £1000 consigned to the Sydney Mint for circulation in Australia, have been inconsiderable. As in the case of the silver coinage, it has been impossible for the Mint, while engaged in the coinage of gold, to perform the operations of "rolling" and "cutting" bronze bars. These operations, therefore, have been performed by contract at Birmingham.

For the first time, a statement showing on one side the total expenses incurred in connection with the Mint during the year, and on the other the receipts of the department payable to the Exchequer has been added, in order that the general result of the transactions of the year may be seen at a glance, with the balance of profit or loss which has accrued to the public.

In the expenses of the Mint have been included the amounts paid for superannuation and compensation allowances, and the expenditure incurred by the Office of Works for repairs of buildings, coals, stores, etc., and by the Stationery Office for books and stationery, on account of the department during the year. After including these sums, the operations of the Mint for 1872 show a net gain (or excess of receipts over the total charge) of no less than £98,313. This result is due to the profit on the exceptionally large amount of silver bullion coined.

At the beginning of the year 1872 no less than 240 tons of the old copper coin, which had been withdrawn from circulation in consequence of the issue of the bronze coinage, still remained in store at the Mint. As there was no prospect that the entire amount would be used for the bronze coinage for many years, and, as the price of copper was unusually high, arrangements were made to dispose of 175 tons at its market value, under conditions

which provided for the conversion of the coin into cake copper under the supervision of an officer of the department.

The vote for the loss on the withdrawal of worn silver coin from circulation during the year 1872–73 had been raised from £15,000 to £30,000, so as to provide for the extension to other parts of the empire of the privilege, before enjoyed by England only, of returning the worn coin to the Mint at its full nominal value. The unusual demand for silver coin has had the effect of preventing the withdrawal from circulation of so large an amount of worn coin as was expected, and the sum required to make good the loss on withdrawal till the 31st of March last has been only £20,800 ; but as the demand has now been satisfied, and large amounts of worn silver coin may be expected to be sent in to the Mint, it has been considered necessary that the sum to meet this expenditure during the year 1873–74 should again be estimated at £30,000.

The work devolving upon the Mint office has been extremely heavy throughout the year, and, in recognition of the exertions made by the Mint generally, their lordships were pleased, at the close of the year, to authorize the payment of gratuities equal to two months' salary to the officers and men of the permanent establishment, with an intimation of their approval of the manner in which the duties of the department had been performed.

A quantity of worn crowns and half-crowns, weighing about 100,000 ounces, which had been withdrawn from circulation, have been subjected to the process of refinage, in order that the gold contained in them might be extracted before they were melted for re-coinage. The coins in question were known to contain such an amount of gold as might, with the present improved methods of refining, be extracted at a profit, and that it might probably be found advisable to recommend an arrangement for the extraction of the more precious metal. No refinery being now attached to the Mint, the operation was performed by Messrs. Johnson, Matthey, and Co., the well-known metallurgists, at a charge which left a margin of profit.

Before the close of the year, a communication was received from Mr. Norman Lockyer, F.R.S., on the subject of a discovery of much interest to which he had been led in the course of an investigation, by means of the spectroscope, into the constitution of the solar atmosphere. Mr. Lockyer stated that his discovery seemed likely to afford a simple and accurate method of estimating the relative proportions of the component metals of alloy, and he suggested that, as he was anxious that his method should be submitted to the test of further experiments of a practical nature, its details should be examined in the Mint, in order that it might be ascertained whether it could be applied to the assay or verification of the alloys of precious metals used in the coinage. Mr. Roberts, Chemist of the Mint, was requested to render every assistance in developing a process which might with advantage replace the methods of assay or verification in use in the Mint, and that gentleman reports rather hopefully on the results of the preliminary experiments which have been made. He says that he is satisfied that, in the examination of a series of gold-copper alloys by means of the spectroscope, differences of composition more minute than the $\frac{1}{10000}$ part can be readily distinguished. The advantage of the proposed method consists in the fact that the value of a single assay piece could be determined in a few minutes, while an assay by the ordinary method can hardly be completed in less than two hours ; but he considers that further experiments are necessary to prove whether the spectral method is sufficiently trustworthy to render it possible to substitute it for the existing method.

Mr. Roberts also reports that the amount of brittle gold set aside as unfit for working, during the coinage of more than 24 millions, was 17,000 ounces, whereas the amount of gold rejected during the coinage of £6,500,000, which was completed in July, 1871, was no less than 40,000 ounces. This diminution in the amount of brittle gold is in some measure the result of great care in the selection of metal for coinage ; but gold may be received by the Mint with a tendency to brittleness, and its unsuitability for conversion into coin may not be fully developed until the bars, into which it is melted, have been submitted to the process of annealing. It was only found necessary to employ the chlorine process for treating 9000 ounces of brittle gold, and the remaining 8000 ounces were treated by two methods found to be effectual in toughening gold which was rejected during the coinage of 1870. One of the processes adopted consists in pouring the molten metal in a thin stream into a suitable receptacle lined with borax, the metal being freely exposed to atmospheric air ; the other in the addition of chloride of copper to the molten gold.

CULTIVATION OF CINCHONA AT DARJEELING.

The following paragraph occurs in a letter from the Calcutta correspondent of the *Times*, dated June 3 :—

The cultivation of the cinchona at Darjeeling is making, comparatively, as hopeful progress as that of tea. Nine years have passed since the late Dr. T. Anderson, whom Lord Canning sent to Java to study the plantations there, removed the first nursery of cinchonas which he had formed from the northern slope of a spur near Darjeeling to a fine valley of 30,000 acres which runs down to the Teesta river. In its broad expanse and varying slope the varieties of climate are remarkable. This is Rungbee, where the Lieutenant-Governor is at this moment. I believe close to it is the Pomong garden of the Cinchona Association of Darjeeling. The *officinalis*, or grey bark variety, which had succeeded so well on the Neilgherry hills, proved a failure here. The *Calisaya*, or yellow bark, planted on a lower slope has fairly succeeded. But the *succirubra* has prospered above all expectation on the lower altitudes. The height of 4000 feet is the limit of growth, but the lower plantations are much healthier down to 1000 feet. The experiments of the government officials began to bear fruit here in 1867, when the Pomong Company took advantage of them, covering 1000 acres with *succirubra*, while the government area under that plant is 1500 acres. Last year the Pomong garden, which is worked as a commercial enterprise, yielded 36,000lb. of dry bark, and it will produce 50,000lb. this season. Its proprietors take advantage of the fact that when a five-year-old tree is cut down several shoots at once spring up, and in four years one of these is as stout as the old stem. Hence the bark which sold in the London market at 1*s.* 6*d.* a pound. Government is in a different position. It has borne the expense of all the experiments, and need run no risk for a small immediate gain. Of 3,000,000 of plants at Rungbee, more than 2,000,000 have been permanently set out. Some 200 acres of fresh soil are planted out every year. The highest tree rises to 36ft., and is 17in. in girth ; a large number of trees rise from 22ft. to 30ft. high. They are rarely touched by that canker which the Neilgherry authorities predicted would ruin them all. Dr. Henderson, who has just reported on the plantation, to which he is new, states that a trial consignment of bark, sent to England last year, realized 2*s.* per lb. Some 50,000lb. will be ready for manufacture or sale this year. A quinologist is expected from England, and the bark is being kept for his operations. But a moderate estimate gives the produce of dry bark in the next three years at 200,000lb., calculated to produce 6000lb. of quinine, and 6000lb. of other valuable alkaloids. Fever-stricken Bengal, with its swamps and malaria, will hail the boon. A sum of £50,000 has been spent on the government plantation from the first, and it costs £5000 a year now. The 400 coolies employed are Nepaulese ; but in a few years the plantation should be self-supporting. The Pomong garden, which owes its existence to it, costs £1800, and should this season pay its expenses.

The Pharmaceutical Journal.

SATURDAY, JULY 5, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE NEW EDUCATIONAL ARRANGEMENTS.

AMONG the proceedings at the last Council meeting, reported in the present number of the Journal, will be found an important resolution, embodying a series of regulations in regard to the Society's laboratory and the lectures delivered at the Society's school. As we took occasion to notice some short time since, it has been very generally regarded as unsatisfactory that so large an amount of money should annually appear on the balance-sheet as a deficit of receipts against expenditure for the professional teaching at Bloomsbury Square. The grounds of objection to this feature in the financial affairs of the Society were twofold; in the first, it was thought that such expenditure, being confined to the metropolitan school, there was some injustice done to the provinces or, at any rate, that unequal advantages were thus offered to those who could attend the Society's school in Bloomsbury Square. This view has, no doubt, some degree of plausibility at first sight, and, as our readers will be aware, it has been popular. But, like many popular plausibilities, it has not much foundation in fact; and as we have often pointed out, the advantages of the metropolitan school have always been largely shared in by the provinces. Indeed, the majority of the laboratory students have been from the commencement provincials. True, it has been argued that there was some degree of hardship inflicted on those who came to London to study in this way; but in these days of cheap and facile locomotion such hardship, in a pecuniary sense, cannot be very seriously insisted upon, and we think it might well be maintained, on the contrary, that the inducements offered by the school to make some stay in London would in the main operate advantageously. Certainly the facilities now-a-days offered in London establishments for young men to attend educational courses would tend to counterbalance any other disadvantage on the score of expense to be incurred, while at the same time there would be the opportunity for acquiring trade experience, such as is almost peculiar to the business of a London pharmacist.

However, the most serious objection to the Society's expenditure on the school was based on the ground of its inappropriateness to the existing state of things. British pharmacy is no longer in the position which the founders of the Society had to deal with. Qualification for the pursuit is no longer optional as it then was, and although the standard required may not be so high as many would desire to see, still the ordeal to be passed through in order to obtain a legal qualification to carry on the business of pharmacy is, at any rate, such as to recognize the principle that the pharmacist should have had a special education. That being the case, the means of education possess a current value which ought not to be depreciated. The new regime, inaugurated as a voluntary matter by the Society some thirty years ago, and established as a binding obligation for all by the Pharmacy Act of 1868, has now, in this latter phase, been in existence for five years, and it is natural enough that the measures originally found expedient and necessary for promoting the study of science in relation to pharmacy should now be regarded as superfluous and out of date.

As regards the Society's laboratory, the fees demanded of students have long been on a par with other schools of a similar kind, but in the case of the lectures, the fees have always been merely nominal, and it is mainly owing to this fact that the maintenance of the school has involved an output of something like £500 a-year. The new regulations will place this section of the educational establishment on a footing more analogous to other institutions, while at the same time the attendance fees are fixed on a scale sufficiently liberal to be within the means of students.

A further and perhaps still more important provision of the new regulations is the severance of the school from its former immediate connection with the Society. The feeling that this was necessary has long been gaining ground, and we congratulate the Council on having boldly taken the step of placing the school on an independent footing financially. No doubt this step may cause some shock to those who have followed the fortunes of the Society's school from its cradle, and are connected with it not only by their present interest in the advancement of pharmacy, but also by the reminiscences of their own student days. To such, Mr. SCHACHT's earnest protest against the proposed severance will need no explanation or apology, and we feel sure that even those who think his action in this respect antagonistic to progress, will respect him more than ever—if that be possible—for the course he took.

For our own part, we do not regard the new measure as being fraught with those possible evil results which Mr. SCHACHT apprehends. The school will still be the Society's school, although no longer in leading-strings, and we see no reason to fear that its establishment in financial independence will be any barrier to the creation of other schools—and let us hope rival schools—in the provinces.

Certainly there will be additional opportunity for applying the funds of the Society to an object so

eminently desirable, and since the chief aim of the Society must ever be to promote an uniform system of education of those intending to practise pharmacy, there will be more than ever scope for the efforts of those who share with Mr. SCHACHT the well-founded regret that the Society has no process by which its large surplus income can be made useful to the community who supply it.

The resolutions passed by the Council in reference to the BELL Scholarships and the PEREIRA Medal will be hailed with satisfaction by students who have felt some apprehension that they would be ineligible on account of the misunderstanding that has prevailed as to the position of persons who have passed the Major Examination. We call especial attention to the necessity of sending notice of desire to compete for the BELL Scholarship, on or before the 19th instant.

PROJECTED HERBARIUM OF MEDICINAL PLANTS.

IT is thought desirable by the Council of the Pharmaceutical Society to extend the small herbarium of medicinal plants at present in their possession, so as to include specimens of medicinal plants from every quarter of the globe, whether official or non-official, and thus render it available for reference to those who are interested in the identification of medicinal plants, or in the determination of the sources of the Materia Medica of foreign countries. The large amount of time and trouble at present necessary in order to ascertain the identity of foreign medicinal plants by comparison with the immense number of species in the collections at the British Museum and Kew—of which a comparatively small number are used in medicine—would thus be rendered considerably less. Native medicines are often brought home by medical gentlemen who have been residents in foreign countries, and who have seen beneficial results arising from their use. There cannot be much doubt that the "medicine men" of uncivilized countries have in many cases a very accurate knowledge of the medical uses of the plants around them, and that there are probably many valuable remedies used by them which are worthy of a trial in civilized countries. Of this fact *Physostigma* and *Quassia* may be quoted as instances.

The occasional failure in obtaining results from medicines used successfully by the natives of foreign countries is perhaps in some measure due to the imperfect knowledge at present possessed of foreign medical plants, and also to the limited number and poorness of the specimens available for examination by competent botanists. Of this *Sarracenia* and *Cundurango* may be instances.

The uncertainty of action attending the use of some drugs, such as aconite, probably depends in a measure upon a want of discrimination between the species which yield them. In the case of aconite, it is well known that some species, such as *A. heterophyllum*, are innocuous, while others differ considerably in power. *Pareira brava* is another instance. The roots and stems of several entirely different, though allied, plants have at different times been imported, as Pareira brava, which appear to vary widely in the amount of extract yielded by them, and in their medical properties. A specimen recently examined, which appeared identical with that described in Pereira's Materia Medica, had leaves attached which, although evidently belonging to a species of *Chondrodendron*, could not be identified with certainty by means of any of the specimens either in the British Museum or at Kew. Difficulties like these can only be overcome by a more accurate knowledge of all the plants used as medicine in the countries yielding the drugs, as there are often plants similar in habit and general appearance which grow in the same localities and are confounded one with the other by those who collect them. *Cocculus palmatus* may be quoted as an instance of this.

Pharmaceutists resident in foreign countries have frequent opportunities for increasing our knowledge of Materia Medica, and it is to them that we especially appeal to assist in carrying out this project in a manner worthy of the scientific standing of the Pharmaceutical Society of Great Britain. There is abundant provision in the museum of the Pharmaceutical Society for an extensive herbarium of medicinal plants, and the Curator will be glad to correspond with any pharmaceutists in other countries who are willing to help in making the herbarium a really useful one. It should not be forgotten that specimens of medicinal plants are rendered much more valuable when accompanied by specimens of the part used in medicine, whether root, bark, etc., and also by the fruit in a mature state when possible.

POISONING BY STRAMONIUM.

ABOUT two months since two ladies applied at a pharmacy at Pau for some leaves of soap wort. Some leaves were given them in a bottle labelled "Saponaire" by a pupil. The next day a report spread that two ladies had been poisoned by the carelessness of a pharmacien, and the physicians who were called in declared they were suffering from the effects of some poisonous solanaceous plant. The bottle was examined, and found to contain stramonium leaves. The ladies recovered, but have since entered an action against the pharmacien for an indemnity of twenty thousand francs, which sum, if they get it, they propose to give to the poor.

THE Colony of Victoria imported in 1871 drugs to the value of £21,430, on which a duty of 5 per cent. was paid, and £26,594 on which a duty of 10 per cent. was paid, besides druggists' wares amounting to £833, subject to the 5 per cent. duty, and £1458 subject to the 10 per cent. duty.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL
July 2nd, 1873.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Baynes, Betty, Brown, Greenish, Hampson, Mackay, Owen, Radley, Robbins, Sandford, Savage, Schacht, Shaw, and Urwick.

The minutes of the previous meeting were read and confirmed.

Inaugural Sessional Address.

The Secretary read a letter from Mr. Reynolds, of Leeds, stating that, much to his regret, he felt compelled, from the state of his health, to decline the honour which had been offered him of delivering the Inaugural Address in October next.

Mr. Mackay then proposed that Mr. Sandford be requested to undertake that duty, and the resolution was carried unanimously, notwithstanding a very earnest protest on the part of Mr. Sandford.

London Collector.

Mr. Mackay drew attention to an item in the accounts for commission on the collection of subscriptions in London. He did not think it was fair to put the Society to that expense when local secretaries were expected to do the work for nothing and those members who did not send in their subscriptions by a certain date had to pay a fine.

Mr. Owen said he was originally led to join the Society through being called upon by the collector.

Mr. Brown was glad this matter had been mentioned. He thought the time had long since passed when it was desirable to employ a paid canvasser to induce gentlemen to join the Society.

The Vice-President having also expressed his concurrence in the view that London members should no longer have a privilege not accorded to those in the country,

It was then resolved,

"That the employment of a collector for London and neighbourhood, in connection with the annual subscriptions, be discontinued, and that due intimation of this change be made in the Pharmaceutical Journal."

Several Members, Associates, and Apprentices, who had neglected to pay their subscriptions within the proper time, were ordered to be restored to their original status, on payment of their subscriptions and a nominal fine.

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

Cleaver, Edward Lawrance.....London.
Galloway, George Ross.....Inverness.
Gilmour, David.....Edinburgh.
Kirton, Christopher Henry.....Hull.
Plowman, Sydney.....Boston.
Pound, Henry William .....London.
Woods, Joseph Henry .....Warrington.
Woolldridge, George.....Birmingham.

Elections.

MEMBERS.

Pharmaceutical Chemists.

Cleaver, Edward Lawrance ... ..London.
Plowman, Sydney.....Boston.
Pound, Henry William .....London.
Sharp, John James .....London.

Chemists and Druggists.

Buckley, Robert Clarence .....Todmorden.
Chalmers, George .....Dufftown.
Coleman, William.....Wolverhampton.
Midgley, Frank.....Padiham.
Savage, George .....Lincoln.
Shelley, Henry .....Twickenham.
Titley, Thomas .....London.
White, Timothy .....Landport.
Wright, Mark .....Wokingham.

ASSOCIATES.

The following having passed their respective examinations, and being in business, were elected "Associates in Business" of the Society :—

Minor.

Lawson, Edward James .....Whitstable.
Oliver, Frederick Bailey .....West Malling.
Otley, John .....Sheffield.

Modified.

Child, Thomas .....New Wortley, Leeds.
Storm, Elliott Baxter .....Ipswich.

The following having passed their respective examinations were elected "Associates" of the Society :—

Minor.

Adams, William .....Barnstaple.
Askew, Hugh de Bosco .....Workington.
Barry, Frederick .....Bath.
Bathe, William .....Chippenham.
Beverley, Robert Henry .....Nottingham.
Fairman, George Peters .. ..London.
Griffiths, Edwin Harpham .....Hanley.
Mason, Michael .....Salisbury.
Maynard, Henry Robert .....Brandon.
Piquet, Frederic George .....Jersey.
Slater, Elias .....Fallowfield.
Tearle, Walter .....Ilfracombe.
Thornton, Edward .....Walsall.
Tucker, William Charles.....London.

Modified.

Fenton, William .....London.
Phillips, Charles .....Birmingham.
Shaw, John .....Ashton-under-Lyne.
Taubman, Robert.....London.

APPRENTICES OR STUDENTS.

The following, having passed the preliminary examination, were elected "Apprentices or Students" of the Society —

Brick, John ....Welchpool.
Dobson, George.....Egremont, Cheshire.
Fletcher, Howard Bennett .....Leicester.
Williams, Thomas Robert .....Ipswich.

Finance Committee.

The Report of this Committee was read and adopted, and sundry payments of rent, salaries, and accounts ordered to be made.

Benevolent Fund.

The Report of this Committee, recommending that a grant of £10 be made to the widow of a deceased member, at Leeds, was received and the recommendation adopted.

Parliamentary Committee.

The Report of this Committee was received and adopted. It contained particulars of some of the cases which had been submitted to the Solicitor, and which were still under consideration. In the case of a memorial which had been sent from a provincial society, giving information of infringements of the Pharmacy Act, 1868, the Committee recommended that each of the parties offending should receive a communication from the Registrar before any legal proceedings were taken.

In another case, where a prescription containing laud-

anum had been dispensed at the shop of a person not on the Register, the compound, when submitted to an analysis, was found to contain no preparation of opium whatever.

Library, Museum, and Laboratory.

The report of several sittings of this Committee was presented, and, in accordance with some of its recommendations, the Council ordered the purchase of Jenkin's "Electricity and Magnetism" and sundry specimen bottles for the Museum.

The Society's School of Pharmacy.

The most important subject coming under the attention of the Library, Museum, and Laboratory Committee was the educational arrangements of the Society, in reference to which several meetings of the Committee had been held, the subject having been referred to them by the Council. The Committee had agreed to a report which had been submitted to and approved by the General Purposes Committee.

Mr. Schacht said he was very sorry not to have been able to attend the meeting of the General Purposes Committee on the previous evening, when this matter was discussed, but, of course, there were very many whose opinion one would like to have upon such an important change, namely, the members of the Society at large, and he sincerely hoped no decision would be arrived at on that occasion on this almost revolutionary proposition. He would venture to suggest that these regulations be published in the Pharmaceutical Journal, so that an opportunity might be given of considering them. He really was not prepared to give an opinion at the present moment. The change seemed so pregnant with importance that almost every line required a large amount of consideration. He did not mean to suggest that the matter had not received proper consideration from those gentlemen who had attended the Committee, and no doubt they had excellent reasons for everything they had said, but he should not like to hold up his hand for such a sweeping change without having much more time to think of it. He was certainly astonished at the recommendation that the ten months' course of lectures should be divided into two of five months each, for all his experience on these matters as regarded the teaching of the important sciences which they professed to teach, had gone to show that even ten months was all too short a time. A good many years ago he attended the lectures on chemistry at the Royal Institution, and chemistry in those days was not so great as it was now, organic chemistry being treated very slightly, whereas at the present time it almost swallowed up the other department. The subjects never appeared to be verbosely treated by the gentlemen who then lectured, nor did the students appear to show any lack of interest towards the close of the course. He might also refer to the system adopted by the authorities at South Kensington, where they divided the subject which was called chemistry at the Pharmaceutical Society, into three parts—namely, physics, inorganic chemistry, and organic chemistry, in each of which a student must attend at least twenty-five lectures before he was admitted as a candidate for a prize, so that in the whole he must attend something like ninety lectures. He hoped that the matter would not be pressed until an opportunity was given to enable the members of the Society to express their opinion upon it.

Mr. Mackay said the Committee had not taken action in this matter without duly consulting the professors themselves, who entirely concurred in it. It was not for him to say whether there had been any verboseness hitherto on the part of the lecturers, but they certainly stated to the Committee that they would be able to condense their subjects so as to give in a course of five months the substance of what they had hitherto delivered in the ten months' course. With regard to the laboratory, there would be no change, because the students could attend two, three, five, or ten months, as they felt disposed. He should also like it to be known that they were not quite at one with the professors on the subject of the fees, with the exception of Professor Attfield, who was quite content to let them remain as at present. Both Professor Redwood and Professor Bentley were of opinion that their fees should be a little higher; but the Committee, after long discussion, had come to the conclusion that, looking at the increased number of students who it was expected would attend, the monetary return would be greater than if their fees were raised. This matter had been mentioned on several occasions, and had been very well discussed now, and he hoped it would be decided at once. He had held for some years that this change must come sooner or later.

Mr. Betty also observed that the subject had been well discussed during the month, Mr. Schacht himself having been present at one meeting of the Committee, when the professors also attended. Professor Redwood stated his intention so to recast the subject matter of his lectures, that they may form substantially an ample course of instruction in a five months' course; as, for instance, by proving certain and scientific principles, by illustrations bearing a special relation to pharmacy. And this shorter course, whilst suiting the convenience of many students, would thus remain undiminished in efficiency. Professor Bentley also said that experience had given him the power of condensation.

Mr. Schacht said this was not really a mere matter of experiment, but it involved a very large principle, viz., whether the Society was to cease teaching or not, and he must be excused for again protesting against its being decided so hastily. He had certainly attended one of the Committee meetings, but not being a member, he had taken no part in the proceedings, and he did not then gather that it was the intention to recommend the entire separation of the Society from the province of education, for this, he apprehended was what was now going to be done. Of course, if that were so, it would be a death blow to the hopes of the provinces, for what was discontinued as a principle in London could never be urged for one moment in the country. He saw that quite plainly. Here they were giving up what had been for thirty-seven years their principle.

The President said they were not going to give up education entirely, since it was intended to endow the professorships.

Mr. Schacht said he supposed that was simply because the professors were old servants.

Mr. Mackay said that was not so. They should endow the chair, and also give accommodation for the lecturers.

The President said besides that they would still retain surveillance over the whole of the educational department.

Mr. Schacht said he apprehended they had no responsibility.

The President said they took all the responsibility, the same as before, except from a commercial point of view.

Mr. Urwick thought the course now proposed would tend to further education, as each department would now stand on its own merits, and the school would be thereby much improved. Each of the professors would now have the strongest interest in making his lectures attractive, and so more students would be brought to the school.

Mr. Sandford said he had great pleasure in embodying the Report of the Committee in the following motion:—

> "That the School of Pharmacy be no longer conducted under the immediate direction of the Council, or at the actual cost of the Society, but that in future three Professors shall be appointed annually by the Council to be called respectively:—
>
> The Professor of Chemistry and Pharmacy;
> The Professor of Botany and Materia Medica;
> The Professor of Practical Chemistry.

The endowment of each Professorship shall be £100 per annum.

It shall be the duty of the Professor of Chemistry and Pharmacy to deliver a course of sixty lectures from the beginning of October to the end of February, and a second course of sixty lectures from the beginning of March to the end of July, on three mornings of each week.

It shall be the duty of the Professor of Botany and Materia Medica to deliver a course of forty lectures from the beginning of October to the end of February, and a second course of forty lectures from the beginning of March to the end of July, on two mornings of each week. He shall, in addition, deliver a course of about twenty lectures on Practical Botany in the gardens of the Royal Botanic Society, from the middle of May to the end of July.

The Professors shall be allowed the use of the Lecture-room of the Society free of charge ; gas and fuel necessary for lighting and warming the room shall be provided by the Society, but all other expenses for assistants and materials required for carrying out the courses of lectures shall be paid by the Professors.

The Professors shall (without fee) admit the holders of the Jacob Bell Memorial Scholarships to the lectures.

That the fees for each course of lectures on Chemistry and Pharmacy shall be Two guineas, but that a student entering for two courses shall be admitted to both on payment of Three guineas, or a perpetual pupil shall pay Four guineas.

That the fees for each course of lectures on Botany and Materia Medica shall be One guinea and a half, or Two guineas and a half for the two courses. For the course of lectures on Practical Botany, One guinea. But a student entering for either of the first-named courses shall be entitled to attend the lectures on Practical Botany on payment of Two guineas at the time of entering, or perpetual admission shall be granted for Four guineas.

The Professors shall receive and appropriate all fees.

The Professor of Practical Chemistry shall have free use of the Laboratory and plant, and surrender them in good condition, fair wear and tear excepted, at the termination of his appointment.

The Professor shall receive and appropriate all fees, and pay all expenses, including gas and fuel. The fees to be on the same scale as is charged at present.

He shall admit the Bell scholars to the Laboratory, and instruct them annually without fee, but the sum of five pounds shall be paid to the Professor for each Scholar in consideration of the materials used.

In order to retain authority over the lectures and laboratory, the Library, Museum, and Laboratory Committee shall, from time to time, visit and report to the Council on the general conduct of the School. These visits may be made by the members of the Committee individually as well as by the Committee collectively.

It is not intended that the Committee shall interfere with the arrangements, the object of their inspection being simply to be assured, from time to time, that the teaching is continued in a manner conducive to the advancement of Pharmacy, and consequently satisfactory to the Council."

Mr. SANDFORD said that it was known to most present that he had for a long time considered it an anomaly that they should be both an educating and an examining body. When the Society was first established, there was no public school of pharmacy in existence, and it was, therefore, necessary to found one, and nurse it until it should be able to support itself. He believed the time had now arrived when it would support itself; at any rate with the assistance which they still proposed to give, for he thought it quite right and proper that the Society, although not an educating body should still have professors attached to the Institution, especially as they had there all the necessary means and appliances. The question of the lectures must be in some respects separate from the question of the laboratory, but it was one school. He did not adopt the phrase of there being two sessions of five months, for the whole ten months should still be considered as one session, though there were two courses of lectures delivered. The mode of distributing prizes, etc., would, no doubt, have to be further considered in detail. He did not agree with the idea that, because they gave up teaching they would be unable to assist education in the country. On the contrary, he thought they would be all the better able to assist those in the country who, like Mr. Schacht, Mr. Sutton, Mr. Atherton, and others, were doing their best to promote pharmaceutical education, as they would have more means at their disposal for so doing. With regard to the lectures, he thought having two courses of five months each would be a great improvement, as it would enable many more young men to attend. There were great numbers who could give five months to study, but who would be unable to devote so long a time as ten months. As had been already remarked also, the professors would be thrown on their own resources and thus have great inducements to make their lectures interesting and profitable, and he hoped more students would be attracted. He had felt that the proposed change was a very serious one, but as it had been so well considered, both by the Library Committee and the General Purposes Committee, on the previous evening, when there was a very full attendance, he thought the question might be decided at once.

Mr. MACKAY said he seconded the motion with a considerable amount of satisfaction, and, in doing so, wished to disabuse Mr. Schacht's mind of the belief that in agreeing to it there was the least idea of, in any way, cramping the assistance given to any provincial town in connection with pharmaceutical education ; in his belief the prevalent feeling was quite of an opposite character. They were not entirely disconnecting themselves with education, because the endowment of £100 per annum to each of the professors was a considerable item, and the use of the rooms and the laboratory would also be given them ; besides which, the Committee were still, from time to time, to inspect the arrangements, and see that everything was going on satisfactorily. He thought the provinces generally might with great advantage follow the example set them, and he spoke more positively, because of the experience of the Society in Edinburgh. Having now a place of meeting there, with specimens, and a library, it was found that a very great number of young men availed themselves of these advantages, many more in fact than was at all anticipated. They were in hopes that the same thing would continue, and he was more and more convinced, in his own mind, that if those connected with pharmacy, throughout the country, would unite and provide a place of meeting, and engage, if possible, someone able and willing to give instruction, and form something like a library and museum, the Council would be very much wanting in their duty if they did not liberally assist such endeavours. He should be the very last to propose such an alteration if it were not with the idea that it would tend to open the door wider for provincial education, rather than to close it.

Mr. SCHACHT said that he felt bound to move an amendment, not that he meant to oppose the principle or detail of the matter, for he had not really considered it, but simply because he wanted a little more time to be given before it was decided upon. He therefore begged to move, as an amendment,

"That the proposition of the Committee be published in the PHARMACEUTICAL JOURNAL, and postponed for decision until the meeting of the next Council."

Mr. SAVAGE seconded the amendment.

Mr. SHAW said he had not heard any observations from Mr. Schacht which would seem to justify the Council in postponing the matter, especially as the arrangements, with regard to fees, etc., for the ensuing session should be shortly published in the PHARMACEUTICAL JOURNAL, and the alteration ought to be made known immediately. He anticipated that this alteration would very much increase the amount of fees, and did not think it would in any way interfere with assistance being given to provincial education. They might still continue to make grants as on former occasions.

The amendment was then put and lost, only the mover and seconder voting for it.

The original motion was then put and carried.

A further resolution was passed, requesting the Library, Museum, and Laboratory Committee to arrange the details involved in carrying out the previous resolution, and to report thereon to the next meeting of Council.

THE SENIOR JACOB BELL MEMORIAL SCHOLARSHIP.

The SECRETARY read a letter received from a gentleman who was desirous of competing for the Senior Bell Scholarship, drawing attention to the fact that, under the present regulations, no one was eligible to compete, since a student who passed the Major examination *ipso facto* ceased to be an Associate.

Mr. SANDFORD said it was evidently the intention of the Council, in arranging the scholarships, that those students who were Associates and came up and passed the Major examination should be eligible to compete, and the following resolution was passed unanimously.

"That the Senior Jacob Bell Memorial Scholarship for the Session 1873-74 shall be open for competition by persons who were Associates of the Society at the time of passing the Major examination, and who are under twenty-four years of age. Candidates desiring to compete must send notice to the Secretary accompanied by certificates of age, and by testimonials from their previous employers or masters as to capability, industry, and general conduct, on or before the 19th instant."

THE PEREIRA MEDAL.

A letter was read drawing attention to the conditions of competition for the Pereira Medal, by which it would appear that only Associates who had passed the Major examination were eligible to compete. The Council considered it necessary to amend the regulation, and the following was passed :—

"That Pharmaceutical Chemists who were Associates of the Society at the time of passing the Major examination, and who have exhibited a certain proficiency in the several subjects embraced in the examination, will be placed on the list of Honors, and entitled to compete for the Pereira Medal at the end of the Session in which they passed the Major examination."

BOARDS OF EXAMINERS.

The following Reports of the Boards of Examiners were presented :—

REPORTS OF EXAMINATIONS.

June, 1873.

ENGLAND AND WALES.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	9	6	3
Minor	48	23	25
Modified	34	26	8
	91	55	36

SCOTLAND.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	2	2	0
Minor	18	14	4
Modified	3	3	0
	23	19	4

The Board of Examiners for England and Wales reported that they had considered the present system of carrying out or superintending the Preliminary examination in the provinces, and that they thought it very desirable that youths should be encouraged as much as possible to pass the examination of some one of the examining bodies approved by the Council, before entering the trade.

ELECTION OF PROFESSORS.

Professors Redwood, Bentley, and Attfield were respectively re-elected for the ensuing year, subject to the provisions of the resolution of the Council of this date.

CURATOR OF THE SOCIETY'S MUSEUMS.

Mr. Holmes was re-appointed Curator.

HOUSE COMMITTEE.

The Report of this Committee was read, recommending that estimates should be obtained for sundry repairs and for painting for the Society's house, also for replacing the existing windows with plate-glass. The Report was received, and the Committee were requested to obtain specific tenders for the alterations proposed, to be submitted to the next Council meeting.

LOCAL SECRETARIES, 1873-74.*

Aberdare	Evans, Thomas Whitty.
Aberdeen	Davidson, Charles.
Aberystwith	Davies, John Hugh.
Abingdon	Smith, William.
Altrincham	Holt, William Henry.
Andover	Madgwick, William B.
Ashby de la Zouch	Johnson, Samuel E.
Ashton-under-Lyne	Bostock, William.
Aylesbury	Turner, John.
Banbury	Beesley, Thomas.
Banff	Ellis, Bartlet.
Bangor	Griffiths, John E.
Barnsley	Badger, Alfred.
Barnstaple	Goss, Samuel.
Barrow in Furness	Sansom, Edwin.
Basingstoke	Sapp, Arkas.
Bath	Pooley, John Carpenter.
Bedford	Cuthbert, John M.
Belper	Ashton, John.
Berwick	Carr, William Graham.
Beverley	Robinson, James Mowld.
Bewdley	Newman, Robert.
Birkenhead	Nicholson, Henry.
Birmingham	Southall, William.
Blackburn	Pickup, Thomas Hartley.
Blackpool	Harrison, Joseph.
Bodmin	Williams, Joel Drew.
Bolton	Dutton, George.
Boston	Marshall, Robert.
Bradford (Yorkshire)	Rogerson, Michael.
Bridgnorth	Deighton, Thomas Milner.
Bridlington	Forge, Christopher.
Bridport	Tucker, Charles.
Brighton	Gwatkin, James Thomas.
Bristol	Stoddart, William W.
Buckingham	George, Sirett.

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

Burnley	Thomas, Richard.
Burslem	Blackshaw, Thomas.
Bury St. Edmunds	Portway, John.
Buxton	Barnett, Alexander.
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Cross, William.
Cardigan	Jones, John Edwards.
Carlisle	Thompson, Andrew.
Carmarthen	Davies, Richard M.
Carnarvon	Lloyd, William.
Chelmsford	Baker, Charles Patrick.
Cheltenham	Smith, Nathaniel.
Chester	Mills, John.
Chesterfield	Greaves, Abraham.
Chichester	Long, William Elliott.
Chippenham	Westlake, Bernard.
Christchurch	Green, John.
Cirencester	Skinner, Thomas.
Cockermouth	Bowerbank, Joseph.
Colchester	Prosser, Evan Thomas.
Congleton	Goode, Charles.
Coventry	Wyley, John.
Darlington	Barlow, Samuel.
Deal	Green, John.
Denbigh	Edwards, William.
Derby	Frost, George.
Devizes	Portbury, George Henry.
Devonport	Dickerson, Henry.
Dewsbury	Gloyne, Thomas H.
Diss	Gostling, Thomas Preston.
Doncaster	Dunhill, William W.
Dorchester	Evans, Alfred John.
Dorking	Clift, Joseph.
Dover	Bottle, Alexander.
Droitwich	Taylor, Edmund.
Dudley	Hollier, Elliott.
Dumfries	Allan, William.
Dundee	Hardie, James.
Durham	Sarsfield, William.
Eastbourne	Provost, James A.
Edinburgh	Mackay, John.
Elgin	Robertson, William.
Evesham	Dingley, Richard Loxley.
Exeter	Walton, Ralph.
Eye	Bishop, Robert.
Falkirk	Murdoch, David.
Falmouth	Newm..., W. F.
Fareham	Franklin, Alfred.
Flint	Jones, Michael.
Folkestone	Cadman, Daniel-Charles.
Forfar	Ranken, James A.
Frome	Harvey, William Brett.
Gainsborough	Marshall, John F.
Gateshead	Elliott, Robert.
Glasgow	Kinninmont, Alexander.
Gloucester	Curtis, A. A.
Gosport	Hunter, John.
Grantham	Gamble, Richard.
Gravesend	Spencer, Charles.
Greenock	Alexander, James G. F.
Grimsby, Great	Palmer, Enoch.
Guernsey	Arnold, Adolphus.
Guildford	Martin, Edward W.
Haddington	Watt, James.
Halifax	Dyer, William.
Hanley	Jones, Charles.
Harrogate	Coupland, Joseph.
Hartlepool, West	Jackson, William G.
Harwich	Bevan, Charles F.
Hastings & St. Leonards	Maggs, Samuel B.
Haverfordwest	Williams, William.
Hawkhurst	White, William Edwin.
Hereford	Jennings, Reginald.
Hertford	Lines, George.
Hitchin	Ransom, William.
Horncastle	Elsey, John.
Horsham	Williams, Philip.
Huddersfield	Higgins, Tom Sellers.
Hull	Bell, Charles Bains.
Huntingdon	Ekins, William.
Hyde	Brocklehurst, James.
Ipswich	Anness, Samuel Richard
Ironbridge	Hartshorn, William H. T.
Jersey	Ereaut, John, jun.
Kendal	Severs, Joseph.
Kidderminster	Hewitt, George.
Kilmarnock	Rankin, William.
King's Lynn	Atmore, George.
Knaresborough	Sindall, John William.
Knutsford	Silvester, Joseph.
Lancaster	Whimpray, John.
Launceston	Eyre, Jonathan Symes.
Leamington	Jones, Samuel Urwick.
Leeds	Reynolds, Richard.
Leek	Johnson, William.
Leicester	Cooper, Thomas.
Leighton Buzzard	Readman, William.
Leith	Finlayson, Thomas.
Leominster	Davis, David Frederick.
Lewes	Martin, Thomas.
Lincoln	Maltby, Joseph.
Liskeard	Eliott, Samuel.
Littleborough	Dickinson, John E. B.
Liverpool	Abraham, John.
Loughborough	Paget, John.
Louth	Hurst, John B.
Ludlow	Cocking, George.
Lyme Regis	Thornton, Edward.
Lymington	Allen, Adam U.
Macclesfield	Bates, William Isaac.
Maidenhead	Walker, Robert.
Maldon	Wallworth, David.
Malvern, Great	Francis, George.
Manchester, etc.	Wilkinson, William.
March	Davies, Peter Hughes.
Margate	Knight, Alfred.
Market Harborough	Bragg, William B.
Merthyr Tydvil	Smyth, Walter.
Middlesborough	Taylor, William James.
Montrose	Burrell, George.
Neath	Hibbert, Walter.
Newark	Harvey, John.
Newbury	Childs, Philip.
Newcastle-under-Lyne	Cartwright, William.
Newcastle-on-Tyne	Swan, Joseph Wilson.
Newport (I. of Wight)	Orchard, Herbert Joseph.
Newport (Mon.)	Pearman, Henry.
Newtown	Owen, Edward.
Northallerton	Warrior, William.
Northampton	Bingley, John.
Norwich	Sutton, Francis.
Nottingham	Atherton, John Henry.
Nuneaton	Iliffe, George.
Oldham	Hargraves, Henry Lister.
Oswestry	Smale, Richard Bill.
Over Darwen	Hargreaves, William Henry.
Oxford	Prior, George T.
Paisley	Hatrick, William.
Pembroke	John, David William.
Pembroke Dock	Andrews, Charles.
Penrith	Kirkbride, William.
Penzance	Cornish, Henry Robert.
Perth	Reid, Neil.
Peterborough	Heanley, Marshall.
Petersfield	Edgeler, William B.
Plymouth	Balkwill, Alfred P.
Poole	Penney, William.
Portsmouth, etc.	Rastrick, J. L.
Preston	Houghton, William.
Ramsgate	Morton, Henry.
Reading	Hayward, William G.

Redditch	Mousley, William.
Reigate	Forbes, William.
Retford	Baker, William.
Ripon	Stevenson, Thomas.
Rochdale	Taylor, Edward.
Rochester	Harris, Henry William.
Romford	Pertwee, Edward.
Rothesay	Duncan, William.
Runcorn	Whittaker, William.
Rugby	Garratt, John C.
Ruthin	Bancroft, John James.
Ryde (Isle of Wight)	Wavell, John.
Rye	Plomley, James F.
St. Albans	Martin, Henry Gilham.
St. Andrews	Govan, Alexander.
St. Austell	Hern, William Henry.
St. Ives (Cornwall)	Young, Tonkin.
Salisbury	Atkins, Samuel Ralph.
Scarborough	Whitfield, John.
Selby	Colton, Thomas.
Shaftesbury	Powell, John.
Sheerness	Rayner, William.
Sheffield	Wilson, Edward.
Shields, South	Mays, Robert J. J.
Shoreham	Barker, John.
Shrewsbury	Cross, William Gowen.
Southampton	Dawson, Oliver R.
Southport	Walker, William Henry.
Spalding	Rhodes, Frank.
Stafford	Averill, John.
Stalybridge	Brierley, Richard.
Stamford	Patterson, George.
Stirling	Duncanson, William.
Stockport	Shaw, Alex. H.
Stockton-on-Tees	Brayshay, William B.
Stoke-on-Trent	Adams, Jonathan Henry.
Stourbridge	Bland, John Handel.
Stowmarket	Sutton, Charles William.
Stroud	Blake, William F.
Sunderland	Nicholson, John J.
Swansea	Brend, Thomas.
Tamworth	Allkins, Thomas Boulton.
Taunton	Prince, Henry.
Tavistock	Gill, William.
Teignmouth	Cornelius, Joseph.
Tenby	Walkinton, Wm. Marmaduke.
Tenterden	Willsher, Stephen H.
Tewkesbury	Allis, Francis.
Thirsk	Thompson, John.
Tiverton	Havill, Paul.
Torquay	Smith, Edward
Truro	Serpell, Samuel.
Tunbridge Wells	Gardener, Charles.
Ulverstone	Radnall, William Henry.
Uttoxeter	Johnson, John Borwell.
Wakefield	Taylor, John.
Wallingford	Payne, Sidney.
Walsall	Highway, Henry.
Wareham	Randall, Thomas.
Warrington	Webster, Samuel Mather.
Warwick	Pratt, Henry.
Watford	Chater, Jonathan.
Wednesbury	Gittoes, Samuel James.
Wellington	Langford, John Brown.
West Bromwich	Pershouse, Edward.
Weston-super-Mare	Rich, Thomas.
Weymouth	Groves, Thos. Bennett.
Whitby	Stevenson, John.
Whitehaven	Kitchin, Archibald.
Wigan	Dunsford, Samuel.
Winchester	Powell, Edward.
Windsor	Russell, Charles J. L.
Witney	Pardue, Thomas.
Wolverhampton	Brevitt, William Yates.
Woodstock	Stubbs, Robert.
Worcester	Witherington, Thomas.
Worthing	Cortis, Charles.
Wrexham	Peters, Henry.
Wycombe	Furmston, Samuel C.
Yarmouth, Great	Poll, Wm. Sheppard.
York	Davison, Ralph.

EXAMINATIONS IN EDINBURGH.

June 25th and *26th*, 1873.

Present—Messrs. Ainslie, Gilmour, Kinninmont, Noble, Tait, and Young.

MAJOR EXAMINATION.

Two candidates were examined, and declared duly qualified to be registered as Pharmaceutical Chemists :—

*Galloway, George Ross .....Inverness.
Gilmour, David .....Edinburgh.

MINOR EXAMINATION.

Eighteen candidates were examined. *Four* failed. The following *fourteen* passed, and were declared duly qualified to be registered as Chemists and Druggists :—

*Sharp, Robert Henry .....Portobello.
Morrison, William Hay .....Aberdeen.
Pendrigh, John Cuthbertson .. Sanquhar.
Equal. Carruthers, Robert Buck.....Manchester.
Equal. Duggleby, Thomas Waldby.....London.
Equal. Berry, Robert Innes.....Aberdeen.
Equal. Thompson, Mark Foggitt .....Thirsk.
Johnstone, Thomas Francis.....Dumfries.
Baikie, Peter.....Belfast.
Henderson, Andrew .....Perth.
Johnstone, Robert E. .....Edinburgh.
Cowper, David Burgess .....Edinburgh.
Robertson, John .....Inverness.
McIntyre, Ewen, Jun. .....Edinburgh.

The above names are arranged in order of merit.

MODIFIED EXAMINATION.

Three candidates were examined, and declared qualified to be registered as Chemists and Druggists :—

Andrew, Ablett Ashworth .....Clitheroe.
Brodie, Robert .....Glasgow.
Stones, William.....Manchester.

ERRATUM.—Vol. III., p. 1041, col. i, line 23, *for* Griffiths Francis, *read* Griffith, Francis.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING JUNE, 1873.

LONDON.

	£	s.	d.
Bigg, Thomas, Great Dover Street, S.E.	1	1	0
Brookes, Samuel, 62, Lisson Grove, N.W.	1	0	0
Churchill, J. and A, 11, New Burlington Street, W.	1	1	0
Fallowfield, Jonathan, 36, Lower Marsh, Lambeth, S.E.	1	1	0
Field, James John, 22, Upper Gifford Street, Caledonian Road, N.	1	1	0
King, Henry, 1, Churton Street, S.W.	1	1	0
Marks, Henry, and Sons, 61, Houndsditch, E.C.	0	10	6
Mays, Robert M., 64, Titchfie'd Street, Oxford Street, W.	0	10	6
Parkinson and Son, Southampton Row, W.C.	1	1	0
Strawson, George Frederick, 2, Bouverie Street, E.C	0	10	6
Thomas, Henry, 7, Upper St. Martin's Lane, W.C.	1	1	0
Wylde, George, 53, King's Road, Chelsea, S.W.	0	10	6

COUNTRY.

Cheltenham, Walters, John R.	0	10	6
Edinburgh, Tait, William	1	1	0
Nottingham, Patchitt, Edwin Cheshire	0	10	6
Walsham-le-Willows, Wilson, Thomas	0	5	0

DONATIONS.

Murphy, John, 11, Nile Street, Hoxton, N.	5	5	0
Titley, Thomas, 44, Charlotte Street, Fitzroy Square	5	5	0

* Passed with Honours.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

Report for 1873.

The following Report for the year 1873, has been issued by the Council of the Midland Counties Chemists' Association :—

"In reviewing the proceedings of the past year, the council have satisfaction in believing that the Midland Counties Chemists' Association has steadily endeavoured to maintain its position of usefulness. It has sought, so far as lay in its power, to promote the interests of the important body of chemists and druggists residing in Birmingham and the Midland district, as well as of the younger generation of chemists, on whom the obligation of special qualifications has devolved. There are always matters of a *local* character, of commercial or scientific importance, which do not come under the cognizance of the central council in London, which very suitably claim the attention of a local organization. It is such interests as these which this council has sought to watch over.

"In July last, the council endeavoured to procure a more uniform and early closing of chemists' shops in the Birmingham district. The various members of the trade were individually appealed to, but they could not be induced to accede to an uniform hour, even though the hour was proposed to be varied in separate districts, and this well-meant endeavour was consequently frustrated.

"The council has had under its notice cases of unregistered persons who were suspected of selling poisons, in contravention of the Pharmacy Act, to the injury of the legitimate chemist. Steps have been taken to prevent offences of this kind.

"A question relating to the sale and registration of vermin killers, and the irregularity with which the law in respect thereto was observed by various chemists, has been discussed, but the subject was deferred until the annual meeting, in expectation that some practical suggestions relating thereto would be then entertained.

"The price book of the Midland Counties Chemists' Association continues to find a steady sale. The cordial co-operation of the trade generally in this district is earnestly desired, with a view to promote a healthy tariff, which shall fairly remunerate the hard-worked druggist. The responsible nature of the calling, and the increased demand for a higher scientific education, claim a corresponding standard of remuneration.

"It has been felt by this council that, in order to embrace more compactly and efficiently the various trade and other interests in this district than is even yet the case, for purposes of mutual help and benefit, some organ of communication would be helpful, which should be a medium of ready communication. The *cost* of a local magazine would be an insuperable obstacle to the establishment of a special journal, but an effort was made by this council to ascertain how far the plan of a "partially printed magazine" (to be distributed over the kingdom) would meet the wants of other associations of chemists, blank leaves being provided for recording the local affairs of each association. Whilst some of the associations cordially supported the proposal, the promises of co-operation were not sufficient to enable the scheme to be carried out.

"The rooms of the Association continue to be well frequented. The visitors' list shows an entry of 1050 persons during the year, but as many visitors fail to enter their names, the attendance must considerably exceed that number.

"Papers have been read in the rooms by the following entlemen :—

Notes on Dispensing	Mr. J. B. Williams.
Pharmaceutical Ethics . . .	Mr. W. Churchill.
,, Latin. . . .	Mr. P. Mucklow.
On Yellow Cinchon. Bark . .	Mr. H. W. Jones.
,, Iron Preparations . . .	Mr. Featherstone.

"For the information of members who do not often visit the rooms, it may here be stated that the reading room is provided with books and periodicals, specimens of materia medica, and facilities for study, whilst the accommodation the rooms afford is available for any purpose of convenience or business conference which members or their friends may desire.

"The lectutes on chemistry provided by the Birmingham and Midland Institute have been well attended by pharmaceutical students, but the number of those attending the lectures on botany has been very small. One of these few students has been in the habit of travelling from Gloucester (56 miles) to attend them. This earnestness and pressure through difficulties, in order to take advantage of the educational facilities of that noble institution, may serve to stimulate the large number of students who live in its nearer neighbourhood.

"The annual soirée of the Association took place on the 23rd of January. As on a similar occasion last year, it was held in the spacious Assembly Room of the Royal Hotel, Birmingham. It proved a most successful and enjoyable evening. Two hundred and fifty guests assembled, including chemists, a few leading medical and scientific gentlemen, and a large number of ladies. An attractive display of objects of scientific, chemical, and pharmaceutical interest, occupied several large tables in the room during the earlier hours of the evening. At half-past nine, Mr. C. J. Woodward, B.Sc., of the Midland Institute, delivered a short and brilliant lecture on "Flame." Dancing commenced about ten o'clock, and was kept up with great spirit until after two o'clock, when the company separated. This soirée will rank as one of the best of those which have distinguished the growing interests of chemistry and pharmacy in the Midland Counties.

"The council invite the members to maintain the present position of the Association by a liberal subscription list. The difficulty of providing voluntary canvassers, able to devote sufficient leisure to the collection of subscriptions, has induced the council to employ a paid canvasser, who will, in future, call upon the members for their subscriptions."

General Account.

Dr.	£	s.	d.
By Eighty-nine Members' Subscriptions	34	0	6
,, Forty-eight Associates' Subscriptions	8	11	6
,, Sale of Price Books, etc.	3	13	3
,, Fees received for Institute	0	13	6
,, Donation	2	2	0
May, 1872. Balance in hand	11	7	3½
,, 1873. Balance due to Treasurer	2	0	9½
	£62	8	10

Cr.	£	s.	d.
Expenses of Annual Meeting...	0	17	0
By Rent	30	0	0
,, Rates, etc.	7	8	9
,, Educational Company's Account	6	6	5
,, Printing, etc.	6	4	9
,, Postage, etc., etc.	2	5	10
,, Attendance	1	10	0
,, Gas	1	19	5
,, Coal	4	0	7
,, Daily News Subscription	0	15	0
,, Chemist and Druggist, etc.	0	7	7
,, Fees repaid to Midland Institute	0	13	6
	£62	8	10

Proceedings of Scientific Societies.

CHICAGO COLLEGE OF PHARMACY.

Certificates for Display.—Portrait of Professor Attfield.

A meeting of the Chicago College was held on Wednesday, June 11, Mr. Thomas Whitefield presiding. After the reading of the minutes a question arose, which

was discussed at some length, as to what kind of certificate should be given to members of the College. One member favoured a simple form, answering the purpose of a receipt for dues. Another said the country members would not be satisfied with anything of the sort; they attached a good deal of value to their college certificates, and wished them gotten up with considerable "display style." Mr. Ebert was of opinion that the use of the showy order of certificates should be discontinued. A large number of druggists had them hung up prominently in their stores, and a great many people were led to suppose that they were diplomas. There was really a species of fraud being perpetrated by their use. The subject was finally disposed of by referring it to the board of trustees.

The financial condition of the organization having become very uncertain, through the disordered state of its records, a committee consisting of the secretary, treasurer, and former treasurer, was appointed to examine them and ascertain the present standing of the society.

Messrs. Jameson, Ebert, Patterson, Sargent, and Buck were appointed delegates to attend the convention of the American Pharmaceutical Association, to be held September 13th, in Richmond, Va.

Mr. Ebert suggested that the board of trustees should be empowered to invite the druggists of the north-west to visit Chicago during the forthcoming exposition, urging the necessity for uniting the interests of the drug trade more closely, and the prospect of being able to form an association to embrace the whole north-west.

A member doubted the propriety of committing the College to this action, and thought that the wholesale trade of the city should move in the matter. On motion, the board of trustees were authorized to act with the wholesale drug trade in event of the suggestion being carried out.

The members then arose to view a large portrait of Professor John Attfield, Professor of Chemistry to the Pharmaceutical Society of Great Britain, through whose exertions the handsome English donation to the College of scientific books and instruments was made up. The portrait was painted at the request and expense of the members of the College.

Parliamentary and Law Proceedings.

The Dishonest Dipsomaniac.

A person, giving the name of John Smith, was charged before Mr. D'Eyncourt, at the Marylebone Police Court, on Thursday, July 3, with obtaining 1oz. chloroform and one bottle of lemonade, value 1*s.* 6*d.*, under false and fraudulent representations, from the pharmacy of Mr. A. Crotch, 74, Edgware Road, on Saturday night last, June 28th. Mr. Chas. Isaacson appeared for the prisoner.

It appeared from the evidence of Mr. W. B. Fitch that the prisoner entered the shop about 10.45 p.m., and requested to be served with 1oz. pure chloroform (Duncan and Flockhart's) and one bottle of lemonade, stating that he was a medical man, that he had taken chloroform for many years for epileptic fits, and that, as he felt he had one hanging about him, he wished to be prepared for it. Witness told him it was a very unusual thing to sell that quantity of chloroform to a stranger, but still, if he was really a medical man, and required it for his own use, and would write a prescription as well as sign his name in the poison-book, he should feel bound to supply him. With this prisoner immediately complied, stating that he considered him mighty particular for such a trivial thing. After having received the chloroform, he ordered a bottle of lemonade, which was in due time opened and brought to him, when, much to witness's surprise, he found his customer with a piece of lint doubled about 6in. by 6in. saturated with chloroform and placed over his mouth and nostrils, presenting the appearance of enjoying a delightful sleep. On perceiving this, witness immediately rushed round the counter and seized the lint from him, when the prisoner, after a little time and a great deal of shaking, roused himself and drank the lemonade. When asked for payment, he stated that he received the chloroform but that witness had since taken it from him, and, therefore, he should not pay. Witness said that if he did not pay immediately he would give him into custody. After a short time, seeing a policeman at the door, prisoner said he would give his name and address, and call and pay on Monday, as he had not a penny in his pocket. The name and address given was John Lee, surgeon, 52, Eastbourne Terrace, but was found to be false; therefore, he was given into custody.

Mr. D'Eyncourt: Did you know the prisoner before this transaction?—No.

Did he appear to you to be perfectly sane?—Yes.

Do you know whether he has ever obtained chloroform before?—Yes. I find that he had obtained 1oz. of chloroform about 10.15 p.m. the same evening, before he came to me, and would not pay for it, and I am also prepared to prove four or five other cases.

Mr. D'Eyncourt: Had any person applied to you for chloroform should you have let them had it?—No, certainly not; unless I knew the parties or I received a prescription.

Mr. D'Eyncourt: I suppose had he have taken the chloroform it would have killed him?—Yes, in a very short time, and I consider him a man quite as capable of taking it as he is of inhaling it.

Mr. Isaacson: Will you swear that the defendant did not give you his name as John Reid, 22, Westbourne Terrace, instead of John Lee, 52, Eastbourne Terrace?—I will, and what is more I have it in his own handwriting twice over.

In answer to questions by Mr. D'Eyncourt, prisoner said he was in his right mind, and considered very intelligent. He had taken chloroform in this manner for about sixteen years. On his return from India, some nine years since, he had met with an accident to his arm which at times caused him great pain, and he was compelled to take chloroform to obtain rest. He supposed on this occasion, owing to domestic affairs, he took more than he really ought, for which he was extremely sorry.

At this stage of the proceedings, Mr. D'Eyncourt said he considered the prisoner ought to be put under restraint in some way, and that his friends ought to look after him. With this prisoner agreed, and, in answer to a question as to his means, said he was in receipt of 9*s.* 6*d.* a day, half-pay. After some cab fares, for which summonses had been taken out by cabmen, together with the expenses, had been paid, the prisoner was ordered a formal discharge.

The Sale of Poisons in Ireland.

Suicide by Laudanum.

An inquest was held on Monday, June 30, at the Belfast General Hospital, by Dr. Dill, the borough coroner, on the body of a woman who died in that institution on Saturday evening from the effects of an overdose of laudanum.

Evidence was given that deceased was found lying senseless on her bed. There was a great smell of creasote in the house. A bottle was found in the house having a smell of creasote. A label which was found in the house by one of the police was also handed in. On the label was the word "Laudanum," the amount to be taken as a dose, "Poison," and the name, "Hogg, grocer, 209, York Street."

A young man named Walsh, who was in the employment of Mr. James Hogg, 209, York Street, grocer and druggist, deposed, after being cautioned, that on Saturday, in the middle of the day, a woman, about fifty years of age, came into his master's shop, and purchased half-an-ounce of laudanum. The label produced was his master's. The woman appeared to be sober.

Witness, in answer to the Coroner, said that they sold arsenic, laudanum, and corrosive sublimate, in the same establishment as they sold groceries.

Mr. Hogg (owner of the establishment) : They are kept separate.

The Coroner (to witness) : What quantity of corrosive sublimate do you sell for a dose ?

Mr. Hogg : If I be permitted to interfere, it is not fair to ask this young man any questions, the answers to which might criminate him.

The Coroner : He has been cautioned, and he may answer them at his peril. If you are proprietor of this establishment, it is a most injudicious practice for a person in your position and trade to be selling such intense poisons as arsenic and corrosive sublimate.

Mr. Hogg : We do not give any of these to persons without a line from some person that we know ; some one who would vouch for the purpose for which it is intended.

The Coroner: Did you get a line when this laudanum was sold ?

Mr. Hogg : As you are aware, laudanum is in the second class of poisons, and a line is not required for that.

The Coroner: A certain dose of laudanum is just as intense a poison as any other.

Mr. Hogg : There is no Act of Parliament to bind sellers to give any particular quantity of laudanum, and of course we are not to go beyond the Act of Parliament.

The Coroner: I don't care about all the Acts of Parliament in the world ! It is a most injudicious thing for any person to be dealing in such poisons and groceries at the same time.

Mr. Hogg: It is the case with many of the druggists in town. They there give any quantity of laudanum they wish. Doctors often send to me for one ounce and two ounces, but to any one that we are suspicious of we should not give it, and, in fact, I have refused men frequently. I do not think it is fair to ask any man a question which might criminate him.

The Coroner: If we could produce a sufficient case to get an Act of Parliament modified we should be perfectly justified in doing it. We are not to kill people, even by Act of Parliament.

Dr. Calvert, House-surgeon to the General Hospital, deposed that deceased was brought under his care at half-past three o'clock on Saturday afternoon, in a state of insensibility, he believed from the effects of an overdose of some preparation of opium. She died about two hours after being brought to the hospital. Half an ounce of laudanum would produce the symptoms that she laboured under. Twenty-five drops would be a medium dose for an adult. When the stomach was pumped there was nothing in it.

The jury found that the woman died from the effects of an overdose of laudanum, taken while in an unsound state of mind.—*Belfast News Letter.*

Poisoning by a Lotion.

On Monday, June 30, the Liverpool Borough Coroner, Mr. C. Aspinall, held an inquest upon the body of John O'Brien, a painter, 44 years of age. The deceased's wife stated that he had been for some time in a bad state of health, suffering severely from rheumatism. On the preceding Friday, the doctor sent him a bottle of medicine, labelled "Two table-spoonsful three times a day," and also another bottle, containing a lotion for rubbing his foot, on which was printed in large letters the word "Poison." The deceased was in the habit of taking his medicine himself. About one o'clock on Sunday afternoon witness found him vomiting in the yard, and he told her that he had made a mistake, having taken some of the lotion in place of his proper medicine. He said his mouth felt as if it were on fire, but added that he did not think he had drunk enough to do him any serious injury. However, he seemed to grow worse, and about two o'clock she sent for a medical man, who administered an emetic, and tried other remedies, but without avail, for O'Brien died about an hour afterwards. A verdict of "Accidentally poisoned" was returned.—*Liverpool Post.*

Prosecutions under the Adulteration Act.

At the Birkenhead Police Court, on the 19th ult., a number of teadealers were summoned for selling tea which, it was alleged, was adulterated. Messrs. Robert Roberts and Co. were summoned for selling three samples of tea, which had been analysed by Dr. J. C. Brown, public analyst, Liverpool, and found to be adulterated, in one case a sample of green tea being faced with mineral matter and Prussian blue, and in the others with gypsum slightly and a trace of Prussian blue. Mr. R. B. Moore appeared to prosecute, and Mr. Segar, barrister, was for the defence. Sergeant Millington, of the County Constabulary, gave evidence of the purchase of the samples of green tea produced. He was in plain clothes at the time. He stated that the defendant's shopman told him that he would not guarantee any tea sold under 3*s.* per lb. ; the samples produced cost at the rate of from 3*s.* 8*d.* to 4*s.* per lb. Superintendent Egerton proved the delivery of them to Dr. Brown, and the latter gave evidence of the state in which he found them. He said the tea was adulterated by being faced or painted with Prussian blue and gypsum, in the proportion of from 1½ to 2 per cent. in the different samples. The substances used were not absolutely poisonous, but were injurious to health. To a weakly person they might, and probably would, be injurious, but to a strong person, not taking large quantities of the tea, he could not say decidedly that they would do much harm. In cross-examination witness said pure green tea was prepared by being dried more quickly than black ; there was some green tea which was not faced with foreign matter, and in former times there was very little of the faced or painted kinds imported. Witness produced a sample, and said, in reply to questions, "Prussian blue is not a tonic or alterative ; it is not a mineral substance at all. It does not rank among poisons, but is closely allied to them. It would not increase the bulk of the tea to any appreciable extent, though it would make a difference in the weight, say from 1 to 2 per cent. The other matters used—clay and gypsum—are not poisonous, but are used for the purpose of lightening the colour. One of the samples submitted contained as much colouring matter as any sample I have seen ; another is about the average, and the third rather better than the average of the samples that I have analysed." At the conclusion of Dr. Brown's evidence, an infusion of one of the samples was made by the magistrates, and the result was that a thick green scum floated on the surface.

Mr. Segar, in defence, argued that there had been no representation on this occasion that the tea sold was not adulterated. It was the same tea as that commonly sold in the market, and of which about ten million pounds were annually imported into this country. Samples similar to that produced had been submitted to analysis by Mr. Davies, analytical chemist, Liverpool, who pronounced the tea to be faced, but not so as to be injurious to health. Of the green tea generally sold, every bit was coloured, and every purchaser of it knew that it was not guaranteed to be pure or unprepared by any process. If a man asked for tea, he would get black, and if he wanted green, he would buy it as a fancy article, and would know he was getting something which had been doctored before it came into this country. Mr. Segar further contented that the meaning of the word "Adulteration," according to Walker's "Dictionary," was the "act of corruption by false mixture, the state of being contaminated by false mixture," and would not apply to an article which in itself remained the same, though coated with some other substance ; the painting and colouring was not, he held, adulteration. He therefore urged that the Act would not apply to a case of this kind. He called the following evidence :—

William Sharman, assistant to the defendant, said that when he sold the tea to the officer he informed him that all green tea was more or less subjected to an artificial process before it came to this country. Witness denied that this was said only after the officer had stated that the tea was intended to be subjected to analysis.

Mr. Thomas Matheson, tea broker, said that the only uncoloured green tea known was imported from Japan, and was not generally known in the market as green tea.

Mr. Davies, analytical chemist, Liverpool, said that he had examined a sample of the same tea and detected the presence of Prussian blue and gypsum, but in very minute quantities. They were inert substances and not poisonous; in small quantities, such as would be consumed, they would not be prejudicial to health. An infusion of uncoloured green tea produced by Dr. Brown was made, and the result was at once apparent,—there was no green scum, and a clear brown liquid filled the cup.

The magistrates then retired to consider their decision. On returning into court they said they were satisfied that the charge of adulteration was proved, and fined the defendants 5*s.* and costs.

Mr. Segar asked for a case for submission to the Court of Queen's Bench, as to the terms "adulterated" and "selling as adulterated." He said it was most important that these points should be cleared up by a decision of the court above.

The magistrates granted the application, and it was arranged that a number of other cases of a similar nature should stand over till the decision is given.—*Grocer.*

Reviews.

PRACTICAL MAGAZINE: an Illustrated Cyclopædia of Industrial News, Inventions, and Improvements, collected from Foreign and British Sources, for the use of those concerned in Raw Materials, Machinery, Manufactures, Building, and Decoration, etc. Vol. I. London. 1873.

Although the above title is only about half of what appears on the first page of the volume before us, it covers an exceedingly wide ground, but it is not an exaggerated epitome of the contents of the handsome volume just completed. In fact, a busy man would scarcely find time to keep abreast of the issue; and the eighty closely-printed, large quarto pages, which are published each month, would gradually accumulate like a terrible nightmare of unfulfilled duties. Subject to this qualification, the work is an admirable production. The subjects dealt with are most diverse. The textile, ceramic, and chemical manufactures, civil and mechanical engineering, metallurgy, architecture, surveying, building, are all, in their turn, the topics of valuable articles; while for lighter reading there are capital biographical and historical memoirs, sketches of the mechanism of London life, and initiation into the mysteries even of such subjects as cheap sausages. A principal feature of the work, however, is the illustration, for which the large size of the page is peculiarly adapted. Those who know what French wood-engraving is will appreciate the remark that many of the pictures appear to be printed either from the original blocks or *clichés* of engravings used in French works. Specially worthy of notice are the series illustrating an account of the dye-works of Messrs. Bontarel and Co., a drawing of an enamel cup by M. Lepec, and another of a clock in the renaissance style, which serves as a frontispiece.

But the section having special interest for the readers of this journal is an extensive series of abstracts of published articles relating to applied chemistry; and this is not the most satisfactory portion of the volume. To do such a work well requires considerable acquaintance with chemical literature, as well as vigilance in making the selection. In the first place, the quotation of authority ought to give some idea of the original source of the article. As a few out of numerous instances where this result has not been attain[illegible]y be mentioned several originally French articles that are quoted from German periodicals—for instance, Miahle's communication to the Academy respecting a neutral soap and Falière's test for bromide of potassium. Tichborne's method of filtering through parchment paper under pressure, originally published in this journal (i. 881), is quoted from the *Zeitschrift für Analytischen Chemie;* Ekin on subnitrate of bismuth (PHARM. JOURN., iii.) is attributed to the *Moniteur Scientifique;* Merrick on Cochineal (*Amer. Chemist*), to Dingler; while Mr. Consul Medhurst's information as to the adulteration of tea with willow leaves at Shanghai is quoted from the *Polytechnisches Centralblatt.* Want of vigilance is illustrated by the fact that, in the short space of six months, several paragraphs have been repeated. Thus, Girard's new method of preparing artificial alizarine is described from a German source on p. 55, and from a French source on p. 437; a similar occurrence takes place on pp. 220 and 438, with reference to a black for woollen dyeing; and on pp. 339 and 437, in reference to indigo printing; while, to conclude, but not to exhaust the list, the same method of purifying glycerine is described three times, namely, on pp. 104, 223, and 280. All the abstracts, however, appear to be ably made.

ELEMENTARY TREATISE ON PHYSICS, EXPERIMENTAL AND APPLIED, FOR THE USE OF COLLEGES AND SCHOOLS. Translated and Edited from Ganot's "Éléments de Physique." By E. ATKINSON, Ph.D., F.C.S. Fifth edition, revised and enlarged. 1872. (Longmans).

NATURAL PHILOSOPHY FOR GENERAL READERS AND YOUNG PERSONS. Translated and Edited from Ganot's "Cours Elémentaire de Physique." By E. ATKINSON, Ph.D., F.C.S. 1872. (Longmans).

Ganot's 'Eléments de Physique' is so well known to English readers by Dr. Atkinson's excellent translation that a detailed analysis of it would be superfluous. The publication of the English edition supplied a want which was keenly felt by all teachers of physical science in this country. It is, in fact, one of the few treatises in our language that give a systematic exposition of the several branches of physics; and by the clearness and exactness of its explanations and descriptions, and the excellence of its graphic illustrations, it places the facts and theories of physical science before the reader in a manner which leaves nothing to be desired. The student who has mastered it will have gained a sound knowledge, both of the principles of physics, and of the methods by which they are established.

In the present edition several useful additions of new matter have been made, among which may be mentioned the description of the apparatus invented by Helmholtz and by König for the analysis and synthesis of sounds; of the alterations produced in the spectra of gases by variations of pressure and temperature; of the discoveries of Lockyer and Janssen, relating to the nature of the solar protuberances and the methods of observing them; of Carré's dielectrical machine, Lechanché's battery Browning's regulator for the electric light, and Becquerel's electric thermometer and pyrometer. Notwithstanding these additions, and the introduction of twenty-eight new illustrations, the use of a larger page has rendered it possible to reduce the number of pages in the volume by sixty.

The second of the works which form the subject of this notice is a smaller and more elementary treatise, in which the use of mathematical symbols is altogether dispensed with. It is especially designed as a text-book of physics for the middle and upper classes of boys' and of girls' schools, and as a familiar account of physical phenomena and laws for the general reader. In range, it may, pe

haps, fairly be taken to represent the amount of knowledge required for the matriculation examination of the London University. For these purposes it is admirably adapted. The explanations and descriptions throughout are singularly clear, and the graphic illustrations are excellent. Many of these are the same in the larger treatise, but a considerable number have been made especially for the smaller one. These latter are of a striking character, well adapted to convey to young minds a vivid picture of the object or phenomenon represented,—witness those relating to the mechanical powers and the centre of gravity; the formation of images by lenses and mirrors; the camera obscura, and various optical illusions, including the diorama and ghost-scenes; and several striking experiments in electricity and magnetism. Under electromagnetism there is a clear and well-illustrated description of Morse's telegraph.

In conclusion we sincerely congratulate Dr. Atkinson on the production of two books so admirably adapted to the wants of junior and senior students of physical science.

Obituary.

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

On the 13th June, 1873, Mr. Daniel Dixon, Chemist and Druggist, of Preston.

On the 18th June, 1873, Mr. John Mason, Chemist and Druggist, of Bournemouth.

Notes and Queries.

[345].—PRESERVATION OF SYRUPS.—I shall feel obliged by your allowing me the opportunity of making inquiry what is the best method for preventing Syr. Violæ et Syr. Rhœados from fermenting during hot weather. Re-boiling is of no *lasting* benefit. Rectified spirit tends to remove the evil, but as it would not be the right thing to use, I shall be glad to learn of a plan that will effectually cure the evil complained of.—INQUIRER.

[346].—VAPOR OLEI PINI SYLVESTRIS.—Will you kindly favour me with the formula for Dr. Morell Mackenzie's "Vapor Olei Pini Sylvestris"?—E. W.

[In the 'Pharmacopœia of the Hospital for Diseases of the Throat,' edited by Dr. Morell Mackenzie, the following formula is given for a "Vapor Folii Pini Sylvestris :"—

Oil of Scotch Pine (Fir-wool oil) .	2 fluid drachms.
Light Carbonate of Magnesia . .	60 grains.
Water to . .	3 fluid ounces.

Mix. A teaspoonful in a pint of water at 150° F. for each inhalation. A caution is given against confounding the oil ordered with ordinary oil of turpentine. The former is prepared from the leaves of *Pinus sylvestris*, and is imported from Germany as "Fir-wool Oil."—ED. PHARM. JOURN.]

[347].—ERASURE OF INK MARKS FROM PAPER.—Can any correspondent inform me what is the best process for erasing ink from paper without affecting the fibre. The usual things for linen have been tried, but without effect.—R. M.

[348.]—SPICED CONDIMENT FOR CATTLE.—In reply to this query, I should recommend the following :—

Rad. Gent. Pulv.....	℥ iv.
Rad. Ling. Pulv.....	℥ ij.
Sem : Coriand Pulv.	aa. ℥i.
Sem : Anisi. Pulv.	aa. ℥i.
Sodii. Chlor.....	℥i.

To be divided into 12 doses.—W. D.

DR. LOCOCK'S LOTION.—We are informed that the formula for this preparation, recently quoted in this Journal (iii. 779) from Cooley's Cyclopædia, is incorrect. The following, taken from the original prescription of Dr. Locock, has been kindly supplied to us by Mr T. Greenish :—

Ol. Macis	℥ ss
Liq. Ammoniæ	
Ol. Olivæ aa.	℥ ij
Sp. Rosmarini	℥ j
Aq. Rosæ	℥ ijss

M. ft. Lotio ℥ iv.

PILLS OF PROTOXIDE OF IRON.—M. Kirchmann *(Archiv. der Pharm.)*, prepares pills of protoxide of iron by mixing an equivalent of calcined magnesia with one of crystallized protosulphate of iron, and adding a small quantity of concentrated glycerine. For sixty pills he employs—

Crystallized ferrous sulphate.....	120 grams.
Calcined magnesia.....	20 „
Glycerine.....	15 drops.

These pills have a good consistence, and can be covered with sugar. If they be placed in water the sulphate of magnesia is dissolved, and the oxide of iron deposited.

TURPENTINE PILLS.—M. Lachambre *(Journ. des Connaissances Médicales)*, gives the following formula for preparing turpentine pills, which he says are promptly digested without fatiguing the stomach or causing disagreeable eructations :—

Oil of turpentine.....	8 grams.
White wax..	20 „
Essence of lemon.....	2 drops.
Powdered sugar.....	9 grams.

Melt the wax in the turpentine and essence of lemon, pour into a mortar, and when cool add the sugar and form a mass. Divide into pills of twenty-five centigrams each, which should be covered with starch and kept in well-stoppered bottles. Each pill will contain five centigrams of turpentine.

TRACING PAPER.—Tracing paper may be prepared (Dingl. polyt. J. quoted in Journ. Chem. Soc.) by mixing castor oil with three or four parts of absolute alcohol, and spreading the homogeneous mixture over paper with a brush. By washing with alcohol the oil is again dissolved and the paper restored to its original character.

CHLORINATED WATER.—Hydrochloric acid, acting on chlorate of potash, does not necessarily yield theoretically chlorine, but several intermediate oxygenated compounds are produced equal, and often superior in their medicinal effect to chlorine alone. That is why these so-called chlorine mixtures have attained such a deserved popularity. It only remains to have a uniform standard for this mixture, and the following formula attains this desideratum :

Take of Chlorate of Potash, 10 grains.
Hydrochloric Acid, 1 fluid drachm.
Water, 1 pint.

Throw the chlorate into a dry pint bottle, and pour in the acid; then let stand a few minutes, agitating occasionally, and pour in 4 fluid ounces of the water and shake; then add 4 fluid ounces more of the water and shake again. Finally, add the rest of the water, cork well, mix, and keep the mixture in a cool place.—*Pharmacist.*

Appointment.

STANSBY, Mr. CHARLES J., Pharmaceutical Chemist, has been appointed Dispenser in Charge of Stores at H. M. Naval Hospital, Bermuda.

Correspondence.

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

Pharmacopœia of the University College Hospital.

Sir,—In your review of the above work last week, the reviewer wonders "what the object is of ordering both calamine and oxide of zinc in a lotion." For the information of your readers generally, I beg to state that the calamine is to give the lotion the necessary flesh colour, as it is generally used for facial acne and other skin diseases, where the diseased parts exposed would appear conspicuous if the plain oxide of zinc lotion were used. The application of *Lotio Calaminæ*, besides having a healing effect, hides the unsightly appearance of the diseased parts, which, next to complete cure, is desirable for the patient's sake. Such being the object of it, levigated calamine of the right tint—that prepared from an ore containing a little red oxide of iron—should be preferred. This is of some importance, because patients frequently complain that they do not get the lotion, when dispensed by chemists, prepared of the uniform flesh colour necessary for the purpose it is required.

Wm. Martindale.

10, *New Cavendish Street, W.*

Women in Pharmacies.

Sir,—Reading in the number of May 24th the *compte-rendu* of the annual meeting of the Pharmaceutical Society, I noticed that, in the course of the discussion which took place on Mr. Hampson's proposition, Mr. Burden said that—"In the druggists' shops in Paris you constantly saw the wife assisting her husband."

Allow me to say that the assertion of this gentleman is not quite correct. I have been now in the profession in Paris for more than twenty-nine years, and I never saw a lady at work behind the counter. I do not mean to say that ladies are not to be met with in chemists' shops, such is generally the case, but what they do is exactly the same as they can do in any other trade, that is, to receive money, give change, write bills, keep accounts, etc., etc.

E. Gallois.

2, *Place Vendôme, Paris, June* 24, 1873.

Artificial Fibrin.

Sir,—In this week's journal you notice the claim which Dr. J. Goodman puts forward of having discovered a method of converting egg-albumen into fibrin. The consideration of a few obvious facts will prevent any illusion which might be caused by the statements which he makes. To prepare the artificial (!) fibrin, he directs that the shell of an egg is to be removed and the contents immersed in cold water for twelve hours or so, when it is found to undergo a chemico-molecular change, and to become solid and insoluble. This change refers, presumably, to the albumen only.

Now, it is well known to those who have made solution of albumen from eggs that a portion remains undissolved, and this, if examined under the microscope, will be found to have a fibrinous structure. This is the material which Dr. Goodman asserts is formed upon treating the egg in the manner he directs, and his statement infers that the whole of the albumen becomes thus converted by being left in contact with the water a sufficient length of time. Such, however, is by no means the case, as may be easily proved by experiment, when it will be found that the fibrinous material merely forms an envelope within which the albumen remains unaltered. If the water is then boiled, of course, there is coagulation. If the water is frequently agitated the fibrinous envelopes are broken, and the albumen gradually dissolves. Upon estimating the amount of this material it was found to be only ·75 per cent. of the fluid albumen, or 5·4 per cent. of the solid residue left on evaporating albumen to dryness at 100 C.

The formation of this egg-fibrin is nevertheless a very interesting physiological fact, and the following is a possible explanation of it:—

The ov-albumen being alkaline, or containing salts of the alkalies, retains the fibrin in solution, but when diluted with a large access of water it can no longer do so, and the fibrin is precipitated, the effect upon the viscid albumen being that the surface is acted upon first and becomes covered with a protecting envelope of the precipitate, as occurs when lumps of calcic carbonate are placed in sulphuric acid.

Thos. Garside.

Lord Street, Southport, June 16th, 1873.

A Pharmaceutical Curiosity.

Sir,—I have not the least idea where Kingswinford is, but it is evidently a locality unsuited to so erudite a gentleman as J. Bower Williams, A.P.S. Who but must sympathize with that gentleman when he pathetically exclaims, "Can ignorance go further" than to refuse to believe that "green" oil can be "black," and to hint that he had not passed his diploma because he ventured to suggest the identity of the two? He clearly has never been accustomed to *such* "green" folk as the Kingswinfordians.

But why should "our Examiners" be more flabbergasted by "Oil of Exeter" than by "Unction," "Trooper's Ointment," "Blue Butter," "Paregoric," "Salt of Wormwood," etc.? and peradventure no less virtue resides in "Oil of Cabbage" than in "Ol. Viride (Sambuci)."

I am sure we shall look anxiously for more of the promised specimens, especially if interspersed with J. Bower Williams's (A.P.S.) amusing remarks.

R. T. C. D.

Southampton.

X. Y. Z.—We do not find in the 'Directory' the name you inquire about, but a well-known "quack" lives at the address you mention.

H. Hyne.—The article is to be dipped in hypophosphite of soda solution, *after* removing it from the Javelle water.

"*Chemist and Druggist*" is referred to the rule respecting anonymous communications.

J. W.—The arrangement you complain of was one imposed upon the Pharmaceutical Society by the Legislature; but the inconvenience arising from it must cease with the lapse of time.

E. Richardson.—*Lamium album.*

G. C. Druce.—(1) *Brassica napus.* (2) *Lepidium Draba.*

X. Y. Z.—The better plan would be to consult a medical man.

A Correspondent sends us the following curious piece of news cut from the columns of a provincial paper:—

Conversazione of the Pharmaceutical Society of Great Britain.—Mr. ————, pharmacological chemist (by examination), received an invitation from the President, Vice-President, and Council of the Pharmaceutical Society to be present at the conversazione held at South Kensington Museum on Wednesday last.

Our correspondent remarks—"Could presumption and ignorance carry a man further than this?"

The following journals have been received:—The 'British Medical Journal,' June 28; the 'Medical Times and Gazette,' June 28; the 'Lancet,' June 28; the 'London Medical Record,' June 28; 'Medical Press and Circular,' June 28; 'Nature,' June 28; 'Chemical News,' June 28; 'Gardeners' Chronicle,' June 28; the 'Grocer,' June 28; 'Journal of the Society of Arts,' June 28; 'Grocery News,' June 28; 'Produce Markets Review,' June 28; 'The Practioner,' for July; 'Liverpool Daily Post,' June 28; 'Belfast News Letter,' June 28; 'Dover Chronicle,' June 28; 'Journal of Applied Science,' for July: 'British Journal of Dental Science,' for July; 'Food, Water, and Air,' for July; 'Educational Times,' for July: 'Brewers' Guardian,' July 1; 'Scientific American,' June 21.

Communications, Letters, etc., have been received from Dr. Kidd, Messrs. E. Richardson, F. R. Bessant, H. Greatrex, J. Abraham, R. M., E. W., W. S., "Nemo," "Ubique," "Euphorbia."

THE CINCHONA PLANTATIONS IN JAVA.

BY JOHN ELIOT HOWARD, F.L.S.

These plantations have just been distinguished by a great success, in having sent into the market, at Amsterdam, bark which has been sold at prices equal to from 8*s.* to 9*s.* 5*d.* (English money) per lb.; and this not simply from such accidental circumstances as will at times occur, but from the intrinsic goodness of the bark.* It was indeed time that the praiseworthy exertions of the Dutch Government in taking the lead in the introduction of the Cinchonæ into the East should be rewarded with something better than was apparent at the sale on 14th March, 1872. An "account" of the above sale, published in the PHARMACEUTICAL JOURNAL, accompanying specimens presented to the museum—apparently then copied into the 'Flora of Ratisbon,' from whence it was transferred into Haaxmann's 'Tydscrift voor Pharmacie,'—was one of the first means of conveying information to those in Java who were longing for full accounts, and who were disappointed with the silence of the pharmaceutical journals of the Netherlands. I therefore the more willingly hasten to congratulate those engaged in this friendly rivalry of nations in having taken the lead on this occasion, and having achieved that success which they merited, because in obtaining the best seeds they took the course which was calculated to lead to such a result.

I shall have to recur to this subject, as I do not say that the obtaining of the very best seed would of itself ensure success without precautions, since natural selection has a tendency *downwards* in the Cinchonæ, and the survival of the fittest is most problematical; but first I will show the importance of the results obtained, by a translation of part of the report which has reached me through Mr. Hasskarl's obliging communication, as follows:—

"Towards the middle of November the chemist for the Cinchona culture was called to his commission at Batavia, and did not return even with the closing year. As far as possible he continued his quinological studies in a chemical laboratory at Weltevreden. The distinguished quality of the *Cinchona Calisaya*, which was raised from seed gathered by Ledger in Bolivia, has been already mentioned, and has now by the examination of seven more samples been clearly set forth.

"This sort began for the first time to bear blossoms towards the end of the year (October and November), and showed in two specimens that a part of the quinine had been replaced by quinidine (Chinidin). Further experience must decide whether this phenomenon is usually present, and whether the quinidine diminishes again after the time of flowering. This will, of course, be of great importance to the bark harvest.

"To what extent this variety of C. Calisaya exceeds those before introduced into Java, will be seen by the following summary:—

	Quin.	Quinid.	S. Q.	Total Alk.
1. C. Calisaya, Java seed, medium of 8 trials	1·23	1·24	1·64	5·04
2. C. Calisaya, seed from Bolivia, Shuhkraft, med. 8 trials	2·32	0·43	3·11	4·88
3. C. Calisaya, seed from Ledger, med. of 9 trials	5·53	0·43	7·44	7·25

* I speak in general terms, resting my opinion on the analysis of M. Moens.

"This example already shows clearly *how important the chemical examination is for the choice of the sorts which are to be planted out.*" *

It also shows, as I think, the importance of not being deceived by a mere name, and led away by confounding together different sorts of Cinchonæ, which, however classified, vary to such an extraordinary degree in their produce.

I remarked, in my note on the 1872 sale above, that the Calisaya then sold had neither the appearance nor the qualities of the genuine bark, and that it was really no better than the C. Pahudiana. Mr. Moens seems to insinuate that some unworthy motive existed for depreciating the bark then sold, some of which certainly obtained extraordinary prices; but the result has been that Mr. Jobst (who is himself a quinine manufacturer), having bought the largest portion, in his published report thereon, says, that "although the external appearance of the bark has certainly improved, the alkaloidal contents *have not advanced in equal proportion*," and advises the cultivators to lay themselves out in the first place for the production of medicinal bark. We may then conclude that Mr. Jobst did not find reason to suppose that the grand object of the cultivation of the trees for the *production of quinine* had been then attained.†

He gave the following percentage as the result of his experiments:—

C. Calisaya	3·39
C. Hasskarliana	2·52
C. officinalis	3·73
C. Pahudiana	2·07

If anyone will compare these figures with the prices given at the sale, as reported in the PHARMACEUTICAL JOURNAL, they will comprehend what I have said above, and will not thereby be induced to erect a quinine manufactory—at least, not at their own expense.

Moreover, the contrast between the above figures and those given before as representing the produce of the bark from Ledger's seeds, shows but imperfectly the advantage derived from cultivating the latter sort.

In the first place, Mr. Markham has remarked on the poor and stunted appearance of the (so-called) Calisaya as it met his view in India; so contrasted, as he says, with the glorious Calisaya of the American forests. Now one obvious reason for this difference is that the seed earliest sown was of the easiest procurable kind, viz., the C. Josephiana and kindred sorts. These are mere shrubby existences, incapable of ever becoming remunerative to the planter. I have under my eye a photograph of "C. Calisaya, No. 33 plantation, Tybodas," showing both the meagre growth—spreading like a slender willow tree—and also the contortion of the roots from the volcanic soil, which had apparently conduced to bring it to its end.

I do not impute any want of care to the earliest collectors of seed. It was unfortunate that the distinctions between good and bad were not then known. I have from Mr. Hasskarl botanical specimens which show his endeavours to secure the real C. Calisaya; but none doubt the preponderance of the seed to have been such, as will be seen in our further details.

* From 'Report of the Government Bark Cultivation in Java. IV. Quarter, 1872.'

† See the *Pharmaceutische Zeitung*, 24 Mai, 1873.

If, in the place of these, the cultivators of Java have obtained from seed growing trees, capable of attaining the height (as Don Pedro Rada told me was the case of those which he felled) of 120 to 150 feet English, the prospect is very different.* That such is the case, I can well believe, since, in the interval of writing, I have measured some plants (such as I had the opportunity of showing at a meeting of the Linnean Society, May 1st of this year), proceeding originally from the same source. Mr. Broughton sent me in April, 1872, some seed of his Calisaya, raised from Ledger's seeds. I sowed these on May 22nd, 1872, and now (June 24th, 1873), the finest average about a yard in height (two are exactly one *metre* each), and the circumference at base of stem two inches. They have from four to six commencing branches, and are forming bark on the lower part of the stem. I will now give Mr. Broughton's account of his success with these at Ootacamund; he says in his report to the Indian Government, 31st July, 1871, as follows:—

"After the above kinds, the most important at present cultivated on the plantations is, undoubtedly, that of C. Calisaya. As in my former reports, the trees of Calisaya were very young, it is quite natural to find the amount of alkaloids in the bark has increased. The most remarkable point about the plants of C. Calisaya is *the great number of varieties.*

"These display ALMOST EVERY HABIT. As it was necessary to examine the bark of the trees of most marked character, in order to determine the kind most suitable for cultivation, these varieties have taken up much time. I have the honour to quote the analysis of several of these varieties. The alkaloids are given in percentages contained in dry bark.

"Trunk bark of C. Calisaya, grown at Neddivuttum:—

	I.	II.	III.	IV.	V.
Total Alkaloids...	3·95	3·93	5·28	4·16	5·36
Quinine	2·67	3·18	1·02	2·50	4·67
Cinchonidine and Cinchonine ...	1·28	0·75	4·26	1·66	0.69

"These represent fairly the different yields I have met with among the kinds of C. Calisaya raised from seed obtained from Mr. Money.† They are, as a whole, of good quality, but No. V., or *the bark of a variety with broad leaves, which are red on the under surface, and of vigorous habit, is the kind which should be propagated,* as it is the one whose cultivation can be most profitably extended. I have examined the bark of several other varieties besides those whose analyses are given above, but find them all inferior to No. V., and promising nothing remarkable in their qualities. The bark of our C. Calisaya is of excellent quality, *and is better suited for quinine manufacturers* than that of C. succirubra. I regret that a larger number of the trees has not been planted, but as the yield of bark from the present plantations will shortly be so large, I cannot now recommend any considerable extension even of this sort."*

I am unable to explain how it is that the Dutch analysis surpasses that of Mr. Broughton (*essentially*, as to commercial value, in the proportion of 5·53 to 4·67 per cent.), but the results of the recent sale at Amsterdam show that this superiority of the Dutch Calisaya is (at all events for the present) an established fact.

These results, as communicated in the way of trade, are as follows:—

		Sample.	Sold from		s.	d.		s.	d.
72	C. Calisaya ...	... A ...	110 to 120	say	1	10	to	2	0
23	„ do. ...	... B ...	130 „ 220	„	2	2	„	3	8
3	„ do. ...	... C ...	116 „	„	1	11½	„		
5	„ do. ...	... D ...	158 „ 159	„	2	6	„		
4	„ do. ...	... E ...	410 „ 500	„	8	0	„	9	5
20	„ Hasskarliana	... H ...	145 „ 150	„	2	4	„	2	5½
5	„ succirubra...	... S ...	215 „ 116	„	1	11½	„		
8	„ officinalis ...	... O ...	210 „ 230	„	3	6	„	3	9
1	„ caloptera ...	... M ...	175 „	„	2	11	„		
35	„ Pahudiana	... P ...	120 „ 140	„	2	0	„	2	4
29	Ground Calisaya	... R ...	20 „ 35	„	0	4	„	0	7

Mr. Moens seems to object to the publication of the results of the previous sale. I hope that he will be more satisfied on the present occasion, as I think the buyers were much better aware this time than last of the real worth of their purchases; samples of the present having evidently been well tested. I do not think that any from the present sale fell into English hands, except of the last unimportant parcel; but believe that the lots of Calisaya were sold to a German quinine manufacturer, far too much experienced to be influenced by English opinion. If any one will take the trouble to compare my first table with this—looking only to the *quinine* as most essential—he will be able to discern *at once* some probable connection between the contents in *quinine*, and the price given. But to facilitate the understanding of the subject, I will present to the Pharmaceutical Society selections from the above samples, together with such opinion of them as I am able to form.

"Calisaya, sample A," I divided into five portions, thus:—

α. Bark of C. micrantha Calisayoides (grey bark).

β. Looks like bark of C. Hasskarliana, rather than Calisaya.

γ. Much like Weddell's "morada," but *more exactly* the "morada fina" of Hasskarl—C. euneura of Miquel.†

δ. Bark of C. Pahudiana.

ε. Bark of C. Hasskarliana.

"Calisaya, sample B":—

α. Probably Calisaya, resembles bark of C. nitida.

β. Compare with bark of C. Hasskarliana.

"Calisaya, sample C":—

All bark of C. Hasskarliana.

"Calisaya, sample D":—

Calisaya, but rather peculiar. I *think*, equal to E.

* A large parcel of *this* bark, coming *viâ* Para, is just now (July 8) on sale in London. The specimen of Rada's bark in the Pharmaceutical Society's museum confirms this account of the trees.

† *i.e.*, Ledger's originally.

* [With this advice I do not coincide.—J. E. H.]

† "C. euneura, Miq. sp. nov. (C. Boliviana Hsskl. hrb. non Weddell, C. Calisaya var. fina, according to Howard, in the herbarium of Hasskarl). . . . Subtus costâ argute prominente, costulisque utrinque 15-16 patulis parallelis rectis. . . . Hasskarl found it in the Province of Carabaya, on the banks of the Rio Grande, in Nov. 1853, where it is called by the inhabitants *cascarilla morada*, or *morada fina*.—Comp. Howard, in *London Bot. Congress*, p. 201."

"Calisaya, sample E" :—

Bark of Calisaya Zamba.*

H sample, C. Hasskarliana :—

Apparently very characteristic, and showing a bark intermediate in appearance between the *Calisaya* and the *Pahudiana*—probably a true *hybrid*.

S sample, C. succirubra :—

Very inferior looking. I have a botanical specimen from Java, which I think *erronously* marked C. succirubra, and more like C. pubescens; possibly this bark may belong to the sort.

O sample, C. officinalis :—

a. Bark of C. Bonplandiana, "Colorada del Rey."
β. Bark of C. officinalis, a Uritusinga.

M sample, Caloptera :†—

Contains little except Cinchonine.

P sample, Pahudiana :—

A characteristic sample of this bark.

Many of the readers of this Journal are probably not aware of the cyclone of controversy which has agitated Holland, and even found its way into both houses of legislature, respecting this sort. In my 'Nueva Quinologia' I named and described the plant after specimens and an *adumbratio* (by Junghuhn) received from Java. To this description I still adhere, as also to the accuracy of the drawing by Mr. Fitch, which I can *now* compare with five living plants in my possession. The colouring is too bright, and the minute and characteristic veining not quite done justice to, owing to the drawing being made from a dried specimen. But on the whole I congratulate myself on not having erred more widely in (to me) so new a field of definition. I then expressed my belief that this kind would prove a source of disappointment to the Dutch Government, and remonstrated against the excessive development of this particular sort (or *sorts*, for we are now informed that in part they were hybrid, and belonged to the Cinchona hybrida termed *Hasskarliana*). At all events they were then reported 408,230 of the Pahudiana, against 11,668 of the Calisaya.

An English correspondent writes me :—"If you had lauded Pahudiana to the skies, you too would have been lauded." But this was not to be. Afterwards, when it seemed to me that the kind was too much depreciated, I put in my plea against the trees being considered as "firewood."* I showed that they would in all probability yield good medicinal bark, though useless for the extraction of quinine. On this, some one accused me of "*Een meesterstuk van Verschoonenheid*," because I seemed to shift my ground, and to show that the sort was neither so good nor so bad as party spirit on the one side or the other represented. This amused much more than it annoyed me; but it was otherwise with an attack of the late Professor Miquel, written in Latin, intelligible to all the learned, published under favour of the Government, and preserved in the Belgian Archives.† Of this I am not sufficiently fortunate to possess a copy from the author, but I understand that he says of the C. Pahudiana: "Ejus cortex de quo adeo multum et *malâ fide* scriptum est." He attacks my botanical knowledge, which is unimportant: but the insinuation above ought not to have been printed.

Time generally sets things of this sort to right; and I now copy from the organ of the *Deutschen Apotheker Vereins*, (their Pharmaceutical Journal), of 24th May, 1873, the following admission of M. Moens, who writes from Bandong, Java; and, being in charge of the plantations, naturally feels some sensitiveness in respect to what is said of them; he says in reference to my observations in this Journal on the sale of Java bark at Amsterdam, 14th March, 1872:—

"I do not know what 'advice' Howard means here. Howard has only prophesied that the bark of C. Pahu-

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* Of this sort Dr. Weddell writes thus :—"42. *C. Calisaya microcarpa* (vide tabulam), foliis oblongo-ovatis ellipticisve, obtusis, utrinque viridibus, aut in pagina inferiore nonnihil purpurascentibus, subtus pubescentibus, scrobiculis prorsus deficientibus v. parcissimis; capsulis quam in typo minoribus (8-10 *millim.* circiter longis), cæterum similibus.—*Hab.* in montibus vallis Coroico, prov. Yungas Bolivianorum, ubi vernacule *Calisaya Zamba* et *Zambita* nuncupatur.

"This variety of *Calisaya* was brought over by me in 1851, from the mountains that rise over the river Coroico, a tributary of the Mapiri, one of the most important streams of the department of La Paz. The bark gatherers (*cascarilleros*) of the neighbourhood informed me that it yielded a bark superior in quality to that of the other varieties growing in the same localities; and I confess that I was glad to find this statement of the dwellers in the wood confirmed by Mr. Howard. In fact, it was from a bark, acknowledged by him to be identical with the one just referred to, that my distinguished friend extracted the largest proportion of quinine ever found in any bark. [My largest amount (S.Q. 7·40 p.c.) was similar to that obtained by Mr. Moens, but I have since obtained 8 per cent. from the richest Calisaya.—J.E.H.] That is to say, about double the quantity mentioned by MM. Delondre and Bouchardat, as the average one of the *Calisaya*. The more or less purplish *nuance* of the under part of the leaves imparts to this variety a character of resemblance to the *C. Boliviana*. I am unacquainted with its young leaves, but it appears probable that they too must be very analogous to those of the above-named variety. Perhaps we may take for granted that it is represented by fig. 2 of the plate accompanying the article published by Mr. Howard, with regard to the barks brought over from Bolivia by Don Pedro Rada, the merchant."—*Weddell's Notes, etc.*

† C. caloptera, Miquel, sp. nov.

C. succirubra, Jung. (*non Pavon.*)

"From seed brought by Hasskarl. C. pubescens, Wedd. (Reise nicht anderer); C. purpurea, very like, according to Howard, in letters; C. pubescens, R.P. Peruv. MSS., Howard Nueva Quin., p. 74, according to Howard, London Botan. Congress, 213, in part. This has a certain resemblance to C. succirubra, and was taken for it by Junghuhn. Hasskarl compared it more rightly, as Miquel thinks, with C. cordifolia, Wedd., which it resembles in its seed, but differs in other particulars. It also stands near to C. ovata, which its bark resembles. The leaves of the specimens cultivated in Java are larger, whilst living, saturated with green and red nerves, and more pointed than those of C. succirubra—called Cascarilla naranjada by the natives."—*Hasskarl.*

A specimen given me by Hasskarl, was gathered in Nov. 1853, in the higher valleys of Carabaya.—J. E. H.

* The official reports of the transactions of the Dutch Parliament on 27th May, 1862, recorded as follows :—

Mr. Uhlenbeck, Minister of the Colonies, said: "And to show the great difference, I communicate that all the time that the Cinchona culture has been performed on a large scale there have only been planted 7804 Cinchona trees which really contain quinine, whilst in the meantime there have been planted 1,029,291 trees (Pahudianas), which are only fit for firewood."

On 2nd June 1863, Mr. Van Eck, M.P., said: "The former Minister of the Colonies stated only, the trees are firewood (*Brandhout*); we must uproot (*uitroeijen*) them."

† 'Commentatio de Cinchonæ speciebus quibusdam adjectis iis quæ in Java coluntur. Scripsit F. A. G. Miquel commentatio ex Annalibus Musei Botanici Lugduno-Batavi exscripta. Amstelodami: C. G. Vander Post. 1869.' This I understand is an abstract from the official work printed with the aid of the Government.

diana would be desired for pharmaceutical use, and that it would find buyers, *and this has certainly come to pass.* But he has also expressed his opinion that the Java Calisaya would possess no greater worth than the C. Pahudiana, and that is not correct; and so much less when it is considered that the greatest part of the plantations consist at present of C. Calisaya, which have been produced since 1867 from Bolivian seed."

So, after all, I have been right about the C. Pahudiana. Now, then, about the C. Calisaya. Turn to the first table, and we see on indubitable authority that the "Calisaya" of Java is derived from three sources.

1. C. Calisaya ("Java seed").

This table is kindly sent me by M. Hasskarl, and the paper is signed C. H. I conclude then that by Java seed the table implies that first introduced into Java, and this chiefly through his own exertions. Now, the "Calisaya of Hasskarl's sending," according to Professor Miquel, is his var. *rugosa*, of which he says, "This kind reminds through its leaves of C. parabolica and C. obovata, Pav., but *may well be a new kind*, which is, notwithstanding, *very nearly related to* the forms of Calisaya. Hasskarl found it in November, 1853, in the dale of Sandia, and the province of Carabaya, in South Peru, already in flowering condition. *The inhabitants call it Ichu-calisaya* (*itschu*, grass, straw), since it comes less on the forests than on grassy plots of ground, which are apparently the remains of earlier forests. The bark of such a tree cultivated in Java, six years old, gave Moens nearly five per cent. alkaloid, of which 2·845 quinine."

I have a specimen of the plant under my eye from Hasskarl, and, with all respect for its noble though somewhat distant relationship to the Calisaya, I venture to pronounce this Ichu-calisaya, and all derived from it, a failure.

I *predict* nothing, but look at the table!

2. Bolivia seed (Shuhkraft).

This is somewhat better, but still *not** C. Calisaya, but seed of C. Josephiana, for which latter statement I have the authority of Miquel, as follows:—

"More recently the Netherlands Consul, Shuhkraft, sent seeds of this 'C. Calisaya, Wedd. var. Josephiana, acc. ad. β.' "—*Hasskarl*, from Bolivia. "*These plants, now cultivated in Java*, bear flowers and fruit, and are not to be distinguished from the original specimens, but the plants raised from layers show always smaller leaves. The specimens brought from English India of this form stand between this kind and that next following. To this belong the specimens, brought by Hasskarl, of an old tree from the Valle Grande of Vilquebamba, in Carabaya, and also of a young tree in fruit from the same province, which grew in dry and sunny ground."—*Miquel, trans. by Hasskarl.*

I have under my eye from Hasskarl a specimen both of the young and of the old tree alluded to above, and I venture to say that *the plantations of C. Josephiana are not a success.* Again I say, *look at the table*, and understand that what is called *quinidin* has to be *deducted* from the total, 3·11 per cent.—at least, so I take it. M. Jobst does not seem to have thought the Calisaya which he bought at the previous sale much of a bargain, though he gives its produce as 3·39 per cent.

3. Bolivia seed (Ledger):—

This, I freely admit, is a great success, but (as I know from plants raised by myself) not altogether of equal quality. For proof of this I turn back to Mr. Broughton's experience; so that again we have to limit the number of genuine Calisaya trees. Out of the 2,000,000 trees said in the return to be about the number now in Java, I know not how many are of this superior kind, but I see with dissatisfaction that the "C. Calisaya *et Hasskarliana*" are enumerated *together.** Now the Hasskarliana is only a shade better than the Pahudiana, as 2·52 to 2·07,—see Jobst's analysis. In the sale we have four, or at most nine, packages of this fine bark in a total of 107 of so-called Calisaya. On the whole, I think I am not far wrong about the Calisaya.

But, if I had any doubt on the matter, M. Moens himself, in the same letter, would seem to have taken pains to relieve my uncertainty. He says:—"If we look at the cultivation of Cinchona as a speculation, people ought not to have the desire to produce bark suited for the manufacture of quinine, since, as Jobst tells us, the medicinal barks bring disproportionately higher prices than those destined for the factories, and some thousand packages of medicinal bark easily represent the value of half-a-million of guilders. The desire to produce barks rich in quinine and suited for the manufacture, has nevertheless always prevailed; but we can also point to good prospects for the quinine manufacturers. These have no need to place their hopes on the bark of C. officinalis, which in its riper age, as it appears, contains more cinchonidine and less quinine; they may place much more confidence in the culture of C. Calisaya. At all events, this sort of bark, such as has been brought into the market, contains *not so much quinine as might have been expected* from the cortex regius; moreover, the hope is not great that at a more mature age it would produce more quinine, since it has often been shown—and so again with me recently—that a handsome, very *thick bark of a ten years' old tree contains no quinine*, but very much conchinin.† But the observations of *a very large percentage of quinidine, all belong to trees which proceed from some supplied by Weddell, which were brought to Java in* 1852, and to these Calisayas, which were provided through Hasskarl's mission to South America. *Of these sorts there are about* 600,000 *to* 700,000 *trees at present, which may be cut down from time to time, and the bark of which will produce a very distinguished medicinal bark.*"

[This disposes of one-third of the two million trees in Java.]

"The larger half of the present C. Calisaya trees, some 700,000 to 800,000, proceed from trees which have been received at a later period (1864, 1865, and 1868) from Bolivia. The bark of these trees contains, so far as at present examined, no quinidine, or, at all events, very little, whether younger or older trees were tried. On the other hand, they show a very large percentage of quinine. From these trees about 270 kilogrammes will be sent to the Netherlands in the current year" (? the four packages above), "and in the next year's auction of bark, probably in March, 1873 (May), *will this sort of bark appear for the first time.* Some samples of this lot gave me 5·47 and 5·24 per cent. of pure quinine, which equals 7·05 to 6·75 of sulphate of quinine. From this people may be assured that we possess something

* According to Weddell's 'Notes,' 9, *q. v.*

* "C. Calisaya et Hasskarliana 1,235,423, total at present in the Garden." IV. Quarter, 1872.

† *i.e.*, quinidine of Pasteur.

better to found our hopes upon than the C. officinalis, and that the *main object* of the introduction of the Cinchona cultivation into Java has not failed—namely, *the obtaining a rich source of quinine.*"

This is all very good, but it does not impeach my statement about the No. 1 and No. 2 sorts of Calisaya above. This *entirely new light* shines out from *at most* "the larger half of 700,000 to 800,000 trees." I fail *exactly* to comprehend the calculation, for which the reader must recur to the original.

"In 1872 there were gathered and sent into the Netherlands 15,000 kilogrammes of bark of extraordinary goodness. Without doubt, the report of these will be more favourable than that which Jobst has given of the bark of the preceding year, and there is no reason to think that this bark will sell for less than was the case in March, 1872."

But it did sell for less, and considerably less, if I am not mistaken. Perhaps our friends will tell us why. At all events, M. Moens seems not to have present to his mind that the market may be glutted if over supplied with medicinal barks, whilst it is scarcely probable that this can be the case with *good* material for the extraction of quinine.

Let me then say one parting word to M. Moens, which I hope that he will take in good part. My advice to all cultivators of Cinchona bark is *to plant none but the very best species and to go in for high cultivation.* In so doing they will be quite independent of all courtly favour, and of all foreign competition. Success must be won by strenuous persevering exertion, for (as Schiller says of the flowers of German poetry) the Cinchona blossoms "do not expand under the sunshine of princely favour."

In this, let me say that I do not *prophesy.* I have far too much regard to a shrewd saying which imports that it is best not to prophesy till one is quite sure that what is prophesied will *certainly* come to pass.

Further, it may be a consolation to M. Moens to know that if the Dutch have erred as to excessive multiplication of the C. Pahudiana, so have the English as to the C. succirubra; and if advice has been unwelcome in the one quarter, so has it been in the other. Those who tender advice on such a subject may be content to wait till they are dead and buried before their advice will be regarded or appreciated.

I will conclude this paper with a short account of Mr. Ledger's seeds, on which so much has been seen to rest. It was while engaged in his great project of transferring the alpaca from Peru to Australia that Mr. Charles Ledger obtained the information from his native shepherds respecting the seeds of the Cinchona which he thus subsequently obtained. In the early part of the year 1865 he wrote to his brother in London that after four years of fruitless expectation the trees of the "Calisaya red bark" were reported to be in maguificent condition, and promising for seed. An Indian and his son were sent as collectors into Caupolican and returned from thence with the precious seed, which on July 22nd, 1865, was shipped from Arica to London. The autumn of the same year Mr. George Ledger sold some portion to the Consul for the Dutch Government, and after much correspondence obtained an introduction to Mr. Money to look at the box of seeds. I was asked to give my opinion, and, as I saw by the capsules that the sort appeared to be of the microcarpa kind, and as the collection was from the best district, advised that the sum named should be paid for the seeds on condition that not less than 10,000 germinated in India.

This price has since been paid by Mr. Money, and the seed, or part of it, transferred to the Indian Government. This account may be relied upon, as I have recently seen Mr. George Ledger on the subject. I cannot tell what Spanish word is translated by *red* in the above expressions. It was possibly *morada*, a term applied by the Spaniards, who are very accurate in their descriptive terms, to some of the finest Calisaya; but in looking at my plants as they are growing, I see that the term "Calisaya red bark," is still more applicable. Moreover, they are not the true *morada*, or C. Boliviana, but an undescribed sort or race. Indeed, I should not be surprised if some future botanist should define from them five or six new species, to one of which, I hope, the term *Ledgeriana* may be applied in honour of the enterprising traveller.

P.S.—I have some fifty or sixty plants now growing in the open border. They were planted out in May, and some of them bore a slight frost, but I shall have to take them up before autumn frosts set in, and I shall be glad then to give them away to early applicants.

VESICATING INSECTS.*

BY DR. FUMOUGE, PARIS.

Vesicating insects live in all the countries of the globe, and more especially the hot and temperate climates; and there is perhaps not a people which is not acquainted with their properties and knows not how to utilize them. In Europe, one kind is more particularly employed; namely officinal cantharides. It is pre-eminently *the* vesicating insect, or at least the one which holds the first rank in European pharmacopœias. And yet it would be a mistake to conclude, from its place in the Materia Medica, that it posesses vesicating properties in the highest degree: it will be seen further that it is not so. Its vesicating properties are certainly quite sufficient for the wants of therapeutics, and this explains how its use has become so prevalent; but if it is so employed in preference to other more vesicating insects, it is most especially because it is more easily gathered. Cantharides, as is well known, alight in swarms upon certain trees; it is therefore possible to collect thousands of them in a few instants, whilst this is not the case with other vesicating insects. Sometimes, as with the meloës, it is even necessary to catch them one by one, and it follows that, being thus gathered, they are far more expensive than cantharides.

Such is, I believe the cause of its almost exclusive, and I think I may say its quite exclusive, employment in pharmaceutical laboratories, as it has superseded the use of meloë and mylabris even in the countries where these were formerly employed; so that I am surprised to read, in the most recent treatises on Materia Medica, that the *Mylabris* and *Meloë Majalis* or *Proscarabœus* are employed, the former in Italy and the East, the latter in Spain. Already, several years ago, as I desired to study these insects, I asked for samples of them in Italy, Turkey, and Spain, on the strength of authors' statements; and the answer invariably was, that they no longer existed in commerce. It was with the greatest difficulty that I was enabled to procure a few pounds of *Meloë.*

There is, however, one *Mylabris*, the *Mylabris Sidæ*, better known commercially by the name of China Mylabris, which for several years has reached us from China in pretty large quantities, and may be procured in the London Docks. This insect affords on analysis as much cantharidin as cantharides; but as it is less abundant in

* From the *Practitioner.*

fatty matter, it is not, I think, as suitable as cantharides for the preparation of vesicating plasters.

The richness in cantharidin of vesicating insects is certainly very variable, and it would be very interesting to classify them according to their degree of strength, as it would be easy to do if the chemists who have had occasion to analyse them had not generally contented themselves with asserting that such and such a kind was vesicating, without stating the richness in cantharidin. This blank in the history of vesicating insects, though it is to be regretted, is, however, of slight importance for the pharmaceutical chemist, who habitually in commerce only meets with the officinal cantharides, occasionally the China Mylabris, and scarcely ever the Meloë. These are, therefore, the only vesicating insects about which he cares to be informed, as regards their richness in cantharidin.

The *Meloë Majalis* is perhaps, of all sorts, the one which contains the most cantharidin. According to my analyses, it contains 12 parts to 1000. It is, therefore, not allowable to substitute it for cantharides in pharmaceutical preparations, as this latter insect only affords 4 parts of cantharides to 1000, or only 5 at the maximum.

The China Mylabris affords, as I have said, as much cantharidin as cantharides do, but for reasons above stated it could not be used with advantage instead of cantharides in the preparation of vesicating plasters.

The pharmaceutical chemist should, therefore, not think of using Meloë or Mylabris for his preparations, and should only employ cantharides, and even that with caution, as all cantharides do not contain the same quantity of cantharidin, and may be adulterated, as happens more often than is suspected. In order to make out their proportion of active principle and not be the dupe of cheats, he has only the resource of analysis.

Researches of this kind must be made with care and promptitude, and both these conditions are, I think, fulfilled by a method of analysis which M. Mortheux and myself made known some years ago.

Though this procedure has already been described in a former publication of mine, it may be of use to give an account of it here. First, we put into a displacing apparatus 100 or even 50 grammes of the cantharides, whose strength we wish to determine, and which have been previously triturated in a mortar; then we pour on the cantharides a sufficient quantity of chloroform to immerse them entirely; and after twenty-five hours the cock of the apparatus is opened so as to let the tincture of cantharides run out. In this way the cantharides are subjected to three successive macerations, and the tincture afforded by the three macerations is distilled in the water-bath, so as to give out all its chloroform. The extract thus obtained is mixed with an equal quantity of sulphide of carbon, and then the liquid is agitated and poured on to a filter. The filter retains the cantharidin, which must be washed with a little sulphide of carbon. When thus obtained it is not entirely pure, but it is sufficiently so to enable us to ascertain the therapeutical action and commercial value of cantharides.

By analysing with this procedure various specimens of cantharides, I have been able to find out that the French Codex has adopted too high a figure in fixing at 5 per cent. the minimum quantity of cantharidin contained in cantharides of good quality. It ought to have fixed upon 4 per cent., and perhaps even upon 3 per cent, as cantharides containing only this proportion have appeared to me to be quite strong enough.

I am also surprised to see that the commission of the French Codex and authors of the British Pharmacopœia do not recommend to prepare tincture of cantharides with such a quantity of cantharides as to cause this preparation to present invariably the same proportion of cantharidin.

If the following table of mine be consulted, it will be granted that the justness of my remark is obvious on noticing that the proportion of cantharidin in cantharides may vary from 1·75 to 5 per cent.; and I have no need to insist on pointing out how untrustworthy a medicament is, prepared with a fixed quantity of a substance the active principle of which may vary in such a degree. This is a real danger when, as with tincture of cantharides, the preparations may be prescribed internally.

Origin of Cantharides.	Quantity used.	Cantharidin obtained.	Cantharidin contained in 100 grm.
	Grammes	Grm.	Grm.
1. Cantharides from France, 1866	100	0·48	4·80
2. ,, ,, ,, 1866	,,	0·275	2·75
3. ,, ,, Germany, 1866	,,	0·435	4·35
4. ,, ,, Trieste, 1866	,,	0·50	5·00
5. ,, ,, France, 1865	,,	0·375	3·75
6. ,, ,, Germany, 1865	,,	0·215	2·15
7. ,, ,, ,, 1865	,,	0·17	1·70
8. ,, ,, ,, 1866	,,	0·48	4·80

The British Pharmacopœia ought also, I think, to have indicated the minimum quantity of active principle which cantharides, employed for the preparation of blisters or epispastic papers, ought to contain. It is obvious that, if need be, cantharides containing more or less cantharidin may be used for those preparations, but only within certain limits which should not be exceeded. The epispastic papers and blistering tissues which for years have been prepared in France according to my method and by the name Albespeyres contain as nearly as possible 4 per cent. of cantharidin, and I think that this constitutes a valuable property and a real improvement in them.

Before concluding this paper it may be good to notice the trials which have lately been made with the object of replacing cantharides in the preparation of blistering plasters by cantharidin and cantharidate of potash.

The vesicating tissues prepared with cantharidin have until now been very unsatisfactory. The surface easily breaks, and they soon lose their properties on account of the slow evaporation of the cantharidin, which, as is well known, gives off vapours at the ordinary temperature. In order to prevent this last inconvenience, trials have been made of cantharidate of potash, which presents greater stability. Experience will show whether vesicating tissues prepared with the cantharidate are brittle or not; meanwhile it is quite obvious that if tissues thus prepared do not blister more quickly than those made with cantharides, there can be no advantage in using the cantharidate, which is so much dearer.

Vesicating tissues made with cantharides are at present the best agents we possess for producing vesication.

RECENT EXPERIMENTS ON OLD AND NEW ALKALOIDS OF OPIUM.*

BY A. GUBLER.

The immediate principles contained in the juice of the poppy seem to be metamorphosed at the will of each investigator, and the chemical composition of opium, already so varied, according to the analyses of Mulder, Schinler, and Bilz, has been yet further complicated, of late years, by the discovery of a great number of organic compounds.

To the old alkaloids, which were nine in number: morphine, narcotine, codeine, narceine, meconine, thebaine or paramorphine, opianine, papaverine, and porphyroxine, there are added eleven new alkaloids.

These are, in alphabetical order: apomorphine, chlorocodine, codamine, cotarnine, cryptopine, hydrocotarnine, lanthopine, laudanine, laudanosine, meconidine, and protopine.

Several, if not all, are modifications of the primitive alkaloids, produced probably by chemical operations resorted to in order to extract from opium the secrets of its magical power.

* From the *Journal de Pharmacie et de Chimie* [4] xvii. 312.

Of all these vegetable alkalies recently obtained, only two have been hitherto the object of physiological experiment, viz. *cryptopine*, and *apomorphine*. The latter, as its name indicates, seems to be, in elementary composition, merely a slightly modified form of the principal alkaloid of opium. It differs, indeed, only by the removal of an equivalent of water; its formula, according to Matthiessen and Wright (the discoverers), being $C_{17}H_{19}NO_3$; while that of morphine is $C_{17}H_{19}NO_3H_2O$. But this simple subtraction of H_2O confers on it organoleptic qualities entirely different. Far from being hypnotic and narcotic like its congener, apomorphine possesses only nauseating and vomitive properties, which are very energetic. Entering the stomach in a dose of 1 to 2 centigrammes, it produces vomiting without previous nausea in ten or twelve minutes. Subcutaneously injected, only 4 to 5 milligrammes are required to produce very powerful emetic effects, but without great depression.

Should these figures be true, we must infer that apomorphine is rapidly altered in the stomach and transformed into a substance inoffensive in contact with the digestive mucus. If it were otherwise, if there were no hindrance to the accomplishment of its topical action on the stomach, an indispensable condition of the starting of those complex movements which constitute vomiting, the latter should be produced more easily and with more intensity when apomorphine directly enters the principal passages than when, after injection, it reaches these to be partially eliminated and acts in its passage on the gastric mucus. It is thus that Drs. D'Omellas and Labbé have proved the necessity of administering by hypodermic injections much stronger doses of emetine than directly by the principal passage in order to obtain vomiting.

However it may be, apomorphine is, with reason, considered by Matthiessen and Wright as fitted to become an efficacious agent of emetic and counter-stimulant medication. It has one advantage over substances of similar action, and that is, that it is capable of being readily conveyed into the cellular tissue in sufficient quantity to produce all its physiological effects, in cases where introduction by the mouth may be impracticable, either from disease, or the patient's will.

This pharmacodynamic anomaly in the case of an immediate principle of opium merits a little attention.

And we observe, first, that the mode of action of apomorphine is exactly that of an American plant belonging to the family of Papaveraceæ, the *Sanguinaria Canadensis*, which may authorize the supposition that the active principle of this plant is the same as apomorphine. The *sanguinarine* discovered by Dana, and described also under the name of *chelerythine*, presents a similarity of composition to morphine, which warrants us in anticipating that new researches will establish its identity with apomorphine. It is, according to Gerhardt, represented by $C_{38}H_{17}NO_8$, not far removed from the old way of representing morphine $= C_{34}H_{19}NO_6\,2HO$. On the other hand, Naschold has assigned to it the formula $C_{17}H_{15}NO_4$, which brings it still nearer the new formula for morphine $C_{17}H_{19}NO_3H_2O$. In any case, the divergence between the two results is so marked as to leave some uncertainty with regard to the exact chemical composition of sanguinarine, and to justify the hypothesis of a more complete resemblance with the *dehydrated morphine* now under consideration.

In default of a rigorous quantitative analysis, always so difficult to execute, such conjectures might be tested by comparison of the *ensemble* of physical and chemical properties of the two substances. It would be interesting to ascertain if apomorphine, like sanguinarine, is soluble in amylic alcohol, benzine, sulphide of carbon, chloroform, and petroleum, and whether it communicates to its solutions a violet fluorescence.

Should experiment answer in the affirmative, it is probable that the fact would be reproduced in a certain number of similar cases, and that the profound dissimilarity of physiological action between species of the same botanical family would not imply an essential difference between the immediate principles, nor, consequently, a blow dealt to the laws of natural affinities. We might thus succeed in demonstrating that the volatile *oleiform* alkaloids of hemlock and *Œnanthe Phellandrium* are simple modifications of the essential oils of the family of Umbelliferæ; that aconitine and the neighbouring alkaloids are particular states of that volatile substance which belongs to the acrid Ranunculaceæ; that veratrine is a principle of the same origin with the toxical resinous matter which accompanies it; that picrotoxine is only a form derived from the purely bitter substance isolated in calumba, etc.

And if it were demonstrated that the same fundamental substance, submitted to changes of chemical composition apparently insignificant, may thus manifest, by turns, according to the botanical species and conditions of vegetation in each of them, the most different physiological properties, it would at the same time be established that the therapeutical or toxical virtues of immediate principles—alkaline, neutral, glucoside—are connected, not with the nature of the constituent elements, as was formerly supposed, nor even with the relative proportion of the masses of these elements, as is generally enough believed, but rather with their molecular character, or, better still, with the allotropic and dynamic states in which their elementary or compound molecules exist.

Pursuing this study, we should doubtless arrive at an explanation of the pharmacodynamic similarity of plants belonging to different groups, and the diversity in species united in the same natural family.

The second new alkaloid, of which it remains to speak, has been discovered in England by the brothers Smith, who have given it the name *cryptopia*, probably in order to denote that it was long concealed from the researches of investigators. It seems to be the least abundant of all the alkaline principles of opium, and consequently, notwithstanding its somewhat superior power to that of opium, acts efficaciously only when combined with all the others.

Pure cryptopine is colourless, and crystallizes in six-sided prisms. It dissolves readily in chloroform and alcohol, but less so in ether and in water. It combines with hydrochloric and acetic acids to form well defined salts, and is dissolved by sulphuric and nitric acids, giving a splendid purple colour with the former and an orange with the latter.

This new alkaloid has been fully experimented with by the author of the remarkable work published in London in 1869, under the title: 'The Old Vegetable Neurotics.' From his experiments on dogs and some other animal species, Dr. Harley draws the following conclusions:—

1. Cryptopine, like morphine, has two distinct actions, hypnotic and excitant, the latter consisting in the production, on one hand, of visual illusions, on the other, of convulsive phenomena. Some subjects experience simply excitation, while others are only hypnotized.

2. The somniferous effects of cryptopine are more intense and prolonged than that of the principal alkaloid of opium. A quarter more powerful than morphine, cryptopine is twice stronger than meconine and narceine.

3. Further experiments are necessary to ascertain if it presents advantages over morphine.

4. The action on the respiratory apparatus, at first stimulating, becomes depressive in strong doses, to the point of directly causing death.

5. Cardiac troubles are subordinate to respiratory disorders.

6. In considerable doses cryptopine produces pupillary dilatation.

In short, the new alkaloid ranges in the group of alkaloids of opium in which the hypnotic power predominates a little above opium, which it seems closely to resemble. It is necessary, however, to be guarded in transferring to the domain of human physiology the results obtained from lower animals. It is possible that with man, cryptopine may show itself inferior to morphine, as we have

seen to occur in the case of narceine, recognized as superior to morphine in the beautiful experiments of M. Cl. Bernard, and which the clinic finds four or five times less powerful than the old alkaloid of opium. This inequality of action, according to animal species, enables us to understand how a substance more energetic than morphine is considered by Dr. Harley as being only twice stronger than narceine. The relation indicated by this eminent observer is only true for animals experimented on by him. It may be quite different, and even reversed, in the case of man.

(*To be continued.*)

TASTELESS IODIDE AND CHLORIDE OF IRON.

The following is an extract from a letter written by Mr. Creuse, respecting the tasteless preparations of iron recently described by him,* which is published in the *American Journal of Pharmacy*:—

"If you ask me what kind of combination citrate of potassa can form with sesqui-iodide of iron, I will answer frankly that I cannot say with certitude; it is probably a combination similar to the medicinal pyrophosphate of iron or the green scales of sesquiphosphate of iron and citrate of potassa I sent you last year. That they form a combination does not admit of any doubt, for the physical and chemical changes are such as would not be presented by a simple mixture. But, be the combination what it may, I believe the new salt represents exactly the results of what happens in the stomach when protoiodide of iron is administered. Protoiodide of iron cannot be absorbed as it is, for no protosalt of iron is ever found in the animal system; when ingested into the stomach it must change in whole or in part into sesqui-iodide, which, combining with the citrates, tartrates, oxalates, malates or lactates, etc., always present in human food, becomes ready for absorption. The balance of the iodide of iron is probably eliminated, like all unabsorbed substances (I leave acetates purposely out of the list, for acetic acid is monobasic, and this class of compounds seems to be limited to the salts of polybasic vegetable acids). This explains also why protoiodide of iron is best administered just before a meal; for the food supplies the stomach with both the oxygen and the vegetable salts necessary for the digestion of the ferrous compound.

"The new iodide of iron, according to this theory, ought to be more effective and more uniformly so than the protoiodide, for it comes all ready for absorption, while the old salt, being absorbed only with the help of other variable substances, will vary more or less in its effects, besides interfering with the natural functions of the stomach.

"Experiments made by Dr. Lalanne, of this city, have confirmed this view, and have served to determine the medicinal dose of the new combination. This was necessary on account of the entirely different character of the new and the old form of iodide of iron. It has been found that from one to three grains of the salt have the same medicinal effect as an average dose of the U.S. Pharmacopœia syrup of protoiodide. As the new salt contains about 42 per cent. of iodine and 9 per cent. of metallic iron, this shows that its effects are proportionally greater than those obtained from the same substances administered as protoiodide.

"Its medical properties are, otherwise, precisely the same as those of the official iodide of iron, and its administration has always been followed by the most gratifying results; but it is not my province to speak of this, except to mention that it has found great favour among children and female patients, on account of its relatively pleasant taste and because it never blackens their teeth.

"Much of this applies also to the tasteless tincture of muriate of iron. The official tincture is still more injurious to the teeth than the syrup of protoiodide of iron; it not merely blackens them but destroys them when used long enough. I have heard some dentists speak very strongly on the subject.

"In regard to the quantity of citric acid needed for one fluidounce of tincture of muriate of iron, I have found from recent experiments that it requires from 90 to 95 grains of citric acid, neutralized by 180 to 190 grains of crystallized carbonate of soda to transform that quantity into the tasteless compound. It seems singular at first sight that the more acid is the solution of muriate of iron, the more citric acid it requires; but it is easy to account for that apparent anomaly: for, any excess of muriatic acid decomposing a corresponding quantity of citrate of soda, more of that salt is needed in proportion to the free acid present."

* See PHARMACEUTICAL JOURNAL [3] vol. iii., p. 953.

ESSENCE OF ALAN-GILAN (YLANG-YLANG).*

Unona odoratissima.

BY H. GAL.

In a paper presented to the French Academy the author has recorded the results of an investigation of the principal properties of the essence which for the last few years has been known in commerce as Ylang-ylang or Alan-gilan. It is a product obtained by distillation from the flower of the *Unona odoratissima*, an anonaceous tree growing in the Antilles and Jamaica.

The essence has a density of 0·980, at a temperature of 0·15° C. A column five centimetres long rotates a beam of polarized light 14° to the left. It passes over entirely in distillation without leaving any carbonaceous residue, but within very extended limits of temperature, ebullition commencing at about 160° C., and the temperature continuing to rise till beyond 300° C.

The essence is insoluble in water, but entirely soluble in ether; alcohol only partially dissolves it. The insoluble portion taken up in ether appears after the evaporation of that solvent as a semi-fluid, transparent mass. About one fourth of the essence yields this product.

Nitric acid attacks ylang-ylang with great energy, intense vapours being disengaged in the cold, and by the addition of water a resin is obtained presenting a great analogy with that which is formed by oxidation of benzoin by means of the same reagent. Bisulphite of soda is without action upon this essence. Potash, on the contrary, when sufficiently concentrated and used at a suitable temperature, gives rise to a kind of saponification. If the alkaline portion be removed, and a fresh quantity of potash added, and the treatment be repeated until the essence is no longer attacked, a substance is left which is insoluble in water. The aqueous portion, upon the addition of hydrochloric acid, deposits a solid body having a crystalline aspect. This dissolves with facility in boiling water; the solution, being filtered to separate a small quantity of resinous matter, yields upon cooling white pearly plates. This body melts at about 120° C., it volatilizes very readily, and is deposited upon the cool sides of the vessel in shining needles, and boils regularly at about 245° C. These are the physical properties of benzoic acid, and this substance has also its chemical properties. In fact if a small quantity be heated in presence of an excess of lime, an oil is separated which is insoluble in water, and possesses the odour and properties of benzine. Treated with perchloride of phosphorus, an energetic reaction takes place, and the piquant and characteristic odour of chloride of benzole becomes manifest. A few drops of this latter body with alcohol yielded benzoic ether. For greater certainty M. Gal submitted some of this acid to analysis. 0·276 of matter, ignited by means of oxide of copper, gave 0·126 of water and 0·696 of carbonic acid.

	Found.	Calculated.
C	68·7 ...	68·8
H	5·0 ...	4·9

It is, therefore, quite evident that the acid abstracted

* *Comptes Rendus*, June 16, 1873.

from the essence by saponification is none other than benzoic acid. The author believes this to be the first essence which has yielded a like result, that compound having been, hitherto, only met with in balsams.

The part insoluble in potash was distilled with water, and then separated from the water which passed over with it into the receiver. After drying over chloride of calcium, this oil distilled at from 170° C. to 300° C., very nearly as the natural essence. With so great a range of temperature, it was useless to expect to separate from this matter definite products with a constant boiling point; M. Gal, therefore, attempted to ascertain the nature of these bodies, which might be supposed to consist of carbides of hydrogen analogous to those so often met with in essences.

The product was treated with anhydrous phosphoric acid; a vigorous reaction took place, and a liquid was collected which no longer possessed the odour of the essence. Iodide of phosphorus also reacted upon it with great energy, and a liquid was distilled more dense than water, and possessing a piquant odour. These reactions showed that it was an oxygenated substance—or rather a mixture of oxygenated substances—resembling the alcohols in chemical properties.

M. Gal considers it probable that the acid referred to may be considered as forming in the essence benzoic ethers with these alcohols. On the one hand, the acid does not exist in the essence in a free state; and on the other hand, he was unable to obtain any alcohol soluble in water by distillation of the essence in the presence of potash.

THE USE OF TARTARIC ACID IN SOLUTIONS OF MAGNESIA.*

BY E. LEGER.

Since the introduction of citrate of magnesia into therapeutics several attempts, more or less successful, have been made to replace the citric acid, in consequence of its relatively high price. When ordinary tartaric acid is used in combination with magnesia, the solution, at first limpid, quickly becomes turbid, and deposits the greater part of the salt formed. In seeking to overcome this difficulty, and render the solution stable, the author tried successively the various modifications of tartaric acid which are formed under the influence of heat, and found that the use of metatartaric acid leaves nothing to be desired.

When tartaric acid is heated to 170° C. it quickly melts and is transformed into metatartaric acid, which, dissolved in water, is no longer susceptible of crystallization. It forms with magnesia a very soluble tasteless salt, the purgative action of which is more energetic and more constant than that of the citrate, which in many cases is uncertain.

The method of preparation which M. Leger adopts is to heat over a gentle fire a small quantity of tartaric acid in a porcelain capsule,—or, better still, a silver basin,—until it melts, carefully stirring it from time to time. Small portions of fresh acid are successively added, in such a manner as not to cool the mass too much, which might cause it to solidify and burn. The additions are stopped when the vessel is two-thirds full, and the same temperature is continued until the mass which at first is pasty and puffed up becomes completely liquid; large bubbles are formed and burst on the surface; the acid takes a slight amber colour and is then completely modified. The basin is removed from the fire and the contents allowed to cool until the acid can be manipulated without adhering to the fingers; it is then pressed into cakes, quickly cooled, and put into well stoppered bottles, it being very hygroscopic.

In the preparation of the purgative magnesian solution three-fourths of the quantity of water to be used is poured, cold, on the mixture of acid and carbonate of magnesia. The reaction is very brisk, and in less than ten minutes the solution is complete. It is necessary to avoid the use of heat; for the modified tartaric acid brought into contact with water at the boiling temperature repasses immediately to the state of ordinary tartaric acid, and the tartrate of magnesia is precipitated.

The respective proportions of modified tartaric acid and carbonate of magnesia required are two parts of acid to one part of magnesia.

When the acid has been completely modified the solutions will keep for several weeks without alteration. The action of the tartrate of magnesia is much more certain than that of the citrate, and is nearly equal to that of the sulphate. The author believes that this new salt will take high rank in therapeutics, and that this form of tartaric acid will to a great extent replace citric acid.

* *Répertoire de Pharmacie*, June 25, 1873.

ALCOHOLS FROM FLINT AND QUARTZ.*

BY DR. J. EMERSON REYNOLDS,

In appearing before you this evening to lecture on "Alcohols from Flint and Quartz," you will permit me at the outset to explain, and even materially to extend, the title of my discourse.

I do not propose to show that spirits can be extracted from flint and quartz by mechanical processes; but I hope to satisfy you that by indirect and purely chemical means we can obtain from these familiar and widely-diffused minerals, and from native silicates, bodies resembling in chemical action, and even in appearance, the well-known alcohol of wine.

Carbon has hitherto been considered the sole alcohol-forming element; but we shall see that the chief constituent of flint and quartz, namely, silicon, must now be admitted to share in this power, and likewise in the ability to form other remarkable compounds.

In selecting this subject, I have done so in part because this most promising field of research, opened up by the labours of Wöhler, Buff, Friedel, Crafts, Ladenburg, and others, has hitherto been but little cultivated in this country; and also because we find in this new branch of chemical investigation most interesting illustrations of the advantage we may derive from the cautious use of the argument from analogy.

As a preliminary to the inquiry I propose, we may consider very briefly the chemical nature of flint and quartz.

The word "flint" is of very ancient origin, and was often used to indicate any particularly hard rock. In this sense it is employed several times in the Old Testament—first, in the Book of Deuteronomy, viii., 15, and in Psalms, cxiv., 8, where the rock struck by Moses is said to be "of flint." We now use the term to distinguish a well-known uncrystalline mineral, which can be easily shown to be a chemical compound of two so-called elementary forms of matter—oxygen and silicon.

Flint is identical in chemical composition with quartz or rock-crystal, though physically different. The common name of "silica" is given to the chemical compound, and the terms flint, agate, quartz, rock-crystal to the forms in which we meet with this substance in nature.

Having cleared our ground so far, we have to find how the oxygen may be separated from any of those forms of silica, and the element silicon may be obtained. This cannot be directly accomplished, but by indirect means we can obtain the desired results. I have here a quantity of finely-divided flint, mixed with some powdered fluor-spar; when I pour oil of vitriol on the mixture, and apply heat, a colourless gas is obtained, which, when passed into water, produces a highly acid and gelatinous liquid. The gas is a compound of the element fluorine with silicon—the tetrafluoride of silicon—and this, when brought in contact with water, produces an acid called hydrofluosilicic and a quantity of gelatinous hydrate of silica.

* Lecture delivered at the Royal Institution, Friday, May 2, 1873.

The clear acid liquid, when treated with caustic soda, yields this white salt, the fluosilicate of sodium, from which we directly obtain the silicon, as you see, by simply heating with some metallic sodium. In this case, the sodium replaces the silicon, the latter separating, as you observe, in the tube as a dark-brown substance.

Having thus prepared silicon from flint, we are in a position to compare it with carbon, to trace out the analogies which subsist between them, and then to show that some of the alcoholic and other *compounds* of carbon have their strange and interesting analogues in a silicon series.

First, then, we shall compare the elements themselves.

We meet with nearly pure carbon under the well-known forms of charcoal, graphite, and diamond.

We can easily prepare the corresponding varieties of silicon—the amorphous, the graphitoidal, and adamantine. With the aid of the phengascope, I shall now project on the screen images of specimens, in order that you may compare the varieties side by side. I have also on the table a very fine specimen of crystallized silicon, for which I have to thank Messrs. Hopkin and Williams. [The lecturer showed a greatly magnified image of a fine crystallized diamond on the screen; a number of other specimens were exhibited in the same way.]

As might be anticipated, the specific gravity of carbon is lowest in charcoal and highest in diamond. Corresponding differences in specific gravity are observed between the varieties of silicon. The two elements also correspond remarkably in variations of specific heat, with different states of aggregation. The specific heat of the diamond is lower than that of graphite, and the specific heat of adamantine silicon is lower than that of the graphitoidal variety.

We are familiar with the fact that carbon burns in oxygen, producing, in an excess of that gas, the well-known gaseous oxide of carbon, commonly called carbonic acid; charcoal and coke burn readily in oxygen, while graphite is consumed with considerable difficulty, and the diamond is still more difficult of combustion. Amorphous silicon burns as easily in oxygen as charcoal, and forms the oxide silica, the same oxide that we find as flint or quartz.

In this way we can reproduce, so far as composition is concerned, the substance from which we originally obtained the silicon for our experiments. Now, though amorphous silicon is easily burnt, the graphitic and adamantine varieties of the element resemble the corresponding forms of carbon in difficult combustibility. Crystalline silicon may be raised even to a white heat in oxygen gas without burning.

Unlike carbon, silicon in any of its forms easily combines directly with chlorine, producing the liquid chloride which I have in this tube. This is a very volatile body, boiling at 50° C., and is half as heavy again as water. It can also be prepared from silica by heating to full redness the finely-divided oxide and carbon in a current of chlorine. In composition this chloride is the silicon representative of tetrachloride of carbon.

In addition to this chloride of silicon, the discovery of which we owe to Berzelius, another has very recently been obtained by Friedel, which corresponds to a well-known carbon hexachloride.

We next pass to a compound of silicon with hydrogen. It may be prepared in a pure state by means of a rather complex reaction I shall have presently to refer to; but we can easily obtain the impure gas by Wöhler's method, in treating a compound of silicon and magnesium with hydrochloric acid. We thus obtain a colourless, spontaneously inflammable gas, which burns with a bright light on contact with the air. In its pure condition siliciuretted hydrogen is not spontaneously combustible at ordinary pressure, but in a slightly rarefied atmosphere it easily inflames. The compositions of these silicon and carbon compounds are shown in this table:—

SiO_2.	Oxides.	CO_2.
$SiCl_4$.	Chlorides.	CCl_4.
Si_2Cl_6.	,,	C_2Cl_6.
SiH_4.	Hydrides.	CH_4.

The siliciuretted hydrogen is evidently the chemical analogue of marsh-gas, the tetrahydride of carbon.

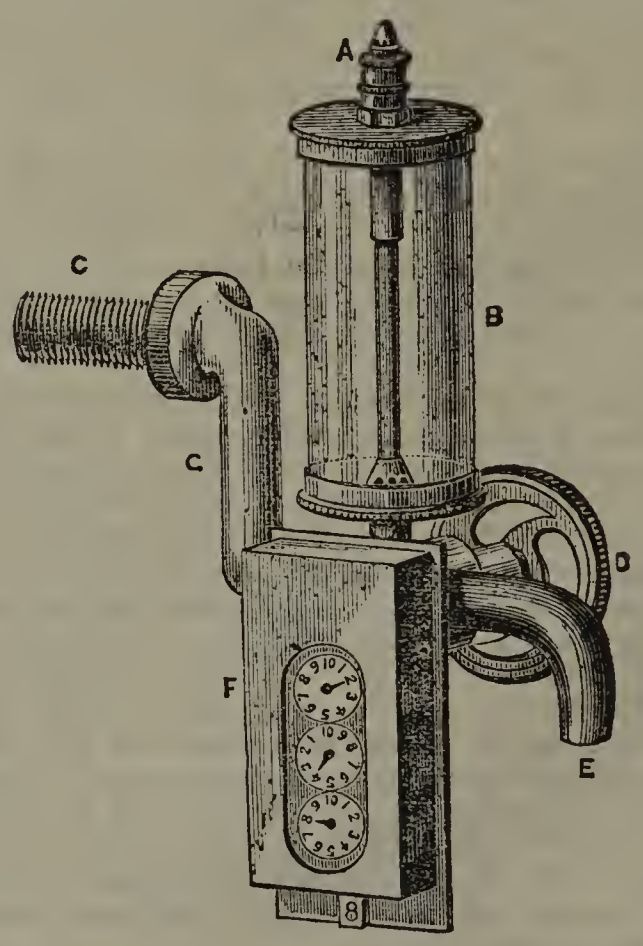
It is usual to regard marsh gas as the typical carbon compound from which some alcoholic series may be supposed to spring, and, in fact, all the alcohols belonging to the group of which the well-known wood-spirit and spirit of wine are the the chief members are commonly regarded as derivatives of marsh-gas, in which a part, or all, the hydrogen has been replaced by one or more compound radicals, such as hydroxyl, methyl, ethyl, propyl, etc. In these cases carbon of the marsh-gas is the grouping element of the compound, or that constituent which serves to bind together the different materials of which the molecular edifice is constructed. In the same way the silicon in siliciuretted hydrogen may be shown to be the nucleus round which can be grouped hydroxyl, methyl, ethyl, etc., so as to form alcohols. Several of the less complex terms are still wanting, but their existence is rendered highly probable by the occurrence of bodies bearing the same close relation to the unknown alcohol that marsh-gas bears to wood-spirit, or the acid of vinegar (acetic acid) to common spirit of wine. As we ascend in the series, however, we meet with the true alcohols, in which silicon takes the place of carbon as the grouping element.

It must be here admitted, however, that no well-defined alcohols have yet been discovered in which silicon acts in any other way than as the nucleus of the compound; carbon radicals in all these cases playing the subordinate parts. But we have every reason to expect that complex alcohols containing silicon only will yet be obtained.

(*To be continued.*)

SELF-REGISTERING MEASURING TAP.

The accompanying woodcut represents a useful improvement in measuring taps. By means of an arrangement similar to that adopted in gas meters, every discharge from the tap, whether it be in ounces or drachms, or any other fixed quantity, according to the size of the measuring glass, is registered on the dial. A check is thus kept on the quantity drawn, and that which remains in the barrel or tank. The contrivance has been registered by Messrs. Dows, Clark, and Co.



The Pharmaceutical Journal.

SATURDAY, JULY 12, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE DRUG TRADE.

THE statistics which refer to our drug trade and its collateral branches during the past thirty years—a commercial period most important to this country—possess features of the greatest interest. They are, too, more especially interesting to chemists and druggists as showing how goods in which they deal in the every-day course of business have progressed as a distinct branch of trade, or whether they have progressed at all. We have before us the statistics giving the exports and imports of drugs, so far as the United Kingdom is concerned, during the past thirty years—say from 1840 to 1870—and we propose to give the most salient points which these figures bring to light. We first begin with our exports of "drugs and chemical products unenumerated," which is the official classification given to these goods in the Government returns. In the year 1840 the declared value of these goods exported was £142,902, which gradually increased until the amount was, in the year 1850, no less than £363,142. From this time the increase was still more rapid, the amount being in 1853 £538,616, and subsequently the trade appears to have increased and expanded with remarkable rapidity. The exports were in 1864, £900,402; 1865, £919,256; 1866, £1,011,506; 1867, £1,068,114; 1868, £1,049,277; 1869, £1,287,453; and 1870, £1,382,786. It will thus be perceived at a glance how remarkable has been the modern development of this branch of our commerce. In the year 1840, as we have shown above, the value of the drugs, etc., exported from this country was only £142,000 in round numbers, whereas in 1870—thirty years after—the amount had increased to no less a sum than £1,382,000—an augmentation of considerably over a million pounds sterling! Probably it may surprise many of our readers, and even those who are more directly concerned in the shipment of drugs, to know that the trade has achieved such rapid progress in modern times as is here shown—a progress as remarkable as it is gratifying. While upon the subject of our exports we may appropriately glance at the export trade in soda alkali, and here again we find a no less astonishing progress than is recorded above. In the year 1840 this article was exported from the United Kingdom to the value of £47,045; in 1850, £375,351; in 1860, £965,348; and in 1870, £1,485,596; and we thus see the results of thirty years' commerce in respect to this commodity. The increase in the trade here shown is certainly astonishing, and amounts to over a million pounds sterling as a clear gain in this branch of the business during the three decades under notice. The subject of the rapid development of England's foreign commerce of late years was eloquently alluded to by Mr. GLADSTONE in a recent speech; and such facts as we here show, concerning as they do comparatively minor goods, bear out the truth of the Prime Minister's observation that our trade is not increasing gradually and slowly, but by "leaps and bounds." In respect to drugs and chemicals, this is specially the case, and must be an interesting fact to the readers of this Journal.

The statistics giving the exports of opium from this country during the past thirty years are well worthy of passing notice. Here again the inevitable law of increase appears to go on, testifying to the indomitable principle of British commerce. In the year 1840 our exports of opium only reached the small total of 35,848 lbs.; in 1850 they were 87,451 lbs.; in 1860, 98,072 lbs., and in 1870, 150,414 lbs. Thus it will be seen from these few figures that the export trade in opium has grown into much greater importance in present times than as compared with what it was formerly. From 35,000 lbs. to 150,000 lbs. is not a bad increase to have occurred in such an article during a period of thirty years, and is a sufficient refutation of the erroneous arguments of those who assert that the commerce in this article is entirely stagnant, and quite unsusceptible of improvement. Speaking in a comparative sense, this trade is, of course, small; but, speaking again comparatively, the increase shown above is certainly noteworthy. It is a fact also that, while the declared real value of the exports of opium from the United Kingdom was in the year 1860 £91,125, it was in the year 1870 £196,165, an augmentation which places the progress of the trade in this article in a yet clearer light. Indeed, it is worthy of remembrance, amongst the notabilia of the chemist and druggist, that the exports of opium from this country are now annually worth something like two hundred thousand pounds sterling and that during the past thirty years the amount has been more than quadrupled. Before finishing our exports of drugs, it may be well to state that in 1840 the exports of Peruvian bark amounted to 1058 cwts., while in 1870 they were 12,785 cwts. The declared value of these exports was in 1856 £110,695, and in 1870, £123,375.

We must next turn to the figures relating to the imports, from which we learn how the trade has gone on in the importation of saltpetre and cubic nitre. In the year 1840 saltpetre was imported to the amount of 304,817 cwts.; in 1850, 271,139 cwts.; in 1860, 329,206 cwts., and in 1870, 295,538 cwts., a diminution thus being apparent. With regard, however, to the imports of cubic nitre, the

case is widely different, as will be seen from the following statistics of the importation: — 1840, 33,000 cwts.; 1850, 257,873 cwts.; 1860, 745,559 cwts., and 1870, 1,132,647 cwts. The augmentation in the imports of this last named commodity is very great, in fact astonishingly so. In 1840 the amount imported was 33,000 cwts., which, as contrasted with the large total of the imports of the year 1870, shows the great rapidity with which this branch of the import trade has progressed and expanded.

WHAT IS A MEDICINE?

What is an adulteration? is a question which has somewhat perplexed many British pharmacists, and it still remains without a satisfactory answer. Our brethren across La Manche are also just now experiencing the truth of the saying that nothing is so difficult as a definition, the all important question to them now being, What is a medicine? The French law confining the sale and dispensing of medicines to pharmaciens has recently been enforced in several cases, but it has been difficult sometimes for the Court to discriminate between articles of medication and those of alimentation. Discussions have taken place at the meetings of various societies, and opinions have been volunteered to assist the judges in coming to a decision, but apparently without securing unanimity, for while the court at Paris has decided that cod-liver oil is a medicine, and has fined unqualified persons for selling it, the court at Douai has decided that it is an article of grocery. To add to the ludicrousness of the position, it has been pointed out that the same law which confines the sale of drugs to the pharmacien also limits the dealings of the pharmacien to drugs, and therefore if cod-liver oil be an article of food its sale in a French pharmacy is interdicted.

THE ROYAL BOTANIC SOCIETY'S FETE.

On Wednesday evening last the Royal Botanic Society gave a grand fête in their gardens at Regent's Park. Unlike the fête of last year, the pleasure of which was marred by a violent thunderstorm, the present reception was a great success every way.

About eight thousand invitations were issued—the fellows themselves numbering between two and three thousand—and the result was a sight which for gay beauty has been seldom surpassed. The gardens were illuminated by one of Gramm's patent lights placed on the anemometer tower; and several other electric lights were displayed from prominent parts of the grounds. Thousands of coloured lights were scattered in every direction, and at intervals the whole was further illuminated by magnesium lights and various coloured fires.

A BOTANICAL FEATURE OF KHIVA.

The Prussian correspondent of the *Times*, in a recent letter describing the physical characters of the steppes and deserts surrounding Khiva, gives the following account of one of the plants indigenous to this district:—

"Excepting one extraordinary plant, as uncanny in its appearance as the character of the entire region, there are no shrubs or trees to be met with even in summer. This plant, the queen of the melancholy family of the *Chenopodiaceæ*, which prevails in the steppe, is the well-known Saxaul (*Anabasis Ammodendron*). A sort of willow, sometimes growing to a height of fifteen feet, and forming whole woods on rivers and lakes, it is probably the most lugubrious-looking tree in the world. It has no leaves, but only small excrescences of a livid hue; it has no ramifying branches, but only thin boughs coming immediately from the stems; last, not least, it does not grow erect, but laboriously struggles up in zig-zag curves, as though it longed to return to the earth, whence it sprang up with such painful effort. Compared to a wood in more favoured climes, a Saxaul copse is an assemblage of hunch-backs and consumptives, wearing mourning for their deceased relatives, whose footsteps they expect speedily to follow. Still the tree makes excellent fuel, and is an inestimable blessing in a country in which there is no other material to kindle a fire. Until lately the Russians heated their steamers on the Aral and Sir Daria exclusively with Saxaul."

RHEEA OR CHINA GRASS.

An advertisement in the *Times* of July 10th, signed by the Under Secretary of State for India, states that an opportunity having presented itself of obtaining the Rheea—"China Grass," or "Ramie"—plant in its fresh state, persons wishing for a supply for the purpose of experiment should apply to the Reporter on Indian Products, at the India Office, without delay. Inventors in this country will thus for the first time have an opportunity of experimenting with the Rheea plant in its green state.

INDIAN OPIUM.

The poppy being exclusively grown for the Supreme Government of India in Benares and Behar, the permission of the Lieutenant-Governor of Bengal has been sought and obtained on the subject of improving its cultivation. The opium manufactured in the Himalayas contains 50 per cent. more morphia than that of the plains of India. This fact was placed on record in the *Journal of the Agri-Horticultural Society of India.*

LIEBIG'S SUCCESSOR AT THE FRENCH ACADEMY.

We learn from the *Moniteur Scientifique* that at the sitting of the French Academy, on Monday last, Sir Charles Wheatstone was elected as a Foreign Associate of that body, in the place of the late Baron Liebig.

MANNA, ETC., FROM PALERMO.

From the consular reports we find that the shipments of manna from Palermo were 1345 cwt., valued at £8189, in 1870, and 2530 cwt., valued at £14,642, in 1871. Most of this goes to France. The trade in essences and essential oils also shows a large increase, having risen from 8890 lbs., valued at £1252, in 1870, to 49,800 lbs., valued at £6620, in 1871. There are five manufactories of concentrated lemon juice and essences in that city which turn out 400 pipes annually.

Provincial Transactions.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

The district round Northampton is not a good one for botanical specimens, the land being cultivated to the exclusion of wild flowers, while the absence of commons and chalky uplands renders it comparatively unproductive; but, though great varieties are not to be discovered, a fair variety of plants may with diligence be found. One of the most favoured spots, perhaps, is Yardley Chase, about eight miles from the town, and this was after a due amount of discussion chosen for the botanical ramble of the above Society.

Accordingly, the few favoured ones who were able started on the 27th ultimo under most discouraging circumstances, the sky being overcast and the horizon covered with nimbus of a most lurid tint, denoting their full charge of electricity. Candid friends had given their various opinions: all arriving with extraordinary unanimity to the fact that the worst possible day had been chosen; but, despite the prophecies of ill weather, it was determined to go, and the company proceeded by rail to Castle Ashby, where the ramble proper commenced, along a road leading to the seat of the Marquis of Northampton, who had kindly given permission for the members to go over the park and gardens. Several spring flowers were gathered, including *Geranium dissectum* and *G. pusillum*, the little *Erodium moschatum*, with its extraordinary long carpophore—whence its common name, stork's bill—being especially abundant. The view to the rear was extremely pretty across the Nene valley, with the old church of Earl's Barton a prominent object in the landscape, and the Nene winding its sinuous course through the numerous mills that impede its progess. By the time the entrance gate of the Comptons was reached the sky had begun to clear, and those members who had with provident foresight brought umbrellas and mackintoshes began to make overtures of business. The mansion was soon in sight, and a gentle walk conducted to the terraces, round which were stone letters for a fence, forming the text: "Consider the lilies of the field," etc.; on which, in striking juxtaposition, some peacocks were displaying their beauties, in vain trying to outshine the floral treasures contained within. The entrance to the old garden having been effected, the enthusiasm and delight of all was aroused by the sight of plants which are but too commonly thrust out to make room for the everlasting rows of pyrethrum, lobelia, and geranium, placed with mathematical exactitude—plants such as comfrey, whose use in bone-setting is sanctioned by Squire; *Chelidonium majus*, the cure for warts; fumitory, hogweed, holy thistle, and large bunches of borage which, with comfrey explained so well the definite inflorescence of a scorpioid cyme; while in the herb garden such old monkish legacies as henbane, angelica, lambs' lettuce, herb burnet, and tarragon were growing luxuriantly.

Down the long walk were masses of *Rheum* in flower, forming a very effective plant; and by the path

> "Foxglove and nightshade, side by side,
> Emblems of punishment and pride."

Solomon's Seal was pointed out as the plant yielding the rhizome sometimes in request after those sweet interchanges of courtesy with which alley life abounds, while its near relation, lily of the valley, recalled vividly Lodore Falls to one at least of the company. Then came the visits to the ferneries and conservatories, and neither few nor far between were the objects of interest and beauty. *Chœmerops*, with its straight-veined variety of parallel venation, the spiral phyllotaxy of the screw-pine, the beautiful passion and trumpet flowers, the giant-leaved banana, the *Citrus Limetta*, *Limonis*, and *Aurantium*, characteristically showing buds, flower, and fruit, on the same plant; the Hoya, which carried back to one's memory a diagram of Bentley, showing the filled up cell by secondary deposits, the stag-horn fern, with an epiphytian mode of existence, the fragrant orchids, graceful tree-ferns, showy azaleas, and fantastic palms, all holding out, and not in vain, some inducements to linger. And then under glorious old trees, sycamores, limes, and birch, under which the rose of sharon was displaying its multifarious stamens, and the rhododendrons made a magnificent show.

Dinner having been partaken of, the following toasts were heartily drunk:—"Success to the Northampton Pharmaceutical Association," "The President, Mr. Hester," "The Secretary," "The Pharmaceutical Society of Great Britain: its late and present President," "The Pharmaceutical Journal and Dr. Paul," "The Principals," and "The Marquis of Northampton." The company then proceeded through the long avenue (three miles) to Yardley Chase, soon separating to search after *Paris quadrifolia*, helleborine, *Habenaria bifolia*, *Listera ovata*, and other desired floral treasures, the way leading through an old quiet forest, over the springy turf, by sedge-lined ditches and primrose-covered nooks, on through fields and pastures, till a group of oaks attract attention and excite curiosity as to which is the Yardley oak, immortalized by Cowper. There, beyond all doubt, is the one, so gnarled, distorted, and hollow, so completely weather-worn, yet putting forth as if in the prime of life leaves so abundantly. Then on, passing Cowper's house and through country as redolent of him as the Trosachs are of Scott, in the distance the River Ouse, with its white water lilies, Weston Underwood, and Clifton Church, Olney's long street and church spire—all interesting and attractive by his aid. Reluctantly at Olney was the ramble completed, long to be remembered for its pleasures, longingly looked back to for its enjoyment and forward for its renewal. By the kind invitation of P. Jeyes, Esq., the members of the Association breakfasted at Holly Lodge on the following Tuesday and Thursday, a very happy morning being spent in looking over the gardens and conservatories, croquet and archery however competing with botanical attractions. Many hearty thanks were given to Mr. and the Misses Jeyes for their kind and graceful hospitality, and to the principals for the extra time allowed.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

On the Energies of the Imponderables, with especial reference to the Measurement and Utilization of them.*

BY THE REV. ARTHUR RIGG, M.A.

Lecture I.

Introduction—Inter-relations—Units of Measurement, etc.

"Imponderables," as a technical term, was in the last century a name given to those fluids which were supposed to convey electricity, light, heat, etc.; and because these fluids could not be isolated and weighed, all that men received through their agency were also named "imponderables." These phenomena are now regarded as being due to motions in ponderable matter, and they are considered rather as forces causing motion in this matter than either as a fluid, or as that which can be conveyed, *i.e.*, carried, by fluids. The term is, however, retained as a brief mode of expressing the subject of this course of lectures, especially as no one can confidently assert that it may not again be reinstated in the position it once occupied.

The "energies of the imponderables," then, is a phrase comprehending all results of those unseen, unknown, and by man unweighable powers which pervade space. By

* Cantor Lecture, delivered February 3.

such powers the very sun, and planets, and stars are so influenced that they move in harmonious union or oneness, and, therefore, the name universe is applicable. With this extensive view of the influences and actions of the imponderables these lectures are not to be concerned. The bounds of them are, however, easily defined. This earth and that which man can utilize upon it are our limits. Even when thus "cabined, cribbed, confined" to the earth and the handiwork of men, still, those who have perused and thought over the title, viz., "The Energies of the Imponderables, with especial reference to the Measurement and Utilization of them," may have commented upon it in spirit, saying, "Fools rush in where angels fear to tread." When body, form, and fashion were first given to the scheme of this course, that great was the presumption, and that great, therefore, would be the failure, were not unknown feelings.

The causes of such views are simple and easily made clear. The energies of the imponderables have in one form or another occupied the attention of the most thoughtful as well as the most practical men in every age. They may not have given this name to the subject of their investigation, but, call it what you will, the ultimate source of all power that nature gives to man is to be found in the energy of one or more of those unknown agents to which the name of imponderables has been given. To dwell upon this now would be to anticipate the series of lectures. It may suffice to state that the object of the course is to bring before you illustrations of the modes in which men have been led—or are now being led—to define not only the ways and varieties of ways in which each imponderable acts, but also to estimate by those measurements to which men appeal in material things, the amount or value (if the word be preferred) of that work in material things done by these imponderable elemental powers. To do this involves references, perhaps, in few words, to conclusions at which a life of self-devotion to one cause may have arrived, that life, too, being aided by the very highest of cultivated mental intelligence and the capability of employing such powers of scientific research, the very alphabet of which is beyond the attainment of the majority of men.

Whilst thus frankly, and at the outset, admitting how high a class of mind is required for these original investigations, it must not be overlooked that the principles which have governed the researches of these men, and the conclusions at which they have arrived, may be appreciated by many minds.

When the late Mr. Faraday was discoursing "On the Conservation of Force," he made a statement in relation to an observing and a mathematical mind which will have more weight by your generalization of his words than by my dilution of them. Hence this quotation :—

"It may be supposed that one who has little or no mathematical knowledge should hardly assume a right to judge of the generality and force of a principle such as that which forms the subject of these remarks. My apology is this :—I do not perceive that a mathematical mind, simply as such, has any advantage over an equally acute mind not mathematical in perceiving the nature and power of a natural principle of action. It cannot of itself introduce the knowledge of any new principle. Dealing with any and every amount of static-electricity, the mathematical mind can and has balanced and adjusted them with wonderful advantage, and has foretold results which the experimentalist can do no more than verify. But it could not discover dynamic-electricity, nor electro-magnetism, nor magneto-electricity, or even suggest them; though, when once discovered by the experimentalist, it can take them up with extreme facility. So, in respect to the force of gravitation, it has calculated the results of the power in such a wonderful manner as to trace the known planets through their courses of perturbations, and in so doing has discovered a planet before unknown. There may be results of the gravitating force of other kinds than attraction inversely as the square of the distance, of which it knows nothing, can discover nothing, and can neither assert nor deny their possibility or occurrence." *

Influenced by such views as these, it seemed that no disrespect to the highest intellect could accrue from an attempt to make clear, even to the lowest, a few of the fundamental principles from which important truths have been evolved. It must be borne in mind that to illustrate the modes by which these energies have been measured and utilized, and not to make any attempt at measuring them, is the leading principle which, thus early enunciated, may prevent misconceptions of the title.

The very words, "Energies of the Imponderables," are to some minds terms and not realities—symbols, like political watch-words, serving only to classify their professors—things for *savans* to discourse upon—provinces in that intellectual dreamland in which natural science is supposed to dwell. To the majority of men, to those who toil for their daily bread, and with all their toiling find but scant supply, the monastery of science, in which her monks live apart from the world and all its vulgar cares, seems a paradise in which is no unrest. Such is only one of many thousand delusions. Within the thinly-peopled world of those who investigate the laws of nature there are all the pleasures and pains which meet the labourer with his spade, the mechanic with his tools, the merchant in his office, or the statesman in his cabinet. It is because students and investigators of nature's laws live much alone —because they cultivate a species of clanship—because there is amongst them a kind of Hindoo caste—that they are seldom in contact and companionship with the toilers in material things. This is much to be regretted. Although both parties are losers, yet the toilers in material things are by far the greatest losers.

Such men as these are the true pioneers of the human race, and that army is ill-directed which allows the work of preparation done by its pioneers to be so far in advance that the mountains they had levelled were again piled up, the rivers they had dried were again flowing, and the thorns once cleared from the desolate prairies were again rendering the ground unfertile. The men of science are they who give the sap of vitality to the tree of commerce. Society plucks the fruit and seldom waters the plant. Such has been, and such still is, the case with investigators of natural science, if the men amongst whom they live take the fruit and care neither for the gardeners nor the garden.

Look at the world! the beautiful glass in some of our stained windows is a lost art. Look at the temples in India, illustrations of which the photographs so truthfully reproduced in this room a few weeks since. Civilized Europe and self-satisfied England cannot, either by their St. Peter's at Rome or those recent productions which we are bound to recognize as the highest attainment of national architecture — the Albert Hall and adjacent memorial—approach even at a distance. These temples of a religious profession, with which we are not even acquainted, and of which no records remain, abound in an architecture with which neither in its conception nor in its detail have we aught to compare. And of the materials the men of that age used, we may say the stone is stone still; the sharpness of the carvings is sharpness still.

Is all our dolomite a bastard dolomite? Why are we in England obliged to seek for Italians to form our moulds—to pour in the clay, and to sculpture the marble? Why do we go to Germany for our draughtsmen, our science, and our music, and to France for our adornments and our designs?

One illustration of the neglect of obviously social gain from want of scientific attention cannot, in this room, be out of place?

The Society of Arts was founded in 1753, and when the scientifically practical and theoretical minds of Count

* P. 364, 'Proceedings of Royal Institution,' on 27th Feb., 1857.

Rumford and others considered on what basis and why the "Royal Institution of Great Britain" should be founded, they expressed the objects of thus founding a Society, which should supplement the work of the Society of Arts, in the following title-page to the charter of 1800 :—

"Royal Institution of Great Britain, for Diffusing the Knowledge and Facilitating the General Introduction of Useful Mechanical Inventions and Improvements, and for Teaching, by Courses of Philosophical Lectures and Experiments, the Application of Science to the Common Purposes of Life."

In reference to the necessity for so supplementing the work done here by our predecessors, in order to "advance the applications of science to the common purposes of life," the then managers state that "the giving of premiums to inventors, was done by a most respectable society (the Society of Arts), but to diffuse knowledge needed another incorporation."

Whilst admitting how nobly the Royal Institution has done good work, and how generations yet unborn will look back with reverential gratitude to the boons which those who have laboured within its walls have conferred upon men, it is curious to mark how the views of its founders, and the one great purpose of its formation in 1800, are being realized by the Society of Arts in 1873.

In 1800 the managers of the Royal Institution, as their first act, constituted fourteen committees, for the following purposes :—

1. To investigate the various processes used in making bread, with a view to their improvement.
2. To investigate means for producing cheap and nutritious soups for feeding the poor.
3. Improvement of cottages and cottage fireplaces.
4. Improvements in the construction of stoves for warming dwelling-houses.
5. Improvements in kitchen fireplaces and kitchen utensils of private families.
6. Improvements of the most useful articles of household furniture.
7. To ascertain, by experiment, the effects of various processes of cookery upon the food of cattle.
8. Improvement of kitchen fire-places and kitchen utensils used on shipboard.
9. Improvement of lime-kilns.
10. Ascertaining the effects of mixing clay, etc., with coal-dust and cinders, in forming fire-balls and combustible cakes.
11. Improving the composition of mortar and cements.
12. To ascertain the best method of building cottages and farm-houses with earth rammed together.
13. A committee of mechanics for the improvement of useful machines of all descriptions.
14. A committee for improving the various processes necessary in producing iron from its ores, and in working and refining of iron and steel.

Thus did one noble foster-child of this Society prescribe its own duty, and, child-like, neglect that particular duty, and now that the child has attained the age of threescore years and ten, the nursing mother, by gold medals and money rewards, steps forward to complete the work begun by her foster-child, and further, by these annual Cantor Lectures, she now does that which, not being done in 1800, led to the formation of the "Royal Institution of Great Britain."

This comes of the people of a country allowing the science of a country to dwell alone. All advances are first suggested by men who observe and think; they are extended by men who reason and test; they are utilized by men who act.

The pioneers of an army are not the fighting men; sailors navigate the ship; marines do the warfare.

The men who investigate the laws which govern the energies of the imponderables are not the men to utilize and apply them. The practical knowledge—the stimulus of interest—the capital of the manufacturer, are wanting to the philosopher; while the manufacturer, on his part, is equally in want of the general information and accurate reasoning of the man of science. When the commercial element enters, and another object of regard is set up for worship, the man of science cannot serve two masters; he cannot serve science and mammon. The more earnestly and heartily he serves the former, the less he bows to the latter. The service of natural science has within itself far more ennobling mental rewards than mammon can confer.

Longfellow, in his letter to Agassiz, on his fiftieth birthday (28th May, 1857), after alluding to the sacrifice he made of his country and his home, for the cause of natural history, well expresses what he feels who, single-minded, teaches men to read what is still unread in the manuscripts of God. Agassiz is described as—

"He who wandered away and away,
With Nature, the dear old nurse,
Who sang to him night and day
The rhymes of the universe."

And then comes a reward more welcome than money or honours—

"For whenever the way seems long,
Or his heart begins to fail,
Nature sings a more wonderful song,
Or tells a more marvellous tale."

This course of Cantor Lectures, in relation to the energies of the imponderables, is to be an attempt to occupy the border-land between pure scientific research and the ministration to social needs; to tread, in fact, upon neutral ground, to launch our boat upon the Rubicon which divides the provinces of science from those of commerce. It does not aspire to any claim on the nests of science; they who build them are welcome to the imagined and worthless immortality of a name. It does not propound to commerce new modes of amassing wealth. They may keep their wealth who can. But it does seek to bring before those whose daily bread and daily luxuries are derived from science, illustrations of some of the truths on which our daily labour rests. It will try to do this in plain and simple form, divested of those higher studies through which these truths have been in some measure attained, and in a thousand ways extended.

That the work is one worthy of all human intelligence may be inferred from the official document given by the authorities of that incorporation of men who are the real rulers of the earth, properly so-called. Statesmen and politicians may influence the minds and bodies of men, but engineers influence all material things.

The Institution of Civil Engineers, established in 1818, long before passenger railways, telegraphs, etc., etc., were known, and now numbering among its members men in all parts of the globe, clearly and aptly defined the objects of their incorporation in words well fitted to the purposes of our present consideration. They then (in 1818) defined the object of their association to be, "The acquisition of that species of knowledge which constitutes the profession of a civil engineer, whereby the great sources of power in nature—*i.e.*, the energies of the imponderables—are converted, adapted, and applied, for the use and convenience of man."

It may be said, and with some show of reason, when the comprehensive title of these lectures is considered, a little well or completely done is better than much ill or very partially done. As a principle in education this is a truism which the Committee of Council on Education and our various School Boards would do well to adopt and illustrate; but these Cantor Lectures are not to be scholastic lessons; they may teach, but the primary object of them is rather to be suggestive of thought—to give the minds of hearers and readers food for reflection, material for development, to arouse inquiry, to provoke investigation; to leave, in fact, an unsatisfied impression that there is more than the lecturer has expressed—and there is much for hearers and readers to consider. If thus they only lay in the foundations of knowledge, and in rough

and sketchy outline show the superstructure, they will have done good service — they will have stimulated research, and so led to the acquisition of knowledge and a habit of mind more valuable far than any which can be given from this platform to you who sit at ease on those cushioned seats, willing to rest for a while under the delusive spell that the Society of Arts has thus found a right royal road (and perhaps a pleasant one) to learning. Such an unsatisfied feeling in relation to the energies named, and the measurement and utilization of them, it is the object of this course to endeavour to create. If this result be attained, then in those future years, when by individual labour present difficulties are overcome, and light shines where thick darkness now overspreads, there will be cause for thanks, where, perhaps, when these lectures end an unsatisfied longing may alone be found.

Men need but watch the progress of science truths for a few years, or read the development, stage by stage, of any branch of investigation, to be satisfied of this, that with whatever pertinacity and show of reasoning any theory is propounded and established, it rapidly wanes. Astronomical and geological truths and facts, how often and again have they been satisfactorily (?) explained, and yet how soon and how rapidly has one explanation been so crushed out by another, that the first, which by its authors was applauded, is by the upholders of the second ridiculed.

The theories of the imponderables, with which we must occasionally deal or allude to, but with which we are in no degree further concerned, are, day by day, in a transition state. Like the cause of solar heat, or the rotation of the moon, they are a bloodless battle-field, on which, with our increasing love of talking and our decreasing love of working, words may war with words.

A triumphant victory to-day in science theory may be the prelude to an ignominious defeat of the same theory to-morrow. Subject, doubtless, to many dissentient views, the belief that he who propounds theory, and uses theories solely as means or ways by which to convey ideas of how such and such facts may perhaps be brought about, and not of expressing a conviction that the way described is the actual plan in operation, he is the truly wise man. Those who allow themselves to dwell upon the conception and the development of theories, who build theory upon theory, who sometimes pile Ossa upon Pelion, and sometimes Pelion upon Ossa, are not unlike those whom Milton describes—

> . . . . "Who reasoned high
> Of providence, foreknowledge, will, and fate,
> Fixed fate, free will, foreknowledge absolute,
> And found no end, in wandering mazes lost."

Thus it is that the decisions of one age and one day differ from those of another age and another day. Theories, we must remember, are but opinions; with opinions, as such, this course of lectures is not concerned. The facts of nature, so far as they have yet been made apparent, or may be in process of being so, are our province. They change not. To those who have appealed to nature direct, and brought from her exhaustless stores of knowledge some truths that men may utilize, is due the information which is to be brought before you.

The mode by which they have won this knowledge is exactly that pursued in our courts of law and equity, to arrive at the truth on one point and on one point only. Look how long and tedious legal investigations seem, and yet in how few words the result is declared. Guilty or not guilty—Verdict for the plaintiff or verdict for the defendant. One or other of these very brief phrases records the conclusion or the judgment of many days of patient labours and searchings for truths.

To not less careful questioning by men in years past, as well as now current, we owe all we know of the energies, the measurement and utilization of which is to be a feature in these lectures. That cross-questioning of the keenest and clearest kind has been essential, may be inferred from the fact that these energies are so co-related —so mutually convertible—that they merge and change, Proteus-like, one into the other so instantaneously, that no one energy can be conveniently retained alone and in operation. They thus pass and interchange without (to our eyes) a signal from any magician's wand.

The transmutations of the imponderables are accomplished in a way that would have gladdened the eyes of the most profound alchemist, could he have seen as great transmutations in some of the material things in which he worked. For example, whenever energy is lost by resistance heat is produced,* *i.e.*, when the resistance is perfect and complete, admitting of no intermediate state. *E.g.*, if a wheel in machinery does not move easily, the consequence is heat, manifested on the shaft.

If, however, that energy can be converted into an intermediate state, then this state may be assumed—much as light from gas is an intermediate state between chemical affinity and heat. Do what we may, that from which energy results can neither be created nor destroyed.

In the case of blows by impact, as in the tongue of a bell, or the hammer on an anvil, or a clock, or a piano, or on a drum-head, or on a gong, then, whilst doubtless some part of this checked energy is converted into heat, yet a large portion is spent in the production of vibrations in matter, appreciable to our senses, and suggestive of vibrations in molecules, which our senses, aided by physical appliances, have not yet made visible, but which chemical changes, and what to the minds of science theorists of the present day, is conclusive evidence, seem to point as similar vibrations in the invisible molecules and atoms of which it is assumed that bodies consist.

These remarks may suffice to explain that, whilst to speak of estimating an "energy" is easy, yet to estimate that "energy" is an employment which tasks the keenest and most watchful faculties of the human mind, as well as claiming from human hands the production of some of their most exquisite and refined work.

(*To be continued.*)

* In reference to this sentence, Mr. Highton, in a letter published in the *Journal of the Society of Arts* (June 27), says:— "This, of course, is a simple matter of fact and observation; but if such a matter be mis-stated, or imperfectly stated, at the threshold of a science, all its conclusions become erroneous, or, to say the least, only partially true. Now what are the real facts as proved by experiments? The destruction of energy may produce heat, or cold, or neither; that is, it may produce an equal quantity of both, so that in the result there is no variation of temperature. Thus a weight falling on a mass of metal produces heat; if its fall be checked by elastic wires it produces cold; If the two be combined, equal quantities of heat and cold may be produced. Conversely, a weight falling on a lump of india-rubber produces cold; if its fall be checked by an elastic string of india-rubber it produces heat. If its fall condenses air it produces heat; if it be so contrived that it expands air it produces cold; if it compresses water above 42° F. it produces heat; if below 42° F. it produces cold; if at 42° F., it produces neither heat nor cold, or perhaps equal quantities of each. An electric current passing through wires usually produces heat, but the wires through which it passes may be so arranged that it shall produce cold.

It is quite plain that if a true science of energy is to be built up, the whole of the facts must be taken into consideration. Partial facts can be the foundation of only a false science. The experiments on which only a true theory can be built have hitherto been comparatively few and one-sided. If the theories of Joule, Sir W. Thomson, and other great men, as they undoubtedly are, have been too hastily accepted in their completeness, and too wide generalizations drawn from partial facts, it is the part of true scientific greatness to pull down a too hastily constructed building, and to lay fresh foundations in more numerous experiments. The scientific world ought to be looking forward with interest to the time when the Committee of the British Association appointed to report on this subject will at length break their long silence of three years and a-half, and either give us a theory which will bear full investigation, or at least confess the imperfeetion of the present theories."

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Trades Marks' Registration Bill.

On Monday evening Mr. Gladstone stated that it was not intended to proceed any further with this Bill during the present session.

Juries Bill.

The second reading of this Bill has been again postponed until Friday, July 11.

Shop Hours' Regulation Bill.

This Bill is set down for second reading on Thursday, July 10.

Poisoning by Arsenic.

An adjourned inquest on the body of Henry Charles Horner, an errand boy in the employ of Mr. Lewis, chemist, High Street, Portsmouth, was held before W. H. Garrington, Esq., at the Hospital at Landport, on Wednesday, July 2. From previous evidence it had appeared that about three weeks ago Mr. Lewis heard what he supposed was a rat behind the drawers of the counter, and having taken out one drawer, a packet of Chapman's Wheat Flour, the corner of which had had been opened, was found. A morning or two afterwards Mr. Lewis handed the packet to the deceased, his errand boy, directing him to throw it away. The lad, however, took it into the kitchen and asked the servant girl to boil some for him. She did so, and the boy took about three spoonfuls. The girl also partook of some; and both noticed that the flour was "hot to the taste." Shortly afterwards they were taken seriously ill. Emetics were administered, and the boy, who was the worse of the two, was taken in a cab to the Hospital, where, after remaining a few days, he died. The girl recovered. It appeared that Mr. Lewis's predecessor (Mr. Pasmore) had some twelve months ago put arsenic into a packet of corn-flour in order to kill the rats with which the house was infested; and though he states that all which was not eaten was subsequently removed, the evidence suggested that Mr. Pasmore must have been mistaken. Mr. Pike, surgeon, who made a *post-mortem* examination, expressed his belief that death had been caused by some irritant poison, which had produced inflammation of the stomach and bowels, but he was unable to state positively whether that poison were arsenic. The inquest had been accordingly adjourned, in order that an analysis of the contents of the stomach might be made.

Mr. William Royston Pike, surgeon, said since the adjournment of the inquest he had made an examination of a small quantity of the contents of the intestines, and an organic analysis of the stomach, liver, and intestines. In the stomach and intestines, and contents of the latter, he found no traces of arsenic; but the organic analysis of the liver afforded abundant evidence of the cause of death. Arsenic had undoubtedly been taken and absorbed into the system. Examination by the microscope also showed numerous crystals of arsenious acid in the liver. He was not assisted by anyone in the analysis; but the crystals had been seen by the house-surgeon, Dr. Wilson, and others. He had no hesitation in saying from the symptoms before death, the appearances after death, the *post-mortem* examination, and the analysis, that death arose from taking white arsenic, or arsenious acid.

The father of the deceased asked if the Coroner thought it necessary to examine Mr. Pasmore?—The Coroner thought nothing hung on his testimony, and that he would not be justified in putting the borough to the expense of sending for him from Exeter. It was not likely Mr. Pasmore put the parcel where it was found purposely to poison the deceased; and if he came, he would not be bound to answer any questions. He (the Coroner) thought they might assume that this packet was part of the one put behind the drawers, while Mr. Pasmore had the business; but he could have had no *animus*, and could not see into futurity. This was one of those unfortunate events which did sometimes occur.—The father: If you are satisfied, I am.—The Coroner: I am satisfied; and I am anxious that you and the public should be.

The jury eventually returned a verdict that deceased was accidentally poisoned by taking arsenic. The jury also unanimously agreed to an addendum to the verdict, stating that not only was no blame attributable to Mr. Lewis, but that he was much to be commended for the promptitude and discretion with which he administered the emetics, whereby probably the girl's life had been preserved. —*From the Hampshire Telegraph.*

Prosecutions under the Adulteration Act.

The Sale of Cocoa.

At Marylebone Police Court, on Thursday, July 3, several grocers were summoned by the Vestry of St. Pancras, before Mr. D'Eyncourt under the 3d section of the Adulteration of Food Act for selling cocoa adulterated with sugar and sago. Mr. Cooper, solicitor, prosecuted; Mr. Willis, barrister, and Mr. Haynes, solicitor, appeared for the defendants. Evidence of the purchase of the cocoa was given, and the certificate of Dr. Stevenson, the analyst, put in. Mr. Willis contended that the cocoa was not mixed with the sugar and sago for the purpose of increasing its weight or bulk, but to render it what was called soluble, and give it a quality which it would not otherwise possess. Mr. Charles Stevens Reynolds, a partner in the firm of Barry and Co., mustard manufacturers, etc., of Ropemaker Street, Finsbury, was then called. He said there were three kinds of cocoa—nibs, flake, and soluble. There was a much greater quantity sold in the soluble form than in the nib, the proportion being fifty tons of the former to one ton of the latter. The sugar and sago were not added to the cocoa for the purpose of increasing its bulk, but to produce an article that the public would more readily buy and drink. Mr. D'Eyncourt remarked that although the defendants had not conformed strictly with the Act of Parliament, yet he was of opinion that the sugar and sago had not been added to the cocoa for the purpose of fraudulently increasing its weight. The summons would therefore be dismissed.—*Times.*

Adulterated Mustard.

On Monday, July 7, Mr. Edmund Shemeld, a grocer, carrying on business at 160, Westminster Bridge Road, was summoned to the Southwark Police Court by Mr. Roffey, the Vestry Clerk of Lambeth, under the third section of the Adulteration of Food Act, for selling adulterated mustard. Mr. Coxhead, one of the sanitary inspectors, said that on the 13th ult. he purchased of defendant, at his shop, a quarter of a pound of mustard, for which he paid him 4*d.* Witness told him he intended to have it analysed, when the defendant said it was not genuine, as the public would not like genuine mustard. Witness told him he had not declared it mixed. Dr. Muter, after analysing the mustard, certified it to be mixed with turmeric and inferior flour. However, it was not injurious to health. The defendant said that all cheap mustard was mixed, and he generally put a label on, "This article is sold free from any injurious mixture." Mr. Partridge told him that would not do, and fined him 40*s.*, and 4*s.* 6*d.* costs.—*Times.*

PAPERS PRESENTED TO PARLIAMENT.

International Metric Commission at Paris.

A report to the Board of Trade upon the formation and proceedings of the International Metric Commission at Paris, 1869–1872, made by the Warden of the Standards, one of the delegates from the United Kingdom, has been presented to Parliament by command of Her Majesty.

The objects of the appointment of the International Metric Commission at Paris were wholly and exclusively of a scientific character. They consisted of the construction and verification, with all the best appliances of modern science, of new international standards of the metre and kilogram ; together with a series of authoritative copies of those standards, uniform in construction and identical in value, for the use of the several countries who have adopted or contemplate the adoption of the metric system ; thus establishing it anew upon a scientific basis, and affording the means of making it by the common accord of all the countries interested a *de facto* uniform system of international weights and measures.

The first meeting of the French section of the Commission took place on the 9th of November, 1869, and their meetings were continued weekly until the end of May, 1870, when a general meeting of the Commission was called together on 8th of August, 1870.

In the meantime, war was declared between France and Germany, and although there was a numerous meeting of the delegates from the several countries on the day appointed, the German members were necessarily absent. The Commission was then inaugurated. The veteran M. Mathieu, who had been secretary to the Metric Commission of 1812, was appointed president of the Commission ; MM. Struve, Miller, Henry, and Herr, vice-presidents, and MM. Hirsch and Tresca, joint secretaries. Under the existing disturbed state of affairs at Paris, it was at once decided that no definitive resolutions should be adopted until the whole Commission could assemble at a more favourable period. Nevertheless the members held several meetings, and fully discussed the principles upon which the new standards were to be constructed and verified, as a preliminary study. This discussion was much facilitated by the results of the previous labours of the members of the French section, who had laid the foundation of future operations by experiments in metals and their alloys, for ascertaining the best material for the new standards, and in the preparation of new instruments and apparatus for their comparisons.

The *Procès-Verbaux* of the meetings of the French section were laid before the Commission, and the French members were requested to continue their valuable labours and investigations. A committee of preparatory researches was appointed by the Commission, consisting, in addition to the French members, of some of the representatives of other countries, who were the most practically conversant with the various technical details of the comparison of standards. This committee was requested to examine into the best methods of carrying into effect the objects of the Commission, and to make all the necessary preparatory arrangements for the meeting of the Commission so soon as circumstances would allow their being called together. The Commission adjourned on 13th August.

After the conclusion of the war, and when a calm had been re-established at Paris, the French section of the Commission resumed their labours on 1st December, 1871. They continued their weekly meetings until the end of March, 1872, when the committee of preparatory researches was called together for the purpose of completing all the preliminary arrangements for the general meeting of the Commission.

This committee met on 2nd April, 1872, and sat daily until 13th April. The printed *procès-verbaux* of these meetings fill ninety 12mo pages. After a full discussion of the several subjects which would require to be decided by the Commission, it was resolved that a general meeting of the Commission should be called together in September following, and the questions to be proposed for deliberation and decision were formally drawn up under twenty-three separate heads.

Of the questions so formulated, 1 to 14 related to the new international metre ; 16 to 23 to the new international kilogram, whilst 15 had for its object the creation at Paris of a permanent international bureau of weights and measures, under the direction and control of the International Metric Commission.

The meeting of the International Metric Commission took place as proposed, on 24th September, 1872, and was very fully attended. Meetings were held daily until 12th October. The twenty-nine countries who took part in this scientific commission, and their fifty representatives, were as follows :—Germany (Professor Förster ; including, also, for Bavaria, Professor de Jolly, and for Wurtemburg, Dr. Steinbeis). Great Britain (Sir G. B. Airy, K.C.B. ; W. H. Miller, F.R.S. ; H. W. Chisholm). Argentine Republic (M. de Balcarce). Austria and Hungary (for Austria, Dr. J. Herr and Dr. Von Lang ; for Hungary, E. de Krusper, and C. de Szily). Belgium (H. Maus, M. Stas, and M. Heusschen). Chili (C. Gay). Columbia (T. el Caïcedo). Denmark (M. Holten). Spain (General Ibañez). United States of America (Professor J. Henry and Mr. Hilgard). Republic of the Equator (A. y Montufar). France (M. Mathieu, General Morin, M. Le Verrier, M. Faye, M. Fizeau, M. H. St. Claire Deville, General Jarras, E. Becquerel, M. E. Peligot, and H. Tresca). Greece (M. Soutzo). Italy (Marquis Ricci and M. G. Govi). Nicaragua (Michel Chevalier). Holland (M. Stamkart and M. Bosscha). Peru (Don P. Galvez and Dr. E. Bonifaz). Portugal (General Morin). Russia (M. de Jacobi, Otto Struve, and H. Wild). Papal See (Padre Secchi). San Salvador (T. el Caïcedo). Sweden (Baron Wrede). Norway (M. Broch). Switzerland (Dr. A. Hirsch). Turkey (Husny Bey). Uruguay (Don M.M. Cervantes). Venezuela (Dr. E. Acosta).

A resolution was at once unanimously adopted by the Commission for constructing the new international metre, the *mètre des Archives* in its existing state to be taken as the point of departure. Considering, too, that the simple relation established by the originators of the metric system between the unit of weight and the unit of volume is represented by the actual kilogram in a manner sufficiently exact for ordinary uses, and that the exact sciences have not the same need of a simple numerical relation, but only of a determination of such relation as perfect as possible ; and, considering also the difficulties that would arise from a change in the actual unit of the metric system, it was decided that the international kilogram shall be derived from the *kilogramme des Archives* in its actual state.

Several of the questions were decided at once, and the remainder were referred to separate committees, each composed of ten members of the Commission, selected as being more particularly conversant with the several subjects, who were to report to the Commission the mode and form in which in their decisions might most properly be made. One of these committees was charged with the duty of examining the defining ends of the mètre des Archives, to ascertain whether or how far the defining surfaces of the metre were altered by contact of instruments in the frequent comparisons made not only during its construction in 1797, but subsequently, or by other circumstances.

The apparatus consisted in the first instance of an excellent microscope, mounted on an iron carriage, with rectangular movement, and having a micrometer for measuring fractions of a *micron* or a thousandth of a millimetre. A simple magnifying glass was also used, as well as the telescope of a cathetometer. Photographs of the ends of the metre were also taken, considerably enlarged.

The mètre des Archives is of forged platinum, no method of fusing platinum having at the time of its construction been known. The bar appeared to be straight, and to have no appreciable flexure round its longitudinal axis. The ends had evidently been finished off, and polished, by an ordinary lapidary's wheel, charged with fine emery and tripoli, the concentric marks of which were left on each surface, showing a radius of curvature of about six centimetres. Around the middle of each end the metal was brighter and of a higher polish, owing to the pressure of contact pieces during comparisons, and it was considered important to ascertain if any sensible

alteration of the length of the measure had thus occurred. But it was found that even here the marks of the original finishing off were still visible, and no perceptible depression could be proved. There was also nothing to show that this higher polish might not have been caused during the original verification of the metre, and consequently that the subsequent scientific comparisons of other metres were made with the mètre des Archives in its existing state. On the whole, it was found that there was no ground for believing that any material alteration had occurred in the length of the metre, and it was believed that its original length could at the present time be determined with certainty from untouched points in the end surfaces.

The material for constructing the metre was the subject of report by another Committee. The material required is one that shall, as far as possible, be unalterable by the action of air, fire, or chemical agents; and that will resist mechanical forces applied to it by friction, compression, or sudden shock. It ought to possess physical properties invariable with time, and be subject to no molecular or spontaneous modifications dependent upon change in the surrounding physical conditions, such as temperature, atmospheric pressure, terrestrial magnetism, etc. To satisfy these requirements, a non-oxidizable material is needed which shall be insensible to the action of ozone, sulphur, chlorine, sulphuretted hydrogen, ammonia, water including sea water, and even some acids and alkalies. It should be capable of resisting the red heat of ordinary fires, and not be acted upon by such heat, so as to anneal it or temper it; in fact, that it should experience no change either in its dimensions or its composition. It ought to be hard enough for the surface not to be easily scratched; its elasticity should be so great that considerable pressure applied to it will produce no permanent change of form; its cohesion should be sufficient to prevent any fracture from even a violent blow; its polished straight surface should render any modification of its normal form at once evident to the eye. The material, if amorphous, should not crystallize spontaneously; and if crystallized, it should be of a regular system, and not liable to a change of crystalline form, which is equivalent to a change of density, and consequently of its length. In order to lessen the influences of the sources of error arising from variations in temperature during the comparisons, a material is required that has a very small co-efficient of expansion. To provide for the international metres being as nearly as possible identical in their material, they should all be produced from one mass, all the parts of which shall be perfectly homogeneous.

After laying down these essential conditions, the first material considered was *quartz*. This satisfied many of the requirements, though its fragility and want of power of resistance to fire rendered it objectionable. But the difficulty, if not impossibility, of finding a sufficiently large and homogeneous piece of quartz, perfect in its axis of crystallization, even for a single metre, much less for the whole number of metres required, constituted an immediate and fatal objection to its adoption.

The objections to glass, in addition to some of those attaching to quartz, were its being affected by moist air tarnishing its surface, and more particularly by changes of temperature altering its molecular and crystalline composition as a tempered body. These changes affect the constancy of its density, dilatation, and even length; a glass metre, like a steel metre, becoming shorter by time.

Only two of the metals satisfied the requirements for invariability in the material of the metre, gold and platinum. All other metals were rejected, from being injuriously affected by air more or less pure or charged with moisture. Gold was evidently too soft. The choice of platinum might be justified by the state of preservation of the original metric standards. This old hard platinum, however, was not pure, but was mixed with rhodium, palladium, and particularly iridium. It also probably contained arsenic. On the other hand, the new platinum of commerce was too soft for the purpose.

Few alloys when fused and cooled afford a homogeneous ingot, from the difference in density and fusibility of their component metals; in solidifying when cooling, there is a want of uniformity in the molecules of their several superincumbent strata. This constitutes an objection to brass, bronze, and all alloys of copper, zinc, and tin, which also are too dilatable by heat. The sole alloy answering all the conditions is that of platinum and iridium. Not only have these two metals the same system of regular crystallization, and the same density, 21·15; but this is also the case when platinum is alloyed with 10, 20, or 30 per cent. of iridium; and these alloys produce a perfectly homogeneous material. They are the two metals which of all others dilate the least by heat, and it has been proved that the co-efficient of dilatation of platinum containing 10 per cent. of iridium is as nearly as possible identical with that of the mètre des Archives, and that it remains unchanged after great alternations of temperature and lapse of time. Platinum-iridium has been also proved to be extremely hard and rigid, and its co-efficient of elasticity to be considerable, as well as its cohesion or resistance to fracture. It is easily cut with a diamond, and lines $\frac{3}{1000}$ of a millimetre apart, even when magnified from 300 to 600 times, are perfectly regular. If the proportion of iridium is conveniently fixed, the malleability and ductility of the ingot is such that it may be laminated by the hammer, or by pressure into any form required. Platinum is very easily rendered quite pure, and so is iridium. Sufficient quantities of these metals can be readily obtained for all the standards required, the price varying from 700 to 1000 francs (£28 to £40) the kilogram.

It was consequently proposed by the Committee that for the material of the metres, an alloy shall be used of 90 per cent. of platinum with 10 per cent. of iridium; that the measuring bars shall be constructed from one ingot produced at a single casting, and that these bars should be annealed for several days at the highest temperature.

After full discussion by the Commission, and particularly as to some objections which had been raised by Sir G. B. Airy against the employment of platinum, and in favour of the bronze used for the English standard yards, these resolutions were unanimously adopted. It was also decided, for similar reasons, that the material of the international kilogram should be the same, but that kilograms of quartz should be constructed for such countries as required them.

A third Committee reported on the Form and Support of the Metre, the problem being to determine upon a form of bar that with a given quantity of material should possess great rigidity, both in a vertical and horizontal direction, readily take a uniform temperature, and allow other division lines to be marked, if required, between the extreme defining lines.

Another Committee, entrusted with the subject of Thermometers and Dilatation, held that for determining the temperature with a degree of precision exceeding 0°·1 C., recourse must be had to an air thermometer. In all mercurial thermometers, the dilatation of the glass which envelops it being about one-seventh that of the quicksilver renders the reading of the best calibrated thermometers liable to an error of some tenths of a degree. On the other hand, the air thermometer was considered to be an instrument too complicated in construction and difficult of use. The Committee therefore recommended that every international metre be accompanied by two detached mercurial thermometers, carefully compared with an air thermometer, and verified with it from time to time.

On the recommendation of the Committee considering the Normal Temperature of the Metre, and the Weight of Kilogram in a Vacuum or in Air, the Commission resolved that the international metre shall have the length of a metre at the temperature of 0° C., and that the international kilogram shall be determined with reference to its weight in a vacuum.

For the determination of the weight of a cubic decimetre of water, of the methods hitherto adopted it was decided the best was that by the accurate measurement of the external volume of a solid body, and the subsequent determination by hydrostatic weighings of the weight of the water displaced by the immersion of the body in this liquid, that the cylindrical form is that which affords the greatest facilities of construction, if made of sufficiently large dimensions, and that for the definite determination a cylinder of sufficiently large volume be chosen (of 10 litres for instance), so that the condensation of liquid upon the surface shall have less influence on the result.

Among the propositions submitted by the committee on balances and the mode of weighing to the Commission, and subsequently unanimously adopted, was one that a new balance to be constructed so as to give results of the greatest precision, and another that in weighing, both the method of alternation of the weights and that of substitution, with counterpoise of a similar material, shall be employed.

The Commission decided to elect from its body a permanent committee whose functions shall continue in force until the next general meeting of the Commission : this committee, which is to be composed of twelve members, all belonging to different countries, is to direct and superintend the execution of the decisions of the International Commission relating to the comparisons amongst themselves of the new metric standards, as well as the construction of the comparateurs, balances, and all other auxiliary instruments required for these comparisons.

An election having taken place for the members of the permanent committee, those having the majority of votes were found to be as follows :—Messrs. Förster (Germany), Ibañez (Spain), Bosscha (Holland), Herr (Austria), Wild (Russia), Baron Wrede (Sweden), Hilgard (America, U.S.) Morin (France), Chisholm (Gt. Britain), Broch (Norway), Stas (Belgium), Husny Bey (Turkey).

The International Commission also urges upon the several governments interested the great utility of founding an international bureau of weights and measures, having its seat to be at Paris, and maintained by common contributions from all countries who shall be parties to the treaty to be entered into by the governments interested in the creation of the bureau.

The first step in progress since taken has been for the French government to communicate diplomatically with all the other governments interested, and to inquire how many of the new standard metres, either *à traits* or *à bouts*, and kilograms, will be required for each country, in order that all necessary arrangements may be made as soon as possible for their construction. The cost of each platinum-iridium metre, to be repaid to the French government, is estimated at about 4000 francs, or £160, and of a platinum-iridium kilogram at 1500 francs, or £75. The metric standards required for the Standards Department of this country are a platinum-iridium *mètre à traits*, *mètre à bouts*, and a kilogram.

Obituary.

Notice has been received of the death of the following :—
On the 2nd July, 1873, Mr. Stanley Wood, Chemist and Druggist, of Arlington Street, Salford.

BOOK RECEIVED.

THE HALF-YEARLY ABSTRACT OF THE MEDICAL SCIENCES. Being a Digest of British and Continental Medicine, and of the Progress of Medicine and the Collateral Sciences. Edited by WILLIAM DOMETT STONE, M.D., etc. Vol. LVII. January to June, 1873. London : J. and A. Churchill.

Correspondence.

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

A WARNING.

Sir,—I wish to avail myself of the columns of the PHARMACEUTICAL JOURNAL to put my brother chemists on their guard against a Frenchwoman travelling the country with "a little lamp, without a wick," for sale. This lamp is perfectly worthless, as any one may ascertain who will watch its operation but for a short time.

Madame is very specious; she talks of the chief chemists (mentioning their names) who are her agents in various towns, and states her intention to confine the sale to chemists alone, having been advised that that is the best course to pursue. You soon ascertain, however, that every grocer, ironmonger, and huckster in the district has been visited, and the same tale told. Of course, no less quantity than the third of a gross of the useless article can be supplied. She must be reaping a rich harvest by her venture, my own neighbourhood being deluged with them, but I trust this word of caution will prevent my *confrères* in those towns she is about to visit being victimized by her.

ONE OF THE BITTEN.

[*** In compliance with the request of our correspondent we publish the foregoing as a warning, although lamps without wicks are rather far removed from pharmacy.—ED. PHARM. JOURNAL.]

J. Bower Williams.—We are unable to comply with your request, and cannot say whether the writer of the letter signed "R. T. C. D." would do so. Having marked your letter "private," we are unable to forward it to him unless you so desire it.

P. H. W.—(1) The precipitate is sesquioxide of manganese, resulting from the reduction of the permanganate. This reaction may be due to the presence of organic matter, but it also takes place when water contains other reducing substances, such as nitrates. The presence of organic impurity or sewage contamination in water cannot be determined by means of permanganates. (2) Wanklyn's 'Water Analysis,' or Sutton's 'Volumetric Analysis.'

"*Inquirer.*"—Your prescription would have been dispensed in London without much hesitation. Perchloride of mercury *is* sometimes given in quarter grain doses, and it is milder in its action when decomposed into mercuric iodide held in solution by an excess of iodide of potassium, as in the formula sent.

W. S.—Apply to the Secretary of the Pharmaceutical Society, 17, Bloomsbury Square.

R. J. M.—No, it is *Erigeron acris*.

"*An Assistant*" (Cardiff), is referred to the regulations respecting anonymous contributions.

"*One that has been Bitten*" writes to inform us that an assistant, whom he had engaged with good references, has suddenly left him in an unsatisfactory manner, but we cannot publish the details as reported. Probably, the proper way would be to seek redress through the hands of the police.

"*Euphorbia.*"—(1) Thlaspi arvense. (2) Ononis arvensis. (3) Sisymbrium officinale. (4) Matricaria Camomilla. (5) Euphorbia Peplis. (6) Stachys sylvatica.

"*Inquirens.*"—"How Crops Grow," published by Macmillan and Co.

"*A Pharmaceutist.*"—(1) We know of no satisfactory work on Adulterations. (2) Wanklyn's 'Water Analysis,' and Sutton's 'Volumetric Analysis.'

F. R. Bessant.—The person mentioned is eligible according to the terms of the Pharmacy Act, and the Council of the Society has thought fit to place him on the list of candidates. The statement accompanying the name will enable each elector to judge the merits of the case and vote accordingly.

B. J. Clarke.—Your complaint has been handed to the Secretary. On referring to the paragraph relating to the issue of the Journal, you will see that once a month its publication takes place on Saturday.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. A. W. Bennett, Pocklington, Harper, "Inquirer," "M. P. S.," E. H.

THE CINCHONA PLANTATIONS IN JAVA.

BY JOHN ELIOT HOWARD, F.L.S.

I did not receive till last Friday a pamphlet called 'A Contribution towards the Knowledge of the Cinchona Culture in Java. By K. W. von Gorkom. Translated from Dutch into German by C. Hasskarl.' This paper, which may be considered official, helps greatly towards the understanding of the very important question, "From whence arises the superiority of the Dutch Calisaya tree, proceeding from Ledger's seed, over those raised from the same seed in British India?" I do not say that we have quite a definite answer, but that we are on the way to it, and shall soon, as I hope, get to the bottom of the business. I feel some responsibility to accomplish this, as in reply to an official letter of inquiry from her Majesty's Secretary of State for India, in January, 1872,* I ventured to recommend the cultivation of these superior kinds of Calisaya, and specially of No. V. Calisaya (Broughton).

There is a contrast *now* pointed out between the plants from British India and those which have been raised in Java. "In 1866-7 there were raised 3000 plants of C. Calisaya, from seed obtained from British India. These have *quite an irregular type*, so that their identity with the remaining Calisaya plants may be called in question. Almost all the Calisaya plants raised since 1868, and thus planted out in the open, since 1869-70 proceed from the trees obtained from Bolivian seed. They show themselves *by an unchangeable type and a high percentage of quinine*, so that from this source in a few years distinguished bark for the manufactories may be expected."

The cultivators in Java, having obtained *the real sort*, have been careful to propagate it by cuttings, not trusting to the variable results of the seed. And what is this typical sort? Of this we shall doubtless be informed from Java. At present I can only say that the appearance of the small portion of the bark which I have seen is that of the *Zamba* (as I have said), and its contents in alkaloid, 7·44 per cent. of sulph. quinine, against 7·40, my best among many trials† of this sort, confirms me in this view. At the same time there are so many kindred kinds that we must wait distinct specimens of the flowers, fruit, and leaves from Java. From British India we shall, I hope, receive similar specimens of *their* variety, which for convenience' sake I shall call "*Calisaya red bark*." The botanical specimens which I have from Ootacamund are all *C. Josephiana*. The one plant remaining from those I raised from Ledger's seed is C. Calisaya of a good type.‡ The present paper so completely confirms what I have written that I might have saved myself much trouble if I had received it sooner. It seems that on July 1st, last year, there were altogether 1,507,079 cinchona trees in Java (exclusive of C. Pahudiana). Of these there were 1,090,797 trees of C. Calisaya, including 80,000 C. Hasskarliana. The amount of good Calisaya was, at the very utmost—"1200 plants planted out in the open in 1865-6, in 1866 about 20,000 plants of like origin (obtained from Mr. Ledger) and in 1869 again more than 5000 plants. The first and last sending of the seeds were through Mr. Schuhkraft, at La Paz, in Bolivia,"—so that if my arithmetic is right, there were then 984,597 plants of poor and so called Calisaya against 26,200 real and good trees. I sincerely hope the proportion may be reversed, and this speedily.

Of these inferior sorts Mr. Von Gorkom says: "The old original varieties of Calisaya show a remarkably varying percentage of alkaloids and must consequently be considered more as medicinal barks."

But though of little account for the production of quinine, some of these trees contain (according to Mr. Moens) a *large* amount of *conchinin* (quinidine of Pasteur). This fact, which separates them widely from the genuine Calisaya, turns out most fortunate for the success of the plantations. There is no alkaloid (unless it be aricine) so sparingly produced by the Cinchona as this *conchinin* (whilst *cinchonidine* on the other hand is the most abundant), and, as it happens to be much sought after, it may *soon* reach a price in the market near to that of quinine.

I refer to the original paper for much interesting information, and also for confirmation of what I have written, especially about the C. Pahudiana, which has been planted out in the wild forest, and (as Mr. Von Gorkom justly observes) "what has been obtained from these forest plantations is clear gain. From the C. Pahudiana planted out in the open ground since 1863-4 we have gathered about 5000 kilogrammes of bark." The maximum price in 1872 sale was 5*s.* 4*d.*, and the minimum price in May, 1873, was 2*s.* The whole may then represent at least £1500 already saved from destruction, and I will further add that this tree, "which has now become historical,"* is not unlikely to *improve much with age*, whilst the reverse is pretty sure to be the case (owing to the cinchotannic acid) with the C. succirubra.

* See PHARM. JOURN., March 9, 1872.

† My 8 per cent. trial was from the bark of a *very large Calisaya tree* of I know not exactly what type.

‡ I cannot identify it either with the Zamba or the red variety.

* The following is from Mr. Von Gorkom's account of the Pahudiana. "This sort of Cinchona soon raised a violent contest. Miquel defined it as the worthless *C. Carabayensis*, and remained of the same opinion. Howard examined it carefully and described it as a new kind, to which he gave the name of C. Pahudiana, in order to do honour to the statesman to whom, without contradiction, the paternity of the Cinchona culture belongs. The value of this C. Pahudiana was so strongly called in question, that the Indian Government, moved by the higher authorities, forbade by a decree of 11th Sept., 1862, its further extension." [It increased notwithstanding from 324,343 in 1862 to 909,155 in 1866.] "But whatever may be said of this now historical plant, it has shown that it can be useful in Pharmacy, and that its product can be sold for a considerable price in Europe. In alkaloidal contents it stands certainly near our other barks."

THE PHARMACY OF THE UNITED STATES' PHARMACOPŒIA.

BY WILLIAM MARTINDALE, F.C.S.,

Demonstrator of Materia Medica in University College, London.

(*Continued from p.* 4.)

Glycerita.—Four out of the five formulæ for these are new to the American work, and are taken from the British Pharmacopœia, but the most useful of our preparations of glycerine—*glycerinum amyli* is not inserted, and, shade of Bishop Berkeley! there is not only tar-water—*infusum picis liquidæ*—but there is a glycerite of tar. This is made by mixing tar, first with carbonate of magnesia, treating with two successive portions of a mixture of glycerine, alcohol, and water, and finally it is of course—percolated!

Infusa.—Thirty-one of these are official; they are

generally *macerated*, as it is termed—that of rhubarb is *digested*—with water, boiling or cold, during periods varying from ten minutes to two hours; *infusum quassiæ*, with cold water, stands twelve hours, and *infusum picis liquidæ*, also cold, stands twenty-four hours. The following cold infusions—*infusum angusturæ*, *infusum calumbæ*, *infusum cascarillæ*, *infusum serpentariæ*, and *infusum valerianæ*, may be made by percolation, or alternative processes are given by which they can be made by maceration; *infusum krameriæ* and *infusum pruni virginianæ* are made by percolation only. The infusion of calumba is ordered to be boiled after straining to coagulate and separate by again straining the albuminous matter which calumba contains; this undoubtedly makes the infusion keep much better. *Infusum cinchonæ flavæ* and *infusum cinchonæ rubræ* are directed to be percolated with one fluid drachm of aromatic sulphuric acid and water q. s. to obtain a pint. *Infusum digitalis* is two and a half times stronger than the B.P. preparation, it also contains some tincture of cinnamon. *Infusum gentianæ compositum* is our *mistura gentianæ* made by percolation. There are also infusions (not official in B.P.) of capsicum, thoroughwort, juniper, sage, spigelia-root, tobacco, dandelion, and ginger, all made with boiling water.

Linimenta.—Nine formulæ. *Linimentum aconiti* is made by percolating eight troyounces of finely powdered aconite root with alcohol sp. gr. 0·835 till thirty-two ounces of tincture are obtained, distilling and evaporating this down to seven fluid ounces, and adding a fluid ounce of glycerine. It will be a little stronger than the British Pharmacopœia liniment, and glycerine will be a much more advantageous addition to it than camphor for use as a liniment. *Extractum belladonnæ radicis fluidum* is, I think, intended to represent our *linimentum belladonnæ*. *Linimentum calcis* is eight fluid ounces of solution of lime mixed with seven troyounces of flaxseed (linseed) oil; it is, in fact, the original Carron oil. *Linimentum cantharidis* is prepared by digesting one troyounce of cantharides in half-a-pint of oil of turpentine and straining. In making *linimentum saponis* the soap is first ordered to be dissolved in the water and the other ingredients mixed with this; thus made it will gelatinize at low temperatures, which is a disadvantage in its use on account of the difficulty in getting it out of the vessels containing it.

Linimentum plumbi subacetatis is three troyounces of olive oil mixed with two troyounces of solution of subacetate of lead. *Linimentum terebinthinæ* is made by melting twelve troyounces of resin cerate and adding half-a-pint of oil of turpentine. The other liniments have little interest pharmaceutically. One point in these formulæ for liniments is worthy of notice and imitation—fixed oils are ordered to be weighed, not measured.

Liquores.—*Liquor gutta-perchæ* is prepared by dissolving gutta-percha in purified chloroform, agitating with finely powdered carbonate of lead to separate the mechanical impurities, and decanting the clear supernatant liquor after it has deposited.

Liquor morphiæ sulphatis.—The only official solution of morphia is one grain of the sulphate dissolved in an ounce of distilled water. *Liquor plumbi subacetatis dilutus*—*syn.* Lead Water—contains no spirit. *Liquor ammoniæ acetatis* is ordered to be prepared at the time of use, and it will thus be slightly effervescent. The other official liquors possess more chemical than pharmaceutical interest.

Mellita.—Three preparations, *mel despumatum*, *mel rosæ* and *mel sodii boratis*. A tincture of red rose petals is prepared by percolation and concentrating by evaporation the second portion of percolate to a small bulk, the two are then mixed with clarified honey to make *mel rosæ*.

Misturæ.—Eight preparations. Assafœtida is emulsified with water to make *mistura assafœtidæ*. *Mistura chloroformi* is prepared by dissolving sixty grains of camphor in half a troyounce of purified chloroform, triturating them with the yolk of one egg and gradually adding six fluid ounces of water. *Mistura potassæ citratis*—*syn.* Neutral Mixture—is prepared by neutralizing lemon juice with bicarbonate of potash. *Mistura glycyrrhizæ composita*—*syn.* Brown Mixture, "an exceedingly popular cough mixture" in America,—has the following composition—

Take of—		
Liquorice (commercial extract) in fine powder,		
Sugar in coarse powder,		
Gum Arabic, in fine powder, each	½ troyounce.	
Camphorated Tincture of Opium	fl. ℥ ij	
Wine of Antimony	fl. ℥ j	
Spirit of Nitrous Ether	fl. ℥ ss	
Water	fl. ℥ xij	M.

Mistura cretæ contains glycerine in place of syrup and *mistura ferri composita* spirit of lavender in place of spirit of nutmeg.

Mucilagines.—Four formulæ. *Mucilago acaciæ* is prepared by dissolving four troyounces of gum arabic in eight fluid ounces of water. *Mucilago sassafras medullæ*, principally used as an eye lotion, is prepared by macerating sassafras pith, 120 grains, in a pint of water and straining. *Mucilago tragacanthæ* is made by dissolving tragacanth in boiling water. As I have shown,* it is much more easily prepared by moistening the powdered tragacanth placed in a dry bottle first with a little rectified spirit, adding the requisite quantity of water and shaking briskly till in about two minutes a homogeneous mucilage is obtained. *Mucilago ulmi* is simply an infusion of slippery elm-bark prepared with boiling water.

Olea destillata.—Twenty-four of these are official. The following general tests and mode of preparing them are given in a head note—

"The Distilled Oils, when dropped on paper, produce a greasy stain, which entirely disappears on exposure to a moderate heat. When shaken with water in a graduated tube and allowed to separate, they are not diminished in volume. Dry acetate of potassium, or solid chloride of calcium, is not liquefied on being agitated with them.

"Most of the Distilled Oils are prepared by the following general formula.

"Put the substance from which the Oil is to be extracted into a retort, or other vessel suitable for distillation, and add enough water to cover it; then distil by a regulated heat into a large refrigeratory. Separate the Distilled Oil from the water which comes over with it."

The following not contained in the British Pharmacopœia are official, viz.:—*oleum chenopodii* (wormseed), *oleum erigerontis canadensis*, *oleum gaultheriæ*, *oleum hedeomæ*, *oleum fœniculi*, *oleum monardæ* (horsemint), *oleum origani* (true), *oleum sassafras*, *oleum succini* (in materia medica list), *oleum succini rectificatum*, *oleum valerianæ*, and there is also a pyroligneous oil of tobacco.

Oleoresina.—Six formulæ, viz., those of capsicum cubeb, fern, lupulina, black pepper, and ginger.

* Pharmaceutical Journal, Vol. ix., 2nd series, p. 521

These preparations, as their name implies, consist "of oils, either fixed or volatile, holding resin and sometimes other active matter in solution. Their preparation is very simple, consisting in the exhausting of the medicine employed with ether, by means of percolation, and the subsequent evaporation of the menstruum."* In preparing the oleoresin of capsicum the fatty matter that separates is ordered to be removed, as is also the piperin from that of black pepper and of cubeb. *Oleoresina filicis* corresponds, of course, to our *extractum filicis liquidum.*

Pilulæ.—For these there are nineteen formulæ, which are headed by this note :—

"The practice of sugar-coating pills is approved in reference to pills which are expected to be slow in their operation, but is of doubtful propriety in regard to those intended to act quickly, as the coating retards the solution of the pill matter in the liquids of the stomach."

In fourteen of the formulæ the quantity of ingredients are ordered to be divided into twenty-four pills, two only are ordered to be kept in the mass—*pilula saponis composita* (the same as B.P.) and *pilula ferri carbonatis*—the same as Vallet's Ferruginous Pills. The formula for this is an excellent one, and the preparation much superior to either *ferri carbonas saccharata*, B.P., which is not official in the United States' Pharmacopœia, or to the pill bearing the same name in the British Pharmacopœia. The carbonate of iron is ordered to be precipitated in a weak syrup, and carefully freed from the sulphate of soda, formed in double decomposition, by washing the precipitate also with a weak syrup. It is then collected, mixed with sugar and clarified honey, and evaporated in a water-bath to a definite weight, in which state it will be suitable to form pills. In this process the carbonate will not be so liable to oxidation as in making *ferri carbonas saccharata*, B.P. In the U.S. Pharmacopœia there are also *pilulæ ferri compositæ* : they are nearly the same as the old London preparation, and contain myrrh, etc. *Pilulæ aloes* contain two grains each of socotrine aloes and powdered soap made into a pill with water, q. s. *Pilulæ aloes et assafœtidæ* contain equal quantities of socotrine aloes, assafœtida, and powdered soap, with water, q. s. *Pilulæ aloes et mastiches*—the old Lady Webster's dinner pills—find a place : socotrine aloes, 48 grains, mastic and powdered red rose petals, of each 12 grains, with water, q. s., are divided into twenty-four pills. *Pilulæ aloes et myrrhæ* have aromatic powder in place of saffron in their composition. Plummer's Pills made into a mass with molasses are called *pilulæ antimonii compositæ.* One part of powdered soap with three parts of assafœtida form *pilulæ asssfœditæ.* The following is the formula for

Pilulæ Catharticæ Compositæ.

℞. Compound Extract of Colocynth, 32 grains.
Extract of Jalap, in fine powder.
Mild Chloride of Mercury (calomel), each 24 grains.
Gamboge, in fine powder, 6 grains.

Mix the powders together, then, with water, form a pilular mass, and divide into twenty-four pills.

Copaiba is made into pills by the aid of magnesia recently burnt. *Pilulæ ferri iodidi* are prepared to resemble Blancard's Pills, as nearly as possible ; care is directed to be taken in forming the solution of the iodide of iron, and, in concentrating this, that the iron shall not get oxidized, or the iodine liberated. A little reduced iron is mixed with the solution and incorporated with the mass, which also contains sugar, powdered liquorice root, powdered liquorice (commercial extract), and gum arabic. The pills are ordered to be varnished with an ethereal solution of balsam of Tolu. They should be "devoid of the smell of iodine ; and distilled water rubbed with them and filtered, does not colour solution of starch, or gives it only a slight blue tint." *Pilulæ hydrargyri* are much the same as ours. *Pilulæ opii* have 1 grain of powdered opium in each, made into a mass with powdered soap and water. *Pilulæ quiniæ* contain 1 grain of sulphate of quinine in each, made into a mass with inspissated clarified honey. *Pilulæ rhei* have in each 3 grains of rhubarb and 2 of powdered soap, with water, q. s. *Pilulæ rhei compositæ* have rhubarb, 2 grains, socotrine aloes, 1½ grains, powdered myrrh, 1 grain, and oil of peppermint, one-eight of a minim, with water, q. s., in each pill. *Pilulæ scillæ compositæ* are much the same as the corresponding B.P. preparation.

The proportions in these formulæ have been simplified, and, as compared with our own pharmacopœia, they are not complicated with a quantity of inert matter as, for example, our compound rhubarb pill is, nearly one-third of its weight being treacle. It is generally a desideratum to make pills as small as possible. In the U.S. Pharmacopœia compound rhubarb pill is the only one which contains an essential oil. Powdered soap, as will be observed above, is freely ordered as an excipient, sometimes where quite unnecessary, as, for example, in *pilulæ opii* ; it is rather too chemical in its action to be compatible even with aloes.

(To be continued.)

* Wood and Bache's 'Dispensatory,' 12th edition, p. 1259.

CRYSTALLIZED PROTOIODIDE OF MERCURY.*

BY P. YVON.

In a note presented to the French Academy, the author states that crystallized protoiodide of mercury may be obtained by heating in a sand bath a flask containing mercury and iodine, the latter being enclosed in a small tube suspended in the centre of the flask. With this arrangement, the mercurial vapour being in excess, the crystals obtained have been always contaminated by it ; the first analyses having yielded 64·2 and 64·3 per cent. of mercury instead of 61·16 per cent.

This excess of mercury may be removed by washing the crystals with dilute nitric acid, analysis having given 61·64 and 61·76 per cent. Upon prolonging the action of the nitric acid the crystals become orange red, and that without change of composition.

The process by which the crystallized protoiodide of mercury may be produced in a regular manner is by heating in a sand bath, in a sealed flask, iodine and mercury in the proportions indicated by their equivalents. The temperature should not exceed 250° C. Upon removing immediately the flask from the sand bath, it will be found that the upper part is hung with crystals of a very beautiful red colour, which become yellow upon cooling. The crystals so obtained are well defined, yellow or slightly orange

* *Comptes Rendus*, vol. lxxvi., p. 1607.

and attain sometimes a pretty considerable size, especially when they unite to form spangles, some of which measure 15 to 18 millimetres long. The smaller of these spangles are flexible.

These crystals, submitted to analysis, gave as a mean of three operations

	Found per cent.	Theory per cent.
Mercury	61·17	61·16
Iodine	38·76	38·83

Their crystalline form belongs to the orthorhombic system. Examined by the monochromatic light of sodium these crystals appear to be a clear brilliant green.

Submitted to the action of heat the crystallized protoiodide of mercury becomes red, the change of colour commencing at about 70° C., and the tint deepening more and more, until at 220° C. the crystals are of a magnificent garnet red colour. Upon cooling they reassume their primitive hues. It is curious to compare this phenomenon with that—exactly the reverse—presented by the biniodide.

If heated with precaution the crystallized protoiodide sublimes entirely without decomposition. The sublimation commences at about 190° C.; but at 220° C. the crystals soften, and at 290° C. they melt in a black liquid which commences to boil at about 310° C. If, on the contrary, the protoiodide be heated suddenly, it is decomposed into metallic mercury and a rather clear yellow sublimate. It might have been supposed that this body would be an iodide richer in iodine; but it is not. The following results are given by the author under reserve, in view of the difficulty of obtaining a pure body. The direct valuation of the quantity of mercury abandoned through the sudden sublimation of the protoiodide may be fixed at 8 per cent., this and the following figures being the mean of a great number of sublimations, all of which varied within the limits of 1·5 per cent. The sublimed iodide would therefore contain very nearly $61{\cdot}16 - 8 = 53{\cdot}16$ per cent. of mercury; but 58 per cent. was found. The following are the centesimal proportions of its composition, showing that the sublimate was an oxyiodide corresponding to the formula—

$$Hg_{12}O_6I_7 = 6HgO, 7HgI$$

	Found.	Theory.
Mercury	58	58·11
Iodine	40	39·74
Oxygen (by difference) .	2	2·14

This oxyiodide, soon after its preparation, is of a fine clear yellow colour, and occurs in brilliant crystalline spangles; but these rapidly, and especially in the light, become orange yellow, and at length brick red. They also diminish much in volume, the spangles bend back upon themselves, and then assume a pulverulent appearance.

PREPARATIONS OF WILD CHERRY BARK.

(*Prunus Virginiana.*)

Infusion of Wild Cherry Bark forms the subject of a paper by Mr. J. B. Moore, published in the *American Journal of Pharmacy* for June. He considers that water extracts but a meagre proportion of the bitter tonic principle of the drug, and that an infusion made according to the U.S. Pharmacopœia formula represents only the sedative properties. He says that glycerine is one of the best solvents for the bitter principle of the bark, and associated with water, forms a menstruum admirably adapted for extracting its entire medicinal virtues. He proposes the following formula, which he has found to give satisfactory results:—

℞. Powd. Wild Cherry Bark, No. 60,	℥ss, troy
Glycerine	f ℥ ij
Water, temp. 86°,	
Water,	each a sufficient quantity.

Moisten the bark with six fluid drachms of water, at the temperature of 86°. Allow the mixture to stand for two hours in an air-tight vessel, at about the same temperature. Then pack it firmly in a glass percolator. Mix the glycerine with ten fluid ounces of water at the temperature of 86°, gradually pour the mixture upon the bark, and when it has all passed from the surface continue the percolation with water until one pint of infusion is obtained.

As prepared by the above formula, the infusion is stated to be much darker in colour than as made by the officinal process, and much more bitter; the taste, however, is modified and rendered more agreeable by the glycerine it contains. The hydrocyanic acid odour is also strongly marked in it.

Mr. Moore thinks that the formula might be still further improved by doubling the strength of the infusion; that is, using one troyounce of bark to the pint of infusion instead of half a troy ounce as is now employed. It would greatly lessen the bulk of the dose, which might then be reduced from two or three fluid ounces to two or three tablespoonfuls.

A sample made by the above formula kept without apparent change for about ten days, with the exception of very slight turbidity and a little deposit of resinous or other insoluble matter. The characteristic hydrocyanic acid odour remained apparently undiminished for that period, after which there was a gradual loss of that odour, with an increased cloudiness and deposit; a sample made with double the proportion of the bark kept without visible change, beyond a slight cloudiness and a little deposit, for about sixteen days, retaining its characteristic odour and taste but very slightly diminished for that time. A sample made in strict conformity to the officinal formula, with water alone as the menstruum, exhibited in a very short time a cloudiness, which rapidly increased, and the hydrocyanic odour was entirely lost in four or five days, while the infusion became entirely spoiled and unfit for use in less than a week.

The glycerine not only contributes to its preservation, but also forms a better and more potent menstruum for the solution of the virtues of the bark, and affords a much more active and efficient preparation. The sweet taste of the glycerine also serves to conceal in a measure the bitterness of the infusion, and renders it more agreeable to the taste. Glycerine itself, possessing alterative, nutrient and demulcent properties, is useful in almost all cases in which the infusion of wild cherry bark would be employed; while in no case can there be any possible objection to its use.

The two hours' preliminary maceration in the above process may with advantage be prolonged to five or six hours, time will thus be given for the necessary reactions which develop the sedative properties of the bark to become more complete.

The temperature of the water with which the bark is moistened preparatory to maceration should never be below 86° to 90°, and the maceration should be conducted at about the same temperature, as this temperature serves to promote the reactions referred to above. But care must be exercised not to allow the temperature to much exceed that point, otherwise there will be more or less loss of hydrocyanic acid.

An elegant and valuable combination of the properties of tar with those of wild cherry bark may be formed in the following manner:—

℞. Tar, pure	one pint.
Infusion Wild Cherry Bark .	four pints.

To the infusion, in a suitable bottle, or other air-tight vessel, add the tar. Set it aside to macerate for two or three days. Stir the mixture well with a stick, and shake it vigorously frequently during the maceration. Then filter through paper. The *stirring* is an important part of the process, as it breaks up the tar and thus presents a larger surface of it to the action of the solvent, which enables the liquid to more thoroughly and more quickly exhaust the tar of all that is soluble in it; whereas, if the mixture is simply shaken the tar will often remain in an impermeable mass, the interior of which is entirely inaccessible to the menstruum. When prepared as above directed, and filtered, this infusion is quite a handsome preparation, and, to those who have not an aversion to the taste of tar, it is not an unpleasant one. Glycerine being a good solvent of the medicinal virtues of tar, this compound infusion possesses the properties of the latter in a high degree. It may be administered in the dose of from one to two tablespoonfuls every two or three hours, as required.

This infusion is not so liable to spoil as the simple infusion of wild cherry bark. Being impregnated with the antiseptic properties of tar, it will keep for a long time unchanged, if kept in a cool dark place.

In the late revised edition of the U.S. Pharmacopœia, the Committee of Revision have substituted a "fine powder" of wild cherry bark for the "moderately coarse" one employed in the edition of 1860. This Mr. Moore considers a judicious change.

In a paper on the preparation of the fluid extract of wild cherry bark of the United States Pharmacopœia (*American Journal of Pharmacy*, July), Mr. H. W. Porter proposes to reduce the bulk of material used for developing the latent hydrocyanic acid by depriving the almonds of their fixed oil, which amounts to more than one-half their weight (54 per cent.), and of other matters insoluble in water, amounting in all to nearly three-fourths the weight of the almonds; or, in other words, by extracting from the almonds all that is requisite for developing the hydrocyanic acid represented by the amygdalin of the bark, namely, a nearly pure emulsin.

He prepares a smooth paste of almonds, and mixes with it sufficient benzin to make a fluid mass, transfers it to a long cylindrical percolator and treats with benzin until the drops falling from the percolator contain no fixed oil. The powder remaining in the percolator is then turned out, and laid by to dry in a warm place, where the temperature does not exceed 100° degrees, until the odour of benzin has entirely disappeared. One troy ounce of almonds, when treated in this manner, yielded 160 grains.

The powder is next treated with water by percolation. It is soon exhausted, as the drops from the percolator soon fail to give a precipitate when added to alcohol. A dense solution results, which consists largely of emulsin, and contains small portions of gum and sugar. This dense aqueous solution is then added to some properly concentrated fluid extract of wild cherry, and put aside for twenty-four hours. It is then filtered, and finally sugar or glycerine added.

The final filtration is easily made, the small portions of emulsin and the gum, which are precipitated by the tannin of the fluid extract, do not clog the filter in the least appreciable degree. The use of benzin instead of ether is simply a matter of economy.

The formula Mr. Porter has worked by is as follows: Take of wild cherry bark, in fine powder, sixteen troy ounces; glycerine, eight fluid ounces; stronger alcohol and water, of each a sufficient quantity; sweet almonds, two troy ounces; benzin, a sufficient quantity; moisten the bark with eight fluid ounces of alcohol, and pack carefully in a percolator; add alcohol until three pints of tincture is obtained, from this distil two pints and a half of alcohol, mix the residue with twenty fluid ounces of water, evaporate to twenty-two fluid ounces, pour into a bottle, and add the solution of emulsin prepared from two troy ounces of almonds by the process above described. Allow the mixture to stand for twenty-four hours, filter through paper, and add the glycerine.

ALCOHOLS FROM FLINTS AND QUARTZ.*

BY DR. J. EMERSON REYNOLDS.

(*Continued from page* 30.)

In 1857, Buff and Wöhler obtained a volatile fuming liquid on heating crystalline silicon nearly to redness in a current of dry hydrochloric acid gas. The precise nature of this liquid was unknown until 1871, when Friedel and Crafts published the results of their admirable researches upon Buff and Wöhler's liquid, and showed that it was a mixture of chloride of silicon with a new body, which proved to be the strict chemical analogue of our well-known chloroform, silicon replacing carbon.

$SiHCl_3$. Chloroforms. $CHCl_3$.

This body is a colourless, mobile, and very volatile liquid, boiling at 35° C. I have a quantity of it in this tube. One of its most remarkable properties is that of exploding with great facility when its vapour is mixed with air. I shall now show you the experiment. Ordinary chloride of silicon does not afford an explosive mixture when its vapour is mingled with air.

When this remarkable body is made to unite with anhydrous alcohol, a colourless, ethereal liquid is obtained on distillation, having an agreeable odour, and a boiling-point at 134° C. This body is strictly analogous in composition to a substance obtained by Williamson and Kay, by acting on ordinary chloroform with sodium alcohol.

These ethers may each be regarded as derived from a glycerine or triatomic alcohol, as shown below. Neither of these alcohols has as yet been isolated.

$Si\begin{cases}H\\OC_2H_5\\OC_2H_5\\OC_2H_5\end{cases}$	Formic ethers (tribasic).	$C\begin{cases}H\\OC_2H_5\\OC_2H_5\\OC_2H_5\end{cases}$
$Si\begin{cases}H\\OH\\OH\\OH\end{cases}$	Glycerines.	$C\begin{cases}H\\OH\\OH\\OH\end{cases}$

By the action of sodium on the silicon ether just referred to, we can obtain siliciuretted hydrogen in a state of purity. This is the only known mode of obtaining the pure compound.

Returning to the silicon chloroform, about whose chemical nature we can now have little if any doubt, we next have to inquire in what direction, and how far, we can pursue the analogy between the great pain-killer, discovered almost simultaneously by Soubeiran and the illustrious chemist of Giessen, who has so recently passed away from amongst us, and the curious body that we can obtain indirectly from flint or other form of silica in the manner I have described.

Ordinary chloroform is well known to be closely allied to common wood-spirit, or methyl alcohol, in a way that will be evident on comparing the formulæ. In fact, chloroform is easily obtained by treating wood-spirit with bleaching-powder. We cannot in any simple way reverse this process and prepare wood-spirit from chloroform, but we can do something in this direction, for we are able by the action of caustic potash to obtain from chloroform formic acid, a body which is one of the most remarkable products of oxidation of wood-spirit. The relation of formic acid to the alcohol is shown in the table which follows; and it is there further pointed out that this formic acid should yield an anhydride—a body capable of producing the acid by union with the elements of water. This anhydride is not known, but the importance of suggesting its existence will appear in a moment.

* Lecture delivered at the Royal Institution, Friday, May 2, 1873.

$Si\begin{cases}H\\H\\H\\OH\end{cases}$	Methyl alcohols.	$C\begin{cases}H\\H\\H\\OH\end{cases}$
$Si\begin{cases}H\\O\\OH\end{cases}$	Formic acids.	$C\begin{cases}H\\O\\OH\end{cases}$
$Si\begin{cases}H\\O\\O(SiOH)\end{cases}$	Anhydrides.	$C\begin{cases}H\\O\\O(COH)\end{cases}$

Regarding silicon chloroform from the same point of view, analogy would lead us to look for a simple silicon alcohol similar to wood-spirit or methyl alcohol; but we would not expect the silicon chloroform easily to yield this alcohol directly, though we would be justified in hoping that an acid, corresponding to formic acid, might be obtained. As a matter of fact, no such alcohol has as yet been prepared, even indirectly; but a corresponding acid is very readily produced, and more than this, for the anhydride at present wanting in the carbon series is found in that of silicon. If I pass the vapour of silicon chloroform into water nearly ice-cold, a white solid body is obtained without any evolution of hydrogen, and an acid liquid produced. The white solid then collected, washed, and dried at a low temperature, forms a white, inflammable powder, which was first described by Buff and Wöhler. Friedel and Ladenburg have shown that this remarkable body is the anhydride of the silico-formic acid. According to the results of my own investigations, the acid liquid to which I referred just now contains, in addition to hydrochloric acid, the true silico-formic acid—a body possessing nearly as energetic reducing properties as the corresponding acid derived from wood-spirit. I shall now demonstrate these facts. [The lecturer then exhibited the experiments referred to.]

It will naturally be asked whether the silicon chloroform is capable of acting as an anæsthetic, like ordinary chloroform. But it is only necessary to bear in mind the fact that it is very easily decomposed by water into gelatinous matter, and highly corrosive hydrochloric acid, in order to understand that its inhalation would be attended by the speedy destruction of the lungs of any person persisting in the experiment. Starting from silicon chloroform, then, we have been led, by analogical reasoning in the first instance, to infer the existence of a simple silicon alcohol precisely corresponding to wood-spirit. On testing this induction by experiment, we have obtained answers which are, so far as they go, altogether favourable to the view just stated. In fact, the results are as satisfactory as they can be short of the discovery of the silico-methyl alcohol.

I shall now endeavour to strengthen this position by showing that the existence of three higher members of the alcoholic series has been rendered highly probable by the discovery of closely related bodies, though the alcohols themselves have not been isolated; and, finally, I shall show that the alcohols of still higher terms have actually been obtained.

In the course of their elaborate and able investigation of silicon compounds, Friedel and Crafts discovered that chloride of silicon easily acts upon common alcohol, as I have already mentioned, producing a body which Friedel and Ladenburg have recently shown to be easily attacked by a mixture of sodium with a curious substance contained in this tube—zinc-ethyl. The product, when treated with caustic potash, yields a body which bears the same relation to silico-propyl alcohol that formic acid does to wood-spirit. This relationship is shown in the formulæ—

$Si\begin{cases}C_2H_5\\H\\H\\OH\end{cases}$	Propyl alcohols.	$C\begin{cases}C_2H_5\\H\\H\\OH\end{cases}$
$Si\begin{cases}C_2H_5\\O\\OH\end{cases}$	Propionic acids.	$C\begin{cases}C_2H_5\\O\\OH\end{cases}$

This silico-propionic acid is in this tube, and is a white combustible powder, like the silico-formic anhydride I have already shown to you. It is soluble in warm caustic potash, but not in caustic soda; by which character it can be distinguished from silica. It is only necessary to state that it can be obtained in aqueous solution, and in the pure state, by Professor Graham's valuable dialytic process.

In the amyl term, neither alcohol nor acid are yet known; but by the action of zinc-methyl on chloride of silicon we can obtain a light, colourless, and very volatile liquid, which is silicon-methide, a body that may, for reasons which will presently appear, be fairly considered to stand in the same relation to silico-amyl alcohol that marsh-gas does to wood-spirit. Thus—

$Si\begin{cases}C_4H_9\\H\\H\\H\end{cases}$	Amyl hydrides.	$C\begin{cases}C_4H_9\\H\\H\\H\end{cases}$
$Si\begin{cases}C_4H_9\\H\\H\\OH\end{cases}$	Alcohols.	$C\begin{cases}C_4H_9\\H\\H\\OH\end{cases}$

The researches of Friedel and Crafts have made us acquainted with a body which may also probably be regarded as the hydride corresponding to silico-hexyl alcohol. This compound is prepared by the action of zinc-methide and zinc-ethide in chloride of silicon.

$Si\begin{cases}C_5H_{11}\\H\\H\\H\end{cases}$	Hexyl hydrides.	$C\begin{cases}C_5H_{11}\\H\\H\\H\end{cases}$
$Si\begin{cases}C_5H_{11}\\H\\H\\OH\end{cases}$	Hexyl alchohols.	$C\begin{cases}C_5H_{11}\\H\\H\\OH\end{cases}$

Having, therefore, stated the grounds for inferring the existence of silico-propyl, silico-amyl, and silico-hexyl alcohols, I shall now pass at once to the second-class of evidence, and show that the alcohols of still higher terms can actually be prepared.

In referring to the preparation of silico-propionic acid, it was stated that when chloride of silicon acts upon absolute alcohol a body is obtained which, on treatment with zinc-ethyl and sodium, yields an ethereal product from which silico-propionic acid can be obtained by treatment with caustic potash. If, however, instead of using the caustic alkali we continue the action of zinc-ethyl and sodium, decompose the products with water in sealed tubes, and distil, a liquid is obtained which contains one of the "alcohols from flint" we are in search of. In this tube I have a small quantity of the alcohol, and here you will find its composition stated—

$Si\begin{cases}C_2H_5\\C_2H_5\\C_2H_5\\OH\end{cases}$	Heptyl alcohols.	$C\begin{cases}C_2H_5\\C_2H_5\\C_2H_5\\OH\end{cases}$

You will observe that it is the silico-heptyl alcohol precisely corresponding to a simple carbon alcohol recently discovered by Nahapetian, both being *tertiary* alcohols. We owe to Ladenburg the discovery of this lowest known term of alcohols containing silicon. As you can observe it is a colourless liquid, not unlike the ordinary alcohol of wine. It is insoluble in water, but easily dissolved by spirit and ether. Chemically it acts just like any of the other alcohols, producing ethers, and dissolving the alkali metals to form sodium or potassium alcoholates. When common spirit burns you are aware that its flame is nearly colourless, but I shall now burn some of our alco-

hol from flint, and you will find, particularly when we feed the flame with oxygen, that a bright light is emitted.

Clearly defined though this alcohol is, it does not stand alone, for at least one other compound of the same order is known. It was suggested in 1870, by Friedel and Crafts, that silicon ethide, a body easily prepared by the action of chloride of silicon on zinc ethide—might be regarded as the hydride of silico-nonyl, and should stand in the same relation to an alcohol that marsh-gas does to common wood-spirit, or ethyl hydride to ordinary alcohol. This happy idea, when put to the test of experiment, was fully justified by the result, for, on treating silicon ethide in essentially the same manner that we should adopt in preparing wood-spirit from marsh-gas, a colourless liquid, lighter than, and insoluble in, water is obtained. The boiling-point of this body is 190° C. It yields an ether with acetic acid, dissolves sodium, forming an alcoholate, and, in fact, conforms to the general habits of the alcohols of the series to which common spirit belongs. The compositions of these bodies are thus represented—

$$Si\begin{cases}C_8H_{17}\\H\\H\\H\end{cases}\qquad \text{Nonyl hydrides.}\qquad C\begin{cases}C_8H_{17}\\H\\H\\H\end{cases}$$

$$Si\begin{cases}C_8H_{17}\\H\\H\\OH\end{cases}\qquad \text{Alcohols.}\qquad C\begin{cases}C_8H_{17}\\H\\H\\OH\end{cases}$$

It is thus shown to be precisely similar to the nonyl alcohol prepared by Pelouze and Cahours from American petroleum.

Ladenburg has very recently advanced even beyond the point we have now reached, and has shown that the chloride of silicon can be made to yield two ethers, which correspond, as I may suggest, to silico-nonyl diatomic and triatomic alcohols. Thus—

$$Si\begin{cases}C_2H_5\\C_2H_5\\OC_2H_5\\OC_2H_5\end{cases}\quad\text{or}\quad Si\begin{cases}C_8H_{17}\\H\\OH\\OH\end{cases}$$

$$Si\begin{cases}C_2H_5\\OC_2H_5\\OC_2H_5\\OC_2H_5\end{cases}\quad\text{or}\quad Si\begin{cases}C_8H_{17}\\OH\\OH\\OH\end{cases}$$

In all the preceding compounds it will have been noted that but one atom of silicon is present, and though, as I pointed out in the earlier part of this lecture, the silicon in these cases occupies the chief position as the grouping element, we should much like to see silicon uniting with silicon, and forming a more condensed compound with hydrogen. Happily, however, very important evidence, even upon this point, is forthcoming, for Friedel and Ladenburg have discovered corresponding hexa-chloride, iodide, and bromide of silicon, and treatment of the hexa-iodide with zinc-ethyl enables us to obtain the ethide whose formula is given in this table—

Hydride.	Chloride.	Ethide.
Si_2H_6	Si_2Cl_6	$Si_2(C_2H_5)_6$

It is not improbable that in the last-named compound we have the starting-point of a new series of still more complex bodies, analogous to derivatives of olefiant-gas rather than to those of marsh-gas.

I trust you will now admit that the case I proposed to lay before you has been made out—namely, that we can obtain some alcohols indirectly from flint or other form of silica, and that we have solid ground for inferring the existence of many others.

A rich and beautiful field for chemical research appears to lie before us in tracing out the analogies between the compounds of carbon and silicon, and recognizing the chemical representatives of many of the most complex "organic compounds" in the native silicates which form so large a part of the crust of this earth.

Hitherto in this lecture I have avoided reference to subjects not directly connected with the matter in hand, but, before concluding, I would refer, necessarily in a very few words, to some inquiries in this department of chemistry which have been carried on in the laboratory of the Royal Dublin Society. First, however, allow me to perform an experiment. I have here a glass jar filled with dry ammoniacal gas; when I drop into it some chloride of silicon, a white compound is obtained. This body was discovered by Persoz in 1830, and the composition he assigns to it would, as ably suggested by Dr. Hofmann, represent a mixture of sal-ammoniac with the hydrochlorate of silicon-guanidine. If this white body be ignited strongly in a closed vessel, an infusible white substance remains, which has been examined by Deville and Wöhler, who have shown that it contains silicon and nitrogen, and that the same or similar body can be produced by intensely heating crystalline silicon in an atmosphere of nitrogen.

My examination of this curious body has led me to the conclusion that it is the silicon analogue of cyanogen—a well-known compound of nitrogen with carbon, and the chief constituent of the deadly poison prussic acid. This body, though little affected even at a very high temperature, in the absence of moisture is easily decomposed by steam—silica, ammonia, and hydrogen resulting. A similar decomposition is effected by heating with soda-lime. I may add that, when this singular compound is fused with a small quantity of carbonate of potassium, cyanide and silicate of the metal are produced; in this case, carbon appears to displace silicon.

If, in the experiments with ammoniacal gas, we substitute silicon chloroform for the silicic chloride, a body is obtained from which this compound of silicon and nitrogen can be easily extracted. Now we know well that when ordinary chloroform is heated with ammonia gas, chloride and cyanide of ammonium are obtained, and that under certain circumstances a body called *para-cyanogen* is also produced. Analogy would lead us to anticipate that silicon chloroform would react in a similar manner, and the facts I have hitherto observed justify this inference.

It would be out of place to pursue this subject here, as the results of the inquiry referred to have not yet been published. I have, therefore, now simply shown to you one of the chief bodies to which interest belongs, and ventured to point out the relationship I believe it to bear to some of the well-known and remarkable compounds of carbon with nitrogen.

In concluding this lecture, I need simply remind the audience I have the honour to address that the practical value of scientific research is rarely apparent at first. Who could have suspected that the benzole discovered by the venerable philosopher whose name is so inseparably connected with this Institution would have proved, in the able hands of Perkin and of Hofmann, the chief source of many of the exquisite dyes now largely manufactured in this country? Yet in this, as in a hundred of other instances, the small and apparently useless scientific seedling has gradually expanded into the strong tree, yielding its rich store of useful fruit. Let us hope that a similar future awaits some of the alcohols from flint which have been referred to this evening, and that, in pursuing our studies of the silicon analogues of the more complex carbon compounds, we may be led to appreciate more fully than we have hitherto done the admirable economy and harmony of Nature.

THE ACTION OF WATER ON LEAD.

BY SIR ROBERT CHRISTISON, BART.

The most general results of the author's former inquiries are—1. That the purest waters act the most power-

fully on lead, corroding it, and forming a carbonate of peculiar and uniform composition. 2. That all salts impede this action, and may prevent it altogether, some of them when in extremely minute proportions. 3. That the proportion of each salt required to prevent action is nearly in the inverse ratio of the solubility of the compound which its acid forms with the oxide of lead.

The effect of certain inorganic and organic ingredients of water in modifying the prcservative power of the salts the author did not investigate. This has been made the subject of numerous inquiries and observations by others, chiefly, however, of a desultory nature, some of them much too succinctly described, and some, also, of questionable accuracy.

It has been denied that water acts by reason and in the ratio of its purity ; and it has even been alleged that distilled water itself does not act if really quite pure. The author has, however, invariably found the reverse to be the case, and can assign no other explanation of these statements, except some error in manipulation. For example, a very pure spring water was sent to him from the south of England, with the assurance that it had been found incapable of attacking lead ; but, on making trial of it, he found it to act with an energy not inferior to that of distilled water.

It has also been stated that ordinary distilled water is apt to contain a trace of nitric or nitrous acid, from nitrates incidentally present in the water subjected to distillation ; and that such water, if distilled after the addition of a little potash to fix the acid thoroughly, yields a distillate which has no action upon lead. But when the author prepared distilled water in this way, with great care to prevent the access of impurities from other sources, the only result was that the action was even stronger than that of the ordinary distilled water of the laboratory, and greater, indeed, than he had ever before observed.

An interesting statement has been made by Dr. Nevins, to the effect that some salts appear to allow of a certain action going on when they are present in water largely, although their influence when they exist in very small quantities is to act as preventives. This result the author has sometimes obtained, and has found the action such as might prove dangerous. But its limit requires to be defined ; and there is reason to suppose that the proportion required to *permit* action will be found to be greater than is ever likely to occur in the instance of waters applicable to household use.

It has also been said, but in general terms and without experimental proof, that the presence of carbonate of soda, even in a hard water, takes away the preventive influence of the other salts, and enables the water to dissolve lead. There appears to be some foundation for this statement ; but here, too, it is necessary to fix what is the limit to such influence before its importance can be valued. Moreover, as bicarbonate of soda appears to have no such effect, and this is the usual form of the carbonate in natural waters, the practical importance of the fact is inconsiderable.

The corrosive action of water upon lead has often been confounded with other causes of corrosion, and the water has borne the blame. Thus the true action has been confounded with the corrosive action of potent agents accidentally coming in contact with the metal in the presence of water, as, for example, when a lead pipe has been led through fresh mortar, which is frequently or permanently kept moist, or when lumps of fresh mortar have been allowed to fall upon the bottom of a lead cistern.

The true or simple action of water has not unfrequently been confounded also with the effects of galvanic action. Thus, if a lead pipe or cistern be soldered with pewter solder and not with lead, erosion takes place near the line of junction of the solder with the lead. The presence of bars of other metals crossing lead, or bits of them lying on it, will also develop the same action ; and some facts seem to point to the same property being possessed in a minor degree by some stony and earthy substances. This observation may explain the local erosion sometimes observed in cisterns containing hard water ; since, if galvanic action be excited, it will be increased by the fact of saline matter existing more largely in these waters than in soft or comparatively pure water.

Lastly, some observers have contradicted former statements, because under certain circumstances, which led them to anticipate no action, they nevertheless found lead in water, but only in extremely minute and unimportant proportion. The test for lead, hydrosulphuric acid, when employed in the way now usually practised is so delicate as to detect that metal when dissolved in ten million parts of water, or even more. Facts, however, warrant the conclusion that the impregnation must amount to at least ten times this quantity before water can act injuriously on man, however long it may be used.—*Iron.*

HOMŒOPATHIC PILULES.

With a view of throwing some light upon the question whether the beneficial results sometimes reported as following the use of homœopathic medicines were due to imagination or to the action of a powerful drug, some experiments have been made with the variety of preparations known as pilules, and these are described in the April and July numbers of the *Practitioner*. Pilules are different from globules ; they are about as large as No. 5 shot, and obviously might contain a powerful dose of any energetic substance. The dilution chosen was that known as the second. Each pilule, the average weight of which was 0·6 grain, should accordingly contain 0·00006 grain of the drug. This quantity, in the drugs chosen, is fairly within the reach of analysis.

Sulphate of Copper Pilules.—First sample, no copper could be detected in 100 pilules ; second sample, no copper could be detected in 200 pilules. The quantity of sulphate of copper in the above pilules should have been 0·006 and 0·012 grain respectively. If even as little as 0·0001 grain of the sulphate had been present it would have been detected. These samples therefore contain much less of the drug than they should have done (120 times less in the second sample), and in all probability no copper at all was present.

Corrosive Sublimate Pilules.—It was just possible to detect mercury in 200 of the pilules. The amount was, however, less than corresponds to 0·0005 grain of corrosive sublimate, whereas 0·012 grain of this salt should have been present.

Nux Vomica Pilules.—No strychnine could be detected, even when 300 pilules were employed. Three hundred pilules should have contained about $\frac{1}{10000}$ grain of strychnia. Now, so small a quantity as $\frac{1}{70000}$ grain of strychnia is well known to give distinct reactions to chemical tests, but no reaction could be obtained in the present case.

Aconitum Napellus Pilules.—First sample : no aconite could be detected in 100 of the pilules (weight 80·85 grains). Second sample : same result (weight of the 100 pilules, 96·40 grains). Comparative experiments showed that had these pilules contained as small a quantity even as $\frac{1}{8000}$ of a grain of aconite, it would have been detected with certainty. This corresponds to about the 160th part of a grain of the extract of aconite ; the quantity which should have been present is from $\frac{4}{5}$ to nearly 1 grain, or more than 100 times more.

Belladonna Pilules.—First sample : no atropine could be detected in 100 pilules (weight 80·39 grains). Second sample : same result (weight of 100 pilules, 81·00 grains). Comparative experiments showed that by means of chemical tests alone, as little as $\frac{1}{6000}$ of a grain of atropine would have been detected with certainty. This corresponds to about $\frac{1}{30}$ of a grain of the extract of belladonna, whereas as much as $\frac{4}{5}$ of a grain, or 24 times as much, should have been present.

The Pharmaceutical Journal.

SATURDAY, JULY 19, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

POISONING BY CARBOLIC ACID.

THE numerous cases of poisoning that have occurred, either from design or accidental misuse of carbolic acid, unfortunately constitute too decisive evidence that the application of this material to various purposes connected with daily life is not accompanied with such precautionary measures as are desirable and necessary for preventing accident.

Our readers will find at page 56 the report of another case of this kind, which will serve as an example in support of the view here expressed, and a perusal of the proceedings at the inquest will probably be useful in leading many to observe somewhat of the same caution in selling carbolic acid that they do in selling other materials which are by law regarded as poisons, and therefore must be sold only under certain conditions.

In this case we have another instance of the tendency of popular opinion to read the provisions of the Pharmacy Act, 1868, in regard to poisons, in a much wider sense than is customary among members of the drug trade. As in many previous instances we find here again that the CORONER'S attention was mainly attracted by the 17th clause of the Act, and although reminded that poisons are legally poisons only if included in the two schedules appended to the Act, he still held that from a legal point of view it is absolutely unlawful to sell any poison, no matter whether mentioned in the schedule or not, without labelling it "Poison," and in expressing this as his "decided opinion" he referred to the phrase, "or may hereafter be added thereto," apparently suggesting that if any poisons sold by druggists were not in the schedule, they ought to be put there.

Regarding this part of the Pharmacy Act as a measure for the benefit of the public, it would be unreasonable to deny that there is some cogent reason for the view taken by the CORONER in this case. But we should at the same time be sorry to see the poison schedules of the Act so amplified, and although it is no part of our province to interpret the law, we believe, as we have many times stated already, that the wide reading of the term "all poisons," irrespective of the existing schedules, is an error in point of law. But, nevertheless, the jury appears to have adopted even still more strongly than the CORONER the foregoing opinion, and expressed in the verdict regret that poisons of the kind should be sold without the word "Poison" being written on the bottles containing them.

It is true, the report published in the *Bucks Herald* states that it was generally understood the verdict did not reflect in any special manner on Mr. TURNER, and we are glad to find this publicly stated. But at the same time it would be folly to shut our eyes to the possible damage that may be done to the business of any one who is so unlucky as to have his name connected with such a case. Whether the censures of coroners' juries be well-founded or not, we feel sure that from this point of view every one must desire to be exempt from the penalties they may entail, and on the principle of self-preservation it will be well to consider whether there be not some facile means of attaining such immunity.

In the present case, for instance, it came out in evidence that the purchaser of the carbolic acid "was not aware of the mixture being of so deadly a nature. Had it been labelled 'Poison' he should not have left it where he did." This is highly important, and although, on the other hand, Mr. TURNER pleaded the "custom of the trade" as a justification for not attaching a "Poison" label, that plea—well-founded as it was—did not suffice to command recognition by the jury. Mr. TURNER, no doubt was quite right in thinking he was not bound by law to label carbolic acid "Poison," but as regards his interests, it was a question of human nature rather than of strict law which had to be considered. Would it not, therefore, be desirable for druggists to make a freer use of the "Poison" label, and thus protect themselves from the disagreeable consequences arising from misuse of articles they have sold? The precaution is a simple one at least. As to the argument against the use of the "Poison" label, that it might deter people from having anything to do with articles so labelled, we do not think it is altogether competent for the vendors of such articles to urge that consideration, for the spirit of the Act which gives them an exclusive licence to sell poisonous drugs has unquestionably in view the safety of the public as a primary matter.

We think, therefore, that in the sale of such potent articles as carbolic acid it would be desirable for druggists to make it a "custom of the trade" to attach the "Poison" label. Moreover, we would recommend that in the sale even of such articles as paregoric they should, in the exercise of their knowledge and discretion, sometimes adopt a like course, or at least some similar precautions against accidents in the use of mild opiates for children, such as we have often had occasion to report. By adopting such a course they would, we think, protect themselves, and would also establish some reason for demanding that the sale of drugs should be restricted to those competent to carry it on with due regard to public safety.

SOUND PHARMACY.

In this country it has long been the prevailing opinion among those who best understand the subject that safety in dispensing must always depend mainly upon the intelligence and training of the dispenser, rather than upon such aid as may be obtained from the use of labels and bottles of various shapes and colours. Even when discussion was at its height concerning regulations for the dispensing and keeping of poisons, which the present Government attempted to make compulsory, it was generally conceded that the value of all such contrivances was but slight compared with an intelligent and practical acquaintance with the drugs manipulated on the part of the person handling them. Mr. Haselden, while President of the Pharmaceutical Society, called attention in these columns to the importance of every apprentice having an opportunity of becoming practically acquainted with the Pharmacopœia processes, and suggested that it was the duty of every employer—and not an unprofitable one—as far as possible to practise pharmacy in the laboratory as well as in the shop.

A series of unfortunate accidents in France—such as the substitution of arseniate of potash for the sulphate, of sulphate of zinc for sulphate of magnesia, and acetate of baryta for sulphovinate of soda—has turned the attention of French pharmaciens in the same direction, and some of the opinions uttered during the discussion of the subject have been as applicable to circumstances in this country as those in France.

In a paper on precautions against accidents through the substitution of one medicine for another, M. Baudrimont, Professor of Pharmaceutical Chemistry at the Paris School of Pharmacy, has pointed out that the majority of such accidents as those indicated above have had their origin in mistakes committed outside of the pharmacy. He therefore insists that it is incumbent upon every pharmacist scrupulously to examine every chemical before receiving it into stock, in order not only to identify it, but to recognize any products of alteration or substitution which may be present in it. As to the Galenical preparations, such as the powders, tinctures, extracts, syrups, etc., he considers that every principal of a pharmacy should hold it to be a point of honour never to employ any that he has not manufactured himself, rejecting absolutely preparations of this kind found in commerce.

But M. Baudrimont has other safeguards. Bottles with sharp angles and rugged sides are to appeal to the fingers of the possibly ignorant or inattentive dispenser, and should the spurring of one sense not be sufficient, brown glass, and earthenware painted bright red, red paper, red bags, red drawers, red labels, and a list of poisons drawn up on red paper are to appeal to another. This flaunting of scarlet is to be supplemented by a danger mark to be placed on the prescription by the prescriber, and the keeping of all dangerous substances apart. These expedients, not altogether new, and not altogether neglected in well-conducted pharmacies, M. Baudrimont thinks would render an error practically impossible.

As might have been expected, the programme of M. Baudrimont has elicited criticism which has not always been favourable. The reporter of a committee of the Bordeaux Pharmaceutical Society, M. Martin Barbet, with a frankness scarcely French, expresses an opinion, which he would probably tolerate from no other nationality, namely, that it is to the decadence of French pharmacy, to the insufficient instruction, notorious incapacity and idleness of French pharmacists that the uninterrupted series of accidents has been due. His remarks are worth quoting :—"Where," he asks, "are the pharmaciens who pre-"pare their own distilled waters, their extracts, their "powders, alcoholates, tinctures, etc ?" "Read," he continues, "the remarkable prospectuses of all the "new houses, you will see that they consider them-"selves to be responding to an undisputed want, and "you will find in every line the irrefutable proof of "the degradation into which the profession has "fallen. Under the fallacious pretext of coming to "our aid, while in them it is the bait of lucre, they "sell you fluid extracts for fear you cannot make "them to dissolve ; titrated solutions in case you "cannot calculate ; concentrated products of all sorts, "for the preparation of simple and compound syrups, "alcoholates, etc., because you are no longer apt to "make either infusions or decoctions, or manipula-"tions of any sort. It would not be surprising to see "before long a means for sparing the trouble of "making pills and draughts. And thus we have "allowed the pharmacist to be turned into a mer-"cantile man without initiative and without value."

Beneath the irony of this language there lies a substantial layer of truth, and truth that is at least as applicable, and probably more so, to the pharmacy of this country as to that of France. Of course it will not do to deny the advantages attached to the conducting of some operations upon a large scale. But it will be politic in the pharmacist not to lose sight of some of the most important duties of his calling, and thus sink to the rank of intermediary between the manufacturing druggists and the public. Such must be the natural consequence in proportion as practical pharmacy is discarded from our pharmacies. As a matter of business, each manufacturer will try to attach some special repute to even the pharmacopœia articles of his production ; prescribers will exercise their whims and fancies as to the ingredients entering into their prescriptions ; and more often than now—though now it occurs much too often—the laboratory man will have to be converted into a swift-footed messenger to range over half a town before a mixture can be made up. Those who think this is to be an exaggeration should study the discussions which continually take place

in the American pharmaceutical societies upon the sale of elixirs. Under such a system—the pharmacist being often ignorant of what he is handling—uncomfortable bottles and startling labels might take first rank as educational appliances. But we believe with M. BARBET that the welfare of the pharmacist, as well as the safety of the public, will be best secured by an adherence to healthier pharmaceutical traditions, and the relegation of these expedients to their proper place as mere complementary safeguards.

REPORTS ON THE OLIVE OIL TRADE.

SEVERAL reports upon this subject have been published, from which we glean a good deal of information with regard to the olive oil trade. The British Consul, writing from Corfu (Greece) on the trade and commerce of the past year, states that the export returns of olive oil, the staple product of Corfu, convey no idea whatever of the actual yield of the season—the approximate amount of which is only to be ascertained from the valuation of the exports—which must by law precede the gathering of the olives, and by which the quota of oil payable by the tenant to his landlord in name of rent is fixed and determined. As the present is not a year of crop no estimate has been made. Before the cession of Corfu to Greece, those estimates were returnable to an officer of the government, whose duty it was to enter them in a register kept for the purpose, and to which reference was to be had in the event of any dispute between landlord and tenant. But since the cession this system of collective registration has been discontinued, and has been transferred to the judges of the district courts, with whom the returns are deposited, and by whom the record is kept. The annual exportation of olive oil from Corfu amounts to over 5500 tuns, the greater portion of which goes to Trieste and to English ports. The tun is reckoned to contain sixteen Ionian barrels of sixteen imperial gallons each. The average price of oil during the year varied from 10½ to 11¼ Spanish dollars, or from 45*s.* 6*d.* to 48*s.* 9*d.* per barrel. At the close of the year 600 tuns of the stock-in-hand remained for exportation. From Palermo we learn that the olive oil trade has undergone considerable fluctuation of late. The export of the oil rose from £61,842 in 1868, to £111,908 in 1869, fell in the following year to £39,523, but recovered itself in 1871, advancing to the large figure of £155,900. This, however, is described as a product of most uncertain character, the crop varying greatly according to the season, and rarely continuing good for two consecutive seasons. Olive oil is one of the principal articles of produce available for exportation from the Island of Cephalonia (Greece), and adds materially to the prosperity of the inhabitants. The trade is usually a brisk one. The yield of an average crop is estimated from 30,000 to 35,000 Ionian barrels of 16 imperial gallons. The value of olive oil exported from the Island during the past year was over £15,000. Consul PATON (Ragusa, Austria), writing in reference to the olive oil crop of last year, describes how in a great measure it has been displaced by the advancing popularity in the market of petroleum. He states that the olive pluck of Ragusa last year was a failure, partly from the worm, and partly from the extraordinary deluges of rain which occurred in November and December. Eleven inches of rain, or about one-third of the average total rain of the year, fell on one day in the middle of December, the consequence being that terraces were broken down, trees uprooted, and a large part of the yield not plucked from the tree, but picked up out of the mud. The price has been, moreover, low—viz., 44*s.* a barrel. The fact is, remarks the Consul, that petroleum is now amongst all the populations of the south of Europe doing so much that was formerly done by olive oil, that it is only the extraordinary demand for oil for the purposes of machinery that keeps up the price. This is certainly a significant remark as showing the difference in the progress made respectively by petroleum and olive oil.

SHOP HOURS' REGULATION BILL.

IT will be seen upon reference to p. 56 that the Shop Hours' Regulation Bill has met with the fate to which its native absurdity fully entitled it, and has been withdrawn before it had been discussed in Parliament. This result has been doubtless due as much to the general opposition it has evoked,—in which the Pharmaceutical Society, by its Council, has taken an active part,—as to the late period of the session.

THE TEACHING OF NATURAL SCIENCE IN SCHOOLS.

THE following remark by Professor AGASSIZ on the teaching of natural history in schools is quoted by *Nature* from the *University Monthly*:—"I am satisfied that there are branches of knowlege which are better taught without books than with them; and there are some cases so obvious that I wonder why it is that teachers always resort to books when they would teach some new branch in their schools. When we would study natural history instead of books, let us take specimens—stones, minerals, crystals. When we would study plants let us go to the plants themselves, and not to books describing them. When we would study animals, let us observe animals."

THE USE OF ENAMELLED IRON VESSELS.

M. STANISLAS MARTIN reports that having used an enamelled cast-iron vessel in making a preparation containing citric acid, he was surprised at the end of the operation to notice that the entire surface of the metal had been laid bare. Upon investigation he found that the enamel was composed almost entirely of carbonate of lead.

Proceedings of Scientific Societies.

CHICAGO COLLEGE OF PHARMACY.

An adjourned regular meeting of the College held June 11th, 1873. President Whitfield called the meeting to order. The question of engraving and re-issuing the fire-destroyed certificate of membership was, on motion, referred to the Board of Trustees with power to act.

The Committee on Finance, failing to make a report, on motion, an investigating committee, consisting of the Secretary, Treasurer, and ex-Treasurer, were appointed to examine the accounts.

The following were appointed delegates to the Richmond meeting of the American Pharmaceutical Association, and to the convention of teaching colleges, with power to fill vacancies: Thomas N. Jamieson, Albert E. Ebert, George Buck, E. H. Sargent, and Theo. H. Patterson.

A motion prevailed empowering the Board of Trustees to co-operate with any movement that may be made for holding a convention of pharmacists of the North West during the October Exposition in this city.

The committee on the revision of the bye-laws reported the following changes, which, being separately acted upon, were adopted. The initiation fee and annual dues were each raised from 5 dols. to 10 dols. Life membership to 100 dols. Associate membership to 5 dols. annually, or 50 dols. if paid in one payment.

After making other minor changes in the wording of the bye-laws the business committee moved that a complete list of all the donations received by the College since the fire be published in the *Pharmacist* as soon as an inventory of the same is made.

Mr. E. H. Sargent, in behalf of the committee on the Attfield testimonial, presented to the College an oil painting representing Professor J. Attfield, of London, with the following remarks:

"Mr. PRESIDENT: In behalf of several of our fellow-members, I have the honour and pleasure to present, in their name, to the Chicago College of Pharmacy this work of art, as a fitting memorial of events ever to be remembered—the destruction and re-establishment of this school of pharmacy. And not alone, sir, nor chiefly, does this work of art remind us of events in our own narrow sphere, for the inspiration which gave rise to it had its birth beyond the seas.

"In this picture we present to you, sir, and to our associates, a faithful portrait of one who has for all time endeared himself to each one of us as the benefactor of this College, Professor Attfield, who stands to us as the representative of that noble band of English pharmacists who so generously and so promptly came to our aid, in the time of our great adversity. I cannot, sir, with any words at my command, adequately express the admiration excited by the prompt and effective generosity of our English friends. We owe to their endeavours the present condition and means of usefulness of this College; may we not be sure that so important a result will, in view of the good to be accomplished, compensate in a great measure the generous givers, and prove, more than any words which we may utter, the value and our appreciation of their gift. May we and our successors be ever reminded by this portrait that we have a duty to fulfil: that in receiving we pledge ourselves to bestow, not alone in kind, but in all ways that will aid the unfortunate, nourish the needy, or educate the ignorant. Thus only can we prove ourselves worthy of the confidence and generosity bestowed, or properly use the trust confided to us.

"In conclusion, let us hope that our benefactor and his co-labourers may each receive the reward of the generous giver, and long live to witness the growth of their grateful recipient.

"In placing this truthful portrait of our valued friend upon these walls, let us, with one voice, echo the motto with which we are greeted, '*Concordia soll ihr Name sein*,' and add 'ESTO PERPETUA.'"

The President, Mr. THOS. WHITFIELD, on behalf of the College, accepted the testimonial, responding as follows:

"Sir: As the presiding officer of this College, I have the honour to accept in its behalf the very life-like and handsome offering which you have so appropriately presented.

"In accepting this portrait for the College, I should be doing injustice to those whom I have the honour to represent, and also to my own feelings, were I to pass over in silence the generous action of those who, prompted by the generosity of our transatlantic friends, caused the production of this, to us, touchingly eloquent memorial.

"The College, I am sure, desires to return its grateful thanks to those of its number who were instrumental in honouring it with this portrait of one who must ever occupy a large place in the heart of its every member. Wider spread, better planned or executed, and less ostentatiously displayed benevolence was never known than is represented in these halls, expressing at once the sympathy of our English friends at our calamity, and their appreciation of our efforts in the education of our profession, in a form so tangible that every beholder must be at once struck with admiration. Now we are called upon to accept this the fitting finale, the very counterpart of the originator of this outpouring from our fellow-workers in pharmacy in Great Britain.

"I believe that this College as a body is alive to the importance of the trust reposed in it, and knowing this I feel fully warranted in assuring you, sir, and through you our English as well as our home friends, that it will not prove recreant to the important trust or incompetent to the discharge of its duty.

"We are told that a pebble cast into a body of water causes a displacement co-equal with the water's surface, only limited by its banks. Also, that the vibration communicated to the atmosphere does not die, but 'keeps circling on through infinite space for ever.'

"Now, sir, if these statements are true in relation to causes so minute, who shall dare attempt to measure the influence which this munificent donation—the instigator of which we recognize in this portrait—shall exert on the education of the pharmacists of the present not only, but of the future, throughout endless generations."

It was voted that the portrait of Professor Attfield be placed on exhibition in the Art Gallery of this city, bearing a suitable inscription.

SOCIETY OF ARTS.

ON THE ENERGIES OF THE IMPONDERABLES, WITH ESPECIAL REFERENCE TO THE MEASUREMENT AND UTILIZATION OF THEM.*

BY THE REV. ARTHUR RIGG, M.A.

Lecture I.

Introduction—Inter-relations—Units of Measurement, etc.

(*Continued from page* 36.)

The difficulty of the task results not so much from a solution of the simple problem which the words "estimate that energy" convey, as from the incompetence alluded to of isolating and continuing the special energy and noting its operation. For no one of nature's energies, be they ponderable or imponderable, is alone. Solitariness in the unseen, as well as in the seen, is no part of nature's plans.

Faraday seemed to have realized this view in great intensity when he wrote:—"If, as I believe, dualities are essential to the forces, are always equal, are mutually dependent, that one cannot appear or exist without the other; the proof of this would lead to many consequences of high importance to the philosophy of force generally."†

* Cantor Lecture, delivered February 3, 1873.

† 'Proceedings of Royal Institution for 1854,' p. 6.

This interlacing of energies—this correlation, as it is called, of physical forces, whilst it knits in harmonious union energies which are nominally distinct, baffles the investigator who wishes to assign to each its share in any specific work. For example, the energy of gravity operates everywhere, and our fundamental principle in hydraulics, that fluids press equally in all directions, may be granted as a postulate. The experiments by which it can be confirmed may be and are very clearly described, but no one has ever made or can make them. Gravity never ceases to impress upon fluids a downward tendency, and so prevents an equality of pressures in all directions being established.

It may be in the interest of the Moslem faith to assert that, without visible means, Mahomet's coffin rests between earth and heaven; but, assuming the truth of the tradition, or of the fact (whichever it be), we know well that gravity operates in all its wonted intensity, and that the coffin is held there (if held at all) by the introduction of some counteracting energy, as that of magnetism.

The energy of electricity is ever passing into heat—that of heat into electricity or light. Electricity, again, appears to assume the form of vitality; and then, again, it totally fails to fulfil the vital conditions. In some animals the exhaustion of their muscular energy is consequent upon the exhaustion of their vital energy, and no electrical appliance can restore the vital energy, even though it seems to restore the muscular. Take affinity. This passes, by means unknown to us, into electricity and heat.

There is also this peculiarity amongst these energies. The work of one energy, estimated by any means known to us, gives no indication of the work of some other energy, resident or potential, in the same matter.

For example, the estimation of a drop of water by gravity standards—to speak of it as weighing so many grains—gives no indication whatever of its ability to promote affinities— to absorb and convey heat—to decompose light. And if even all these were known, there would still be no indication that upon an electrical standard of measurement, its destructive effects are equal to that of a flash of lightning.

The only energies that may be said to be non-interchangeable are those of gravity and vitality. The former is enduring—the latter fleeting. The character of the one is persistence and constancy, that of the other, change and variety. Gravity may be said to be quietly resident in matter; vitality shows its presence by growth or motion.

Gravity is an energy pervading all nature, as intense in grains of sand as in the mountain; in a drop of water as in the river or the ocean. Disregarding alike the vitality of the plant or the animal—for gravity treats them as though they were as inert, indifferent, and unconscious of its presence as the soil of the garden or the mineral under the earth—thus this energy, which is to occupy our chief consideration on Monday next, is alone, and yet we shall find how that it has been left for recent times to tabulate its measure, to report and utilize, under the guidance of ordinary arithmetical and mathematical rules, the scientific and social consequences of the measure so established.

The other energy, that of vitality, which is to occupy our attention a fortnight hence, can hardly as yet be said to have been measured. The time, however, is very near when the hope will be realized that the energy of vitality —the mechanical, the statical, the dynamical, and absolute energy, of course, is meant—may be reduced to as exact a science as those of light, heat, and electricity have recently been.

All who have questioned Nature are well aware how simply and truthfully she replies. It must, however, be steadly borne in mind that this truthfulness applies to the question and answer in their mutual relations. If the question be so put that Dame Nature has to answer in respect to the combination of two elements, and so is called upon to give a reply which is in truth the aggregate of the two, she does so. It behoves the questioner to frame his question with the utmost care, in order to eliminate what is extraneous to his purpose. All must have observed how difficult it is to frame a question which cannot be misread or admit of a reply evidently based upon a view which the questioner never contemplated. For example, if the question relate to gravity, caution is needed to exclude the buoyancy and even viscosity of the air and the centrifugal effects of the earth's rotation.

If it relate to electricity, caution is needed to exclude the most infinitesimal alloy of a metal—even a metal itself.

If it relate to vitality, caution is needed to exclude the effects of temporary exhilaration or prostration.

If it relate to affinity, caution is needed to exclude the complication of phenomena by variations in gaseous pressure or atmospheric temperature.

If it relate to heat, caution is needed to exclude peculiarly constituted substances, in their unknown and varying effects on heat from their atomic or rather molecular condition.

Although, for purposes of classification and the general distinction of the phenomena, the energies found in nature are arranged under the general headings which are prefixed to the respective lectures of this course, yet it must be borne in mind that these are verbal rather than emphatically actual distinctions. They are merely the terms recognized at the present day, and in a few years may be dismissed. The convertibility of energy just now alluded to is a phrase which conveys a clear meaning, but this convertibility is a process that cannot be followed. At one time in the science world a general principle seems to have been established in relation to it; again and again the hope fades, the principle is on no secure basis, whilst the convertibility is ever active. It may not inappropriately be asked which energy is the source of the others —which, in fact, seems to have the highest claim to be classed as *the one*. Doubtless, as a question of sequence, in time gravity must claim the first place, but, so far as our powers of utilizing the energies of the imponderables are concerned we are not able to appeal very hopefully to gravity. We cannot obtain the other energies from it. Gravity refuses to be converted; its political principles are of the type which permits no change. Nature's No. 1 must be gravity; man's No. 1 affinity. For example, oxygen and hydrogen manifest their affinities in obedience to some inexplicable law. They enter into what is called combination, and in so doing manifest one form of energy to which the name of the "energy of affinity" is given. But in the transition state—in the act of obeying the very imperfectly known laws of affinity —another energy of a different name and character appears, viz., heat. Evidence of the power of this energy—heat—is furnished to tests very different to those which may be applied to the energy of affinity. The heat presented to the thermo-electric pile, and that a great change in the mode of its energy has taken place is obvious from the results it produces at a distance; to this new form of energy we give the name of electricity. By a species of magic, electricity has called forth an energy to which is given the name of magnetism. Suitable circumstances being presented to this new energy, there is a machine propelled and capable of doing mechanical work. We now call it mechanical energy.

Thus, by change superposed on change, the energy of an imponderable has been converted into that energy of the ponderable to which we are indebted for all, or nearly all, of arts, manufactures, and commerce.

The two imponderable energies into which chemical affinity cannot be converted are vitality and gravity. These two may, as we shall hereafter find, assume the form of the others—the others cannot assume their forms —at least not in any plain and honest sense. Except in these two, physical energy is a visible reproduction of the invisible doings of chemical affinity.

Simple as this process of transformation may appear, and convenient and useful as the suddenness of the change may be, it cannot be denied that to the investigator it is perplexing. Men, however, labour on, each perhaps winning a little from the unknown, and adding it to the

known. Thus, although "hills peep o'er hills, and Alps on Alps arise," yet men of varied resources and patient perseverance have won those invaluable treasures of measurement and utilization from the imponderable and unseen, which give the title to this course of Cantor Lectures.

Even Livingstone has not shown a more noble resolve "to conquer or to die" than have those to whom we are indebted for all we know touching the modes of measuring the energies of gravity, vitality, affinity, electricity, light, and heat.

As illustrations of the difficulties of the tasks before them,. it may suffice, in this introductory stage, briefly to observe that :—

Galvanic currents may escape notice unless the intensity of terrestrial magnetism be neutralized.

Dimagnetism and the magneto-electric spark escape notice, unless a large number of galvanic cells or their equivalent is used.

What was called the "smell of electricity" led Schonbein to the discovery of " ozone," a remarkable product, and one whose energies are yet unknown, although being slowly but surely developed.

That a vibrating magnetizing needle came to rest sooner in the neighbourhood of a copper plate, now called a damper, than when the plate was away, led to the discovery of the induction of electric currents by Faraday.

Opinion from telescopic appearances of the size of the stars led to an idea that their discs differed; the phenomenon has been found to be due to the diffraction of light.

The velocity of sound was calculated, making due allowance for the direction of the wind ; in recent years it has been found that the heat developed by one particle of air striking another must be taken into account.

We are indebted to "energy" for all we have, and all that men have won. For, example, this building and all that it contains is an example of one of the energies of gravity. The lightning, with its thunder, is an example of the energy of electricity. Power of hearing and of speaking are examples of the energy of vitality. The bread eaten and the wine drunk are assimilated and become ours by the energy of affinity. It is owing to the energy of light that vision can be had; and to the energy of heat that railways and locomotion can be utilized.

The word "energy" itself, which has in these days, phœnix-like, risen from its ashes, and which plays so important a part in the title to this course of Cantor Lectures, may properly claim some notice.

The word has been adopted, rejected, and revived. It seems to have been first used by Lucretius, a Roman philosopher, who was born B.C. 95 and died B.C. 55. The word had been forgotten or laid in oblivion until Dr. Young, in his lectures at the Royal Institution in 1807, explained what he meant by energy,* and illustrated his meaning by the impact of an ivory ball or balls upon a line of suspended balls.

Here are several ivory balls suspended so as to touch each other. If the end one be raised a little, and then allowed to fall, the ball at the other end will be driven away. The motion in the last ball resulted from energy expended in the raising of the first ball, and this first ball was raised by the energy of vitality. When, however, vitality no longer puts forth energy, then the energy of gravity operates, and causes the ball to fall. Such a simple experiment revived the word "energy," which has thus been reintroduced, and bids fair to hold an important place in science annals for some years.

Energy is from two Greek words ἐν, within, and ἔργον, work; used in its true sense, it means the work "that is within." Whenever, then, we find that a power to do work exists, we may say, "there is energy." It needs not that the work be done, it is immaterial how long it has lain dormant, or whether it be in man's estimation great or small, we only need the assurance that there is the capacity to do. A loaded gun need not be discharged to assure us that in that which is in the gun is energy, and yet to ascertain or measure the energy the discharge must take place. When that has happened, we may say, within the gun is no energy. The gun itself is merely a contrivance by which certain combinations may be induced to exercise their energies ; it has nothing to do with the communication or even introduction of the energy utilized. When the energy is within the barrel, and inoperative, we handle and play with the gun, disregarding the thought of energy, but when the energy of quiescence is to become energy in action, it behoves us to play with the gun no longer.

But how can the gun be again a means or an agent through which some one or other energy may remanifest itself. Clearly by another group of quiescent energies being introduced. This illustration of an expended and a reintroduced energy may suffice to give a character to an element in respect of all the energies, viz., their expenditure and reintroduction or re-creation. Either through the innate operation of natural causes or through the agency of vital energy, there must be a restoration. These restorations are effected in ways to which the name of legion may be applied. For example, a weight requires energy to raise it, a spring requires energy to bend it, air in a gun requires energy to compress it, before any of these can be said to have energy in possession. The water in a mill-pond has been raised by the energy of the sun. The chemical affinities in a galvanic cell are innate. A labourer and a horse require food that they may work. So with many similar illustrations. In all these is a dormant or quiescent energy. Once let it loose and the Arabian Nights story of Sinbad and the Giant, or that boast of Owen Glendower, that he could

> "Call spirits from the vasty deep,"

would not be met with Hotspur's taunt,

> "Why, so can I, or so can any man ;
> But will they come when you do call for them?"

These energies always come when rightly summoned.

Observe, energy presents itself in two forms—energy in quiescence, and energy in action. To these forms technical names have been given. Energy in quiescence is called potential energy ; and energy in action is called kinetic energy. In this weight, suspended as pendulum, these two energies may be illustrated. If the weight be struck from its lowest position, then the kinetic energy of vitality, as manifested through muscular action, sets it off. But if the weight be elevated and simply let fall, then the potential energy stored up in the act of lifting becomes kinetic energy, through the influence of what we call gravity.

To sum up. Belonging or attached to all that is material are certain powers or influences which cannot be separated and so weighed, hence these powers or influences are said to be "imponderable." Since these powers or influences affect the motions of bodies they are called forces, for force is that unknown influence which causes, retards, stops, or accelerates motion.

Again, when by such arrangements as nature calls into play, or men can contrive, these forces manifest themselves in action, they are said to be energetic.

Now, since we can plan to some extent how and when each force should manifest its energy, and obtain or retain the results, these results are called work. This may be measured or weighed, and it is through such work alone that a value can by men be placed upon the forces of the imponderables, which, by their energy, have done work.

The measurement, therefore, of the energies of the imponderables resolves itself into a measurement of the

* In Lecture 8, Young wrote:—" The term 'energy' may be applied with great propriety to the product of the mass (or weight) of a body into the square of the number expressing its velocity." This is not "energy" according to modern usage, but, for reasons which need not at present concern us, it is double of that to which in these days the term "energy" is applied.

work they do. It is, therefore, very essential that the measurement of work should be by means easily reproducible, scientifically accurate, of universal application, beyond all question and all cavil, admitting of no elements which, under any circumstances, could vitiate or falsify a conclusion.

Three elements only are needed to fulfil these conditions, viz., the *mass* of the body moved, the *space* through which it moved, and the *time* during which, by the operation of some force, it was being moved. These three elements being known, all others or varieties can be derived from them; hence all others are called *derived* measurements. Reasoning thus, a pound weight from which mass may be deduced, a two-foot rule by which space may be measured, and a clock by which time may be noted, are all that we require in England in order to determine measurements of work. But very clearly these three sources of fundamental units must be of an irreproachable character. Speaking generally, who dare venture to say that the pound weight he has, or the clock he has, or the two-foot rule he has, is more to be relied upon than the corresponding instrument in the possession of his neighbour. 'Tis amusing to listen to the pleadings of the owners of watches and two-foot rules, and scales and weights, as to the wonderful accuracy of those they possess.

Where lies the appeal? Who shall decide whether the second ticked by the watch which cost thirty shillings or that ticked by the chronometer which cost one hundred pounds is to be the true second? Who shall decide the inch and the pound when the owners disagree? The answer to these questions, doubtless, raises in your minds forms of difficulties not easily solved.

It may suffice, for this evening, to glance at one or two of these difficulties, in order that we may not think it a trifling with important interests in what, perhaps, seems a kind of childish quibbling, to suggest as a difficulty in such common affairs as a pound weight, a second, and an inch. Let us first see that from these can be had all we use as measures.

When we say of anything it measures ten, twenty, thirty or forty, we may add the words inches, feet, yards, or miles. These words must be in some way related. The measurement thus expressed consists of two parts, a numerical and a denominational one. The numerical is absolute and independent of the denominational one. This latter is, for a special case, the unit of measurement; hence there may be a great variety of units, all, however, by their interrelations, capable of being resolved into one. This one, this original, this is the difficult one to decide, and to it a portion of the lecture on Monday next must be given.

So far, then, for the unit of space. Now as to time. Let anyone attempt to measure time by the repetition of a unit derived from any ordinary source, and he will soon find himself in a labyrinth of doubts. All our measures of time are derived from astronomy. Of the unit of this our future grain there is the compound measure which some may say is put beyond the reach of such disparaging remarks, viz., that invaluable measure in all commercial transactions, the pound weight. Time is our own; we waste it as we please; we do not pay for it. Space is our own; we can walk where and as we please; but as to our food, that is ours by purchase, and we buy it by the pound weight.

Well, "truth," the proverb says, "is mighty and must prevail." The pound weight is quite worthless as a scientifically accurate and universal measure. There is really no such thing as weight for a universal measure, and yet nobody ever bought a pound of sugar without thinking he was getting at one time the same quantity as at another. That is not the case. Weight, speaking accurately, is a most variable measure, and is, therefore, one on which no reliance is to be placed in scientific investigation. What we do measure, scientifically speaking, when we speak of weight, is mass, and an endeavour shall be made to show you the difference between mass and weight.

First, weight is not at all to be relied upon. Here is a jar of water balanced on a scale-beam, but so as to hardly equal the weights on the other side. If I put my finger in the jar, the jar overbalances the weights. But why should the scale pan sink when one simply touches the water with the hand? It is not pressed down. The hand is merely put into another atmosphere, water, instead of air. Lest anyone should think that the jar is pressed down, let a weight hanging by a string, which sustains the weight, be suspended in the water, still the scale pan in which the jar of water is descends. Therefore, the weight appears to be altered—there seems something or other about it which is not altogether correct. The matter presents itself again in this form. Here is a scale-beam with a block of wood at one end and an exactly balanced weight at the other. Now, as the weights pass from one atmosphere to another they change in their relationship; and whilst the mass or quantity of matter contained in this block of wood and in this counterpoising weight remains the same, yet the relation of the weights does not remain the same. Some may say that if the matter undergoes no change, then the weight undergoes no change. It is the weight which undergoes a great change, but the matter undergoes no change. At present both are in an atmosphere of air, and you see that the beam is in exact equilibrium; but now let each be immersed in an atmosphere of water, and you see at once how the relationship to each other is changed; they no longer balance. The mass of wood is the same as before, and, therefore, as far as moving from one atmosphere to another is concerned, masses must be considered, and not weights; therefore, where the atmosphere changes, there we must give up the idea of weight. There is another cause why weight will not act as a standard unit. Weight results from the action of gravity; it is not a property of matter at all. If we change the force of gravity which tends to pull a mass down, we then change the amount of pressure that the mass exerts on a spring. If we take a mass of matter at one of the poles, it is nearer to the centre of the earth than if it were at the equator, and in consequence it will be pulled down with greater force, so that what would weigh (say) $1\frac{1}{2}$ lb. by a spring balance at the pole, would weigh (say) $1\frac{1}{4}$ at the equator. Therefore, if we ordered a quantity of goods to be sent from some place near the poles towards the equator, and they were weighed by a spring balance, they would not weigh so much on reaching their destination as they did when they were shipped; and yet the quantity of matter would be exactly the same.

Observe, it is a spring balance, and not a scale-beam, that is used. A spring balance measures force only, viz., in this case the depressing or pulling down force of gravity at the place where it is used. With a spring balance a gravitation experiment is made. If a scale-beam be used, then as the change of gravity effects the weight in each scale pan equally, the relations between them will not be affected, and the scale-beam will be in equilibrium when the contents of the scales are influenced by the varying force of gravity.

You saw, a short time ago, that weight varies by taking the mass into an atmosphere denser than that in which we live, and now you shall see the same result by changing the atmosphere for one more rare. Here is a glass beaker, suspended bottom upwards by a hook, so as to exactly balance a weight at the other end of the cord; the system is now in equilibrium. I will change the atmosphere within the beaker by admitting some ordinary coal gas into it, and you see the weight changes at once; the beaker appears to be lighter. These illustrations show that, dealing with weight, we deal with that which is variable in all parts of the earth, and, owing to atmospheric changes, variable at the same time almost in the same position. Doubtless all of us who have attained years of discretion, have been asked the question, in our

earlier days, which was the heavier, a pound of lead or a pound of feathers. Here, in a glass case, is a bag of feathers (eiderdown), and a weight exactly balancing them. Call the weight a pound of lead, and then, truly, the pound of lead is balanced by the pound of feathers. Now, the scale-beam is a delicate one, and accurately poised. By this pipe is admitted hydrogen gas into the case, the upper part of the case is closed, the hydrogen ascends, the air gradually escapes at the bottom, the scale-beam loses its equilibrium, and the bag of feathers descends, and is evidently heavier than the pound of lead.

This must for the present suffice to satisfy you that weight, as such, must not be considered an accurate measure, and that, somehow or another, a measure for mass must be obtained and used in the place of that which we call weight. These three units, then,—mass, space, and time—are sufficient for all purposes of measurement, and when reliable data have been furnished from whence these can be deduced, determined, and (if lost) restored, we shall be in possession of all that is required for the purpose of recording every measurement requisite for estimating and comparing the work done by the energy manifested by any one or more of the forces derived from the "imponderables."

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Shop Hours' Regulation Bill.

This Bill was withdrawn on Thursday, July 10th.

Weights and Measures (Metric System) Bill.

On Wednesday, July 16th, Sir T. Bazley, in the absence of Mr. J. B. Smith, through illness, moved that the order for the second reading of the Weights and Measures (Metric System) Bill should be discharged. The motion was agreed to and the Bill was withdrawn.

Juries Bill.

The further consideration of this Bill in Committee is fixed for Thursday, July 17th.

Poisoning by Carbolic Acid.

An inquest was held at the Star Inn, Aylesbury, on Monday, July 7th, to inquire into the circumstances attending the death of Thomas Keen, aged 22.

It appeared from the evidence that the deceased had been playing at cricket, and adjourned to the Star to have a glass of ale with his companions. Whilst they were there, one of the party took up a three-parts emptied bottle of carbolic acid (which had been used for destroying ants, and was standing on the tap-room mantel-piece) smelt it, and said, "Here is some physic." Keen said, "Oh, I can do with a dose of it," and, just glancing at the bottle, put it to his lips, and drank about a tablespoonful of the liquid. In about ten minutes afterwards he sank into a swoon, from which he never rallied.

Wm. Green, the landlord, said that about a fortnight before, he had sent a man in his employ to Mr. Turner's shop to get some mixture to destroy ants with. He did not get the mixture the first time, but he brought it back with him the second. It was carbolic acid. Sells said that the young man who had served him had told him that he did not know that it would kill the ants, but it would certainly drive them away.

The Foreman inquired whether the mixture in question was not of the nature of a disinfectant?

The Coroner—Yes, it is especially sold for that.

Witness said he used a little of the contents according to the directions, and some of it was used for white-washing the walls. As nearly as he could judge, half the bottle-full was used in this way. The bottle was afterwards placed on the tap-room mantel-piece. He did not see the deceased take any of the carbolic acid. He was only fetched into the tap-room when deceased had taken it. Deceased was sitting up, and witness asked him how he was. Deceased said, "Oh, I am all right." He (witness) had been sent for because it was thought the case was serious. He sent for a medical man directly, and in the meantime gave deceased some salt and water with the view of making him vomit. Deceased went out into the back yard, and was afterwards brought into the house. He did not speak after being brought in. He (witness) was not aware of the mixture being of so deadly a nature. Had it been labelled "Poison," he should not have left it where he did.

In answer to a juror, witness stated that deceased was not in the least intoxicated.

Edward Sells said he worked for Mr. Green, and recollected going to Mr. Turner's. He asked for some stuff to kill ants with, and the boy in the shop said he had not got anything he could give him excepting carbolic acid. The boy said it was very nasty smelling stuff, and if he put it against his fingers it would take the skin off. He came out and told his master, who said they ought to have some, and he accordingly went and fetched 3*d*. worth. The bottle on the table was the one he fetched. He used some of the mixture next day for killing the ants.

In answer to the Foreman, witness stated that when he went to Mr. Turner's shop, the junior apprentice, who served him, went up to the elder one to ask how much the bottle would be, but neither of them gave him any sort of intimation that it contained a strong poison. [It should be stated that at a subsequent period witness was re-called and admitted that he could not be quite certain that nothing was said about "Poison."]

Henry Mayne said he was with deceased on Monday night from five o'clock up to the time of his death. Deceased was quite sober. While they were in the tap-room one of the young men who were with them said he smelt something, and took a bottle off the mantel-piece to see if that was what smelt. He was just putting it back on the mantel-piece with the remark that it was medicine, or something of that sort, when deceased took it up, saying "Then it will do me good," and drank some of it. Deceased simply looked at the bottle for a moment, and then put it up to his mouth and drank. Witness did not notice how much there was in the bottle, or how much Keen drank. After that a young man named Quest said, "You have not drunk that stuff, Keen, have you?" and he said, "No, I have not swallowed it." Afterwards somebody said, "I should not wonder if you are not a 'stiff 'un' in two or three hours." Deceased said, "It won't much matter if I am." Deceased made no remark about the mixture tasting strong, but about five minutes afterwards he complained of feeling ill, and said he should like to have a drop of brandy, but everybody said the best thing he could have was some salt and water. Deceased took the salt and water, and shortly afterwards went out into the back yard, and fell down on a dung-heap.

In answer to the jury, witness said that he saw tears come into deceased eyes when he had drunk the mixture, as though it had burnt him. He afterwards took up the cue to strike at a bagatelle ball, but pitched on to the side of the table, and then he went into the yard. It might be seven minutes from the time of his taking the mixture that he fell down in the yard. He could read the label on the bottle very well, as he was a good scholar.

To the Coroner—Nothing had fallen from the deceased during the course of the day showing that he was in low spirits. When deceased said he should not mind if he was a "stiff-'un," he thought it was evidently only intended as a joke.

F. E. Ballard said he was an apprentice to Mr. Turner, chemist, of Aylesbury. He recollected the witness Sells coming to Mr. Turner's shop, and asking for something

to kill ants with. He told Sells that he would have to be very careful with it, for it was a very strong poison, and he might blister his hands with it.

To the Jury: He was quite sure he told Sells it was poison. Sells came in subsequently, and brought a bottle for some of the carbolic acid. The other boy in the shop served him. He (witness) knew that the carbolic acid was poison.

Mr. Turner, who was present in the room, then said that there was nothing in the schedule to the Act regulating the sale of poisonous substances which said anything about carbolic acid.

The Coroner: The Act says it shall be unlawful to sell any poison, either by wholesale or retail, unless the box, bottle, vessel, wrapper, or cover in which such poison is contained be distinctly labelled with the name of the article, and with the word "Poison," and the name and address of the seller of the poison. The words in the Act are very wide.

Mr. Turner: The two schedules to the Act specify what are poisons.

The Coroner: But the Act says "or may hereafter be added thereto." My opinion, from a legal point of view, decidedly is, that it is absolutely unlawful to sell any poison, no matter whether mentioned in the schedule or not, without labelling it.

Mr. Turner admitted that it would have been better for a label with the word "Poison" to have been affixed to the bottle, but as the article in question was almost entirely used as a disinfectant, it was not the custom in the trade to label it "Poison," although he (Mr. Turner) frequently did so. Still, he always received the carbolic acid without a poison label from the wholesale houses, who were bound to put one on as much as he was. Neither in the addenda to the schedules, nor in the schedules themselves, was carbolic acid mentioned as a poison coming under the operation of the Act, although at the time the Act was passed it was known that it was a poison.

The Coroner thought that that decided the matter, as the Act included any "known poison," and it was admitted that carbolic acid was a known poison.

Mr. Turner: So is "paregoric" a poison, and raw rum. The Pharmaceutical Society had decided that more harm than good would result from labelling paregoric "Poison," as it would deter people from taking a very useful medicine.

The Coroner thought there was a difference between poisons made up into medicines and poisons such as carbolic acid.

The Foreman thought that the whole spirit of the Act, as read by the Coroner, was exemplified in the words "all and every," and that neither the Pharmaceutical Society nor any other society could supersede an Act of Parliament.

Mr. Turner still thought that if carbolic acid had been intended to come within the provisions of the Act it would have been mentioned in the schedule. He was as sorry as anyone could be that the accident had occurred.

The Coroner: What Mr. Turner says is, that the trade have never considered it necessary to put "Poison" on these bottles. They are accustomed to have articles sent in very large quantities containing precisely the same ingredients with the word "Poison" altogether omitted, and, therefore, that he has done nothing more than is done in the course of trade by other persons.

The Foreman thought that if it was practised by the whole trade it was a mistake.

Mr. Turner was then formally sworn, and deposed that he was a pharmaceutical chemist practising at Aylesbury. He sold every kind of poison. In selling carbolic acid and other disinfectants it was not usual to put a label with the word "Poison" on. It was thought that the other directions on it were sufficient. He always sold it with the words "carbolic acid" on it, and sometimes added "Poison" as well, but that was not done in this particular case. He produced a bottle of Calvert's carbolic, which was the acid he received in its wholesale form. That had not "Poison" on it. He could not understand how anybody in his senses could take a bottle like that and drink it blindly.

The Coroner: Everyone does not know that carbolic acid is poison.

Mr. Turner: I do not consider that I am bound by law to label these disinfectants as poison, or that these disinfectants come under the provisions of the Act.

Mr. C. Hooper, surgeon, said, that between nine and ten o'clock on the night in question he was sent for to the Star Inn. Upon his arrival he found the deceased upon his hands and knees in the back yard, apparently retching, and covered with a profuse sweat. He had him brought into the inn, and when he found what deceased had been taking, he immediately set to work with a stomach pump, and pumped two or three quarts of fluid in and out for the purpose of washing out the stomach. Deceased was insensible all the time, and never recovered his senses. Witness used the stomach pump for an hour or two. From five to ten drops of carbolic acid would have been enough to destroy life. A tablespoonful would certainly have done so. He made a *post-mortem* examination of the body on Tuesday, and found the internal organs very much congested, and the blood more fluid and darker coloured than was natural. The local effects of the caustic were not very marked. The absorption of the acid into the system was the cause of death. It acted as a narcotic poison.

Mr. Turner asked whether deceased had not been subject to fits?

Mr. Hooper replied that there could be no doubt the carbolic acid was the cause of death, as the blood, the brain, and all the internal organs were strongly impregnated with the smell of it. Deceased never showed the slightest signs of rallying from the time he (witness) saw him till the time of his death. If he had rejected the poison the instant he had taken it, he might have recovered. There were no convulsive movements in deceased's body at all suggestive of a fit.

The jury, having deliberated, returned a verdict "That the deceased died from misadventure, caused by his taking carbolic acid without being aware of the effect it would produce. The jury regret that poisons of this kind should be sold without the word 'Poison' being written upon the bottles which contain them."

It was generally understood that this verdict did not reflect in any special manner on Mr. Turner, who had only complied with the custom of the trade.—*Bucks Herald.*

Poisoning by a Strychnia Vermin Killer.

An inquest was held at Broadmead, Bristol, on Thursday, July 10, on the body of Maria Rich, who it was supposed had committed suicide by taking some vermin powder. Evidence was given that deceased was seen to drink something out of an egg cup and that directly afterwards she was taken ill.

Eliza Stacey, a servant in the deceased's house, said that the deceased sent her for two pennyworth of mice powder; she went to Matthews's, but they said she was not of age, and would not give it to her. She informed deceased, who was very cross about it. She went out again, and obtained some powder at the bottom of West Street, at Mr. Bennett's shop. She was not known at the shop, but she put a cross to a book, and she was asked her name and address. She gave the poison to Mrs. Rich, and did not see it afterwards.

Joseph Bennett, chemist, Lawrence Hill, deposed to letting the girl Stacey have the vermin powder, which contained from 1½ to 2 grains of strychnine.

Dr. Challacombe said he was called in to see the deceased, and found she had died from poison. He had made a *post-mortem* examination of the body. The symp-

toms undoubtedly pointed to strychnine as the cause of death. From half a grain to two grains would kill a person. There were traces of powder on the egg glass. There were no marks of violence about the body. The coroner summed up, and the jury returned a verdict of "Temporary insanity."—*Bristol Times.*

Poisoning by Prussic Acid.

At Stoke-upon-Trent, a youth, named Ash, a druggist's assistant, who had been apprehended on the charge of neglect of service, committed suicide in the police-cell. He told some persons in an adjoining cell that he had taken poison, and he was dead before any assistance could reach him. A large quantity of prussic acid was found concealed upon the body.—*Daily Telegraph.*

A Disputed Case under the Adulteration Act.

At the Lambeth Police-court, on Thursday, the case of the Vestry *v.* Henry Mason came on for hearing. It was a summons which had been adjourned on two previous occasions, charging the defendant, a grocer, 149, Kennington Lane, under the Adulteration Act, with selling an article, to wit, "Tea, containing exhausted leaves mixed with stalks and fragments of foreign matter, such as husks, scorched tea, buds, etc., the said adulterants being added to increase the weight and bulk, but although deteriorating the value, these adulterants are not such as are dangerous to health." At a previous examination, Mr. Douglas Straight, M.P., who appeared for the defendant, contended that there was no case: the Vestry analyst, Dr. Muter, plainly stating that there was nothing deleterious to health in the tea sold; that exhausted leaves were present could not be proved, and was emphatically denied; that the stalks mentioned in the certificate were tea stalks, and the buds so-called tea seeds, both integral portions of rough tea such as the defendant offered for sale at 1*s.* 4*d.* per lb. Professors Campbell and Harkness, who had analysed the tea for the defendant, were in court and prepared to swear its purity; but Mr. Roffey, the vestry clerk, who appeared for the prosecution, objected to the analysis of the two professors on the ground that the sample which had been handed to them had not been identified with the tea sold to the informer. A portion of the latter sample was produced in court in a sealed packet, and was referred by the bench for a joint analysis by Dr. Muter and Dr. T. Stephenson on behalf of the prosecution, and Professors Campbell and Harkness on behalf of the defendant. The joint analysis took place at the laboratory of St. Thomas's Hospital on Monday, the 7th instant. When the case was called on in court on Thursday, Mr. Poland, who had been retained by the Vestry, asked leave to withdraw the summons, the analysis of Dr. Stevenson being found in accord with those of Messrs. Campbell and Harkness as to the purity of the tea, and differing entirely from the original certificate of Dr. Muter, the Vestry analyst, upon whose evidence the charge had been founded. Mr. Gush, for the defendant, asked for full costs. His client had been subjected to a groundless and vexatious prosecution hanging over him for five weeks. The loss to his business was considerable. It was necessary to have the highest professional skill to rebut the evidence of the public analyst, and such witnesses must and ought to be well paid. Mr. Ellison, the presiding magistrate, said he thought the Vestry were not to be intimidated in their endeavour to carry out the Adulteration Act by any heavy claims for expenses where the prosecution broke down. At the same time, it was quite clear that the prosecution were not in this instance well advised, and that the defendant left the court without a stain on his reputation. He should allow six guineas for expenses.

A summons against Mr. Theodore Smith, of Kennington Lane, was then called. Mr. Roffey, on behalf of the Vestry, said that this was a similar charge, and he was not prepared to proceed after the result of the last case. This summons was therefore also dismissed, with costs against the Vestry, £2 2*s.*—*Grocer.*

Reviews.

Les Plantes Médicinales et Usuelles de nos Champs, —Jardins,—Forets. Par H. Rodin. Ornéde 117 Vignettes. Paris: Rothschild. 1873.

M. Rodin enjoys a high reputation among French botanists, not only for his knowledge of the vegetable kingdom, but for his powers as an expositor, whether by tongue or pen.

Twenty years' experience as *chef d'Institution* has convinced him that, in spite of the excellent treatises placed in the hands of young students in botany; in spite, moreover, of the admitted attractiveness of the study, very few cultivate it except for a temporary purpose, so that it is rare to find, in town or country, many students of it over thirty years of age. This premature abandonment of the pursuit M. Rodin ascribes to the technical form in which botanical treatises are cast, addressed as they usually are to students of medicine or pharmacy. He thinks that, while retaining all that is scientifically important, a treatise may yet be popular and inspire a taste for the study which will survive its temporary purpose.

His little work will be found to combine both conditions. To make sure that nothing necessary from a scientific point of view was left out, he submitted his manuscript to the professors of the Jardin-du-Plantes and of the École de Pharmacie, trusting to his own powers to convey his matter clearly and popularly. The result is one of the most charming little volumes ever devoted to the exposition of a science. Starting from the thesis that many of our indigenous plants would acquire an enhanced value in the eyes of physicians and their patients if they grew on the mountains of the Cordilleras or in the forests of Australia, he shows that it is by no means necessary to go so far afield for vegetable agents quite equal in therapeutic value to many imported from abroad. He gives an interesting account of the preparation of simples as it appears in the 'Capitularia' of Charlemagne, and after proving that the rude pharmacy of the Middle Ages is still practised in the case of our indigenous plants, he shows that more skilful processes can educe from these plants a number of virtues of which they were not even suspected. The succeeding chapters treat of "emollient plants," "temperant plants" (by which he means those that modify the activity of the organic functions), "stimulant plants," "astringent plants," and so on till he has constructed a complete medical flora out of the fields and forests of France. The chapters on expectorants, diuretics, purgatives, narcotics, and febrifuges are really excellent, and reveal an amount of *materia medica* indigenous to French soil which few *pharmaciens* have dreamt of. A practical chapter on "dangerous plants" is also a valuable feature in the volume. The illustrations are well chosen and well executed, and materially enhance the attractiveness of a book which cannot fail to have many readers.

Manual of Chemical Analysis as applied to the Examination of Medicinal Chemicals. By Frederick Hoffmann, Ph.D., Pharmaceutist. New York: D. Appleton and Co. 1873.

Associated as pharmacy is with therapeutics, it is important that the materials employed by the pharmacist should be pure; perhaps nothing would so much tend to that end, as all pharmacists becoming conversant with analysis, providing that they used the knowledge in testing their own medicinal chemicals.

Mr. Hoffmann's 'Manual' is a work written essentially for pharmaceutical chemists and manufacturing druggists. It comprises within its range the chief medicinal chemicals, giving their synonyms, their properties, and the tests by which impurities may be recognized. It has been compiled with special reference to the fifth decennial edition of the United States' Pharmacopœia, the latest British Pharmacopœia, and the Pharmacopœia Germanica, 1872, and the latest additions to these works are included and dilated upon. The book is excellently printed; the indices are copious; and as it is mainly a qualitative work, the inconvenience of the American system of weights and measures is not felt.

The strength of the test reagents and the outlines of qualitative and volumetric analysis are given as prefatory matter. The section on qualitative analysis is the weakest part of the book, which is good otherwise. In the scheme of analysis, after the separation has been effected by sulphuretted hydrogen, the analyst is not told to vary his method in the event of phosphoric acid being present; nor is even such a provision mentioned as being requisite, although, as is well known, it is essential, if phosphoric acid has been detected after the passing of sulphuretted hydrogen, to precipitate with ammonia and ammonic chloride, then add ammonic sulphide to the filtrate; and, finally, after mixing the two precipitates, decompose the phosphates with ammonic sulphide; the presence of phosphoric acid as ammonic phosphate in the filtrate showing that phosphates decomposable by ammonic sulphide are present. The usual analysis for phosphates should then be followed with the precipitate. If ammonia, ammonic chloride, and ammonic sulphide were added at once, as the author gives it, the analyst would not be able qualitatively to examine bases in combination with phosphoric acid. Again, the method given for separating manganese and zinc from iron, aluminium, and chromium is based on the solubility of the hydrates of manganese and zinc in ammonic chloride and ammonia. This is imperfect. Invariably, if only small quantities be present, the hydrates of manganese and zinc are carried down by ferric hydrate, and would escape detection. In this part we also notice that on heating the substance under examination on charcoal with *sodic carbonate* fusion into the coal is said denote *alkalies*. Certainly the impurities treated of might be detected by the schemes given; but we hold that outlines are fallacious, inasmuch as chemical analysis without completeness is a myth, and it is to be hoped that those for whom the work was compiled will not study analysis superficially. It were best, therefore, to have had this part thorough or to have omitted it altogether, leaving the analyst to rely on more comprehensive and special works on analysis. If the former suggestion had been adopted the numerous repetitions of tests now inserted after each substance might have been dispensed with. The reader is continually being reminded of the tests for the common acids, especially that for arsenic, after the classification of the properties of the compound in which these impurities may occur. Much time and labour could have been saved by presuming that after a test for an impurity had been indicated it would be remembered and acted upon by the student, excepting only when special methods are requisite. These are, for the most part, trusty ones; but there are certainly some crude tests given. Ammonia in water is said to be indicated by the white turbidity given by sodic carbonate and mercuric chloride, quite ignoring the delicate Nessler test; the organic matter is to be estimated from the amount of potassic permanganate required to colourize a certain quantity of the water. The author seems not to give pharmaceutical chemists credit for being able to perform the higher grades of analysis. Take, for example, that to estimate the moisture in sodic chloride ten scruples are directed *to be allowed to stand for several days* in a tared beaker, at nearly 100° C.

The section on medicinal chemicals and their preparations is full of utility. But it is to be regretted that the author considered a want of unanimity in expressing the constitution of chemical compounds a valid reason for omitting entirely symbolic notation. Each compound is described in the old and in the new nomenclature, *e.g.*, "Cupri sulphas," cuprum sulphuricum; ferri phosphas, ferrum phosphoricum, ferrum oxydulato-oxydatum phosphoricum; followed by the English equivalents. The properties are then given in detail. Under the head of examination the impurities liable to be present are given, and the tests for them. On this part we have already expressed our opinion. In some cases there follows a rough quantitative estimation. Iodoform, chloral, benzoate, bromide and iodide of ammonium, etc., lately added to the American Pharmacopœia, are fully described; the same with the alkaloids and their salts in detail yet succinctly. A good method of estimating the alkaloids in cinchona barks is also supplemented with Stoddart's chemico-microscropic test. Altogether the examination of the medicinal chemicals from their properties is complete, although there is little new matter in this part, nor does the author pretend to have more than gathered facts coming under his title.

In a future edition, to make the work adequately to serve its purpose, attention is required to the imperfections here pointed out, as well as to a careful revision; for there are several errors, vagueness in style, and others, arising, we charitably presume, from haste in compilation, but quite unpardonable in a "Manual." The idea of technical manuals is a happy one, and in these days of progress, when technical compendia are required more than aught else, we should welcome a good work of this kind to pharmaceutical literature.

POSOLOGICAL TABLES. Being a Classification of the Doses of all Officinal Substances for the Use of Students and Practitioners. By W. HANDSEL GRIFFITHS, Ph.D., etc. Dublin: Fannin. London: Baillière, Tindall, and Cox. 1873. Second Edition.

This is a second edition of the sheet-table of doses noticed in these pages a short time since. In the present issue the names of substances and preparations of which the doses are very small or exceptional have been printed in red ink. Should the compilation reach a third edition it would be well to remove eyesores like E. Au*th*emidis and I. Dulcamar*a*. It would also be easy to avoid making the nominative form do duty for the genitive in ammonium, potassium, and several other instances.

Obituary.

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

We regret to have to announce the death of Mr. John Holliday Thomas (of the firm of J. H. Thomas and Son, Pharmaceutical Chemists, Boston, Lincolnshire). The deceased was one of the early founders of the Society, having joined it in 1842. He died on June 24th, at Hampstead Heath, aged 66 years, greatly respected by a large circle of friends.

Notice has also been received of the death, on the 19th May, 1873, Mr. Henry Blacklock, of Bournemouth, Pharmaceutical Chemist. Mr. Blacklock joined the Pharmaceutical Society in 1852.

Notes and Queries.

OLEATE OF MERCURY.—("*Inquirer*").—The following is the formula for "Ung. Hydrargyri Oleatis" (20 per cent.), given in the Pharmacopœia of the University College Hospital, just published:—

"Precipitated peroxide of mercury . . 2 drachms.
Oleic acid . . . . . 10 „

To the oleic acid, kept agitated in a mortar, sprinkle in the peroxide gradually, and triturate frequently during twenty-four hours, until the peroxide is dissolved, and a gelatinous solution is formed."

Correspondence.

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

The School of Pharmacy.

Sir,—Although it is scarcely likely that the purpose of my motion at the last Council meeting has anywhere been misunderstood in consequence of the error, I should still be glad if you will kindly correct your report of its wording, as given in the Pharmaceutical Journal of July 5th, page 11.

My resolution was, "That the proposition of the Committee be published in the Pharmaceutical Journal, and postponed for decision until the next meeting of Council" —that is, until *next month*, and *not*, as your reporter has it, "until the meeting of the next Council," which would have meant until about this time *next year*.

My hope was to gain just so much time for the general consideration of the important changes suggested, as is wisely provided for in that section of the bye-law, which runs—"It shall be lawful for the Chairman to postpone or adjourn to the next meeting any motion whereof notice in writing has not been given at a prior meeting."

It is right I should add that no notice of this motion had been given.

Clifton, July 15th, 1873. G. F. Schacht.

Poisoning by Carbolic Acid.

Sir,—I have forwarded to you *per* same post a copy of the *Bucks Herald* of to-day, containing an account of a case of accidental poisoning by carbolic acid at Aylesbury. I think that no member of the trade can read it without seeing and feeling what an unfortunate position any of us may be placed in, at any moment, through the misinterpretation of the Pharmacy Act by a coroner, combined with the stultity of a country jury.

Really, after some consideration, I begin, with many others, to imagine that this Act, instead of being the boon to the trade we thought it would, will eventually turn out a curse. Here is a case to the point.

Mr. Turner (or rather his assistant), local secretary to the Society at Aylesbury, retails 3*d.* of impure carbolic acid to a man for destroying ants, placing on the bottle a large label (three inches by four), bearing in bold type the words "Carbolic acid," with full directions for use as a disinfectant, etc., at the same time cautioning him as to its corrosive nature. Would any one ever dream of a man being such an idiot as to pick up a bottle and instantly drink off crude carbolic acid. (No doubt it was done in a spirit of bravado.) Would not the result have been the same had it contained nitric or sulphuric acid?

Yet it is all the chemist's fault. He ought, says the jury, to have labelled it "Poison." He has infringed the Pharmacy Act, insinuates the Coroner.

As reported in the local papers, the Coroner does not do Mr. Turner the justice to read that portion of the Act (Clause 2) which states:—

"All the articles named or referred to in the appended list, both in Part I. and Part II., *are poisons within the meaning of the Pharmacy Act of* 1868,"

But he goes on to read Clause 17 of the Act:—

"It is unlawful *to sell any poison*," etc.

I do not find myself that Messrs. Calvert, or any other makers, label their acid for retailing "Poison."

It seems to me as if the public expect that when a chemist sells an article of at all a virulent nature that he must march about with it to see that no one is poisoned thereby.

I think myself if we are to be subjected to these annoyances (which may happen at any time to any one of us) the sooner this preparation and many others of a similar nature are added to Part I. or II. of the schedule the better. In this case the jury did not wish a censure to be passed on the chemist; at the same time it seems hard that a chemist in a country town should have his reputation and trade damaged by the remarks of a coroner who apparently does not quite understand the Act, and the foreman of a jury who speaks of the Pharmaceutical Society with contempt. I must apologize for thus trespassing on your space, but it seems to me a case of great importance to the profession, and a subject that ought to be ventilated, in the hopes of finding a remedy for it. I enclose my card and remain,

July 12th, 1873. A Country Chemist.

Another correspondent writes in reference to this case, to say that no doubt it will cause numbers to label carbolic acid "Poison" who, otherwise, would not do so, and thus prevent their names being brought forward so prominently a Mr. Turner's was, if any such accident were to occur within their district.

A Difficulty in Dispensing.

Sir,—The following prescription was dispensed by me.

℞. Potass. Bicarb.	ʒ v
Liq. Strychniæ	ʒ iss
Inf. Gent. Co. ad.	ʒ viij

ʒss. ter in die.

The patient took more than one-half of the mixture, and left off taking it for more than a fortnight, then finished it with the exception of two doses, and took the remainder in a fortnight afterwards. The consequence was that the mixture was not so clear as when first sent out. When the patient took the last two doses the mixture had a sediment. The patient in the last dose (and to a slight degree in the dose before) suffered from the effects of an over-dose of strychnia, all the symptoms appearing in a very marked degree. My object in writing is to ask the probable cause of this result. The mixture when it left my hands was clear, and contained not a visible particle of strychnia in the "liquor."

It had been made up before elsewhere, but at no time was it kept for such a length of time as on this occasion.

Rothesay, July 15th, 1873. W. K. H.

[*** The result was no doubt due to an overdose of strychnine, for the quantity of water in the mixture was insufficient to dissolve the whole of the strychnine, which would be set free by the reaction of the potass. bicarb. on the liq. strychniæ. The actual quantity of strychnine thus precipitated would be likely to escape notice when the mixture was first made up, but when deposited as sediment might cause serious results. It may be assumed the prescriber intended the strychnine to be in solution, since he ordered the liquor, but it would also seem that he did not take into account the action of the alkali prescribed with it, since he did not order a "Shake the bottle" label to be used. Of course, in the absence of such a direction, it would have been advisable for the dispenser to attach such a label, although the direction to do so is properly the duty of the prescriber.—Ed. Ph. Journ.]

T. E. B.—(1) You would probably be able to obtain some lessons from a practical dentist for a consideration. (2) See Pharmaceutical Journal, 3rd series, vol. i., pp. 457, 557; ii., 637, 878. (3) We cannot undertake to recommend any dealers in preference to others.

Mr. G. Hick is thanked for his information. The communication to the Secretary was not lost sight of, but it was necessary to communicate with the Registrar of Deaths, which caused a little delay.

"*Inquirer.*"—(1) See p. 59. (2) We believe the particular tree mentioned no longer exists. It was not the only one of the kind, but was supposed to be the oldest.

A. E. J.—According to the terms of a letter written by direction of the Commissioners of Inland Revenue, and printed in the issue of the Pharmaceutical Journal for October 26, 1872, p. 327, "no licence is required for the sale of quinine wine, if made according to the receipe in the British Pharmacopœia, and not sold as a proprietary or patent medicine."

"*An Assistant*" (Cardiff). The case is one more suited for the consideration of a medical man.

M. P. S.—We are at a loss to perceive why there should be any restriction such as you refer to. If a candidate passes in such a manner as to entitle him to honours, it appears quite immaterial whether he has failed previously or not.

N. O. T. Bright, writing from the Pons Asinorum (which side is not stated), is referred to the rule respecting anonymous communications.

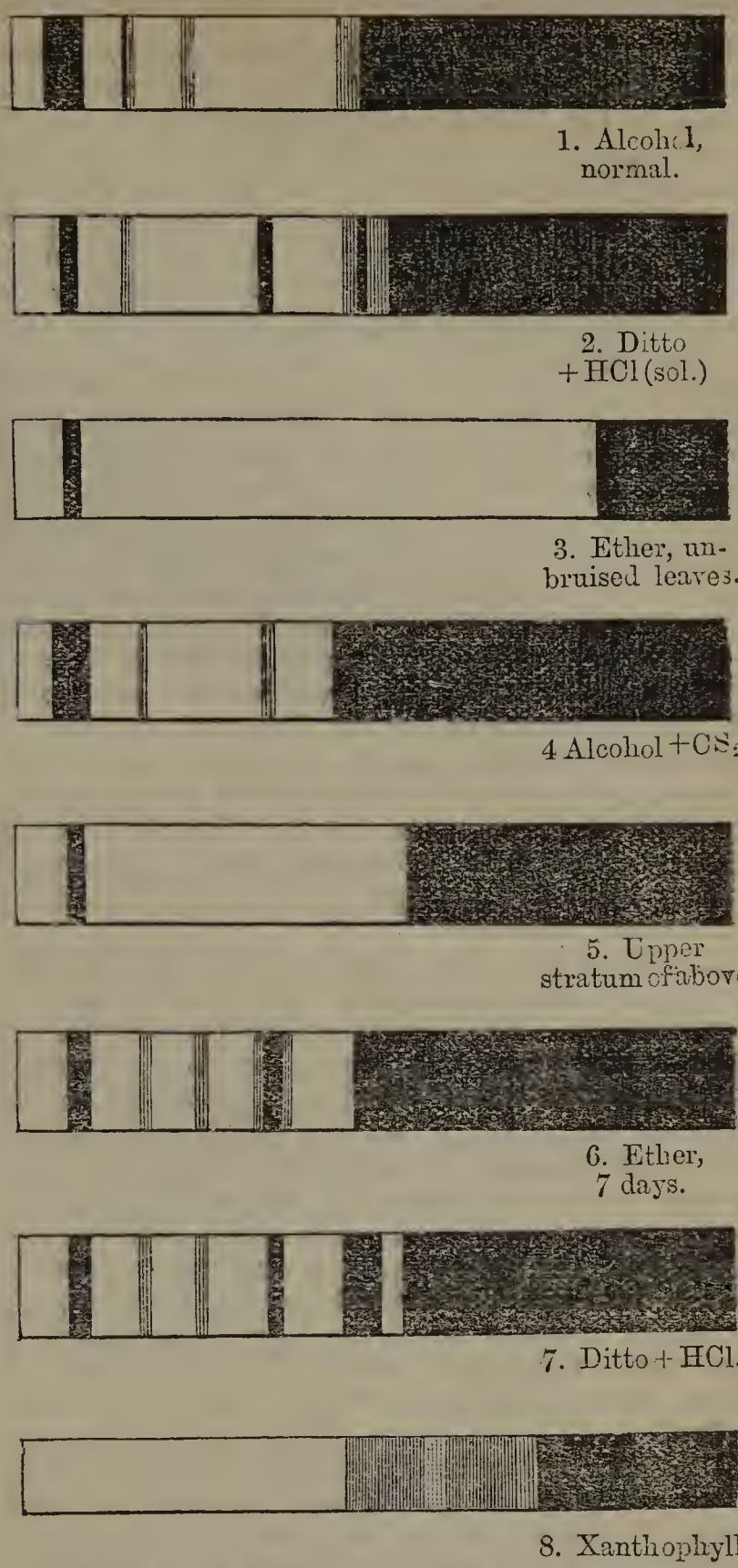
Communications, Letters, etc., have been received from Messrs. Orme, Gibbs, Upsilon, H. P., T. E. B., W. B. B.

M. CHAUTARD'S CLASSIFICATION OF THE ABSORPTION BANDS OF CHLOROPHYLL.

BY HENRY POCKLINGTON.

M. Chautard's interesting memoir, translated in the PHARMACEUTICAL JOURNAL for June 21st (p. 1014), goes a very little way towards completing our knowledge of the various chlorophyll compounds and other colouring matters of leaves. It is to my mind very doubtful whether an English reader will find much that is new in it, and still more doubtful whether the author's classification of bands will give place to Mr. H. C. Sorby's tentative classification* of the colouring matters that produce them. Mr. Sorby, as many of my readers may be aware, forms the following five great families of colouring matters, each of which he places in one of three groups, according as their absorption is removed or not when the solution is alkaline with ammonia, or, if not removed by ammonia, is removed by addition of citric acid, or, finally, when not removed even when it is acid with citric acid. The *first* of these families is the chlorophyll family, distinguished by being insoluble in water, soluble in alcohol and in bisulphide of carbon. Of these there are several species, giving well marked spectra, with several narrow, dark absorption bands, one or more of which occur at the red end of the spectrum. The spectrum of the chlorophyll of nettle—selected because it is the one specially mentioned by M. Chautard—is shown in Fig. 1, and the spectra of elm, elder and privet are figured in my paper on "The Colour of Cantharides,"† recently published in this journal, and show the more characteristic of these absorption bands.

The second family is the *xanthophyll* family, containing several distinct species, of which the more common two are found in the inside and outside respectively of the common carrot. They are insoluble in water, but soluble in alcohol and in bisulphide of carbon, more soluble in the former than the latter, and also, as Herr Krauss ('Archives des Sciences,' noticed in *English Mechanic* for May 23rd) has shown, more soluble in alcohol than in benzine. Mr. Sorby's method of procuring a tolerably pure xanthophyll is the one generally adopted by myself, though I am disposed to prefer Krauss' in the case of deep green leaves, where the xanthophyll family are less fully represented than in the more yellow-green leaves. It is this. Digest the leaves for some time in considerably less alcohol than would dissolve the whole of the xanthophyll. This removes the greater part of the unchanged chlorophyll (more rapidly soluble in alcohol than xanthophyll), and on digesting the "leaves in fresh alcohol, and agitating with bisulphide of carbon, or on evaporating to dryness and dissolving in it, a tolerably pure preparation may be obtained." The spectra of the xanthophyll family are distinct from those of the chlorophyll family, and show two rather indistinct bands at the blue end,



1. Alcohol, normal.

2. Ditto + HCl (sol.)

3. Ether, unbruised leaves.

4 Alcohol + CS_2

5. Upper stratum of above

6. Ether, 7 days.

7. Ditto + HCl.

8. Xanthophyll.

Explanation of Chart.

1.—Is the normal alcoholic spectrum made rapidly from purified bruised leaves of Urtica dioica.

2.—The same with hydrocholoric acid added.

3.—Spectrum of an etherial solution made in twelve hours from unbruised young leaves in perfect condition.

4 and 5.—Lower and upper strata of alcoholic solution, treated with acid and agitated with bisulphide of carbon. The non-acidulated solution gives similar results without the 3rd band of No. 4.

6 and 7.—Ethereal solution of seven days, with and without the addition of acid.

8.—Xanthophyll of same leaves.

* "On the Colour of Leaves at Different Seasons of the Year," *Quarterly Journal of Microscopical Science*, vol. xi., N.S., pp. 214, *et seq.*; "On the Various Tints of Autumn Foliage," *Quarterly Journal of Science*, xxix., pp. 64-77, and in various other papers in *P. R. Society*, *Monthly Microscopical Journal*, *Chemical News*, etc.

† PHARMACEUTICAL JOURNAL, vol. iii. pp. 950. The specific band of the chlorophyll of elm has been partially removed, and a xanthophyllic absorption band substituted. This family is identical partly with the cyanophyll group of Herr Krauss. This family is impure, however.

but the red-yellow and yellow-green rays are freely transmitted. To see these bands, tolerably concentrated solutions in thin strata should be used and the slit carefully adjusted.

The *third* family is the erythrophyll family, and is a large and perplexing one. Its members are soluble in water, alcohol, ether, but not in bisulphide of carbon. To procure it, Mr. Sorby recommends that the reddest leaves be digested for a few hours "in as much cold ether as will dissolve all

their contained water. If the plant be very succulent and too little ether used, the water is displaced and sinks to the bottom with nearly all the colour in solution, and the ether is left almost free from erythrophyll." (The leaves of the red camellia manifest this phenomenon very well.) "On agitating the ethereal solution in a test tube with water it sinks to the bottom with nearly all the erythrophyll, whilst the chlorophyll and xanthophyll are left in the ether at the top along with a considerable part of the colours of the chrysotannin groups." It is probably some one member of this family that produces the red chromule-like substance when deoxidized by metallic potassium, sodium, or by pyrogallic acid with *liquor potassæ*, referred to in my paper on Cantharides, and which also gives the lovely bloom to the leaves* of *Cinchona Calisaya*, and other leaves, when modified by the chrysotannic series. It is also a member of this group, modified by one or more (probably two) others, that produces the "accidental" in the red described by M. Chautard, to which I shall refer presently, merely remarking now that the method adopted by M. Chautard of particularizing the *locale* of his bands renders it difficult to identify them, and that it is unfortunate that he appears not to have made any attempt to distinguish the colouring matters concerned.

The *fourth* family is the *chrysotannin* family, s metimes (and often) confused with a sub-class, the chrysophyllic. The former are to be identified by their action upon the persalts of iron. Neither usually give any absorption bands, but a more or less complete absorption of the blue end of the spectrum when not oxidized or otherwise modified. This family, in its modification (quinotannic, etc.), is a very large one, and enters into union with the preceding and the following to a very great extent, so that it is frequently difficult to say to how great an extent either of the three may be concerned in any colour, or change of colour. They are soluble in water, alcohol, and ether, but not in bisulphide of carbon.

The *fifth* and last family is the *phaiophyll* family. These are more or less brown, insoluble in bisulphide of carbon, and of very varying solubility in alcohol and water, and are usually in a maximum state of oxidation.

To return to M. Chautard's memoir. It will be observed that he recommends the solution to be made with *dilute* alcohol. This is, in fact, nearly essential to his results, as I soon found in working over his ground, and will account probably for the fact that other observers, who, like myself, chiefly operate on stronger and purer solutions, have not described the "accidentals." It is, perhaps, best in discussing this question to take the purer alcoholic solution of the colouring matters first, and compare the results thus obtained with M. Chautard's. If an alcoholic solution be rapidly made, after having purified the leaves by a few minutes' immersion in boiling water, having bruised them (Sach's method), its spectrum will be found to consist of a broad, well-defined band in the red, extending from $\frac{7}{8}$ to $2\frac{1}{4}$, full, a shaded band also in red, or rather orange, at $2\frac{7}{8}$ to $3\frac{1}{16}$, shaded somewhat at $3\frac{1}{4}$ to $4\frac{1}{4}$, full and general absorption of the whole of the violet and blue. (This is as nearly as possible a purely normal chlorophyll spectrum). The addition of hydrochloric acid produces an extra band in the green at $5\frac{1}{4}$ to 6, bare, and the solution changes to olive-green, with, if the method of Sach's be not followed, a considerable amount of turbidity and partial absorption of the extreme red. If bisulphide of carbon be added, and the mixture agitated and then allowed to subside, it will carry down with it nearly all the colouring matter, leaving only a modified xanthophyll, giving an indistinct band in the blue-green part of the spectrum, the bisulphide solution giving a band at $6\frac{1}{4}$ to $7\frac{1}{2}$, by reason of the removal of a portion of the xanthophyllic absorption from the blue.

The bold band in the red is split into halves by the addition of strong ammonia, and the bisulphide of carbon removes from a pure alcoholic solution a colouring matter or matters giving a band similar to the normal "specific band," but leaving in the alcohol a narrow band exactly corresponding to the centre of the normal broad band, and to the narrow strip removed by ammonia. This band is probably due to some form of erythrophyll, and is not of universal occurrence. For example, the green leaves* of *Cinchona Calisaya* do not contain the chlorophylloid to which I suppose it is due when they are fresh, but the dried leaves of *Cinchona succirubra* do contain it. On the other hand, the "red" leaves of *C. Calisaya* do contain this particular substance, as also do the leaves of our English elm. Figs. 4 and 5 show the position of the band referred to. It must be borne in mind in examining this chart that, as Sorby has shown (in his paper on "Aphideine"), the bisulphide of carbon has the property of shifting the absorption generally towards the red end of the spectrum, and that, therefore, the true position of the alcoholic band may be nearer the least refrangible end, as compared with the lower, bisulphide, spectrum. On the other hand, it is to be noted that it exactly corresponds in position with the band given by a rapidly made, pale-coloured solution in ether or alcohol from unbruised leaves, and there is, therefore, reason to believe that it is due to some substance or other selectively soluble in ether and alcohol, less soluble in bisulphide of carbon, and readily acted upon by ammonia.

So far, dealing as we have done with the purer chlorophyllic solution, we have found nothing analogous to the "accidental" bands of M. Chautard. If, as I have already said, we follow his method of preparing the tincture we shall meet with substantially his results. This led me to examine an aqueous decoction (hot and cold, rapidly made in each case), and I found that carefully made solutions, either with hot water or (slightly more prolonged in operation) with cold water, gave, when treated with the acid, the extreme red absorption and obscure bands to which our author refers, and that the solution so treated with hydrochloric acid was sparingly soluble in alcohol and ether, but very soluble in water. Further examination showed that the aqueous solution contained the following groups of colouring matters, of which it is difficult to name with certainty the one actively concerned: one or more of the *erythrophyll* family, a *chrysotannin*, darkening with persalts of iron, and a peculiar *chrysophyll*. Taking some solution, prepared according to our author's plan, I added an excess of ether, and allowed the mixture to

* The colouring matters of these leaves are, however, specially complex, and it is hard to say what particular family or group is most implicated in any colour change.

* For bountiful supplies of these leaves, fresh and dry, my thanks are due to J. Eliot Howard, Esq.

separate. The upper or ethereal solution gave the spectrum referred to by M. Chautard as the normal spectrum; the lower, a spectrum with the "specific" band lowered towards the red end, and behaving, with hydrochloric acid, partially the same as M. Chautard's solution—not entirely, for one constituent (probably a xanthophyllic product) is selectively soluble in ether. The aqueous solution and the diluted alcoholic alike deepen in colour under the action of any deoxidizing agent, and lose their colour again under any oxidizing agent.

To sum up my conclusions very briefly, the shifting of the specific band to the red is probably due to the removal of the more purely chlorophyllic absorption from the violet side of the specific band, and the production of a new absorption band due to an erythrophyll-chrysotannic product on the red side of it, and the introduction of a new, more or less general, absorption at the extreme red end, due to a chrysotannic compound.

The spectrum of an ethereal solution allowed to remain long in contact with the leaves (several days) is worth notice, and is charted in figs. 6 and 7; the former being the spectrum of the unacted upon solution; the latter, on the addition of hydrochloric or diluted nitric acid. The appearance of the fifth band has been previously referred to as following the addition of hydrochloric acid, and frequently appears spontaneously, in cases where the xanthophyll group is sparingly present, and has been figured by myself, and probably by others, as so occurring.

The addition of pyrogallic acid and liquor potassæ, or of metallic sodium, or potassium, to the water-ether solution, precipitates a red colouring matter similar to that previously referred to. But space will not permit anything like a complete discussion of the highly complex colouring matter of this homely leaf. Many of them will come again under consideration, in another connection, very shortly and may be deferred; and others are as yet, so far as I know, imperfectly understood. I have probably said enough to show that these colouring matters are more complex than is generally believed, and to indicate the way in which their study may be conducted. In conclusion, it is but just, though unnecessary, to acknowledge my indebtedness to Mr. Sorby's articles for much that I have said.

P.S.—Since the foregoing was sent to press Mr. Sorby has reviewed Herr Krauss' book (*Academy*, July 1st), and takes very similar ground. Mr. Sorby has also communicated a paper to the Royal Society on a "Comparative Vegetable Chromatology" giving the latest results at which he has arrived.—H. P.

NOTE ON THE EXHIBITION OF RESIN OF COPAIBA.

BY A. W. GERRARD,

Dispenser, and Teacher of Pharmacy, University College Hospital.

The above resin has been recently introduced to the notice of the medical profession by Dr. Samuel Wilks as possessing therapeutic advantages over the balsam, and likewise as being more agreeable for the patient to take. In a letter to the *Lancet* of June the 21st, Dr. Wilks, in reply to numerous inquiries that had been made as to the best method of dispensing it, gave the following formula, which had been recommended by me, and was used in the dispensary of Guy's Hospital:—

Take of—

Resin of Copaiba	180 grains.
Rectified Spirit	5 drachms.
Spirit of Chloroform	1 „
Mucilage of Acacia	2 ounces.
Water to	12 „

Mix according to art.

These ingredients, when mixed in their proper order, form a mixture which, although it contains the resin in a fine state of division, I did not consider altogether satisfactory, as after standing a day or two the resin collects at the bottom of the bottle, forming a semi-compact mass which is shaken apart with difficulty. With the view of overcoming this objection, I made experiments with various other substances and obtained the best result in the following:—

Take of—

Resin of Copaiba	15 grains.
Compound Powder of Almonds	30 „
Water to	1 ounce.

Rub the resin with the powder until well incorporated, then add the water after the manner of forming an emulsion.

This forms a cream-coloured emulsion of a very satisfactory character, having but a faint odour of copaiba. This may be removed by the addition of compound tincture of lavender, which at the same time imparts an agreeable pink tinge.

The emulsifying power of the powder of almonds is undoubtedly due principally to the fixed oil it contains, which acts as a solvent of the resin; the action is also assisted by the gum and sugar. For the use of hospital dispensers and others who may have frequent occasion to dispense it, it may be kept in a concentrated form, 1 = 4.

EFFERVESCING SOLUTION OF TARTRATE OF SODIUM.

A formula for this preparation is published in the *American Journal of Pharmacy* for July, which has been devised by Mr. Joseph Landschütz, of Philadelphia, who states that he has for some time dispensed it, and that his customers decidedly prefer it to the popular solution of citrate of magnesium.

The merits claimed for the solution of tartrate of sodium are that it is more pleasant to the taste than even citrate of magnesium, while it is more reliable and efficient in its action as a purgative, with less tendency to produce tenesmus. Another decided advantage is the fact of its forming a permanent solution, from which no precipitate settles down, and last, though not least, its much greater cheapness, costing only about one-fourth as much as the magnesium citrate. The present high price of citric acid seems to offer peculiar temptations to cheaper sophistications, such as sulphate of magnesium.

Mr. Landschütz's formula for filling fourteen of the ordinary twelve-ounce citrate bottles, is as follows:—

Dissolve 9 oz. crystallized tartaric acid, and 17 oz. crystallized carbonate of sodium, in about one quart of cold water.

Provided the acid is not moist, and the carbonate not effloresced, the above solution will be nearly

neutral. In general, it is best to test it, and neutralize it, if necessary. Then dissolve in it 28 scruples bicarbonate of sodium. Filter, and add sufficient water to make the entire quantity measure 147 fluid ounces.

Make a syrup from

21 oz. best crushed sugar,
14 drachms crystallized tartaric acid,
10 oz. water. After cooling, add
1 drachm essence of lemon and mix thoroughly.

Measure 1½ fluid ounces of this syrup into each of the fourteen bottles. Then pour in slowly the first solution, carefully avoiding an admixture with the syrup; cork and tie each bottle as soon as filled. When this is carefully managed, but very little carbonic acid gas will escape.

Each bottle so prepared will contain about seven drachms of dry tartrate of sodium, which is a fair adult dose.

DETERMINATION OF POISONOUS VEGETABLE SUBSTANCES FOR FORENSIC INVESTIGATIONS.*

The writer proposes chloroform as a very important and easily applicable test reagent for distinguishing between the various vegetable alkaloids. From solution in sulphuric acid the following substances are gradually withdrawn by repeated agitation with chloroform:—caffeine, theobromine, colchicine, thebaine, papaverine, narcotine, and picrotoxine. From the same solution, after neutralizing with an alkali, chloroform withdraws immediately and completely in the cold strychnine, chinine, chinidine, cinchonine, caffeine, theobromine, emetine, atropine, hyoscyamine, aconitine, veratrine, physostygmine, narcotine, codeine, thebaine, nicotine, coniine; and, more slowly, brucine, colchicine, and papaverine; sabadilline only when warmed; and narceine in smaller quantities. Morphine and solanine are not withdrawn by chloroform from either an acid or alkaline solution.

In order to apply the alcohol test, the object is cut up, warmed to 75° C., heated with water containing sulphuric acid, and the solution digested at that temperature; the insoluble residue is pressed off, and repeatedly extracted with warm water. The acid extracts thus obtained are nearly neutralized by bicarbonate of soda till only a slight acid reaction remains, and then evaporated in a water-bath to a thin syrup. This is mixed with four times its volume of 90 per cent. alcohol, and, after twenty-four hours, warmed to 40° or 50° C., filtered off, and the residue extracted with alcohol. From the alcoholic extract the alcohol is then completely distilled off. The residue of distillation is filtered, chloroform added, and then ammonia, till there is a distinct alkaline reaction, and the solution is then repeatedly agitated. The chloroform solution is then separated, and the alkaline fluid extracted with fresh portions of chloroform, until no residue is left on evaporating a small portion of the liquid. The alkaline fluid is in the meantime placed aside, and all the chloroform solutions several times agitated with fresh portions of water containing sulphuric acid. The chloroform is separated from the sulphuric water, the latter neutralized with ammonia, and then shaken again several times with chloroform. The chloroform solution now obtained is passed through a filter moistened with chloroform, washed with chloroform, and evaporated. The residue that remains behind is tested for all those alkaloids which have been mentioned above as being extracted from an alkaline solution by chloroform. The alkaline aqueous fluid that was placed aside is treated with a fresh quantity of chloroform and dilute sulphuric acid till it becomes acid, again agitated with chloroform, and the chloroform separated and evaporated. Any picrotoxine that may be present and the remainder of the colchicine remain in the residue. On the now acid aqueous fluid is poured a stratum of amyl-alcohol, the solution made alkaline with ammonia, and shaken, the amyl-alcohol taken off, filtered, and evaporated; all the morphine, digitaline and solanine, and the greater part of the remainder of the sabadilline, narceine, and picrotoxine will be found in the solution; in the residue, after evaporation, a small quantity of the narcotine, caffeine, papaverine, theobromine, digitaline and colchicine. The first extract with chloroform is now evaporated, the residue repeatedly extracted with warm water containing sulphuric acid, the acid fluid neutralized with ammonia and agitated with chloroform. The remainder of the substances will remain, after evaporation of the chloroform.

Dr. Nowak also gives the following reactions resulting from the application of concentrated sulphuric acid :—

Of the poisonous substance of which an analysis is required a small quantity is placed on a watch-glass, and one or two drops of chemically-pure sulphuric acid added. The results obtained may classify the substances into six groups, as follows :—

1. The substance remains colourless : chinine, cinchonine, morphine, strychnine, caffeine, theobromine, codeine (coniine, nicotine), atropine.

2. A yellow colour of different shades ensues : chinidine, colchicine, emetine, narcotine, aconitine, picrotoxine, solanine, veratrine, sabadilline.

3. The substance becomes rose-red : brucine.

4. It becomes first red, but is very soon dissolved with a yellow colour : thebaine.

5. A violet colour results : papaverine.

6. Various shades of brown are produced : delphinine, narceine, digitaline.

The paper includes also instructions for a variety of other useful tests to determine the presence of the particular alkaloids.

* Abstract of a paper by Dr. Joseph Nowak in the 'Sitzungsberichte der kais. Akademie der Wissenschaften' of Vienna.

THE SANITARY VALUE OF FLOWERS.

The following is quoted by the *Gardeners' Chronicle* from a new American publication, *Hygiene: a Journal of Sanitary Science* :—

"Wordsworth sings that

'Every flower
Enjoys the air it breathes;'

whilst the chemist adds (as far as the leaves are concerned) that, by its breath, it purifies the air for the service of man. Not content with this, modern chemical research is engaged in determining other and unsuspected uses for what have hitherto been considered, in their forms of grace, their various hues and fragrance, to minister only to the æsthetic wants of mankind.

"When these researches, two or three years ago, first began to attract the attention of those interested in sanitary science, the writer, then connected with the health department of a large city, found a fitting field in the low, swampy surroundings, filling the air with malaria, and in the neighbourhood of the numerous slaughter-houses, reeking with animal exhalations, in which to test the value of their deductions. Here, in the vicinity of some of the most beautiful natural scenery in the world, rendered almost uninhabitable—as at Staten Island, at numerous points along the Hudson and elsewhere—by the presence of malaria, there is abundant incentive for urging the speedy carrying out of a measure of reclamation at once inexpensive, attractive, and effectual—namely, the cultivation of odorous and aromatic plants and shrubs in all regions where either animal or vegetable miasms abound.

"That our readers may be able to judge of the probable

effectiveness of such a measure, we present the following *résumé* of the researches above referred to, as well as the collateral evidence of the long-recognized hygienic and sanative value of perfumes in general. . . . . .

"It is to the investigations of an Italian *savant*, Professor Paolo Mantegazza, of Pavia, that we are indebted for the information that this great atmospheric purifier (ozone) is generated in larger quantities by certain plants and fruits possessing spicy aromatic odours than it is by the action of electricity upon the air, the potent influence of which in purifying the atmosphere we all recognize and are grateful for after a thunderstorm. This ozone is developed in some plants by the direct rays of the sun, whilst in others, the action, once commenced in solar light, is continued in darkness; cherry-laurel, clove, lavender, mint, lemon, fennel, narcissus, heliotrope, hyacinth, mignonette, etc., as well as some perfumes, as eau-de-cologne, oil of bergamot, extract of millefleurs, essence of lavender, and some aromatic tinctures, all produce ozone largely on exposure to the sun's rays. Mantegazza has further pointed out that the oxidation of the essential oils, such as turpentine, nutmeg, aniseed, thyme, peppermint, etc., under the influence of light and air, is a convenient source of ozone, as they, even in small quantities, ozonize much of the atmospheric oxygen.

"He finds also, that while the ozonigenic properties of flowers reside mainly in their perfumes—the most odoriferous yielding the largest amount of ozone—certain others, possessing no particular perfume, have extraordinary ozonigenic power; as, for instance, the sun-flower, broad belts of which were planted by the late Commander Maury around the grounds of the National Observatory at Washington, and to the effect of which he attributed the after immunity of his family from intermittent fevers, previously quite prevalent in that neighbourhood. Dr. Cornelius Fox also states in his work on ozone and antozone, that the cultivation of this gaudy plant in malarious districts has been especially urged, as it is said to possess the property of purifying the air laden with marsh miasm, and of exhaling ozonized oxygen.

"Professor Mantegazza demonstrates in his report on the action of essences and flowers in the production of atmospheric ozone and their hygienic utility, that the instructions of Empedocles, in the second book of his didactic poem on Nature, to plant aromatic and balsamic herbs as preventives of pestilence, were founded on a close observation and shrewd, though empirical, insight. The historian Herodian relates that, in a plague which devastated Italy in the second century, strangers crowding into Rome were directed by the physicians to retreat to San Lorenzo, then called *Laurentum*, from the bowers of laurel which surrounded it, that by a cooler atmosphere and by the 'odour of laurel' they might escape the dangers of infection.

"The practice of burning aromatic woods and herbs, as well as odorous gums, spices, etc.,—not to speak of the use of tar-smoke, the antiseptic properties of which are attributed to carbolic and other acids,—as a means of arresting the spread of, and extinguishing epidemics, is of the highest antiquity. Numerous instances are cited of the extinction of the plague by means of fires of odoriferous wood, green laurel, wormwood, chamomile, etc., in the market places, and even in the houses both of the healthy and the sick. Their efficacy, it is now claimed, was due to the production of ozone, by which the pestilential constitution of the atmosphere was purified.

"Within the limit of these pages it is only possible to hint at the sources of information, and this only to give weight and authority to the practical suggestions of measures affecting the great problem of the prevention of disease and the preservation of health. These suggestions, in the present case, are obvious, and will, in some degree, supplement the recent recommendations of Dr. Stephen Smith concerning the cultivation of shade trees in the streets of cities as a means of diminishing the high mortality of summer by modifying the temperature, and by purifying the atmosphere.

"What we would here urge is the cultivation of plants and flowers possessing these desirable ozonigenic properties, alike in city and country, within doors and without; in cities because the air of cities always contains less ozone than the air of the surrounding country, and the denser parts of cities less than the more sparsely built, or than the air of parks and squares; in the country, because very few regions are entirely free from malarial taint.

"They should be cultivated in and around schools and all other places where animal exhalations abound, especially in the districts where slaughtering and kindred occupations are carried on, and in graveyards and cemeteries. The swamps and flats and 'meadows' of Staten Island, those around Jersey City and Hoboken, in the vicinity of Brooklyn and in the upper part of Manhattan Island, should be made to blossom as the rose.

"Aside from the poetical and æsthetic aspects, the florist and the nurseryman and the seedsman may put in a plea for consideration on purely utilitarian grounds. Instead of such disinfectants as those that have been described as chiefly of value because 'they smell so badly that people open the windows and let the fresh air in,' they will furnish us each

> 'Daintie flowre and herb that growes on ground,
> To bud out faire and throw swete smels around.'

And it may yet come to pass that he who makes two flowers to blossom where only one bloomed before shall receive the encomium Dean Swift suggested for the successful corn or grass grower."

SPECTRA OF POLARIZED LIGHT.*

BY WILLIAM SPOTTISWOODE, ESQ., LL.D., M.A.,

Treas. R.S., Sec. R.I.

Some apology is, perhaps, due to you on my part for proposing that you should come together for such elementary experiments as those which I have to offer you this evening; but the growing importance of the subject of polarization, both in general and in astronomical physics, and the increased instrumental means at our command for the study and the exhibition of the phenomena, all seem to indicate that an hour may be not unprofitably spent in trying to obtain a clearer insight into the fundamental parts of the subject.

The object which I propose on this occasion is to verify experimentally the explanation furnished by the wave-theory of the colours produced by crystal plates when submitted to polarized light. Not because the wave-theory or its conclusions need in themselves any verification, but because the line of argument ought to be continuous throughout,—not like an electric current which leaps from one part of a broken conductor to another. Each line, whether theoretical or experimental, should be complete and continuous from one end to another.

Having this object in view, I propose to reproduce, by way of memorandum, a few of the phenomena in question so as to bring them and their analysis in as close juxtaposition as possible; and for this purpose I have arranged two electric lamps, each furnished with a complete polarizing apparatus, but the second having in addition a pair of dispersive prisms, forming, in fact, a spectroscope. In the first arrangement I would draw your particular attention to a Nicol's prism or polarizer, superior in respect of size, and in the opinion of those best capable of judging, not inferior in quality to any hitherto constructed. We have, in fact, before us, first the pair of Nicols constructed by Mr. Ladd, which accompanied Professor Tyndall in his journey to the United States; secondly, a larger one made

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* Lecture delivered at the Royal Institution, Friday, May 23, 1873

for him by Mr. Browning; and thirdly, the largest of all, by Messrs. Tisley and Spiller. And lest it should seem that in thus proceeding from large to larger we have been aiming merely at indefinite size, I may explain that my object has always been a strictly definite one, viz., to obtain a polarizer large enough to transmit the entire beam which issues from the lantern; in this I have now completely succeeded.

Now it is well known that if a plate of selenite sufficiently thin be placed between two such Nicol's prisms, or, more technically speaking, between a polarizer and an analyser, colour will be produced. And the question proposed is, What is the nature of that colour? Is it simply a pure colour of the spectrum, or is it compound, and if so, what are its component parts? The answer given by the wave theory is in brief this: In its passage through the selenite plate the rays have been so separated in the direction of their vibrations and the velocity of their transmission, that, when re-compounded by means of the analyser, they have in some instances neutralized one another. If this be the case, the fact ought to be visible when the beam emerging from the analyser is dispersed by the spectroscope; for then we have the rays of all the different colours ranged side by side, and if any be wanting, their absence will be shown by the appearance of a dark band in their place in the spectrum. But not only so; the spectrum ought also to give an account of the other phenomena exhibited by the selenite when the analyser is turned round, viz., that when the angle of turning amounts to 45° all trace of colour disappears: and also that when the angle amounts to 90° colour reappears. not, however, the original colour, but one complementary to it.

You now see in the spectrum of the reddish light produced by the selenite a broad but dark band in the blue; when the analyser is turned round the band becomes less and less dark, until when the angle of turning amounts to 45° it has entirely disappeared. At this stage each part of the spectrum has its own proportional intensity, and the whole produces the colourless images seen without the spectroscope. Lastly, as the turning of the analyser is continued a dark band appears in the red, the part of the spectrum complementary to that occupied by the first band; and the darkness is most complete when the turning amounts to 90°. Thus we have from the spectroscope a complete account of what has taken place to produce the original colour and its changes.

It is further well known that the colour produced by a selenite, or other crystal plate, is dependent upon the thickness of the plate. And, in fact, if a series of plates be taken, given different colours, their spectra are found to show bands arranged in different positions. The thinner plates show bands in the parts of the spectrum nearest to the violet, where the waves are shorter, and consequently give rise to redder colours; while the thicker show bands nearer to the red, where the waves are longer, and consequently supply bluer tints.

When the thickness of the plate is continually increased, so that the colour produced has gone through the complete cycle of the spectrum, a further increase of thickness causes a reproduction of the colours in the same order; but it will be noticed that at each recurrence of the cycle the tints become paler, until when a number of cycles have been performed, and the thickness of the plate is considerable, all trace of colour is lost. Let us now take a series of plates, the first two of which, as you see, give colours; with the others which are successively of greater thickness the tints are so feeble that they can scarcely be distinguished. The spectrum of the first shows a single band; that of the second, two: showing that the second series of tints is not identical with the first, but that it is produced by the extinction of two colours from the components of white light. The spectra of the others show series of bands more and more numerous in proportion to the thickness of the plate, an array which may be increased indefinitely. The total light, then, of which the spectrum is deprived by the thicker plates is taken from a greater number of its parts; or in other words, the light which still remains is distributed more and more evenly over the spectrum; and in the same proportion the sum total of it approaches more and more nearly to white light.

These experiments were made more than thirty years ago by the French philosophers, MM. Foucault and Fizeau.

If instead of selenite, Iceland spar, or other ordinary crystals, we use plates of quartz cut perpendicularly to the axis, and turn the analyser round as before, the light, instead of exhibiting only one colour and its complementary, with an intermediate stage in which colour is absent, changes continuously in tint; and the order of the colour depends partly upon the direction in which the analyser is turned, and partly upon the character of the crystal, *i.e.*, whether it is right-handed or left-handed. If we examine the spectrum in this case we find that the dark band never disappears, but marches from one end of the spectrum to another, or *vice versâ*, precisely in such a direction as to give rise to the tints seen by direct projection.

The kind of polarization effected by the quartz plates is called circular, while that effected by the other class of crystals is called plane on account of the form of the vibrations executed by the molecules of æther; and this leads us to examine a little more closely the nature of the polarization of different parts of these spectra of polarized light.

Now, two things are clear; first, that if light be plane-polarized, that is, if all the vibrations throughout the entire ray are rectilinear and in one plane, they must in all their bearings have reference to a particular direction in space, so that they will be differently affected by different positions of the analyser. Secondly, that if the vibrations be circular they will be affected in precisely the same way (whatever that may be) in all positions of the analyser. This statement merely recapitulates a fundamental point in polarization. In fact, plane-polarized light is alternately transmitted and extinguished by the analyser as it is turned through 90°; while circularly-polarized light remains to all appearance unchanged. And if we examine carefully the spectrum of light which has passed through a selenite, or other ordinary crystal, we shall find that, commencing with two consecutive bands in position, the parts occupied by the bands and those midway between them are plane-polarized, for they become alternately dark and bright; while the intermediate parts, *i.e.*, the parts at one-fourth of the distance from one band to the next remain permanently bright. These are, in fact, circularly polarized. But it would be incorrect to conclude from this experiment alone that such is really the case, because the same appearance would be seen if those parts were unpolarized, *i.e.*, in the condition of ordinary lights. And on such a supposition we should conclude with equal justice that the parts on either side of the parts last mentioned (*e.g.*, the parts separated by eighth parts of the interval between two bands) were partially polarized. But there is an instrument of very simple construction, called a "quarter-undulation plate," a plate usually of mica, which thickness is an odd multiple of a quarter of a wave length, which enables us to discriminate between light unpolarized and circularly-polarized. The exact mechanical effect produced upon the ray could hardly be explained in detail within our present limits of time; but suffice it for the present to say that when placed in a proper position, the plate transforms plane into circular and circular into plane-polarization. That being so, the parts which were originally banded ought to remain bright, and those which originally remained bright ought to become banded during the rotation of the analyser. The general effect to the eye will consequently be a general shifting of the bands through one-fourth of the space which separates each pair.

Circular-polarization, like circular motion generally, may of course be of two kinds, which differ only in the direction of the motion. And, in fact, to convert the circular polarization produced by this plate from one of these kinds to the other (say from right-handed to left-handed, or *vice versâ*), we have only to turn the plate round through 90°. Conversely right-handed circular-polarization will be changed by the plate into plane-polarization in one direction, while left-handed will be changed into plane at right angles to the first. Hence, if the plate be turned round through 90° we shall see that the bands are shifted in a direction opposite to that in which they were moved at first. In this, therefore, we have evidence not only that the polarization immediately on either side of a band is circular, but also that that immediately on the one side is right-handed, while that immediately on the other is left-handed.

If time permitted, I might enter still further into detail, and show that the polarization between the plane and the circular is elliptical, and even the positions of the longer and shorter axes and the direction of motion in each case. But sufficient has, perhaps, been said for our present purpose.

Before proceeding to the more varied forms of spectral bands, which I hope presently to bring under your notice, I should like to ask your attention for a few minutes to the peculiar phenomena exhibited when two plates of selenite giving complementary colours are used. The appearance of the spectrum varies with the relative position of the plates. If they are similarly placed, that is as if they were one plate of crystal, they will behave as a single plate, whose thickness is the sum of the thicknesses of each, and will produce double the number of bands which one alone would give; and when the analyser is turned, the bands will disappear and reappear in their complementary positions, as usual in the case of plane-polarization. If one of them be turned round through 45°, a single band will be seen at a particular position in the spectrum. This breaks into two, which recede from one another towards the red and violet ends respectively, or advance towards one another according to the direction in which the analyser is turned. If the plate be turned through 45° in the opposite direction the effects will be reversed. The darkness of the bands is, however, not equally complete during their whole passage. Lastly, if one of the plates be turned through 90° no bands will be seen, and the spectrum will be alternately bright and dark, as if no plates were used, except only that the polarization is itself turned through 90°.

If a wedge-shaped crystal be used, the bands instead of being straight will cross the spectrum diagonally, the direction of the diagonal (dexter or sinister) being determined by the position of the thicker end of the wedge. If two similar wedges be used with their thickest ends together, they will act as a wedge whose angle and whose thickness is double of the first. If they be placed in the reverse position they will act as a flat plate, and the bands will again cross the spectrum in straight lines at right angles to its length.

If a concave plate be used the bands will dispose themselves in a fan-like arrangement, their divergence depending upon the distance of the slit from the centre of concavity.

If two quartz wedges, one of which has the optic axis parallel to the edge of the refractory angle, and the other perpendicular to it, but in one of the planes containing the angle (Babinet's Compensator) the appearances of the bands are very various.

The diagonal bands, beside sometimes doubling themselves as with ordinary wedges, sometimes combine so as to form longitudinal (instead of transverse) bands, and sometimes cross one another so as to form a diaper pattern with bright compartments in a dark framework, and *vice versâ*, according to the position of the plates.

The effects of different dispositions of the interposed crystals might be varied indefinitely; but enough has, perhaps, been said to show the delicacy of the method of spectrum analysis as applied to the examination of polarized light.

PRECAUTIONS AGAINST THE INFECTION OF CHOLERA.

The following precautions against the infection of cholera are recommended by Dr. Simon, the medical officer to the Local Government Board. The value of the suggestions and the importance of the subject to which they refer fully justify their reproduction here.

1. As Asiatic cholera is now prevailing in parts of the continent of Europe, and may probably extend (or perhaps has already extended) to places which are in frequent and rapid communication with England, it is not unlikely that, within the next month or two, cases of the disease may be brought into the ports of this country.

2. The order, now about to be issued, of the Local Government Board will give power to local sanitary authorities to deal with any such cases, if they arrive, in a way to protect the population, as far as practicable, against surprise. But as cases of choleraic infection have widely-different degrees of severity, it is possible that some such cases, slightly affected, will, notwithstanding the vigilance of local authorities, be landed without particular notice in English sea-board towns, whence then they may advance to other, and perhaps inland, places.

3. Former experience of cholera in England justifies a belief that the presence of imported cases of the disease at various spots in the country will not be capable of causing much injury to the population, if the places receiving the infection have had the advantage of proper sanitary administration; and, in order that all local populations may make their self-defence as effective as they can, it will be well for them to have regard to the present state of knowledge concerning the mode in which epidemics of cholera (at least in this country) are produced.

4. Cholera in England shows itself so little contagious in the sense in which small-pox and scarlatina are commonly called contagious, that, if reasonable care be taken where it is present, there is almost no risk that the disease will spread to persons who nurse and otherwise closely attend upon the sick. But cholera has a certain peculiar infectiveness of its own, which, *where local conditions assist*, can operate with terrible force, and at considerable distances from the sick. It is characteristic of cholera (and as much so of the slighest choleraic diarrhœa as of the disease in its more developed and alarming forms) that *all matters which the patient discharges from his stomach and bowels are infective*. Probably, under ordinary circumstances, the patient has no power of infecting other persons except by means of these discharges; nor any power of infecting even by them, except in so far as particles of them are enabled to taint the food, water, or air, which people consume. Thus when a case of cholera is imported into any place, the disease is not likely to spread unless in proportion as it finds locally open to it certain facilities for spreading by *indirect infection*. In order rightly to appreciate what these facilities must be the following considerations have to be borne in mind:—*first*, that any choleraic discharge cast without previous thorough disinfection into any cesspool or drain, or other depository or conduit of filth, infects the excremental matters with which it there mingles, and probably, more or less, the effluvia which those matters evolve; *secondly* that the infective power of choleraic discharges attaches to whatever bedding, clothing, towels, and like things, have been imbued with them, and renders these things if not thoroughly disinfected as capable of spreading the disease in places to which they are sent (for washing or other purposes) as, in like circumstances, the patient himself would be · *thirdly*,

that if by leakage or soakage from cesspools or drains, or through reckless casting out of slops and wash-water, any taint (however small) of the infective material gets access to wells or other sources of drinking-water, it imparts to enormous volumes of water the power of propagating the disease. When due regard is had to these possibilities of indirect infection, there will be no difficulty in understanding that even a single case of cholera, perhaps of the slightest degree, and perhaps quite unsuspected in its neighbourhood, may, *if local circumstances co-operate*, exert a terribly infective power on considerable masses of population.

5. It might be supposed that, under those provisions of the Sanitary Acts which relate to precautions against dangerous infections of disease, security could be taken, as regards the infective discharges of cholera, against various kinds of personal conduct which would be dangerous to the public health: above all, that, under those provisions or otherwise, the universal disinfection of such discharges could be enforced. Undoubtedly everything possible in this direction ought to be done, wherever a case of cholera is known to exist: too much importance cannot be attached to the precaution of thoroughly disinfecting, without delay, all discharges from the stomach and bowels of persons suffering under the disease, and of disinfecting or destroying all bedding, clothing, towels, and the like, which such discharges may have imbued: and of course neither choleraic discharges, nor any slops which may contain traces of them, should ever (even when supposed to be disinfected) be cast into any position from which they may get access into drinking-water. But, although the duty of observing those precautions is one which ought never to be neglected, populations cannot prudently stake their lives on the chance that it will be completely fulfilled for them. Apart from all questions of negligence, the degrees of cholera are too many, and the slight and incipient cases far too apt to escape observation, for any such defence against its infection to be more than partial. And therefore the main object for endeavour must be, to secure everywhere such local circumstances that the infective material, though not disinfected, would be unable to spread its influence among the population.

6. The dangers which have to be guarded against as favouring the spread of cholera-infection are particularly two. First, and above all, there is the danger of water-supplies which are in any (even the slightest) degree tainted by house-refuse or other like kinds of filth; as where there is outflow, leakage or filtration, from sewers, house-drains, privies, cesspools, foul ditches or the like, into springs, streams, wells or reservoirs, from which the supply of water is drawn, or into the soil in which the wells are situate: a danger which may exist on a small scale (but perhaps often repeated in the same district) at the pump or dip-well of a private house, or, on a large and even vast scale, in the source of public water-works. And secondly, there is the danger of breathing air which is foul with effluvia from the same sorts of impurity.

7. Information as to the high degree in which those two dangers affect the public health in ordinary times, and as to the special importance which attaches to them at times when any diarrhœal infection is likely to be introduced, has now for so many years been before the public that the improved systems of refuse-removal and water-supply by which the dangers are permanently obviated for large populations, and also the minor structural improvements by which separate households are secured against them, ought long ago to have come into universal use.

So far, however, as this wiser course has not been adopted, temporary security must, as far as practicable, be sought in measures of a palliative kind.

(*a.*) Immediate and searching examination of sources of water supply should be made in all cases where the source is in any degree open to the suspicion of impurity: and the water both from private and public sources should be examined. Where pollution is discovered, everything practicable should be done to prevent the pollution from continuing, or, if this object cannot be attained, to prevent the water from being drunk.

(*b.*) Simultaneously, there should be immediate thorough removal of every sort of house-refuse and other filth which has accumulated in neglected places; future accumulations of the same sort should be prevented: attention should be given to all defects of house-drains and sinks through which offensive smells are let into houses: thorough washing and lime-washing of uncleanly premises, especially of such as are densely occupied, should be practised again and again.

(*c.*) Disinfection should be very freely and very frequently employed in and round about houses, wherever there are receptacles or conduits of filth; wherever there is filth-sodden porous earth; wherever anything else, in or under or about the house, tends to make the atmosphere foul.

In the absence of permanent safeguards, no approach to security can be got without incessant cleansings and disinfections, or without extreme and constant vigilance against every possible contamination of drinking-water.

8. In view of any possibility that the infection of cholera may again be present in this country, it is desirable that in each locality the public should ascertain to whom it practically has to look, in case of need, for its collective safety against such dangers as the above. The responsibility is, in a large proportion of cases, mixed. The most critical of all its branches, the responsibility of providing for the unpollutedness of water-supplies, is, in many very important places, in the hands of commercial companies; and it is to be hoped that these companies, informed, as they must be, of the calamitous influence which some of their number have exerted in previous epidemics of cholera, will remember, if the disease shall again be present here, that each of them, in its daily distribution of water, has hundreds, or even thousands of human lives in its hands. But, except to that extent, the responsibility for local defences against cholera, both as regards water supply and as regards local cleanliness and refuse-removal, is vested in the local sanitary authorities, urban and rural. These authorities are all, by law, so constituted as to represent, in their respective areas of jurisdiction, the will of the local rate-paying population; and each such population has had almost absolute means of deciding for itself whether the district which it inhabits should be wholesomely or unwholesomely kept. It is greatly to be wished that the former of these alternatives had, from long ago, been the desire of every local constituency in the country; and it may fairly be believed that, in considerable parts of the country, conditions favourable to the spread of cholera are less abundant than at former times of visitation. But it is certain that in very many places the conditions of security are wholly or almost wholly absent; and it is to be hoped that in all this large class of cases the authorities, under present circumstances, will do everything which, in the remaining time, can be done to justify the trust reposed in them by the Legislature for the protection of the public health.

9. It is important for the public very distinctly to remember that pains taken and costs incurred for the purposes to which this memorandum refers cannot in any event be regarded as wasted trouble and expense. The local conditions which would enable cholera, if imported, to spread its infection in this country, are conditions which day by day, in the absence of cholera, create and spread other diseases: diseases which, as being never absent from the country, are, in the long run, far more destructive than cholera: and the sanitary improvements which would justify a sense of security against any apprehended importation of cholera would, to their extent, though cholera should never reappear in England, give amply remunerative results in the prevention of those other diseases.

The Pharmaceutical Journal.

SATURDAY, JULY 26, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACY IN THE SERVICES.

OUR readers have lately had an opportunity of learning something of the position held by the pharmacists connected with the French army, and a letter published in the present number (p. 79) affords means of comparing with that the conditions under which our own military authorities require the services of dispensers to be performed.

The comparison is not satisfactory either as regards the status of the pharmacist or as regards the interests of those who may require the services of the military dispenser. Looking to the terms of the advertisement referred to by our correspondent—which appeared in this Journal on the 7th June last—we cannot but agree with him in thinking that its natural purport is a demand for competent pharmacists already qualified for undertaking the duty of dispensing medicines. The heading of the advertisement with the word "Dispensers" is apparently in itself sufficient to justify such an impression, which is moreover, consistent with the regulations relative to the appointment of dispensers in naval hospitals, requiring candidates to possess the Pharmaceutical Society's certificate of qualification, according to the duties they have to perform.

It appears, however, that so far as the army is concerned, the only path by which a young man may hope to obtain employment in dispensing is to enter as a recruit in a particular branch of the service, "The Army Hospital Corps," where, after serving as a private, and possibly engaged in duties having no relation to pharmacy, he may on attaining the rank of sergeant be employed as a compounder of medicine. It is true that by the regulations such employment of those attaining the rank of sergeant is restricted to those sergeants who may have qualified themselves for the duties of dispenser.

Such an arrangement may, in certain instances, work well and conveniently, but it seems open to grave objections on principle, and as a system to be wholly inadequate for ensuring proper performance of the duties of dispensing. After some years' service as a private in a military corps, it is rather late, if it be not also as a rule altogether out of place, to enter upon the study of those branches of science which are essential for the pharmacist, and the acquisition of which, by study as well as practice, is supposed to require several years' undivided attention on the part of the student.

Formerly, dispensers of medicine were employed in the Army Medical Department, and on reference to the Society's Calendar for 1867-68 it will be found that they were required to have passed the examinations of the Pharmaceutical Society, and to be registered as Pharmaceutical Chemists. That system, however, has been superseded.

The subject is one well worth the attention of pharmacists, and the example afforded by France in this respect is one deserving imitation, or at least some effort in that direction. Probably at the coming meeting of the Pharmaceutical Conference someone may bring it forward with advantage.

THE ADULTERATION OF FOOD ACT.

UNDER the provisions of this Act, passed last year, the appointment of public analysts throughout the country, as our readers will be aware, becomes necessary; and in a parliamentary return just issued the number is given of the analysts who have been already appointed in each county and borough or district of the United Kingdom. The return divides the provinces from the metropolis, and considering first the information given as to these appointments in the country, we are at once able to see how few public analysts, comparatively speaking, have been as yet officially appointed. With regard to boroughs, we find that only nine possess a public analyst, and these certainly deserve mention on account of their singularity. They are Bedford, Birmingham, Bolton, Gloucester, Gravesend, Liverpool, Manchester, Sheffield, and Wolverhampton. Most of the analysts for these places have been appointed during the present year, and with the exception of Liverpool, we are not aware that any prosecutions have as yet resulted from the performance of their official duties. With regard to the analysts who have been appointed in the various counties, we do not find that such appointments have been very numerous, thus showing that the local authorities do not consider that there is any very pressing necessity for the operations of these gentlemen. We find that the following counties now possess a public analyst:—Bedford, Berks, Carnarvon, Chester, Denbigh, Derby, Essex, Gloucester, Hertford, Lincoln, Norfolk, Nottingham, Oxford, Salop, Surrey, and Warwick. It will thus be perceived that no very great activity has been manifested by the various local authorities in carrying out that provision of the Act which refers to the appointment of analysts. When, again, we begin to consider what Ireland and Scotland have done in regard to the appointment of public analysts, we find a still greater condition of apathy with respect to the provisions of the Act. In Ireland there has actually been but one analyst appointed, and that is Dr. CHARLES CAMERON of Dublin. This shows that our Irish friends consider their food and drugs do not require the careful attention of the analysts. In

Scotland, too, apparently the same confidence as to food, etc., prevails, inasmuch as, according to the official return from which we quote, there have only been two appointments made, viz., Dr. THORPE, for Glasgow, and Messrs. PATTERSON and OGILVIE for Greenock. We have not heard of any prosecutions under the Act from Scotland, excepting that the analyst for Glasgow, Dr. THORPE, has analysed some butter there, alleged it to be adulterated, and summoned the trader who sold it. Other analysts, however, who examined the same article deposed that the butter was not adulterated as the public analyst described; and thus a very considerable contrariety of chemical evidence was elicited. Much the same state of things occurred in regard to an analysis of the Liverpool analyst, Dr. BROWN; and indeed it appears that of late the provincial analysts have got themselves into rather hot water.

The official return next refers to London, and here we find that the appointment of public analysts has been very complete, as nearly all, if not all, the various parochial districts are represented by officers of this character. For the City Dr. LETHEBY was appointed public analyst in May last; while Dr. MUTER is analyst for no less than five districts, viz., St. George-the-Martyr, Southwark; St. Mary, Lambeth; St. Mary Magdalen, Bermondsey; St. Mary Newington; and Wandsworth. Dr. REDWOOD is analyst for three districts, viz., St. James and St. John, Clerkenwell, Holborn, and St. Giles. In fact, as we have said, the metropolis is most fully represented by public analysts, there being more in London, we should imagine, than there are in the whole of the provinces. Prosecutions under the Act in the metropolis, so far as our readers are concerned, have been extremely rare; and in fact the only traders selected for the operation of this law appear to be the milkmen and grocers, upon whom in many cases it has pressed very heavily.

TWO NEW DRUGS.

FROM a recent number of the *Zeitschrift des allgemeinen österreichischen Apotheker-Vereines* we learn that two plants which are natives of the Philippine Islands have attracted some attention at the Industrial Exhibition at Vienna. One of these is the *Echises scholaris*, an Apocynaceous plant, the other the *Garcinia mangostana*, one of the Guttiferæ.

The Echises is a very abundant tree in the province of Batangar in the island of Luzon, the bark of which has long been used by the natives, under the name of Dita, as a remedy against all kinds of fevers. G. GRUPPE, an apothecary in Manilla, examined the bark and he obtained from it after repeated analyses, a very hygroscopic bitter principle to which he gave the name of Ditaïn.

Professor Dr. MIGUEL ZINA, a Spaniard and chief physician of the province of Manilla, experimented with it in the hospitals under his care and found that Ditaïn is not only a perfect substitute for quinine, but also that in its use the frequently unpleasant after effects of quinine are avoided. It is administered in the same manner and doses as quinine, and it is perfectly certain in its effect. It is also remarkably efficient as a tonic. Ditaïn may be prepared in the same way as quinine. The bark yields about 2 per cent. of Ditaïn. A single tree yields a large quantity of bark without its growth being affected. In Manilla 50 kilograms of the bark cost about 10 francs, and probably Ditaïn might be produced at about half the price of quinine. It has been used successfully in Manilla.

The product of the second named plant is an extract prepared from the fruit husks, which were some years ago imported into Europe as a tanning material. The *Garcinia* occurs frequently in Madras, Cochin China and the Philippines and had previously been used in medicine as a decoction of the fruit husks, until M. GRUPPE introduced the extract which is now used in all hospitals. Numerous experiments have shown that it is a safe, rapid, and thorough remedy for dysentry and chronic diarrhœa, as well as all catarrhal affections of the bladder and urethra.

POISONOUS NUTS.

IN a letter to the *Lancet* (July 19) Dr. HARKER states that several instances of poisoning of children by means of a fruit sold by grocers, and known by the name of "Denna nuts," have come under his notice. He describes the fruit as probably a legume, containing either one or two bay-coloured beans, the case being reticulated with about eight slightly prominent ribs and of a faint straw-colour. One of these beans planted by him in a fernery has produced a plant, the leaves of which are stipulated, the stipules lance-shaped, the leaves articulated as in the pea tribe and four in number, there being no terminal leaflet. Dr. HARKER says that in the cases of poisoning by these beans the children have been sick and powerless; there has been considerable drowsiness and the pupils have been dilated, the symptoms resembling very much those which follow poisoning by laburnam seeds. He therefore suggests that the proper treatment would be to induce vomiting, if it has not already taken place, and then to give a dose of castor oil in milk. He has not yet met with a fatal case.

The plant described by Dr. HARKER as derived from the poisonous nuts is evidently *Arachis hypogœa*. The legumes of this curious plant are ripened underground; those pods which are unable to reach and bury themselves in the ground not coming to maturity. From this circumstance they are commonly called Ground-nuts.

The name of "Denna" nuts is probably derived from Yennai, the name used in India for nuts of any kind, and would seem to indicate that they came from India where they are chiefly cultivated for the sake of the oil which they yield. So far as we are aware, their poisonous property has not before been noticed. They are largely used as food in Africa and other parts of the world, but are generally boiled by the negroes before being eaten.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

July, 1873.

Present on the 9th, 18th, and 21st—Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Southall, and Umney,

Present on the 16th—Messrs. Allchin, Barnes, Bottle, Carteighe, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Southall, and Umney.

Present on the 17th—Messrs. Allchin, Barnes, Bottle, Carteighe, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, Southall, and Umney.

Dr. Greenhow was present on the 18th, on behalf of the Privy Council.

MAJOR EXAMINATION.

Twenty candidates presented themselves. *Five* failed. The following *fifteen* passed, and were declared duly qualified to be registered as Pharmaceutical Chemists :—

*Fletcher, Frederick William	Totton.
*Hulme, Richard Gleave	Hammersmith.
*Roberts, William	London.
*Rimmington, George	Bradford, Yorks.
Ball, George	Ormskirk.
Mumby, Charles John Everitt	Bury St. Edmund's.
Brookes, Frederick James	Selby.
Goulden, Herbert	London.
Cottam, William Procter	Lancaster.
Baynes, James, jun.	Hull.
Hawkes, Richard	Colchester.
Jones, John	Neath.
Hart, Thomas	Manchester.
Crundall, Augustus Horton	Cirencester.
McJannet, James	North Walsham.

MINOR EXAMINATION.

One hundred and seventeen candidates presented themselves. *Fifty-one* failed. The following *sixty-six* passed, and were declared qualified to be registered as Chemists and Druggists :—

	*Carter, Arthur Joseph	London.
	*Thompson, Frank Farrow	Cambridge.
	*Gordelier, John Thomas	Sittingbourne.
	*Dobson, George	Kingswood.
	*Woolnough, Harry Arnold	Norwich.
	*Hunter, Frederick Neish	Durham.
Equal. Equal. Equal.	*Law, Alfred	Towcester.
	*Mills, Thomas William	Birmingham.
	*Collins, Thomas Robert	Leicester.
	*Thompson, Lawrence Joseph	Thirsk.
	*Botting, Charles	Wimborne.
	*Chapman, Walter	Newstead Grange.
	Amoore, Lewis Perigoe	Hastings.
	Strang, Peter	Perth.
	Stevens, Joseph	Camden Road.
	Price, James	Market Drayton.
	Spensley, Thomas Brentnall	Middlesborough.
	Hands, Henry Joseph	Chipping Campden.
Equal	Jinks, John	Tipton.
Equal.	Taylor, Herbert Edwin	Hadleigh.
Equal.	Kemp, Harry	Salford.
	Marten, Cruttenden	Liverpool.
	Turner, William Spencer	Hingham.
	Taylor, John	Carlisle.
Equal. Equal.	Bowling, John Henry	Pembroke Dock.
	Whitehouse, Thomas Arthur	London.
Equal.	Strang, David James	Perth.
	Wolstenholme, John, jun.	Bury.
	Wyles, William	Grantham.
Equal.	Elwood, William	Grimsby.
	Metherell, Kinneard	London.
	Oldfield, Frank	Hawkhurst.
Equal.	Birkett, John Robert	Morecambe.
	Osborn, William Henry	Tewkesbury.
	Peacock, Walter	Oxford.
	Ward, Charles Thomas	London.
	Willan, Robert	Ulverston.
Equal. Equal.	Eminson, Thomas	London.
	Hardy, Joseph Wrangham	Grantham.
Equal.	Stead, Thomas Albert	Heckmondwike.
	Stephen, John	Hoxton.
	Tebb, Henry	St. Ives.
	Brown, William Braithwaite	Preston.
	Sturdy, Thomas Metcalfe	Leeds.
	Whitlamsmith, Walter	Uppingham.
	Coleby, Frederick	Surbiton.
Equal. Equal.	Birchall, Thomas Barrow	Preston.
	Smith, William	Gosport.
Equal.	Norman, Joseph Slaughter	Royston.
	Taylor, Edward	Birmingham.
	Hindle, John	Gorleston.
	Whitrow, Benjamin	Winchester.
	Barling, Gilbert Harry	Manchester.
Equal.	Gadd, William Fletcher	Oxford.
	Haller, Frederick William	Hull.
	Wellington, James	Oakham.
	Sprake, David Lewis	Carmarthen.
	Hall, Ralph	Kingsland Road.
	Storey, John Charles	Hull.
	Davies, William	Llandilo.
Equal	Staning, Walter	Hull.
	White, William Charles	Barnstaple.
	Jenkyn, Thomas, jun.	Penzance.
Equal.	Hambridge, Thomas	Lower Tottenham.
	Payne, Henry	Alford.
	Woolstencroft, Benjamin	Weaverham.

The above names are arranged in order of merit.

* Passed with Honours.

The following is the result of the Preliminary examination held on the 7th instant :—

ENGLAND AND WALES.

Three hundred and thirty-one candidates presented themselves for examination, of whom *one hundred and forty-four* failed. The following *one hundred and eighty-seven* passed, and have been duly registered as Apprentices or Students :—

	Currie, Herbert William	Turnham Green.
	Dyer, Charles Frederick	High Wycombe.
	Kilvington, George	Hartlepool.
Equal.	Mill, John Brown	Holloway.
	Place, Frederick William	Knutsford.
	Reynolds, Richard James	Dewsbury.
	Harry, William	Highbury Hill.
	Martell, Richard	Portsmouth.
Equal.	Brewer, James Curtis	Gloucester.
	Jones, Thomas Glynne	Llanidloes.
	Stacey, Peter	London.
Equal.	Powell, John Alfred	Reading.
	Robertson, James Hay	Long Melford.
	Salter, George Herbert	Bath.
Equal. Equal.	Dutton, Hugh Odard	Rockferry.
	Luxmoore, Charles Mann	Bristol.
Equal.	Padley, William	Goole.
	Winfrey, Richard	Long Sutton.
	Procter, Robert	Kidderminster.
	Cole, Samuel John	Exeter.
	Bell, Frederick Leonard	Southampton.
	Little, Edward Stephen	London.
	Purdy, James Robert	Morpeth.
Equal.	Coleman, Edward James	Cardiff.
	Morris Caleb Guron	Lluynderris.
	Ritson, Fletcher	Carlisle.
	Pennington, George Edgar	Kendal.
Equal.	Drew, John	Wednesbury.
	Lunde, William John	Lancaster.
	Rendall, Theodore Stancombe	Torquay.

Equal.	Bell, Joseph	Alnwick.
	Clayton, Thomas	Malton.
	Henderson, Cristopher	Hoylake.
	Gibbs, Robert Darton	Wolverhampton.
Equal.	Cusse, Ernest	Southampton.
	Duckett, George	Preston.
	Elliott, William Alfred	Bristol.
	Thomas, Lloyd Richard	Beaumaris.
Equal	Draper, James William	Malmesbury.
	Hugill, John Howden	Edmonton.
	Logsdail, Henry	Lincoln.
Equal.	Clark, Robinson Urwin	Jarrow.
	Cuff, Robert Sweeting	Bristol.
	Davies, Daniel	Newcastle-Emlyn.
	Troup, William	Southport.
	Grover, Frank	Folkestone.
	Mansergh, William	Burton-in-Lonsdale.
	Saunders, Frederick	Manchester.
	Snow, Arthur Legge	Ross, Herefordshire.
	Savery, John Manly	Loughborough.
	Newbigin, Lesslie	Newcastle-on-Tyne.
	Gardner, Lewis Silk	Painswick.
Equal.	Bowden, Charles Edward	Hyde.
	Hogben, Howard	Huddersfield.
	Lewis, Llewellyn	Neath.
	Pitts, William Christopher	Norwich.
	Walker, George Edward	Royston.
Equal.	Dodds, Herbert Thomas	Wakefield.
	Fort, William Fairhurst	Liverpool.
Equal.	Broughton, Owen	Sleaford.
	Embley, John	Brierfield.
	Fortescue, Frank	Louth.
	Lloyd, John	Hereford.
	Savile, Harry	Hull.
	Swinbank, John	Heighington, Darlington.
Equal.	Grimshaw, Thomas	Preston.
	Stanley, Thomas	Alcester.
	Mason, Joseph Robert	Workington.
	Mortlock, William J.	Peckham.
	Panton, William Alexander	London.
	Pullin, Arthur Harry	Pontypool.
	Ratcliffe, Henry Norman	Newbury, Bucks.
	Robinson, Frederick	Dewsbury.
	Rodwell, Francis	Ripon.
	Thomson, Thomas Leonard	Birmingham.
	Wynter, Ernest Charles	Seaford.
Equal.	Galloway, James Barker	Liverpool.
	Lambell, Wm. Richard Henry	St. Austell.
	Taylor, James Henry	Pontefract.
Equal.	Cumine, Rupert Henry	Kingston-on-Thames.
	Dunn, John Henry	Hull.
	Hart, James	Sunbury.
	Hooper, David	London.
	Pridmore, Walter Snape	Hinckley.
	Smith, Morgan	Treeynon.
	Weston, Benjamin	Fenton.
	Williams, Stephen	Cardigan.
	Wilson, Erasmus	Southsea.
Equal.	Chapman, Joseph George	Binfield.
	Coleman, Alfred	Southampton.
	Foxcroft, John Peter	Skipton.
	Whitney, William John	London.
	Jones, Thomas Daniel	Seacombe.
Equal.	Coles, William Edwin	Newport Pagnell.
	Epps, James	Upper Norwood.
	George, John Irving	Tunstall.
	Halstead, Henry	Rawtenstall.
	Marratt, Thomas	Gt. Gonerby.
	Stephens, George Thomas	Hereford.
	Thomas, John Tubb	Pontypool.
	Gould, Henry	London.
Equal.	Lewis, Thomas	Newport, Mon.
	Watts, James Orr	Stafford.
	Phillips, George	Dowlais.
	Allis, William	Alford.
	Ashworth, John Robert	Ramsbottom.
	Blagg, Eli	Hanley.
	Bomford, Alfred	Oxford.
	Fletcher, Frederick John	Wolverhampton.
	Hall, William	Portsmouth.
	Hick, Allan Pearson	Wath-on-Dearne.
	Jackson, George	Hartlepool.
Equal.	Jones, David Edward	New Quay.
	Olden, Loathan	Romsey.
	Perry, Horatio Nelson	Gravesend.
	Riley, John Cowgill	York.
	Shilton, James	Sutton Coldfield.
	Stevenson, Jason	Radford, Notts.
	Taylor, Walter	Aberdare.
	Varney, Henry George	Oxford.
	Watson, Lund	York.
	Williamson, Bamford, jun.	South Shields.
Equal. Equal.	Hagon, Albert	Cardiff.
	Mitton, Richard	Skipton.
Equal.	Heaver, Arthur William	Norwich.
	Lester, Samuel	Cheltenham.
	Ridley, Herbert Horace	Walsham le Willows.
	Adamson, William Francis	Blackburn.
	Andrews, Henry Albert.	Harrogate.
	Armistead, Hugh Baldwin.	Liverpool.
	Baker, William	Leicester.
	Barson, George	York.
	Bates, George	Macclesfield.
	Beswick, Jesse.	Liverpool.
	Bird, William	York.
	Boyd, John	Durham.
	Brothwood, Harry Skarratt	Shrewsbury.
	Chaloner, William Francis	Birmingham.
	Cole, Edwin Henry.	Dorking.
	Cooper, Henry.	London.
	Dady, William.	Holt.
	Dashwood, James	Portsmouth.
	Dean, Thomas William	Linton.
	Driver, Arthur Silvester	Elmesthorpe.
	Elliston, Augustus Frederick	Lower Tottenham.
	Evans, Robert Daniel	Liverpool.
	Exley, John	Leeds.
	Fidler, Thomas William	Workington.
	Freeman, William Harrison	Leeds.
	Gilbert, Joseph Anthony	Manchester.
	Glaisyer, Edmund	Brighton.
	Greenhow, William Henry	Leeds.
Equal.	Griffith, John	Pen y Caeran.
	Hargreaves, Robert Hamer	Clitheroe.
	Hill, Arthur	Cheltenham.
	Hill, Charles Walter	Leeds.
	Holden, William Henry	Staithes.
	Jefferson, Charles	Sheffield.
	John, William	Pentre.
	Knight, William	Hinckley.
	Leach, Charles	Middleton.
	Lightfoot, William	Oldham.
	Maddison, Charles John	Swaffham.
	Mayger, William John	Northampton.
	Matthews, Arthur	Bristol.
	Mitchell, Walter	Sheffield.
	Mitchell, Joe Charles	Barnsley.
	Morris, Josiah	Belper.
	Nicholson, John	Heaton Norris.
	Norman, John Turton	Blackpool.
	Northen, Charles	Uppingham.
	Owen, John	Liverpool.
	Palmer, Frederic Henry	Lynn.
	Parry, Robert	Llugwy Pier.
	Rees, William	Pembroke Dock.
	Rich, Stanley	Swinton Bridge.
	Shaw, Arthur	Pendleton.
	Speck, Alexander	Leeds.
	Strachan, John	St. John's Wood.
	Stubbs, Thomas Shaw	Bristol.
	Thomas, Thomas Francis	London.

Todd, George.....Durham.
Tunstall, Edwin James.....Birmingham.
Wates, Fred Wain .....Blackheath.
Wilks, Cuthbert Sympson .....Lincoln.
Wilson, Ivinson.....Carlisle.
Winn, John Christopher .....Darlington.

SCOTLAND.

Thirty-three candidates presented themselves for examination; of these *sixteen* failed. The following *seventeen* passed, and have been duly registered :—

Galloway, David James .....Edinburgh.
Equal. Burley, William .....Ditto.
Equal. Hardie, John Davidson .....Fraserboro'.
Equal. Couper, Frederick Thomas .....Edinburgh.
Fingland, James ....Thornhill.
Fraser, Jonathan Innes ... .Elgin.
Equal. Wilson, James .....Buckie.
Equal. Grant, Alexander .....Cullen.
Equal. Lees, David ... .St. Andrews.
Equal. Currie, Robert Kirkwood .....Glasgow.
Equal. Dunlop, James Buchanan .....Edinburgh.
Equal. Lawson, William Cooper .....Glasgow.
Equal. Presslie, Robert Dowell .....Aberdeen.
Rae, William .....Ballater.
Wishart, William Dick .....Aberdeen.
Storie, Robert .....Edinburgh.
Cathie, Andrew .... Dunoon.

The following is a list of the Towns at which the Examinations were held, with the numbers of Candidates annexed :—

	Candidates. Examined.	Passed.	Failed.
Aberdare	2	2	
Altrincham	1		1
Andover	1		1
Bangor	4	2	2
Barnsley	2	1	1
Bath	1	1	
Bedford	1		1
Belper	1	1	
Birkenhead	3	3	
Birmingham	11	3	8
Blackburn	3	2	1
Blackpool	1	1	
Boston	2	2	
Bradford	2		2
Brighton	5	2	3
Bristol	8	5	3
Burnley	3	3	
Bury St. Edmunds	1	1	
Buxton	1		1
Cambridge	3	1	2
Cardiff	4	4	
Cardigan	4	3	1
Carlisle	3	2	1
Carmarthen	1		1
Carnarvon	1	1	
Cheltenham	3	2	1
Chester	2		2
Chesterfield	2		2
Cockermouth	2	2	
Coventry	2	1	1
Denbigh	1		1
Derby	2		2
Doncaster	1	1	
Dorking	1	1	
Dublin	1		1
Durham	7	4	3
Evesham	1	1	
Exeter	1	1	
Fareham	3		3
Folkestone	1	1	
Frome	1		1
Grantham	1	1	
Grimsby	3	1	2
Guernsey	2		2
Halifax	2	1	1
Hanley	3	1	2
Harrogate	1	1	
Hartlepool	3	2	1
Haverfordwest	2	1	1
Hereford	5	4	1
Huddersfield	1	1	
Hull	4	2	2
Huntingdon	2		2
Hyde	2	1	1
Ipswich	1		1
Kendal	2	1	1
Kidderminster	1	1	
King's Lynn	4	2	2
Knutsford	1	1	
Lancaster	2	2	
Leamington	2		2
Leeds	11	8	3
Leicester	7	3	4
Leighton Buzzard	1	1	
Lewes	2		2
Lincoln	4	2	2
London	42	25	17
Loughborough	1	1	
Liverpool	11	7	4
Macclesfield	1	1	
Manchester	17	6	11
Merthyr Tydvil	1	1	
Middlesborough	1		1
Neath	1	1	
Newbury	1	1	
Newcastle-on-Tyne	5	5	
Newport, Mon	2	1	1
Northampton	3	1	2
Norwich	5	4	1
Nottingham	2	1	1
Oldham	1	1	
Oxford	3	2	1
Pembroke Dock	1	1	
Penzance	1		1
Peterborough	1		1
Portsmouth	4	4	
Preston	3	2	1
Reading	1	1	
Redditch	1		1
Retford	1		1
Ripon	1	1	
Rochdale	3	1	2
Rochester	2		2
St. Austell	1	1	
Scarborough	1	1	
Sheffield	4	4	
Shrewsbury	1	1	
Southampton	5	4	1
Southport	3	1	2
South Shields	2	1	1
Stafford	1	1	
Stamford	2	1	1
Stoke-on Trent	3	2	1
Stowmarket	1	1	
Stroud	1	1	
Sunderland	1		1
Swansea	1		1
Taunton	2		2
Torquay	1	1	
Truro	1		1
Wakefield	2	1	1
Warrington	1		1
Wednesbury	1	1	
Whitby	1		1
Whitehaven	1		1
Winchester	1		1
Wolverhampton	2	1	1
Wrexham	1		1
Wycombe	1		1
York	4	4	
SCOTLAND.			
Aberdeen	7	4	3
Banff	3	2	1
Dumfries	2	1	1
Dundee	3		3
Edinburgh	8	5	3
Elgin	1	1	
Glasgow	6	3	3
Lochgilphead	1		1
St. Andrew's	2	1	1

The questions for examination were as follows :—

Time allowed: Three Hours.

LATIN.

Translate into English two of the following sentences :—

1. Eodem die ab exploratoribus certior factus hostes sub montem consedisse, millia passuum ab ipsius castris octo; qualis esset natura montis et qualis in circuitu ascensus, qui cognoscerent, misit. Renunciatum est, facilem esse.

2. Cæsar, primum suo, deinde omnium, è conspectu remotis equis, ut, æquato periculo, spem fugæ tolleret; cohortatus suos prœlium commisit. Milites, è loco superiore pilis missis, facilè hostium phalangem perfregerunt. Eâ disjectâ, gladiis districtis, in eos impetum fecerunt.

3. Coque per horam dimidiam, subinde agitans, et ubi liquor refrixerit, adjice aquæ destillatæ quantum satis sit ut octarios sex impleat: denique cola. In vasis bene obturatis servetur.

4. Panem in aquâ paulisper macera prope ignem; tum misce, et lini semen paulatim adjice movens ut fiat cataplasma molle. Huic admisce carbonis drachmas duas, et quod restat superficiei insperge.

5. Decline "niger" and "duo."

6. What cases do the following prepositions take—ad, ante, inter, ob, per, cum, ex, pro?

7. Parse "Deum veneramur qui nos creavit."

ARITHMETIC.

8. How many tons are there in a million ounces?

9. What are the weight and cost of a square mile of glass, each square foot of which weighs 9oz., and costs fourpence halfpenny?

10. A market woman buys herrings at 2*s.* 8*d.* the hundred of six score, and retails them at 4*s.* 6*d.* the true hundred. How many must she sell to earn half-a-sovereign?

11. Make out the following bills :—

34lbs. 14oz. beef, at . . . . . 8½*d.* per lb.
14lbs. 10oz. mutton, at . . . . . 9½*d.* „
7lbs. 6oz. lamb, at . . . . . 11½*d.* „

12. Multiply ·0025 × 4·76, and 2·5 × 4·76.

ENGLISH.

13. Parse the following :—

" And every shepherd tells his tale
Under the hawthorn in the dale."

14. Write from fifteen to twenty-five lines in the form of a letter to a friend upon *one* only of the following subjects :—

Idleness.
Ambition.
The Sun.

Proceedings of Scientific Societies.

PARIS SOCIETE DE PHARMACIE.

This Society met on Wednesday, June 4, under the presidency of M. Grassi. A specimen of opium in rolls, from Persia, was presented by M. Martin, which upon examination had not yielded any morphia, and therefore, he considered ought to be excluded from commerce. M. Martin also presented a specimen of gum kino from the Soudan, of a kind which he believed to be unknown in Europe. It was soluble in water to the extent of 80 per cent., and from its very low price, he thought it would find employment in the arts. A microscopic examination showed that it had not undergone any particular manipulation.

A letter was received from M. Gosselet, vice-president of the Society of Pharmaciens of the North of France, in reference to the recent decision of the court at Douai, to the effect that cod liver oil was an aliment, and might be sold by grocers. (See *ante*, p. 32). This affair having shortly to come before the Court of Cassation, the northern Society transmitted to the Society at Paris a number of questions which had been put to it by the Procureur-Général. After hearing the questions read and deliberating thereupon, it was unanimously agreed,—that cod liver oil is a simple drug ; that it constitutes a true medicament; that it cannot be sold in medicinal weights either by druggists or by grocers; and finally, that a distinction ought to be drawn between oil prepared for internal use and that employed by curriers, the first being obtained by the particular processes indicated in the Codex, whilst, the latter is in general, only a more or less impure fish oil.

A specimen of neutral and soluble phosphate of lime was presented to the Society, by M. Forterre, of Saint-Denis, together with a memoir upon its administration, but as the author did not disclose the method of preparation, the Society did not discuss the communication.

M. L. Soubeiran read an extract of a letter received from Mr. J. E. Howard, in which he stated that some plants of Cinchona Calisaya, which he had planted in the open air at Tottenham, near London, had grown perfectly. M. Soubeiran added, that Professor Baillon had this year made a similar experiment in Paris, and that the Cinchonas were in a flourishing state.

M. Martin presented to the Society a new refrigerator, the invention of M. Toselli. The source of cold was nitrate of ammonia, which was dissolved in water, and the machine produced a block of ice of 500 grams weight in five minutes.

M. Mayet read a note upon the preparation of the antiscorbutic syrup, by means of a liquid extract. He presented a specimen of syrup so prepared for comparison with that prepared according to the formula of the Codex.

M. Blondeau said, that this manner of operating was contrary to good pharmacy; that all the fluid extracts and concentrated alcoholates at present met with in commerce yield bad preparations, or preparations more or less differing from those of the Codex; for the fluid extracts, all contain alcohol, which they introduce into the preparations of which they are made the base, but certain syrups ought not to be alcoholic. In the case of the antiscorbutic syrup, M. Blondeau remarked that M. Mayet had only used half the proper proportion of wine, a practice that would open the door to all kinds of falsifications.

M. Marais was opposed to these preparations. He said that in most cases the extractive liquors undergo considerable alteration when they assume the consistence of a fluid extract. He did not see why a decoction should be evaporated to the consistence of an extract before putting in the sugar. Such a process had the inconvenience not only of giving an inferior product, but also of breaking with the traditions of pharmacy and of suppressing the laboratory operations which make good students and pharmacists.

M. Limousin, on the other hand, said that the fluid extracts were of great service, that they would one day replace the preparations of the Codex, and that whatever might be done their sale would increase. He added that the English and Americans are considerably in advance in this direction, and that in preparing fluid extracts with glycerine a means had been given to the pharmacist of avoiding bulk, outlay, and the trouble of preparation.

M. Mayet said that he had been induced to pay attention to this subject because pharmacists purchased bad fluid extracts and consequently obtained with them bad preparations. He was convinced that the use of fluid extracts in the extemporaneous preparation of syrups would present great advantages. It would be better to study completely these preparations to see what could be reasonably gathered from them than to reject them without examination.

M. Boudet said that a letter had been addressed to the Academy of Medicine by the Minister of Public Instruction, on behalf of the Minister of War, asking for advice as to the fusion of the military, medical, and pharmaceutical services, and whether pharmacy should be subordinate or hold the same rank as now. The Academy has named as a commission to consider the question, Messrs. Depaul, Devergie, Gubler, Bussy, Larrey, Poggiale, Gobley, Legouest, and Broca. The Society saw with regret that pharmacy was in a considerable minority upon this commission, since it comprised only three pharmacists to six medical men.

SOCIETE D'EMULATION POUR LES SCIENCES PHARMACEUTIQUES.

At the sitting of this Society, on Tuesday, June 3rd, the following paper was read on

THE SYNTHESIS OF CROTONYLENE.

BY M. PRUNIER.

Ethylacetylene is a carbide of hydrogen, formed synthetically by Berthelot, who obtained it by the direct reaction of acetylene upon ethylene at a dull red heat. The two gases combined in equal volumes with condensation to one-half—

$$\underset{\text{Acetylene.}}{C_2H_2} + \underset{\text{Ethylene.}}{C_2H_4} = \underset{\text{Ethlyacetylene.}}{C_4H_6}$$

The formation of this carbide constitutes one of the simplest and most elegant of the pyrogenous syntheses.

The question arose whether ethylacetylene were identical with either of the carbides having the same formula which had previously been obtained, especially crotonylene, a carbide which Caventou, who discovered it, obtained from bromide of butylene (itself derived from amylic alcohol) by abstracting from the bromide two equivalents of hydrobromic acid. I had also observed that crotonylene was formed during the action of a red heat upon

the petroleum carbides, and I have prepared by this means considerable quantities of its bromide ($C_4 H_6 Br_4$), which under certain conditions can be crystallized directly in the bromine flask. This tetrabromide, as is known, is a body possessing extremely characteristic properties. Moreover, the formation of crotonylene in this and in several other analogous reactions appeared to me to be due to the simultaneous presence and reciprocal reaction of ethylene and acetylene.

In order to clear up this point, I caused nearly equal volumes of acetylene and ethylene to pass into a porcelain tube heated to dull redness; the two gases combined according to the reaction before described. (Care should be taken during this experiment on the one hand to keep the temperature sensibly below red heat, and on the other to pass the previously mixed gases rather rapidly through the tube, so as not to prolong the action of the heat.) In this manner ethylacetylene is formed in sufficient quantity to be easily manifest with 8 or 10 litres of the mixed gases. The gas yielded by such a reaction was conducted into bromine flasks conveniently placed. The brominated liquors were afterward united and left for about two days in contact with a slight excess of bromine: in this manner ethylacetylene passed to the state of tetrabromide ($C_4 H_6 Br_4$).

In order to isolate it, the greater part of the bromide of ethylene was removed by distillation (up to about 130° C.), and the residue was treated by concentrated alcohol. Upon afterwards driving off the excess of alcohol, an immediate crystallization of tetrabromide of ethylacetylene was obtained. Upon treating it a second time with alcohol or ether, a voluminous nacreous body was produced, formed of needles or of extremely light plates. It melted at from 113° C. to 115° C., and could not be distilled without being decomposed. Analysis gave the following percentages:—

	Theory.	Found.
C	12·84	13·2
H	1·60	1·9
Br	85·56	85·3

The composition of this bromide, its appearance and very characteristic properties, its fusing point in particular, showed that it was identical with the tetrabromide of crotonylene described by Caventou.*

This synthetical reaction establishes the constitution of crotonylene, which is no other than that of ethylacetylene ($C_2H_2 + C_2H_4$). It gives rise also to more extended generalizations. It is known that crotonic aldehyd and the acid of the same name ($C_4H_6O_2$) have been obtained by Kekulé in condensing together two molecules of ordinary aldehyd. This mode of formation assigns to crotonic aldehyd and crotonic acid a constitution similar to that of ethylacetylene. The same occurs in the labours of Cahours upon crotonic acid† and of Frankland upon the different isomers of that acid. The following formulæ will serve to indicate these relations:—

Ethylene.	$C_2H_2(H_2)$	Ethylacetylene (crotonylene)	$C_2H_2(C_2H_4)$
Aldehyd.	$C_2H_2(H_2)O$	Crotonic aldehyd	$C_2H_2(C_2H_4)O$
Acetic acid.	$C_2H_2(H_2)O_2$	Crotonic acid	$C_2H_2(C_2H_4)O_2$

It is probable that, conformable to these formulæ, ethylacetylene could be transformed into crotonic aldehyd by the same process of direct oxidation by which Berthelot has been enabled to convert free ethylene into ordinary aldehyd. Finally in this reproduction of crotonylene by synthesis we have a fresh instance of the concordance of the results obtained by pyrogenous synthesis with those yielded by the indirect methods which proceed at a low temperature.

* *Comptes Rendus*, vol. lvi., pp. 646 and 712.

† *Annales de Chimie et de Physique* [3], vol. lxvii., p. 137.

SOCIETY OF ARTS.

On the Energies of the Imponderables, with especial reference to the Measurement and Utilization of them.*

BY THE REV. ARTHUR RIGG, M.A.

Lecture II.

The Energy of Gravity, with especial reference to the Measurement of it.

The energy of gravity is one of the most silent and all-pervading of the energies of the imponderables. Although we may not be conscious of the fact, there need be no doubt that, were this energy to cease, we should be like those whom Milton describes as

> "Upwhirled aloft
> And sent transverse, ten thousand leagues awry,
> Into the devious air."

This calamity is averted by gravity putting forth that energy allotted to it by the Creator, and the work thus done enables us now to sit at ease, and gives us houses in which to dwell.

If, then, it be asked, where do we find this energy? we may say, "Look around." In this room gravity, inasmuch as we are at rest, produces but a static action; there is, however, a clock ticking, and there gravity is producing motion. The combined harmonious operations of the energies of gravity and vitality brought us together this evening. Thus it has been, ever since the creation of man; and yet there is good reason for the surmise that the energy of gravity, even if known, was little regarded in the earlier ages of the world. A history of observations on the energy of gravity, or even of traces of the recognition of this energy in these ages has yet to be written. Whether, by some of the early Greek writers, gravity was supposed to be a power innate, as a living principle—a spirit in every particle of matter; or whether this power had a residence at the centre of the earth; or whether it resided in an atmosphere surrounding each particle of matter; or whether Seneca, who lived about 38 A.D., was moved by a consideration of (to him) that mysterious principle we call gravity, to notice that the tides and the moon were somehow related, need not, this evening, concern us.

From the time of Seneca we may pass over more than fifteen hundred years, to the days of Galileo (A.D. 1600), who was perhaps the first person to notice that bodies in falling moved faster and faster. He attributed this to the effects of gravity, and considered that if he could retard speed whilst still permitting gravity to act, he might determine the law of increasing spaces in equal successive times. This he did by permitting a ball to roll down an inclined plane; friction on the plane caused the retardation, whilst gravity alone caused the motion. Thus he obtained the ratio of spaces in reference to succeeding times; but he made no attempt to measure the absolute spaces when a body fell freely.

Next to Galileo in order of time must be placed Kepler, a German astronomer, who, about 1615, in his search after certain astronomical relations, existing apparently through the mutual attraction of the planets each on the other, was led to surmises respecting the universality of the mutual influences of material bodies.

The succeeding fifty years present a blank in reference to inquiries or investigations respecting gravity. Then came Robert Hooke, who was at the same time a mathematician, an astronomer, and a mechanician. He was secretary to the Royal Society of England, and, from 1666 to 1674, seems to have frequently turned an inquiring mind to the nature of that influence which he thought he could observe to be exercised by the sun and earth upon others of the planetary system.

The great and now (1873) universally recognized law upon this subject was first laid down by observations and reasonings of Sir Isaac Newton, which, even at this day,

* Cantor Lecture, delivered February 10.

are regarded with an almost religious veneration by the advanced and intelligent men of every nation. Although it is said that Newton began in 1670 to form more clear conceptions of the law of gravitation than had been propounded by any of his predecessors, we must remember on what surmises he had to build.

Kepler, about 1615, and Robert Hooke, about 1666, had led Newton, so early as the above-named date (1670), to form these conceptions, and it is probable that he was confirmed and directed in his anticipation by the fact that Richer noticed, in 1672, that a pendulum conveyed from Paris (lat. 48 deg. 50 min. N., long. 2 deg. 20 min. E.) to Cayenne, in South America (lat. 4 deg. 56 min. N., long. 52 deg. 20 min. W.) did not vibrate in the same time. This recorded fact was as a demonstration to the mind of Newton of the deviation of the figure of the earth from perfect sphericity, and its oblateness or compression at the poles. It was not, however, until the publication of his 'Principia,' in 1687, that the law of gravitation was fully established and enunciated.

Briefly expressed, the law, as anticipated by others and propounded by Newton, is this—that the attraction of one planet upon another depends upon the masses (not upon the "weights") and distances of the two planets; not, however, is the law of increase or decrease such, that at one-half of a distance or double of any distance is the intensity of the attractive force doubled or halved. This might be a first impression. Astronomical facts refused to conform themselves to such a law. They rebelled. The parliament of planets had prescribed another code for the interrelationships of their mutual attractiveness, and although it might perhaps have been readily inferred that, as the distance between two attracting bodies was increased, the intensity of attraction would be decreased, yet the law of that decrease was the one which Sir Isaac Newton announced. It is this—that if there be two heavenly bodies, say the earth and the moon, and that these at a known distance are mutually exerting a certain attraction or drawing each to the other; then, if the distance be doubled, the influence will only be one-fourth of what it was. If the distance be trebled, then this influence will become one-ninth of what it was; if quadrupled, then one-sixteenth of what it was. Expressed in precise phraseology, the law of gravitation is that of the inverse square of the distances. Thus far satisfied the requirements of astronomers.

It is remarkable how much of the utilized information men possess has been derived from the observations of astronomers. The mechanism of the universe was known before Harvey discovered the circulation of the blood, or Watt constructed a steam-engine. The astronomers seem to have been the pioneers of every branch of human knowledge. The Old and the New Testaments open astronomically. "In the beginning God created the heaven and the earth." (Gen. i. 1.) "The wise men from the east came to Jerusalem, saying, where is He that is born King of the Jews? for we have seen His star in the east." (Matt. ii. 2.)

It must be remembered that the science of astronomy in one important respect differs from all other sciences. Astronomers are observers only—they ascertain causes by watching effects. They cannot interfere with or alter the causes in operation. They cannot make experiments. That man presumed too much upon the powers of his astronomical friend, who having invited him to bring some of his acquaintance to see an eclipse of the moon by the aid of a telescope, and arriving too late, assured those who accompanied him that the astronomer was not only a personal friend, but also a very kind-hearted man, and he did not doubt that the eclipse would be done again in order that they might see it. Yet upon these observers all experimenters erect their fabrics. The gigantic and uncontrollable phenomena, and all the laws of the universe of planets—of the ebb and flow of the tides, of meteorology, of terrestrial magnetism and its connection with the sun, are the results of observation. They could never have been known by experiment; indeed, we could not so interfere with them as to make an experiment. Remember, experiment is an interference on our parts, and a redirecting of energy into a new channel, in order that that may be observed which cannot otherwise be observed. Hence, if we wish to utilize observation it must be by the adaptation of an experiment in the presence of an observation—to contrive, in fact, a system of apparatus which may enable us to take observations and at the same time to so control the elements of an experiment as to bring them within the range of our means of observation.

Such combination of experiment and observation is to occupy much of our attention this evening, as on the records of these men—Cavendish, Atwood, Kater, Sabine, and Baily, especially Captain Henry Kater—is built our system of measures and weights; for to them we are indebted for what must constitute a court of final appeal, should the time ever come when our present standards being totally lost, it is essential to re-establish them.

The energy of gravity is peculiar, and differs from those other energies with which we are to be concerned, in that it seems inexhaustible—its power is not proportioned to the work it does. All other energies are in process of exhaustion by work when that work is measured by motion; not so gravity. Imagine a large ball, and a second small one, which gravitates towards it—the number of these small balls may be increased, and still the influence of gravity on each ball is as intense as though there was only one small ball; no exhaustion from work done affects the energy of gravity, and yet it seems not to have any power of recouping its expended energies. There is no elasticity about it—at least, none in the hands of men.

For example, we can, in food, avail ourselves of affinity, and so, through the agency of assimilation, revive the energies of an exhausting vitality. Electricity can, upon a system of relays, or upon its extraordinary property of induction, renew at a distance, not only its pristine vigour, but an energy many-fold greater than its original one. Light can have its intensity and purity restored by heat. Gravity remains in its solitariness. True, we believe that vitality, affinity, electricity, light, and heat are independent of, and beyond the influence of, gravity; yet, we know them not—we cannot bring them within the ken of our senses, except when they are associated with what owns the dull, dead, inert, and yet powerful influence of the energy of gravity. For all means yet employed have failed to develop or detect the presence of these imponderables in a *perfect vacuum*.

This fact seems to give support to the suggestion that the "potential energy of gravitation may be, in reality, the ultimate created antecedent of all motion, heat, and light at present existing in the universe."

The mode in which we estimate or measure gravity is peculiar. It is the only one of those energies with which this course of Cantor Lectures has to deal that tells its story upon a scale beam or spring balance. No concentrated rays of a tropical sun have ever caused an appreciable deviation of the most delicate balance; neither light nor heat imparted to a body *in vacuo* has ever required the fraction of a gramme to be added to the other scale-pan. But when gravity is concerned we cannot add the most minute microscopical molecule without having the equilibrium disturbed.

Gravity alone, of all the imponderables, rises up equal to the burden laid upon it. Its power seems to increase with the amount of matter involved or work to be done. The more required from it the more it does. You cannot overburden it. An avalanche of rocks or a gossamer thread are equally the playthings of gravity.

For the purpose of these Cantor Lectures, the law of gravitation which binds the planets in their courses is of little concern, unless we find that the same law binds the material elements with which we are concerned. The question whether the influence whose law Sir Isaac Newton so clearly propounded resulted from an unknown and ungovernable something, resident and centralized, as

it were, within the planets, or whether it was a property of every molecule or group of molecules, was not set at rest until Nevil Maskelyne, the Astronomer-Royal at Greenwich, went to Mount Schiehallien, in Perthshire, in 1774, to calculate the density of the earth.

The mountain of Schiehallien has very steep sides. Mr. Maskelyne suspended plumb-lines from two opposite and nearly vertical sides. Now, if those plumb-lines deviated from what one may call verticality, they would have been caused to deviate by the attraction of the mass of the mountain. Thus Maskelyne examined this—he had an instrument by means of which he could, by observations upon the stars, determine the exact direction that the plumb-line should take, and he found that the strings did not take that direction. Having done that on one vertical side of the mountain, he repeated the experiment on the other side, and found that the deviation there was opposite to that which it was on the first side.* Having determined that these strings no longer followed the vertical, he formed an estimate of how much this mountain attracted the plumb-bob at the end of the string, and so arrived at a conclusion that each particle of matter does attract every other particle. This was the first approximation to an estimate of that which forms a very important element in connection with other experiments. We may here state that in certain regulator clocks the makers put the single weight in the corner of the case, so that being removed to the greatest distance its influence upon the pendulum-bob, similar to that of Schiehallien upon the plumb-bob, may be the least possible.

This, then, established the fact that the power whose law Newton discovered was no gnome resident in some mysterious terrestrial centre, but was a property of every molecule of matter, and could not by any means or contrivance be separated from those molecules. Whether this property be within the molecule, or only in what may be called the atmosphere around the molecule, may be left to those who arrange theories.

Mr. Michael suggested to Cavendish an experiment which has ever since gone by the name of Cavendish's experiment, and from which was deduced the first pretty accurate calculation or actual measurement of the density of the earth. Cavendish, as you know, was a very wise man. It is said of him that "he was the richest wise man, and the wisest rich man, that the world ever saw." He left more than a million of money. He had also another quality which would be very desirable to cultivate in certain parts of this kingdom at the present time—he uttered fewer words than any other man who attained the same age is supposed to have done. He discovered many things, and, amongst others, he was the first to make an attempt at weighing the whole earth, and he weighed it with an accuracy which has only been confirmed in recent times.

(*To be continued.*)

* The deviation was noted by a zenith-sector, and after making the requisite corrections there was left an attraction which caused the two lines to be drawn together, so including an angle of 12 seconds due to the mountain.

Parliamentary and Law Proceedings.

Sudden Death of a Wholesale Druggist.

On Tuesday morning Mr. Carter held an inquiry at the Bull's Head Tavern, Barnes, touching the death of Mr. Benjamin Yates, aged 65, who was found dead in a first-class railway carriage at Barnes station on Saturday morning last. Deceased was a wholesale druggist, carrying on business at Southwark Street, Borough, his country residence being at Feltham. On Saturday he left Feltham by the 9·50 a.m. up train, apparently in his usual health. A Mr. Field entered the same carriage at Brentford, but noticed nothing particular about deceased till the train reached Chiswick, when another gentleman who there entered the train called his attention to deceased. The latter was leaning to one side, with his head resting on his hand. As he did not move when he was touched and spoken to, Mr. Field called for assistance at Barnes station, and Mr. Watts, the station-master, had the body taken into the waiting-room. A doctor was sent for, but on his arrival he found deceased quite dead. Some artificial teeth were found lying on the floor of the railway carriage near where deceased had sat, and it is supposed they had dropped from his mouth. Deceased's family physician, Dr. Kingsford, of Sunbury, stated that deceased, who had been under his care for 10 or 12 years, was liable to apoplectic fits, and, in his opinion, apoplexy was the cause of death. Ebenezer Gaywood, deceased's gardener, also stated that he had seen deceased fall down in the garden in a fit, and remain unconscious for some time. The jury returned as their verdict, "Found dead in a railway carriage at Barnes station."

A Chemist and Druggist Summoned for Sunday Trading.

At the Southwark police-court, Mr. Miles Doughty, chemist and druggist, of the Blackfriars Road, and several other tradesmen living in the parish of St. Saviour, were summoned, under the Lord's Day Act, for carrying on their trades and callings on Sunday morning, the 6th inst. Mr. Errington, the sanitary inspector, having proved the offences, Mr. Doughty, in defence, contended that he did not think the vestry had any authority to act as they had done. He did not keep open unnecessarily. The magistrate was of the same opinion, and thought it was for the general and public good that chemists should be open on Sundays. By their doing so they caused no obstruction, annoyance, or desecration of the day. Under those circumstances he dismissed the summons against him. *South London Press.*

Supposed Poisoning by Carbolic Acid.

An adjourned inquest, was held at Liverpool, on Saturday, July 19th, to inquire into the death of William Stringer, a bricklayer. It appeared that the deceased, who was a man of very intemperate habits, after being absent from home some days was found sitting in the yard, having got over the wall. He appeared to be in drink and was taken into the house; and some time afterwards, a doctor was sent for, but before his arrival, deceased was quite dead. A bruise was noticed on his forehead, as if from a fall. Since the inquest was opened on the 8th inst., a *post-mortem* examination of the body of the deceased had been made by Dr. O'Connor, of Everton, who stated that the stomach was empty, and exhibited signs of an irritant corrosive poison, probably carbolic acid. The injury to deceased's head was not sufficient to account for death, but from the general organic condition of the body he would not be surprised to have found the deceased dead at any time either from heart or brain disease. He believed, however, that an irritant poison, which he took to be carbolic acid, was present in the system, and that it had been the exciting cause of death. He considered the quantity of poison sufficient to account for death even in a healthy person. Dr. Brown, public analyst, had also examined the stomach and found the presence of carbolic acid sufficient to account for death. A bottle containing carbolic acid was found in the pocket of the coat which deceased wore at the time of his death, which it was stated had previously escaped notice. The coroner read an anonymous letter which he had received with reference to the case, reflecting on the character of the family of the deceased and accusing them of neglecting him both at the time of his death and previously. The inquiry, which occupied several hours, was again adjourned for a fortnight that further investigation might be made.—*Liverpool Albion.*

Prosecutions under the Adulteration Act.

Mixture of Chicory with Coffee.

At the Southwark Police Court, Mr. John Wright, grocer and tea dealer, 123, Great Suffolk Street, Borough, was on Monday summoned before Mr. Partridge by Mr. Edwards, the sanitary officer of St. George's, under the Adulteration Act, for unlawfully selling adulterated coffee. Mr. Birt, vestry clerk, prosecuted. It appeared from the evidence of Mr. Edwards that on the afternoon of the 5th he sent into defendant's shop for two ounces of chicory and a quarter of a pound of shilling coffee. He then took the packets back to the shop and told the defendant that he had purchased them for analysis. Witness afterwards placed them in the hands of Dr. Muter, the public analyst appointed by the Vestry. He now produced Dr. Muter's certificate, showing that the coffee was largely mixed with chicory. The defendant said it was well known they could not sell genuine coffee for 1*s.* a pound, and on the wrapper was printed, "This is a mixture of chicory." If he had asked for genuine coffee he would have had it. Mr. Partridge told him he was bound to tell his customers when they purchased the coffee whether it was mixed with chicory. There must be a conviction in this case, but, as he did not think that any fraud was intended, he should fine the defendant only 5*s.* and 4*s.* 6*d.* costs.

Mrs. Mary Jane Bell, grocer, 38, Tower Street, Westminster Road, was summoned under similar circumstances. Mr. Edwards purchased on the same day ¼lb. of 1*s.* coffee and 2oz. of chicory. The coffee was analysed by Dr. Muter, and found to be adulterated with chicory. Mr. Partridge fined her also 5*s.*, and 4*s.* 6*d.* costs.—*Times.*

PAPERS PRESENTED TO PARLIAMENT.

Adulteration of Food.

The following return of the number of analysts appointed under the provisions of "The Adulteration of Food Act, 1872," giving name and date of appointment in each county and borough or district of the United Kingdom has been made to the House of Commons, in compliance with an address voted April 3rd, on the motion of Lord Eustace Cecil :—

ENGLAND AND WALES (exclusive of the Metropolis.)

I.—Counties.

Bedford, Thomas Stevenson (31 Dec. 1872).
Berks, William Frederick Donkin (7 April, 1873).
Carnarvon, James Campbell Brown (9 April, 1873).
Chester, James Campbell Brown (26 Nov., 1872).
Denbigh, John Jones Bancroft (2 Jan., 1873).
Derby, Wentworth Lascelles Scott (8 April, 1873).
Essex, H. Letheby and C. M. Tidy (18 Feb., 1873).
Gloucester, John Horsley (31 Dec., 1872).
Hertford, H. Letheby and C. M. Tidy (31 Dec., 1872).
Lincoln (parts of Holland), G. May Lowe (6 Jan., 1873).
Lincoln (parts of Lindsey), G. May Lowe, 17 Oct., 1872).
Norfolk, Francis Sutton (10 April, 1873).
Nottingham, Edgar Beckit Truman (9 April, 1873).
Oxford, C. C. Pode and W. F. Donkin (7 April, 1873).
Salop, H. Johnson and T. P. Blunt (30 Dec., 1872).
Surrey, Thomas Stevenson, (28 Jan., 1873).
Warwick, Alfred Hill (8 April, 1873).

II.—Boroughs.

Bedford, Charles Edward Prior (15 Jan., 1873).
Birmingham, Alfred Hill (17 Dec., 1872).
Bolton, John Collins (15 Jan., 1873).
Gloucester, John Horsley (22 April, 1873).
Gravesend, James Henry Gramshaw (21 May, 1873).
Liverpool, James Campbell Brown (2 Oct., 1872).
Manchester, Charles Estcourt (5 Mar., 1873).
Sheffield, Alfred Henry Allen (17 June, 1873).
Wolverhampton, Edward W. Taylor Jones (1 Mar. 1873).

METROPOLIS.

City of London, Henry Letheby (23 May, 1873).

Vestries.

Paddington, William Hardwicke (4 Feb., 1873).
St. Giles, Camberwell, Albert J. Bernays (31 Jan., 1873).
St. George, Hanover Sq., W. H. Corfield (7 Nov., 1872).
St. George-the-Martyr, Southwark, John Muter (25 Jan., 1873).
St. James and St. John, Clerkenwell, Theophilus Redwood (8 May, 1873).
St. James, Westminster, E. Lankester (12 Dec., 1872).
St. Leonard, Shoreditch, T. Stevenson (8 April, 1873).
St. Luke, Chelsea, Andrew W. Barclay (18 March, 1873).
St. Luke, Middlesex, F. W. Pavey (5 Nov., 1872).
St. Mary, Islington, Charles M. Tidy (6 Dec., 1872).
St. Mary, Lambeth, John Muter (10 Oct., 1872).
St. Marylebone, John Whitmore (24 Jan., 1873).
St. Mary Magdalen, Bermondsey, John Muter (3 March, 1873).
St. Mary, Newington, John Muter (18 April, 1873).
St. Pancras, Thomas Stevenson (15 Jan., 1873).

District Boards.

Hackney, John William Tripe (3 March, 1873).
Holborn, Theophilus Redwood (8 May, 1873).
Lewisham, Charles Heisch (31 March, 1873).
Plumstead, George W. Wigner (16 May, 1873).
Poplar, William T. G. Woodforde (12 Nov., 1872).
St. Giles, Theophilus Redwood (8 May, 1873).
St. Olave, Southwark, James N. Vinen (18 April, 1873).
St. Saviour's, Robert Bianchi (10 Feb., 1873).
Wandsworth, John Muter (22 Jan., 1873).
Westminster, August Dupré (25 April, 1873).
Whitechapel, Charles Meymott Tidy (11 March, 1873).

IRELAND.

Queen's County, Charles Cameron, M.D., M.B., M.S. Dublin (6 March, 1873).

SCOTLAND.

Glasgow, T. E. Thorpe, F.R.S.E., F.C.S. (21 Jan., 1873).
Greenock, Thomas Law Patterson and Thomas Robertson Ogilvie (7 March, 1873).

Review.

Jahresbericht uber die Fortschritte der Chemie und verwandter Theile anderer Wissenschaften. Für 1870. Giessen. 1873.

The German report of the chemical work done in 1870 is at last out. Delayed by the war, and by the death of the late editor, Professor Engelbach, we receive it now two-and-a-half years after the date of the researches which it describes. It seems almost needless to remark how much the usefulness of such a work suffers when its publication is so long delayed. The present volumes cannot possibly serve as a hand-book to the student of to-day, they are merely valuable books of reference to a by-gone period of chemistry.

The plan of the German 'Jahresbericht' is excellent. The very fact that the whole year's work is before the writers when they begin their task enables them to classify the matter thoroughly, and to describe researches in relation to others on similar subjects, by which space is saved, and the subject elucidated. But the same cause which makes the perfect arrangement of the matter possible necessitates its late publication. A 'Jahresbericht' cannot be composed until the year which it reports is completed, and the production of so bulky a work necessarily occupies much time. The comparison of this plan with the monthly reports now publishing by the Chemical Society is at once suggested. In the case of this society's journal, the yearly volume presents none of the perfect arrangement which we find in the German 'Jahresbericht,' the volume is merely the monthly numbers bound together, but we have the more

than counterbalancing advantage of reports almost contemporaneous with the original papers. The subscribers to the Chemical Society's journal are, in fact, in possession of abstracts of nearly 3000 papers, all of later date than the most recent which appears in the 'Jahresbericht' now before us. The 'Jahresbericht' is a valuable book of reference; the *Journal of the Chemical Society* is a hand-book for the student, and keeps him acquainted with the present condition of science.

The present 'Jahresbericht' is not inferior to its predecessors. The abstracts have been prepared by nine gentlemen, well known as chemists and physicists, Professor Naumann acting as editor. As far as we have been able to judge, the work of abstracting seems well done. The whole forms three bulky volumes of over 1400 pages, and is provided with two copious indices and a classified table of contents. It will be quite unnecessary for us to refer to the matter here brought together, especially as the date of the papers is so far back; one thought is, however, naturally suggested by the appearance of these bulky volumes—it is the vast dimensions which research is gradually assuming. If the scientific results harvested in a year of such dire war as that of 1870 be so numerous, what shall we expect from the future?

BOOK RECEIVED.

On Marienbad Spa and the Diseases curable by its Waters and Baths. By A. V. Jagielski, M.D., etc. London: Trübner and Co. 1873. From the Publishers.

Obituary.

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

On the 17th July, 1873, of phthisis, Mr. Ernest James Tween Agnew, Pharmaceutical Chemist, of 520, New Oxford Street, London, aged 27. Mr. Agnew was a member of the Pharmaceutical Society and had several times contributed to the pages of this Journal.

Notes and Queries.

PREPARATIONS OF OLEATE OF MERCURY.

In addition to the formula of Ung. Hydrargyri Oleatis, published on p. 59 of last week's issue, the following formulæ, which occur in the Pharmacopœia of University College Hospital, recently published, may be of service to some of our readers:—

LINIMENTUM HYDRARGYRI OLEATIS.

(10 per cent.)

Precipitated Peroxide of Mercury .	1 drachm.
Oleic Acid	10 drachms.

To the oleic acid, kept agitated in a mortar, sprinkle in the peroxide gradually, and triturate the mixture frequently during twenty-four hours until the peroxide is dissolved and a viscid solution is formed.

The twenty per cent. preparation, of which the formula was given last week, is too concentrated for use without dilution. It is generally mixed with lard for use as an *ointment*. We believe that the strength of this *liniment* generally ordered by Professor Marshall is from five to ten per cent. of the oleate, and when its application causes pain, one grain of pure morphia is added to the drachm of either strength, as in the following formula:—

LINIMENTUM HYDRARGYRI OLEATIS CUM MORPHIA.

Morphia (pure alkaloid) . . .	10 grains.
Oleic Acid	5 drachms.

Dissolve and add

Liniment of Oleate of Mercury (10 per cent.)	5 drachms.

Mix.

Correspondence.

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

Dispensers.—Army Hospital Corps.

Sir,—I wish to say a few words on the subject of the advertisement which appeared in the columns of this Journal of the 7th inst. with regard to the army hospital corps.

Any one reading that advertisement would naturally be led to suppose that dispensers were required, and that their remuneration *as dispensers* was to be £60 per annum, exclusive of board, lodging, and clothes.

On applying for particulars, however, one receives a paper of regulations (copy of which I enclose), from which it appears that young men are wanted to enlist in the corps as privates—nothing whatever to do with dispensing; but simply as privates—at the pay of 1*s.* 2*d.* per diem. Then, having risen to the rank of sergeant at 2*s.* 4*d.* per diem, one is eligible, if qualified, for the office of compounder; receiving for the same 1*s.* per diem extra. So that the compounders pay of £18 5*s.* per annum, and the sergeant's pay of £42 2*s.* 8*d.* per annum make up that £60 which is advertised as the pay of dispensers.

So the advertisement is either a mistake, which charity would lead us to suppose; or else it is a mean device to get young men to enlist—such a device as an enlisting sergeant at the corner of the street would hardly stoop to put in practice against any of the loafers he endeavours to entrap.

From this point of view—and it appears to me to be the correct one—a direct insult has been offered to the whole profession by the authority or authorities who sanctioned the insertion of that advertisement in such a high class Journal as this.

Brighton. Indignans.

*** The following is the substance of the regulations referred to above:—

"*Army Hospital Corps.*

"The above corps is now open for the enlistment of a limited number of eligible young men, between the ages of 18 and 28 years, who should be intelligent and of a fair education. Height 5 ft. 5 in. and upwards.

"This corps offers good advantages to such young men as may join it, both as regards pay and promotion, and comprises the following ranks:—

Private,	at 1*s.* 2*d.* per diem	(exclusive of good-conduct pay).
2nd corporal,	1*s.* 5*d.*	,,
Corporal,	1*s.* 8*d.*	,,
Sergeant,	2*s.* 4*d.*	,,
Colour-sergeant,	3*s.* 4*d.*	,,
Sergeant-major,	4*s.* 4*d.*	,,

With a further allowance of 1*s.* per diem to sergeants, who, after having qualified themselves for the duties of clerks and compounders of medicines, are employed in either of those capacities.

"In addition to the above rates of pay, each soldier in the several ranks is provided with clothing and lodging, besides a good daily ration of bread, meat, potatoes, tea, and other articles of food, free of cost, and on the termination of a service of twenty-one years to a pension, which increases in ratio according to the rank he may hold at the time of his discharge.

"As the corps is allowed an unusually large number of non-commissioned officers on its establishment, increased facility is necessarily afforded to young men for rising in the profession, which will accordingly ensure to such as merit it by conduct, zeal, and efficiency, success and speedy advancement in the service.

"N.B.—Young men desirous of joining, or requiring further information, must in the first instance apply personally at the head-quarters of the army hospital corps, No. 6, Whitehall Yard, any day (Sunday excepted) between the hours of 10 a.m. and 4 p.m., and will be required to produce testimonials, etc., to character."

SUNDAY TRADING.

Sir,—As a Registered Chemist and Druggist can the District Board of Works compel me to close my shop after 10.30 a.m., for the remainder of the day—Sunday?

MILES DOUGHTY.

26 *and* 27, *Blackfriars Road, S.E.*

I herewith give you a copy of the two documents served upon me:—

ST. SAVIOUR'S DISTRICT BOARD OF WORKS.

Board Room:
Emerson Street, Bankside, Southwark, S.E.

SUNDAY TRADING.

Sir,—The attention of the St. Saviour's District Board of Works having been called to your violation of the Act of Parliament against Sunday trading, notwithstanding their notice upon the subject (a copy of which is enclosed), they have instructed me, upon a repetition of the offence by you, to cause a *summons* to be issued against you to enforce the penalty to which you will be liable.

Trusting you will spare me this painful duty,

I remain, Sir,

Your obedient servant,

HERBERT STURMY, Clerk.

[Document No. 2.]

ST. SAVIOUR'S DISTRICT BOARD OF WORKS.

SUNDAY TRADING.

The St. Saviour's District Board of Works hereby give notice that with a view to lessen, as far as possible, the increasing evils arising from Sunday trading, they have resolved that all shops and business premises throughout their district shall (except as otherwise provided by law) be closed and business stopped before half-past ten o'clock on Sunday mornings.

And notice is also hereby given that in all cases where this resolution is not complied with the Board intend to institute proceedings for the recovery of the penalties or forfeitures which by law are directed against Sunday trading.

By order of the Board,

HERBERT STURMY, Clerk.

Board Room and Offices:
3, *Emerson Street, Bankside, S.E.*
May 7th, 1873.

[*** As will be seen from the report at p. 77, Mr. Doughty has since been summoned before a magistrate, but the summons was eventually dismissed.—ED. PH. J.]

WARNING TO THE TRADE.

Sir,—I am induced to write you requesting the favour of your laying before your readers a case of the grossest rascality it has ever been my fortune to be the subject of during an experience of nearly forty years as a chemist and druggist in my native town.

I inserted an advertisement about a month since in the *Chemist and Druggist* for a trustworthy and experienced assistant; I received a reply almost immediately from one who stated he had served an apprenticeship with Messrs. Allnut and Son, Portsea, and had been in the trade more than twenty years; was a man of very sober, quiet, and domesticated habits, and, amongst other good things, he was a non-smoker, a churchman, and so forth. He referred me to a Mr. Henry Marshall, Chemist, 30, Old Kent Road, with whom he had just concluded a two years' engagement.

I wrote this Mr. Marshall, and received the most plausible answer to my inquiries I could possibly desire, indeed, so much so that I engaged the applicant forthwith, and initiated him into my business on Saturday, the 12th inst. On the following Monday I found him so drunk behind my counter between ten and eleven in the morning that I was obliged to order him out of my shop, and on his refusal to leave I gave him in charge of a police officer for drunkenness and disorderly behaviour. I subsequently received a telegram from London that the reference to Mr. Henry Marshall was an imposture, no such a person residing at the address given; and I also found the reply to my inquiries was written by the applicant himself. The magistrates thought the case so flagrant and disgraceful that they sentenced him to a week's hard labour in the county jail.

A CHEMIST AND DRUGGIST OF
FORTY YEARS' STANDING.

P. L. B.—We must refer you to a directory. We are unable to give information respecting fees of medical men.

"*County Associate.*"—The mixture is completely incompatible; it would be impossible to prevent the alkaloid quinia being precipitated as a resinous-like substance coating the sides of the bottle.

M.D.—We should suspect that English rhubarb had been used in the place of E. I., or that the latter had been adulterated with English in the course of powdering. The English contains much more mucilaginous matter, which would account for the gelatinous appearance of the mixture. We have noticed a similar appearance before. The fact of its being recently powdered would make no difference.

"*Dubitans.*"—The expression is an incorrect one. Possibly it is a mistake for "vegetable life."

Mr. Shaw is thanked for his enclosure.

"*An Associate.*"—Candidates for the Major examination after October 1, 1874, who have passed the Minor under the present regulations, will be examined under the new regulations.

"*Only a Student.*"—Your letter is not suited for publication.

J. Rees.—The widow of a chemist and druggist can, in virtue of being an executor, administrator, or trustee of the estate, and only in those capacities, continue to carry on her husband's business without being registered, provided the business be conducted by a pharmaceutical chemist or a registered chemist and druggist as assistant. In regard to the particular case you mention, we refer you to the Registrar.

T. B., Son and Co.—We think the words "prepared only by" would render the label liable to stamp duty. But we should advise you to apply to the Inland Revenue office, where you would obtain an authoritative decision of the question.

A. J. Hughes.—We believe that no such rating exists as a "dispenser on board ship," the dispensing being done probably by the medical officer.

"*Querist.*"—(1) Bentley's 'Manual of Botany' is published by Messrs. J. and A. Churchill. (2) 1849. (3) Yes.

Homœopathic Pilules.—Mr. J. Tirrel writes in reference to an abstract from the *Practitioner* which appeared under this heading in last week's issue of the PHARM. JOURNAL, that "any reliance that otherwise might have been placed in the result obtained is destroyed by the fact that pilules cannot be medicated with the second dilution of cupri sulph.," and that "a reference to the Homœopathic Pharmacopœia will show that the third is the lowest dilution obtainable in pilules."

"*Chemicus.*"—We believe that no such examination is compulsory at present. Particulars respecting the voluntary examination might be obtained by applying to the secretary of the Royal College of Surgeons.

W. C. A. and "*Pharmacy*" are referred to the regulations respecting anonymous communications.

"*Atlantic.*"—We do not know of such a practice.

W. Orme.—Snow or pounded ice, 2 parts; common salt, 1 part. Or, sulphate of soda, 8 parts; hydrochloric acid, 5 parts.

"*Cupiens.*"—You will best obtain the information sought by applying at the College of Surgeons.

"*Upsilon.*"—We are glad to be able to inform you that cases such as those referred to by you *are* relieved from the Benevolent Fund.

H. P.—A Latin Grammar and such practical experience as can only be obtained in the shop are all that is required to fit you for passing the Modified examination. But if you prefer the assistance of a book, try Lescher's 'Introduction to the Elements of Pharmacy.'

W. B. B.—(1) *Eryngium maritimum* (Umbelliferæ). (2) *Glaucium luteum* (Papaveraceæ).

The report of the meeting of the Nottingham and Notts Association was received too late for insertion this week.

COMMUNICATIONS, LETTERS, etc., have been received from Dr. De Vry, Mr. T. Garside, Mr. Oliver, Mr. Laird, M. P. S., A West End Chemist.

ON PAREIRA BRAVA.

BY DANIEL HANBURY.

The botanical origin of the various stems and roots known as *Pareira Brava* is extremely obscure. By most writers the drug is referred without question to *Cissampelos Pareira* Linn., a climbing plant of the order *Menispermaceæ* growing in the tropical regions of both the Old and New World.

Some years ago the difficulty of purchasing Pareira Brava of good quality in London induced me to seek a supply in the West Indies. I accordingly procured on behalf of the firm of which I was then a member, a quantity of the stems and roots of *Cissampelos Pareira* L., collected in Jamaica under the supervision of Mr. N. Wilson, director of the Bath Botanical Garden in that island. The first importation was accompanied by herbarium specimens of the plant, the examination of which removed all doubt as to its origin. I also obtained specimens of stems of *Cissampelos Pareira* similarly authenticated, from correspondents in Trinidad, Brazil and Ceylon.

From these materials it at once became evident that the long-accepted statement that Pareira Brava is derived from *Cissampelos Pareira* Linn. was erroneous.* In fact neither the stem nor the root of the plant at all resembles any of the forms of that drug I had ever met with in commerce.

What then is *true Pareira Brava?*—To answer this question we must look back to the early history of the drug.

The merit of having first given some account of Pareira Brava is usually conceded to the Dutch traveller Piso, who in his work *De Medicina Brasiliensi*, published in 1648, described a plant called by the Portuguese *Caapeba*, *Cipó de Cobras* or *Herva de Nossa Senhora*. Piso's figure is scarcely recognizable, but his description of the fruit as resembling the catkins of hop (*semen magnum coloris rosacei, e capsulis lupulo similibus prominens*) applies well enough to a *Cissampelos*, and in fact *C. glaberrima* St. Hil. is known under these Portuguese names in Southern Brazil at the present time. My friend Mr. J. Correa de Mello, of Campinas, Prov. S. Paulo, has been good enough to send me a specimen of this plant and of its root; and the latter I find to be wholly unlike any sort of Pareira Brava.

That Piso does not mention Pareira Brava was indeed remarked as long ago as 1710†; and it is only since the drug has been supposed to be derived from *Cissampelos* that authors have identified it with Piso's *Caapeba*.

Pareira Brava was certainly first brought to Europe by the Portuguese. It first attracted general attention in 1688, when Michel Amelot, Marquis de Gournay, a privy councillor of Louis XIV., and a very distinguished political personage, brought it with him from Lisbon whither he had been sent as ambassador by the French king. There can be no doubt that the drug was considered to possess extraordinary properties. Rouillé, the successor of Amelot in the Lisbon embassy, also took home with him to Paris some Pareira Brava; and in 1710 we find it claiming the notice of the French Academy,‡ who requested Etienne-François Geoffroy, Professor of Medicine and Pharmacy in the College of France, to investigate its virtues. Jean-Claude-Adrien Helvetius, a physician of great merit, who though a young man was consulted by Louis XIV. in his last days, and was afterwards attached to the court of Louis XV., tried the new drug still earlier,* and gave strong testimony in its favour.

Both Geoffroy and Helvetius were correspondents of Sir Hans Sloane, that diligent promoter of science whose immense collections gave origin to the British Museum,—and among the Sloanian MSS. I have found a letter of Helvetius† addressed in 1715 to Monsieur Duyvenvoorde, ambassador from the States General to George I., a portion of which I will here quote :—

"I am extreamly pleased s[r] that you have apply'd yor-
"self to me for my advice about the use of the *Pareira*
"*Brava* which has been recomended to you, because I can
"give you a very good account of it haveing been one of
"the first that introduced it in France. I have made
"abundance of lucky experiments about it which have
"made this medicine very well known to me, wherefore I
"assure you, you can do nothing better than to make
"tryall of it. . . The Pareira Brava is a root which
"comes to us from Brazil by the way of Lisbon, but
"which the war has rendred pretty scarce; however it is
"to be found among the good druggists and is sold [at]
"Paris for 40 livres the pound. 'Tis called in Brazill the
"Universall Medicine, and made use of there in all kinds
"of distempers. A Capuchin monk who came from
"thence told me he could not give it a greater character
"than by assuring me that in all their voyages they
"carried the gospell in one pockett and the Pareira Brava
"in another. . . ."

Helvetius recommended the finely-powdered root in five grain doses, to be taken in infusion warm like tea.

Petiver, apothecary of London, and secretary to the Royal Society, an active collector of objects of natural history of every kind, whose letters are also in the Sloanian collection, thus wrote, Dec. 11th, 1716, to Colonel Worsley, His Majesty's Envoy at Lisbon :—

". . . I am glad to hear ye Brasil ffleet is safely
"arrived, wch I hope has brought some materialls for my
"succeeding *Collectaneas*, and amongst them nothing can
"be more welcome than specimens of ye leaves and fruit
"of ye Ipecacuanha, Pareira Brava, Balsam Capevæ and
"ye true Brasile and Brasiletto woods, all which will be
"very acceptable discoveries. . . ."‡

The first author to give an account in print of Pareira Brava seems to be Pomet, whose *Histoire des Drogues* was completed in 1692.§ He describes the drug as then recently seen in Paris, and he figures the specimen given him by Tournefort.

Geoffroy, in his excellent *Tractatus de Materia Medica*,‖ a work he did not live to complete, calls the drug by its Brazilian name of *Butua*, or *Pareira Brava* of the Portuguese, and describes it as a root, woody, hard, contorted, externally of dark colour, rough, with many wrinkles, some long, some running round it transversely, like that of *Thymelæa* [*Daphne Gnidium* L.], internally of a dull, yellowish hue, knit

* This fact was first pointed out in the *Pharmacopœia of India*, 1868, p. 8, *note*.

† *Hist. de l'Acad. Royale des Sciences*, année 1710, 56.

‡ Id.

* Helvetius, *Traité des Maladies les plus fréquentes et des remèdes spécifiques pour les guérir*, Paris, 1703, 98.

† Sloane MS., No. 3340, p. 291.—The letter has already been published in *Phil. Trans*, No. 346, Nov. and Dec., 1715, p. 365.

‡ Sloane MS., 3340, p. 306.

§ As proved by the letters of approbation which precede it. But it was not published until 1694.

‖ Tom. II. (1741) 21.

together, as it were, with many woody fibres, so that when cut transversely it exhibits several concentric circles, intersected by numerous rays of fibres passing from the centre to the circumference ; inodorous, somewhat bitter, with a certain degree of sweetness like liquorice, as thick as the finger, or sometimes as a child's arm. He adds that the Brazilians and Portuguese most highly extol its virtues as a diuretic, lithontriptic, vulnerary, stomachic, cordial, and alexipharmic,* and, in fact, regard it as a complete panacea.

The question now arises—Can the drug which was introduced with so much of laudation be clearly identified ?

As already stated, Pomet has figured it, and his engraving is excellent. But Sloane has left us better materials. In his collection of materia medica, now in the British Museum, there are many well-preserved specimens of the drug obtained from different persons and at different periods, *and all of one kind;* and in his voluminous manuscript catalogues and his other papers, are entries throwing light on their origin.

The first notice I have found is a letter from Lisbon, dated October 17th 1699, addressed by Joseph Geston to John Ellis,† in which the writer says :—

"By order of my brother, Wm. Geston, I send you "here inclosed six sticks of *Pareira Brava*, or *Parra* "*Brava*. The use of it, I am informed, is in powder, "one scruple, and to the strongest patient one octave "[drachm] in Rhenish wine. . . . Its vertues are for "the stone, gravell, obstruction of the urine, and for the "colick,—a very excellent remedy."

Though this letter is not addressed to Sloane, nor is he mentioned in it, yet from its occurrence among his correspondence there can be no doubt that the specimens to which it relates were intended for him.

The entries in his manuscript catalogues, which are in his own handwriting, are these :—

"652. *Pareira Brava.*—From Brasile, pretended "to be good for the stone."

"4039. *Pareira Brava.*—A root used in the stone."

"6708. The *Pareira Brava*, of a brown colour, "from Brazil, said to be the best sort.—From Monsr. "Geoffroy."

"10471. Sevll. specimens of the *Pareira Brava*, "from Lisbon, accounted a great remedy in suppres- "sion of water and the stone,—according to Monsr. "Geoffroy, the *Ambitua* or *Butua* of Zanoni.—From "Dr. Fuller, Sevenoaks."

In 1866, I applied to my friend Theodor Peckolt, druggist, of Rio de Janeiro, then residing at Cantagallo in the same province, on the subject of Pareira Brava, in consequence of which I received from him specimens of two plants, the one marked *Butua* or *Pareira Brava legitima*, the other *Butinha* or *Pareira Brava miuda* (literally *small Pareira Brava*), together with a large dried entire plant of the former. The herbarium specimens of these plants presented no characters by which I could distinguish them as two species ; and Mr. Peckolt subsequently informed me that their difference consists chiefly *in habit*, and that the first or *legitimate* Pereira Brava is found in much drier situations than the small sort or *Pereira Brava miuda.*

I have also received specimens from my friend Mr. J. Correa de Mello of Campinas, marked *Parreira Brava pequena (small Pareira Brava)* or *Abuta pequena*, and others labelled *Leaves of the plant producing Pareira Brava*, all of which seem referable to Mr. Peckolt's plant. Mr. Correa de Mello has likewise sent me the dried root, and I have also received the root as supplied by a drug house of Rio de Janeiro.

Within the last few weeks two specimens of roots bearing some leaves, marked respectively *Pareira Brava, large leaf*, and *Pareira Brava, small leaf*, have been presented to the Pharmaceutical Society as well as to myself by Mr. G. B. Francis of the firm of Hearon, Squire, and Francis. Between these two sorts I fail to recognize any difference.

The roots of Mr. Peckolt's *Pareira Brava legitima*, those sent me by Mr. Correa de Mello, and those received from Mr. Francis, completely agree with Sloane's specimens, as well as with Pomet's figure.

As to the plant, I identify it with *Chondodendron** *tomentosum* of Ruiz et Pavon, with an authentic specimen of which in the herbarium of the British Museum I have compared it. It is the *Cocculus Chondodendron* of De Candolle (Prod. I. 98), and has been figured as *Cocculus(?)platyphylla* by Auguste de St. Hilaire,† and by Eichler,‡ as *Botryopsis platyphylla* Miers. It agrees well with the plate of *Cissampelos Abutua* in Vellozo's *Flora Fluminensis*§ with which Eichler doubtfully identifies it.

Chondodendron tomentosum has been found in various parts of Brazil where it is known as *Butua* and *Abutua.* Its raceme of large oval berries, exactly like a bunch of grapes, is another evidence that it is the plant which the old Portuguese colonists called *Pareira Brava* or *Wild Vine.*|| Neither the fruit nor the foliage of *Cissampelos Pareira* have anything about them suggestive of a grape vine.

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* Hill judiciously remarks that this is going too far in its praise, and yet omitting some of its real virtues. "It is "certainly a diuretic," says he, "of no inferior kind, and "has done great service in nephritic cases ; and in plurisies "and quinzies has been attended with more success than "almost any medicine we know of singly. In suppressions "of urine scarce anything is more efficacious or more in- "stantaneous in its effect, but it is folly to infer from this "that it will dissolve the stone. . . . In cases of ulce- "ration of the kidneys or bladder, when the urine is puru- "lent and voided with great difficulty, there is scarce any- "thing equal to this root as a remedy."—*Hist. of Mat. Med.* 1751. p. 600.

† Sloane MS., 4045, fol. 240.

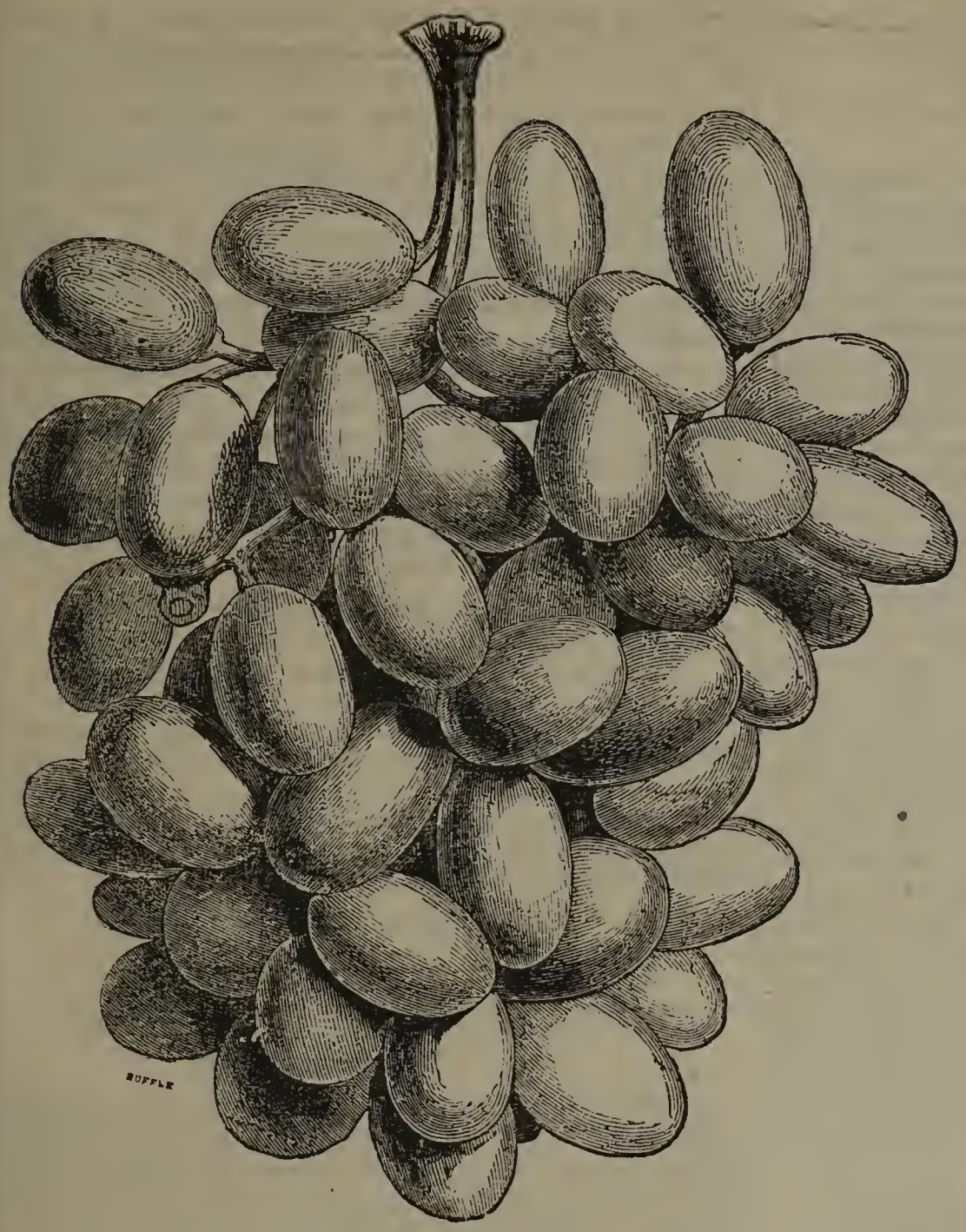
* Mr. Miers (*Contributions to Botany*, III., 307) contends for this name being written *Chondrodendron* as more in accordance with its derivation from χόνδρος. But I think it safer to retain the original spelling as accepted by all botanists.

† *Plantes Usuelles des Brasiliens*, pl. 42.

‡ Martius, *Flor. Bras.*, fasc. 38, tab. 48. Eichler makes *two* species under the name of *Botryopsis*, Miers *eight*, six of them being apparently forms of *Ch. tomentosum.* Mr. Miers's species, as named by himself, can be seen in the British Museum, and a type-specimen of the plant figured by Eichler in the Kew Herbarium.

§ Tom. X, tab. 140. Mr. Miers regards this to represent his *Abuta macrophylla*, a very different plant.

|| In Portuguese the word is written *Parreira*, and signifies a vine that grows against a wall or over an arbour. *Párra* is a vine-leaf.



BUNCH OF FRUITS OF *Chondodendron tomentosum*. R. ET P.*

(*To be continued.*)

THE PHARMACY OF THE UNITED STATES PHARMACOPŒIA.

BY WILLIAM MARTINDALE, F.C.S.,

Demonstrator of Materia Medica in University College, London.

(*Continued from page* 43.)

Pulveres.—Seven formulæ. *Pulveres effervescentes*—*syn.* soda powders—are official—thirty grains of soda and twenty-five grains of tartaric acid, in separate papers of different colours, and *pulveres effervescentes aperientes*, the well-known seidlitz powders, find a place ; these are in the proportions of those generally used, viz.—two drachms of the tartrate and forty grains of the bicarbonate in one paper, with thirty-five grains of acid in the other paper of a different colour. Hiera picra—*pulvis aloës et canellæ*—is also present. *Pulvis ipecacuanhæ compositus, pulvis jalapæ compositus* (without ginger), *pulvis rhei compositus, pulvis aromaticus* (our compound powder of cinnamon with nutmeg in addition), are all much the same as ours.

Resinæ.—Three formulæ. Those of jalap and may apple are prepared much in the same manner as the corresponding B. P. preparations ; that of scammony is prepared from the gum-resin only, the alternative process in the British Pharmacopœia—not from the root at all.

Spiritus.—Sixteen formulæ. Hoffman's anodyne, *spiritus ætheris compositus*, is official, it contains double the quantity of ethereal oil that the P. L. formula did ; a formula is given for the production of this oil also. *Spiritus ætheris nitrosi* is prepared by Dr. Redwood's process, but it is only half the strength of that of the British Pharmacopœia, and contains five per cent. of its peculiar ether. It is ordered to be preserved in well-stopped half-pint bottles, protected from the light, and that "it should not be long kept as it becomes acid by age."

Spiritus ammoniæ is ammoniated alcohol, made by passing ammonia gas into alcohol, sp. gr. 0·835, placed in a bottle which is surrounded by ice-cold water.

Spiritus ammoniæ aromaticus is prepared without distillation. The ingredients are the same as in the British Pharmacopœia preparation, with the addition of oil of lavender, but only half as much carbonate of ammonia is ordered, and even this converts such a quantity of the commercial carbonate into the normal carbonate in the preparation that by experiment I find at 50° F. some of the latter crystallizes out ; there is also much free ammonia gas present in solution. Provided pure carbonate and solution of ammonia be used—not easily procurable at present—there are great advantages in making this preparation by admixture rather than by distillation as, made by the latter process, it will always be of variable composition ; this to be the case with a preparation upon which often hangs the life of a patient is not creditable to pharmacy.

Spiritus menthæ piperitæ and *spiritus menthæ viridis*, synonymous with *essences*, are prepared by dissolving their oils in stronger alcohol and macerating with a little of the powdered herbs for twenty-four hours, to give them the green colour that some think requisite for them to have. *Spiritus limonis* is also made by dissolving the oil of lemon in stronger alcohol, and macerating with some of the freshly grated peel ; to this the synonym of *essence* of lemon is given, which, although perhaps correct, must lead to confusion, as the term essence of lemon is with us synonymous with the oil. *Spiritus lavandulæ compositus*, our compound tincture, retains its old name. *Spiritus chloroformi* is made by mixing one troy-ounce of chloroform with twelve fluidounces of diluted alcohol. *Spiritus juniperi compositus* resembles the P. L. preparation of that name. The other spirits are, like ours, solutions of volatile oil in stronger alcohol.

Succi.—Two formulæ.—Five measures of the expressed juice of the fresh leaves of conium mixed

* From a specimen preserved in alcohol, sent to me by Mr. Peckolt.

with one of alcohol, and after seven days filtered, forms the official *succus conii*. *Succus taraxaci* is prepared in the same manner from the root.

Suppositoria.—Nine formulæ. The following general formula is given :—

"Mix the medicinal portion with a small quantity of oil of theobroma, by rubbing them together, and add the mixture to the remainder of the oil of theobroma previously melted and cooled to the temperature of 95°. Then mix thoroughly without applying more heat, and immediately pour the mixture into suitable moulds, having the capacity of thirty grains each. The moulds previously made cold must be kept so by immersion in iced water. All difficulty in removing suppositories from the moulds may be obviated by having the moulds previously dusted with lycopodium. In the absence of suitable moulds suppositories may be formed by allowing the mixture, prepared as above, to cool, care being taken to keep the ingredients well mixed, and dividing it into parts, each of which shall weigh thirty grains, and may be made into a conical or other convenient form for a suppository."

Oil of theobroma is the basis, and the suppositories are made to weigh about thirty grains each. Why they are diluted with so much inert matter is not very evident ; with us fifteen grains is often thought to be too much, as it is found that this quantity is apt to soil the patient's linen. *Suppositoria acidi tannici* have five grains of tannin in each ; *suppositoria morphiæ* have half-a-grain of the sulphate of morphia in each ; *suppositoria opii* have one grain of the extract of opium in each, with water, q. s. ; *suppositoria plumbi* have three grains of the acetate of lead in each ; *suppositoria plumbi et opii* have three grains of the acetate and half-a-grain of extract of opium in each, with water, q. s. ; *suppositoria belladonnæ* have half a grain of alcoholic extract of belladonna leaves in each, with water, q. s.; *suppositoria aloës* have five grains of purified aloes in each ; *suppositoria assafœtidæ*—a fluidounce of tincture of assafœtidæ is evaporated to a thick syrup, and mixed with oil of theobroma to make twelve suppositories ; *suppositoria acidi carbolici* have one grain of carbolic acid in each, with water, q. s., to liquefy it—the acid would mix better with the oil of theobroma *without* the addition of water.

Syrupi.—Twenty-three formulæ. *Syrupus* consists of thirty-six troyounces of sugar, and nineteen fluidounces of water, it is, therefore, slightly weaker than ours. *Syr. ipecacuanhæ, syr. rhei* and *syr. rubi* are made by mixing the fluid extracts of these drugs with simple syrup. That of krameria may also be prepared in the same way, or an alternative process is given by percolating the powdered root with water, concentrating by evaporation and adding sugar. *Syrupus zingiberis* is made from the fluid extract by mixing this with carbonate of magnesia and sugar, then with water, dissolving and filtering, adding more sugar, and lastly straining while hot. *Syrupus tolutanus* is prepared in a similar way from the tincture of tolu.

Syrupus acidi citrici is flavoured with oil of lemon.

Syrupus alii (syrup of garlic).—Diluted acetic acid is macerated four days with the bruised garlic, the liquor pressed out, filtered, the sugar added, and converted into a syrup without the aid of heat.

Syrupus amygdalæ.—A strong emulsion is made with a portion of the sugar, water, and one part of bitter and three of sweet almonds blanched, and the remainder of the sugar is dissolved in the emulsion by the aid of heat. The utility of this preparation is doubtful, as it will not keep a week, and there is an emulsion official. *Syrupus corticis aurantii* is made from an alcoholic tincture prepared by percolation : the tincture is evaporated to a small bulk, mixed with carbonate of magnesia and sugar, and treated in the same way as syrup of ginger ; in making this and some other syrups I think the game is not worth the candle. In making *Syrupus lactucarii* and *Syrupus rosæ Gallicæ*, tinctures of the lactucarium and rose petals (dried) are made by percolation with diluted alcohol, and these are concentrated and mixed with sugar or syrup. *Syrupus ferri iodidi* is half as strong again as ours ; it is directed to be kept in two-ounce well-stopped vials. *Syrupus limonis* is prepared with sugar and equal parts of lemon juice and water, *sine* the peel. *Syrupus Aurantii Florum* is made with sugar and orange-flower water without dilution. Syrup of Wild Cherry is frequently prescribed in England. The following is the formula for it :—

"*Syrupus Pruni Virginianæ.*

Take of Wild Cherry in coarse powder, five troyounces ;
Sugar, in coarse powder, twenty-eight troy-ounces ;
Water, a sufficient quantity.

Moisten the Wild Cherry thoroughly with water, and allow it to stand for twenty-four hours in a close vessel ; then pack it firmly in a glass percolator, and gradually pour water upon it until a pint of filtered liquid is obtained To this, transferred to a bottle, add the sugar, and agitate occasionally until it is dissolved."

(*To be continued.*)

ETHEREAL TINCTURE OF IODOFORM.*

BY MM. ODIN AND LEYMARIE.

At the request of Dr. Gubler, who uses an ethereal solution of iodoform as a topical application, the authors sought to ascertain the most favourable conditions for its preparation, and to determine the relative proportions in which the iodoform is soluble.

(1.) A solution prepared in a flask of white glass after a little time became discoloured ; the canary yellow passed to an amber, and then brown colour. This change was the result of the liberation of a portion of the iodine, which coloured starch paper blue.

(2.) When iodoform previously pulverized was used, the solution, exposed to diffused light, altered much more quickly than the first.

(3.) When two ethereal solutions were made simultaneously, the one with crystallized iodoform, the other with powdered iodoform, and using red glass bottles, the first preserved its yellow tint, the second assumed a brown colour after a few days.

Solubility.—Experiments were made with pure ether of 65° Baumé (sp. gr. ·724), and also with ethers of 62° and 56°, the temperature being 13° C. Eight grams of tincture obtained with these ethers contained iodoform in solution respectively to the following extent :—

Ether of	65°	Baumé	1·61 grams.
„	62°	„	1·26 „
„	56°	„	1·13 „

The iodine being equal in the first case to 25·195 per cent. of the ether ; in the second to 18·694 per cent., and in the third to 16·044 per cent., or in round numbers, at 65° B., one-fourth ; at 62° B., one-fifth, and at 56° B., one-sixth,

The conclusions drawn by the authors from the foregoing experiments are—

* *Répertoire de Pharmacie*, June 25, p. 350.

(1.) To employ iodoform in the crystalline state.
(2.) To make the solution in a *red* glass flask by simple agitation.
(3.) To use the following proportions :—

Crystallized Iodoform	1 gram.
Ether (60° Baumé)	4 grams.

A METHOD OF DETERMINING THE SPECIFIC GRAVITY OF LIQUIDS WITH EASE AND GREAT EXACTNESS.*

BY HERMANN SPRENGEL, PH. D.

The *Laboratory* for 1867 (p. 191) contains a paper on Specific Gravity, by Matthiesen and Hockin, in which the use of a small pipette is recommended in place of the specific-gravity bottle, when only a few centigrams of liquid are at the operator's disposal. I also had independently, for a number of years, availed myself under all circumstances of pipette-shaped vessels in preference to the usual specific-gravity bottle. But our instruments, and our way of using them, differ sufficiently to justify me in giving a short description of my method.

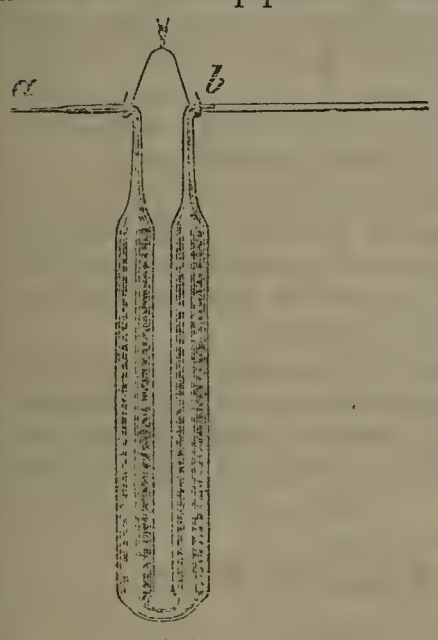


Fig. 1.

The form of my instrument, as shown in Figure 1. is that of an elongated U-tube, the open ends of which terminate in two capillary tubes, which are bent at right angles in opposite directions. The size and weight of this instrument should be adapted to the size and capability of the balance, in which it is to be weighed. As our usual balances indicate $\frac{1}{10}$ milligram when loaded with 50 grams, the U-tube, when charged with the liquid, should not be heavier (1000 grains = 64,799 grams). The instrument which served for my determinations, mentioned below, had a length of 17·7 cm. (7 inches), and was made of a glass tube, the outer diameter of which was 11 mm. ($\frac{7}{16}$ of an inch). It hardly need be mentioned that the U-shape is adopted for the sake of presenting a large surface, and so rendering the instrument sensitive to changes of temperature. The point, however, which I wish to notice more particularly (for reasons explained below) is the different calibre of the two capillary tubes. The shorter one is a good deal narrower (at least towards the end) than the longer one, the inner diameter of which is about $\frac{1}{2}$ mm. The horizontal part of this wider tube is marked *near* the bend with a delicate line (*b*). This line and the extremity of the opposite capillary tube (*a*) are the marks which limit the volume of the liquid to be weighed.

The filling of the instrument is easily effected by suction, provided that the little bulb apparatus (as represented in Figure 2) has previously been attached to the *narrow* capillary tube by means of a perforated stopper, *i.e.* a bit of an india-rubber tube, tightly fitting the conical tubulus of the bulb. On dipping the *wider* and longer capillary tube into a liquid, suction applied to the open end of the india-rubber tube will produce a partial vacuum in the aparatus, causing the liquid to enter the U-tube. As this partial vacuum maintains itself for some time (on account of the bulb, which acts as an air-chamber), it is not necessary to continue the suction, if the end of the india-rubber tube be timely closed by compression between the fingers. When bulb and U-tube have about equal capacity, it is hardly necessary during the filling to repeat the exhaustion more than once. Without such a bulb, the filling of the U-tube through these fine capillary tubes is found somewhat tiresome. The emptying of the U-tube is effected by reversing the action and so compressing the air.

After the U-tube has been filled it is detached from the bulb, placed in water of the standard temperature almost up to the bends in the capillary tubes, left there until it has assumed this temperature, and, after a careful adjustment of the volume, it is taken out, dried, and weighed.

Particular care must be taken to ensure the correctness of the standard temperature, for (as I shall show below) a mistake of 0·1° causes the weight of 10 c.c. of water to be estimated either too high or too low by 0·14 milligram, giving rise to an error in the 5th decimal, or making 100000 parts 100001·4 parts. Those determinations have been made in Dupré's apparatus, which, when furnished with a sensitive thermometer, allows the fluctuations of temperature to be fixed within the limits of 0·01°. If many determinations had to be made I should avail myself of Scheibler's (*Zeitschrift für analytische Chemie*, vol. vii, p. 88, 1868) electro-magnetic regulator for maintaining a constant temperature.

A peculiar feature of my instrument is the ease and precision with which the measurement of the liquid can be adjusted at the moment it has taken the standard temperature ; for it will be found that the liquid expands and contracts only in the wider capillary tube, viz., in the direction of the least resistance. The narrow capillary tube remains always completely filled. Supposing the liquid reaches beyond the mark *b*, it may be reduced through capillary force by touching the point *a* with a little roll of filter-paper. Supposing, however, that in so doing too much liquid is abstracted, capillary force will redress the fault, if point *a* be touched with a drop of the liquid under examination ; for this gentle force acts instantly through the whole mass of the liquid, causing it to move forward again to or beyond the mark.

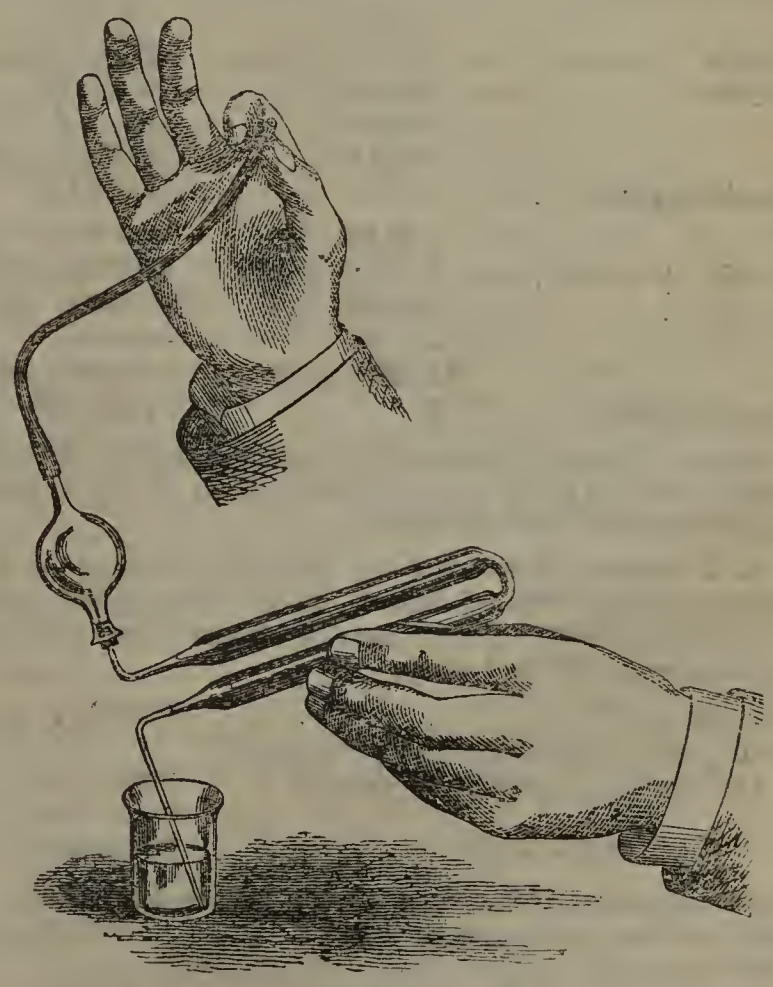


Fig. 2.

As the instrument itself possesses the properties of a delicate thermometer, the time when it has reached the standard temperature of the bath may be learned from the stability of the thread of liquid inside the wider capillary tube. The length of this thread remains constant after the lapse of about *five minutes*.

In wiping the instrument (after its removal from the

* Paper read before the Chemical Society; reprinted from *Journ. Chem. Soc.* [2], xi. 577.

bath) care should be taken not to touch point *a*, as capillarity might extract some of the liquid; otherwise the handling of the instrument requires no especial precaution.

The capillary tubes need not be closed for the purpose of arresting evaporation, at least that of water. I have learned from the mean of several determinations that the error arising from this source amounts in one hour to $\frac{1}{20}$ milligram.

In cases where the temperature of the balance-room is high and the expansion-coefficient of the liquid to be examined is considerable, it may be found necessary to put a small cap (bead-shaped and open at both ends) over the extremity of the *wider* capillary tube, for the purpose of retaining the liquid, which during the time of weighing might otherwise be lost, owing to its expansion. Raising the standard temperature of the bath is another way of meeting this inconvenience. When a cap is used, the wider capillary tube need not be longer than the narrow one.*

The nicety attainable by this method is very satisfactory. As a proof of this I beg to draw attention to the following two examples :—

1. Six weighings in succession were made of the same sample of distilled water, measured three times at 16°, three times at 15°. The instrument was filled and emptied three times, while Dupré's bath was raised and lowered to the desired temperature six times in succession. The weighings were noted down after the instrument had hung inside the balance-case for ten minutes. No counterpoise was used in the shape of another similar U-tube. The results were these :—

	At 16°.		At 15°.
U-tube + water . =	41·9648 gram.		41·9675 gram.
U-tube . . . . =	23·3332 „		23·3332 „
	18·6316 gram.	:	18·6343 „
Specific gravity. .	1	:	1·000145
	At 16°.		At 15°.
U-tube + water . =	41·9648 gram.		41·96735 gram.
U-tube . . . . =	23·3332 „		23·33320 „
	18·6316	:	18·63425 gram.
Specific gravity .	1	:	1·000143
	At 16°.		At 15°.
U-tube + water . =	41·9648 gram.		41·9674 gram.
U-tube . . . . =	23·3332 „		23·3332 „
	18·6316 gram.	:	18·6342 gram.
Specific gravity .	1	:	1·000140

NOTE.—This table shows that the instrument is obviously applicable also to the exact determination of the apparent expansion-coefficient of liquids.

2. A sample of water taken from the Houses of Parliament on the 29th of March, 1873, as supplied by the Government Water Works near Trafalgar Square from an artesian well 380 feet deep,

showed at 15°	1·000794 sp. gr.
while, after being boiled for $\frac{3}{4}$ hour under the usual precautions, it showed . .	1·000711 „
Difference	0·000083

On evaporating 100 grams of the water (unboiled), the solid residue was found to weigh . . . . 0·0835 gram,
while the solid residue from 100 grams of water (boiled and filtered) weighed . . . 0·0775 „
Difference . . . . . 0·0060 gram.

This water, although it contains a considerable amount of mineral matter, was chosen on account of its softness, for, by Clarke's test, its degree of hardness (unboiled) was . . . . . 5·3
(boiled) . . . . . 0·75
Difference . . . . . 4·55

These data suffice to prove that the well known precipitation of carbonate of lime through boiling (in this case 4·55 grains per gallon) was the main cause of lowering the specific gravity of the water after boiling. As we have learned from example No. 1 that reliance may be placed on the correctness of the 5th decimal, the quantity of matter (with reference to the above difference 0·000083, which became insoluble might have been eight times less before its absence ceased to be indicated by such specific gravity determinations. Now the 8th part of 0·006 gram is 0·00075 gram, and represents the difference which refers to the solid residue from 100 grams of water. In other words, if we dissolve in 10,000,000 parts 75 parts, or in 1 litre of water 7·5 milligrams, or in 1 gallon about $\frac{1}{2}$ grain of mineral matter (such as carbonate of lime), its presence in the water can thus be ascertained quantitatively.

If the varying constituents dissolved in natural waters influenced the specific gravity of water to a like degree, the above method would give the readiest means for determining the amount of matter in solution, but an approximation only can thus be obtained.

When, however, a solution contains only one unknown constituent, the relative proportion between this constituent and its solvent can, by means of this simple and quick analytical operation, be ascertained with all the accuracy needed.

* The instrument may be obtained from E. Cetti and Co., 11, Brooke Street, Holborn, London.

ANALYSIS OF THE BRAZIL NUT.*

(*Bertholletia excelsa.*)

BY B. CORENWINDER.

The *Bertholletia excelsa*, which belongs to Schomburgk's section Lecythideæ of the natural order Myrtaceæ, was first described by Humboldt in his work, 'Des Plantes Équinoxiales.' This gigantic and majestic tree presents in its fruit,—a kind of rounded pericarp of thick wood which contains triangular seeds,—a most remarkable example of the power of organic force. It grows abundantly on the banks of the Orinoco, and in Brazil, attaining a height of 33 metres (108 feet) and even more. Its trunk is straight, cylindrical, and about 9 decimetres in diameter; the leaves as well as the branches are alternate. The fruit is a spherical nut about the size of a child's head, divided internally into four cells each containing several seeds. These number from six to eight in each division and are monospermous, obtusely triangular in shape, tuberculate and of a cinnamon colour. The pericarp, which is hard and woody, contains an oily kernel, which when fresh has an exquisite flavour but quickly turns rancid. The fruit has hitherto presented little of interest in an economic point of view, but the author was led to analyse it during some researches upon oleaginous seeds.

The study of the reproductive organs of vegetable life is full of charms for the chemist who has a love for nature. Just as the milk of mammals,—composed of casein, sugar, butter, albumen and phosphates,—is the type of animal alimentary matter, so in fruits, in seeds, nature has condensed the immediate principles which by germination undergo modifications rendering them soluble. They constitute then a vegetable milk which contains oil, sugar, nitrogenous substances and the phosphorus necessary to stimulate and maintain the life of the plant. These principles are found in all seeds, but in varying proportions; though doubtless there reigns a harmony and concordance between these proportions and the medium in which the young plant is born and developed.

* *Journ. Pharm. Chim.* [4], xviii., 14; from the *Mémoires de la Société des Sciences de Lille.*

The elements which constitute the seed have probably special destinations. M. Corenwinder thinks that the oil supplies, by its combustion, the initial heat necessary for the excitation of life and supports his hypothesis by the fact that in maize grains, amongst others, the oil is contained in cells which immediately surround the embryo. When favourable circumstances, such as humidity and warmth, provoke the first symptoms of germination, the tissues swell, the fatty matter burns slowly, absorbing oxygen and disengaging carbonic acid; and the vegetable fœtus, excited by a gentle heat, commences to grow. In a later phase of the phenomenon the starch of the perisperm is transformed into sugar; the nitrogenous materials and phosphates present are dissolved in the weak acid which is developed by chemical action and the milk of the young plant is constituted.

The experiments of the author were made with nuts in a fresh state, to which he attributes the following composition as representing the kernels in the normal state :—

Water.	8·00
Oil.	65·60
Nitrogenous matters.	15·31
Non-nitrogenous organic matters . . .	7·39
Phosphoric acid. . . 1·35 / Lime, potash, silica, etc. 2·35	3·70
	100·00

These figures compared with the following composition attributed to the ground nut (*Arachis hypogœa*) by the author show that in the seeds of the *Bertholletia excelsa* there is a larger proportion of oil, but the nitrogenous matter is less abundant.

Analysis of Ground Nut.

Water.	6·76
Oil.	51·75
Nitrogenous matter	21·80
Non-nitrogenous organic matter containing starch	17·66
Phosphoric acid. . . . . 0·64 / Potash, chlorine, magnesia, etc. 1·39 .	2·03
	100·00

The proportions of phosphoric acid found in the perfectly white ash of these two nuts were as follows :—

Brazil nut	36·54 per cent.
Ground nut	31·53 „

In Brazil and Guiana an excellent edible oil is extracted from the fresh Brazil nut; it is possible however that the facility with which these nuts turn rancid has helped to deter European manufacturers from attempting to utilize them for such a purpose. But even if it were not possible to procure supplies of the nuts sufficiently fresh for the purpose in Europe, the author considers an oil might be obtained from this source suitable for the manufacture of soaps and other industrial purposes; while the oil-cake might be advantageously used as manure or perhaps even as a food for cattle.

EXPORT OF SALTPETRE FROM PERU.

A law relating to the taxation of exports has been published in Peru, which, in respect to saltpetre, contains the following articles :—1. In the exportation of saltpetre 50 per cent. will be charged on the difference between the cost price and the market value, which is to be decided by a commission appointed for the purpose.—2. In the exportation of the raw material (*caliché*) a duty of 25 cents. will be recovered on every 100 lbs.—3. The Government is to adopt any means that may suit to collect this duty. The law, however, with regard to article 1, providing for the charge of 50 per cent. on the profits, has been altered by establishing the production of the saltpetre as a Government monopoly, the State paying two soles and 40 cents (or about 12*s.*) per quintal (100 lbs.) to the producers, and reserving to itself the privilege of fixing a market price to purchasers of the article. The Peruvian government is evidently aware now that the whole realizable amount of guano cannot be calculated at over 3,000,000 of tons, nitrate of soda must become more valuable in the English markets. A proposition has also been made to have the nitrate sold at the markets of Iquique and Lima. Such a monopoly, however, it is stated by good authorities, is not likely to stand before the increasing export of the like material from the republic of Bolivia; and a hope is also entertained of new discoveries in the extensive desert of Atacama, which joins Chili to Bolivia and Peru. The reports of the exports of saltpetre from Iquique show a marked increase during the past two years; the largest quantity of the articles appears to be taken by England. The increase in the trade is considerable. According to a comparative statement of the exports of saltpetre from Iquique for the first six months in the years 1870, 1871, and 1872, we get the following results :—to England, 1870, 299,663 quintals; 1871, 382,698 quintals; 1872, 260,385 quintals; to France, 1870, 168,172 quintals; 1871, 24,443 quintals; 1872, 29,000 quintals. The total exports during these periods were as follows :—1870, 1,415,916 quintals; 1871, 1,542,882 quintals; and 1872, 2,221,540 quintals. The immense increase in the first six months of last year will thus be perceived.

RECENT EXPERIMENTS ON OLD AND NEW ALKALOIDS OF OPIUM.

BY A. GUBLER.

(*Concluded from p.* 28.)

The beautiful researches of M. Cl. Bernard on the alkaloids of opium have opened new ways to clinicians and experimenters. As is known, he has been induced to range the active principles of opium in three series, according to their soporific, convulsive, or toxical action. But what is most interesting, as regards applications in medicine, is that *narceine*, formerly neglected, has now come to be regarded as a valuable means of procuring deep and calm sleep, free from the disturbance generally attendant on opiaceous narcotism.

But if the hypnotic action of narceine be indubitable, it is yet evident that this alkaloid does not show in man the power it has with several lower animal species.

The observations of MM. Behier, Bouchardat, and others, leave no doubt upon this point, and I have come to value the hypnotic power of narceine at a fourth, or a fifth only, of that of morphine.

This inferiority is the more regrettable in practice, since narceine, less abundant in opium, is necessarily much dearer than morphine. Hence the employment of it has not become general. M. Liné has noted a more considerable diminution of diuresis from narceine than from morphine, and this has been verified in England by Dr. Harley, who has besides found the tubuli of the kidneys charged with crystals of narceine, to which circumstance may probably be attributed the symptom mentioned, while excessive doses of narceine may produce an irritation of the urinary glands, or, in other words, catarrhal nephritis.

While this alkaloid stupefies the encephalon, it at the same time influences the sensory nerves, and from this double action results a notable degree of analgesia. Dr. Petrini has especially insisted on this property, and he also attributes to narceine anti-emetic properties superior to those of hydrochlorate of morphine.

One experimenter only, M. Bouchut, refuses to this alkaloid all therapeutical value. He declares that, administered to children in the relatively large dose of ten centigrammes, and even (an incredible thing) seventy-five centigrammes, it continues absolutely inert. A result so paradoxical cannot be explained simply by the administration of the medicine in pilular form, as M. Rabuteau thinks it must be supposed that the chemical substance was of bad quality, or that the young subjects experimented on did not have it really ingested.

The hypnotic virtues of *codeine* have been justly called in question by Schroff, who observed in the rapidly efficacious doses of 10 centigrammes merely the power of provoking nausea, with marked retardation of the pulse. Using a dose of 6 centigrammes with children, M. Bouchut obtained no hypnotic effect, and a dose of 30 centigrammes did not produce more than a slight depression, moisture, and pupillary contraction. These results, partly confirmed by M. Rabuteau, did not surprise me, as I had long since been struck with the weakness of codeine, and perceived it had a slight narcotic or hypnotic and anodyne action more transient than that of other alkaloids (morphine, narceine), and with which one ought not to be contented, except in the less serious cases, or in treating subjects of excessive impressibility for opiaceous preparations.

Narcotine, to which M. Cl. Bernard assigns only convulsive properties, has not shown any soothing or hypnotic virtue, in the recent experiments made by MM. Bouchut and Rabuteau.

According to the same experimenters, *meconine* or *opianine*, in the large dose of 20, and even up to 50, centigrammes, was inert or very nearly so. But here some reserve is necessary, in view of the observations of Dr. Harley, who attributes to this alkaloid, though in small measure, the soothing and soporific qualities of morphine. The opportunity for meconine, therefore, as for codeine, would be with susceptible subjects, and especially with young children, if it were not subject to the inconvenience of being ill-absorbed by the stomach, and requiring hypodermic injection.

A good deal has lately been said about *papaverine*, ranked by M. Cl. Bernard among the convulsive alkaloids above thebaine and codeine. The German observers, Leidersdorff and Breslauer, supported by Baxt and Stark, have opposed the eminent French physiologist, holding that papaverine is purely sedative and produces sleep, with pupillary contraction, retardation of the pulse, and depression of strength. They point out, also, in its action, a slowness of manifestation (after four to seven hours) and a duration (reaching to 24 or even 48 hours) which would make it an agent preferable to opium and to morphine in a large number of circumstances. They, therefore, recommend this alkaloid as a palliative of insomnia, and of over excitement in mania and other forms of insanity.

One of their fellow-countrymen, K. B. Hoffmann, has sought to dissipate these illusions which first experiments have originated. Experimenting on himself, he took, during three consecutive days, 12, 24, and 36 centigrammes successively, of hydrochlorate of papaverine, without procuring either muscular relaxation, or hypnotism, or any effect whatever on the respiration, the pulse, the temperature, or the urinary secretion. On the other hand, he suffered from frontal headache, epigastric uneasiness, and a troublesome hiccough.

These results agree, at least the negative portion, with those of M. Bouchut, who administered 1 gramme of papaverine to a child 14 years old, without remarking any functional modification, or phenomenon imputable to this alkaloid. Indeed, M. Rabuteau thinks papaverine favours the anæsthetic action of chloroform; which would imply, on his part, the ascertainment of a certain degree of stupefying action, but the opinion being based on only one experiment wrought on a dog, does not afford much valid support to the view expressed by Leidendorff and the partisans of papaverine.

Thebaine or *paramorphine* has lately been studied in two theses, one by Dr. Couloma, at Montpellier, the other by Dr. Mihran, a student of the Paris School. It has also, previously, engaged the attention of several physiologists, (Harley, Vulpian, Müller, Falck, etc.) the results being, on the whole, confirmatory of those of Magendie and of M. Cl. Bernard, and demonstrating the tetanising action of this alkaloid, which Falck does not hesitate to place by the side of brucine.

In its toxical action we may distinguish three phases: 1. a period prodromic, or of excitation; 2. a period convulsive, tetanic; 3. a period of collapse or paralysis.

Like the alkaloids of *Strychnos*, thebaine seems to excite the medullary centre, and, when it happens to produce tetaniform convulsions, it appears to give rise at the same time to all the symptoms characterizing the convulsive paroxysms of pathological or artificial tetanus. At least I observed elevation of temperature, and increase of secretions; but it is impossible for me to affirm that the sudoral secretion is augmented, as it is in tetanic paroxysms, for the experiments were generally made on frogs and dogs, which do not perspire. But the mechanism of death by arrest of the respiratory movements, and asphyxia (Harley), as also the lesions found on autopsy, are essential features in the similitude I seek to establish. Dr. Harley points out the absence of crepitation, and the fœtal state of the lungs. M. Rabuteau, in his turn, has found the lungs, the coats of the brain, and the liver, hyperæmic, and often charged with ecchymoses, exactly as in the case of tetanus or of strychnism.

This similarity of action between thebaine and strychnine or brucine being admitted, I can scarcely suppose that the alkaloid of opium is far removed from its powerful congeners in effect on the sensory nervous system, and that, in place of exciting the sensory nerves, like the other convulsive poisons, it soothes and dulls them. Nevertheless, M. Arzerouny asserts the anæsthetic power of thebaine, and that he has proved it with several patients having painful affections. I might be content with opposing to his assertions the contradictory observations of M. Rabuteau or M. Bouchut. I prefer to remark that the facts stated by our young Armenian brother (and which refer to only six cases observed) have not the probatory value he claims for them. [Dr. Gubler briefly criticises each case in succession.]

In fine, thebaine appears, according to the most ample information, which has been furnished by the works of Magendie, and of M. Cl. Bernard, to be a convulsive agent and nothing more.

As for *opianine*, to which its discoverer (Kugler) attributes narcotic properties as energetic as those of morphine, I simply notice a recent statement of M. Rabuteau, who, on the faith of the foreign author, and without previous experiment, was content to say that the action of opianine is comparable with that of morphine.

I designedly pass over the observations made on opianic and meconic acids, as I am occupied exclusively with alkaloids of opium; but this review would be incomplete if I omitted the important researches of Dr. Harley on the pretended absolute antidotism of opium to belladonna, and reciprocally; an antidotism which, for my own part, I have never accepted in the terms in which it has been formulated.

After experiments as numerous as varied, and perfectly conducted, the learned English physiologist states the following conclusions:—

The antagonism does not appear from the cases cited. On the contrary, they show that belladonna is without influence in accelerating recovery after thebaic intoxication. The principal effects of opium, somnolence, stupor, narcotism, and coma, are often prolonged when the poisonous solanea is made to act concurrently. Belladonna is powerless against the chief danger of opium, the depression of the respiratory function.

In fine, the results of the combined action of opium and belladonna are the same for therapeutical as for toxical doses. Still, while belladonna cannot in any way be considered an antidote to opium, or *vice versâ*, it is fitted, on the other hand, to render some service, joined with other remedies, and administered in small quantity, by aiding in dissipation of the phenomena of thebaic poisoning.

These observations, in my opinion, faithfully sum up the facts which have been well observed, and I adhere to them almost without reserve.

NOTES ON PEPSIN.*

BY EDWARD H. HOSKIN, M.D.

Much has been said about physicians' prescriptions being inaccurately compounded, and much fault found with the incompetency of apothecaries and their assistants —frequently, no doubt, without injustice to either party. As much fault may be found with some of the preparations, because of their impurities, and often of the positive inertness of what should be the active principle on which the efficacy of the drug depends. Amongst these preparations, pepsin is particularly alluded to.

The market is flooded with pepsin, of German, French, English and American manufacture, its elixirs, wines and troches—elixirs *per se*, and in alleged combination with bismuth, iron, strychnia, etc.—in fact, so elegantly, and apparently therapeutically combined, as to please the eye, taste and judgment of the physician, and by its promised combination, to appear to him as the very thing he wants in his daily practice. All is not gold that glitters, nor is all pepsin that is called so, nor do all its preparations contain the promised principle.

Curiosity at first induced me to examine a sample of of French make, and getting a negative result, I still more carefully tried three other samples of the same make, and found all inert; I then tried another make, and with the same result, and then various samples of American preparations, but not one could I find that was in any way a solvent of coagulated albumen. I next tried some elixirs, and not one of these would produce the required result; then some of the wines, and with the same lack of success.

After these experiments, I came to the conclusion that pepsin, as sold in the shops, was a fraud, that physicians were defrauded of their success, and the patient of his health and his means, through the worthlessness of the drug supplied.

But on looking over a review of the new Pharmacopœia, in the Journal of March 13th, I noticed the mention of the pepsin made by Scheffer, of Louisville, and being anxious, if possible, to find a reliable article, I wrote to him for a sample, and received by mail two descriptions —"saccharated pepsin," and "concentrated pepsin." I at once experimented with them, and obtained most excellent results. With one grain of the concentrated article, I obtained the solution of one hundred grains of coagulated albumen, and with five grains of the saccharated, sixty grains of albumen—in each case using one ounce of water and six drops of muriatic acid. With one grain, also, of the former, I procured the solution of 137 grains of raw, lean beef.

These results are, I think, eminently satisfactory, and prove, at least, that there is one reliable article to be had —of home manufacture, also, instead of heavily dutied foreign goods, and which so frequently are considered the only reliable preparations.

I have been sceptical as to the therapeutic value of the so-called pepsin wines and elixirs, and my experiments have proved that, at all events, the pepsin used in their manufacture is not of any use, for there is no solvent action exerted whatever on coagulated albumen by any of them I have yet tried.

This may be the proper place to describe the method I adopt for detecting the presence of what I will call active pepsin. It is known that the presence of albumen in diabetic urine is an obstacle to the detection of the sugar, and that a fine mauve or purple colour is produced on the addition of either Trommer's or Fehling's test solution. It occurred to me that this reaction would just come in for my purpose. Take coagulated albumen, and put into the pepsin wine or elixir; submit to one hundred degrees Fahr. in a water-bath, and if there is any of the active peptic principle present, solution of so much of the coagulum will ensue, and the albumen reduced to an allotropic condition, which, when added to the test solution, would produce the purple colour.

On trying the experiment, no such thing occurred; but, on making a simple solution of pepsin in water, adding acid and albumen, and digesting for half an hour, I procured a solution which, on addition of the cupreous test, at once yielded the splendid colour; repeated trials have yielded the same results. Flesh, or cheese, may be used in place of albumen, as all that is required is to obtain a peptone, and the reaction will show it; hence proving that pepsin must have been present in order to its production.

I have repeatedly dissolved a perfectly good pepsin in sherry wine, added hydrochloric acid and albumen, and submitted to a water-bath and then tested for peptone; but in no case have I been able to detect it. From this fact, I conclude that pepsin wines are useless, as far as the drug is concerned, and that the presence of the alcohol, or the small proportion of tannin, or both, distroys its catalytic action. Tannin, in solution, does the same thing. So, also, do most metallic salts; and here I would quote from Dr. T. King Chambers 'On the Indigestions,' page 94: —"But for the time named, I advise its being given alone, and the action not interfered with in general by other medicines. *Many* will really *prevent* its chemical *effect*, and all will confuse one's judgment of the advantage gained."

But, if to a peptone already formed, either wine, alcohol, tannin, or a metallic salt is added, the addition of the test will at once exhibit its reaction, though tannin, if in large quantity, somewhat masks it. From this, it appears that the failure of the test to indicate pepsin in wine or dilute alcohol, or in the presence of tannin, or a metallic salt, does not result from the action being masked, but from the fact of the pepsin (under the conditions) being inert.

If, then, these elegant pseudo-pharmaceutical preparations will not accomplish the conversion of a protein substance into a peptone in the test tube, there is, I think, small likelihood of their doing so in the disabled stomach. It is true the other ingredients may be of service, but often it is the pepsin that the physician is prescribing the compound for, and frequently the one thing the patient most requires; so that, if the above conclusions are true, then, indeed, are physicians labouring in the dark, and their patients done out of their health and their money.

Since writing the above, I have tried samples of Dr. Hawley's preparations, and find that his wine and glycerole of pepsin are good articles, but the wine does not appear to be a pure sherry, and the proportion of alcohol so small as not to interfere with the functions of the principle. They both will dissolve albumen, but not so actively as Scheffer's.

I give these few facts for what they are worth, and hope at least they may be of some service to the profession, especially to those who have not the time for making the investigations they otherwise would do, and to those who may have been disappointed in not obtaining results they may have been led reasonably to expect.

* *Boston Medical and Surgical Journal*, May 22nd, 1873.

THE PRODUCTION AND USE OF TURF AS FUEL IN THE NETHERLANDS.

The production and use of peat or turf as fuel in the Netherlands forms the subject-matter of a very interesting report by Mr. Newnham, her Majesty's Consul at Amsterdam, and another by Mr. Fontein, British Vice-Consul at Harlingen. These have been included in a volume of consular reports recently presented to Parliament, to which we are indebted for the following abstract.

Peat or turf—now generally considered to be a vegetable matter, formed by the decomposition of plants amidst an abundance of moisture, and varying in colour from light-brown to blue-black, according to its more or less perfect state of decomposition and the depth of the layers—is extensively used for fuel throughout the Netherlands. With the exception of a moderate supply of wood, it is, in fact, the only kind of fuel that country produces, so that even in remote times the attention of the industrious inhabitants was directed to the expediency of cutting up and clearing the immense tracts of peat-bog or waste-land in the northern provinces, particularly in

Friesland, Groningen, and Drenthe, with the two-fold object of applying the combustible matter on the surface, to a depth of from two to twenty-five feet, for fuel, and of bringing the soil below it into a state of cultivation.

Peat, however, being a light and bulky kind of fuel, is not adapted for exportation, as it cannot be conveyed to considerable distances without too great an expense, so that its consumption is confined to the country where it is produced. This is the principal reason why the reclaiming of vast waste-lands in many districts is not carried out on a more extensive scale, for if too large a quantity of peat were to be produced at one time the market value would be reduced to such a low figure that the proprietor or contractor, instead of making a profit, would have to sustain a considerable loss. It is true that the soil below is usually found to be well adapted for conversion into arable land, but it takes a number of years, and requires a considerable outlay in wages, to arrive at this desideratum.

As yet peat has been chiefly employed for domestic purposes, in the manufacture of bread, bricks, tiles, etc., and, in general, wherever the use of a more compact kind of fuel is not a requisite. But of late years efforts have been made to render it more generally useful by compressing it until its specific gravity is nearly equal to that of coal. The well-known peculiarity in the character of the Dutch people in general, that of strongly adhering to old habits and customs has, however, hitherto proved a stumbling-block to the manufacture of this new article, so that the compressing of peat has not been prosecuted on an extensive scale, notwithstanding that its advantages in every point of view are sufficiently obvious.

The ordinary way of reclaiming the high peat-bogs in Holland, and of preparing the layers of peat for fuel, is by an efficient system of drainage. This takes a period lasting from ten years, during which nothing further can be done except occasionally deepening the drains a few inches whenever the marshy state of the soil permits it. As soon as the bog has sufficiently settled down and is fit to be operated upon, the crust or surface is pared off with the spade to a depth of from two to four feet, so as to remove the coarse, undecomposed vegetable matter, which, though unfit for fuel, is yet carefully put by for future use in bringing the undersoil into a state of cultivation. The peat is then cut out in pieces, like bricks, by means of a long, narrow spade, which are set up in rows to dry. The process of drying being invariably done in the open air, it depends entirely on the state of the weather ; and it not unfrequently happens, after a wet summer, that consumers who have not laid up a stock of turf dried in the previous year are obliged to make use of the new stock in a damp state.

This is the simplest and most usual method of saving and drying turf. The new plan, however, of compressing the peat and considerably reducing its bulk, is said to offer many advantages. The whole depth of combustible vegetable matter, whether partially or entirely decomposed, is reduced to a pulp and mixed together, consequently one part thereof is not more valuable than the other ; whereas, when turf is procured in the ordinary way by cutting out layer after layer, the upper part, being less perfectly decomposed and therefore of an inferior quality, has to be disposed of at a price that does not even pay the cost of labour, so that the proprietor or contractor does not obtain any profit or interest for his outlay until two or three years later, when the lower and more valuable layers are brought to market. Compressed peat is also said to be an excellent substitute for coal. Being far more compact than ordinary turf, it can be conveyed and warehoused at a considerably cheaper rate, so that when once its advantages are fully appreciated, it cannot fail to come into use for many purposes for which ordinary turf, through its bulk, is totally unfit. As the process of drying does not depend on the weather, compressed peat can be produced with far more certainty and expedition than ordinary turf.

A few years ago an attempt was made in Holland to introduce peat-charcoal or carbonized turf made from compressed peat, but although it was proved by chemical research that this article was equal, and, in some respects, superior to wood charcoal, the consumption was so small that the scheme was abandoned.

Compressed peat or turf is formed by machinery. The raw material dug out of the beds is ground, mixed, compressed, and formed into blocks. The object of grinding or cutting up the raw material is to destroy the roots and fibres of plants contained therein, as these absorb a great quantity of moisture, and are the cause of much delay in drying ordinary turf. These presses used are of various sizes, sometimes a pair coupled together, are driven by donkey-engines of from six to twelve horse power, and combine the process of grinding, mixing, compressing, and forming the raw material into blocks. The price varies from £100 to £350, according to size ; with the largest from 50,000 to 60,000 blocks or turves of about 12 inches in length by 3½ inches breadth and depth, can be manufactured in a day of twelve hours, with the assistance of eight men and four boys. The weight of such a press would be about seven tons.

Peat is also extracted from low beds, or those situated below the ordinary water level, but covered with a crust of clayey soil, forming, in most cases, excellent arable land, and annually yielding abundant crops. In olden times only barren land was used for this purpose, but at a later period proprietors of land, tempted by the profits produced by the peat trade, were induced to destroy fertile plains and fields for the purpose of extracting the peat hidden beneath the upper soil. The result was that in many parts of the Netherlands rich fields were converted into lakes, until the government at last interfered, and set a limit to these proceedings. At the present time no one is allowed to extract peat from land until he has obtained permission from the authorities, and this permission is not granted unless the parties interested bind themselves to excavate the turf and drain the bottom of the peat-bed within a fixed term.

The system generally adopted is as follows :—During the winter the upper crust, usually about two or three feet deep, is carefully removed and deposited in another part of the field, until the peat has been extracted and the water drained off, when, as with the high peat-beds, it will form the basis of fresh cultivation. As soon as the upper surface is removed water appears, and the bed of peat underneath is left bare until the following spring, when workmen in long water-proof boots get into the water with spades and extract the peat.

As the surface of the water completely conceals the peat-bed, these men feel their way, and cut the earth with their spades, seize the divided sod, and throw it into a barge. The barge having been filled is brought to land, and the peat discharged into a wooden trough, where the shapeless and compact sods are crushed by a workman with his feet, and simultaneously freed from large roots, stones, and other impurities. After the peat has been kneaded like dough in the wooden trough, it is thrown on the ground and left for a short time to dry. When sufficiently dry it is trodden down by other workmen, with little planks fastened to their feet, and soon presents a smooth surface. After this process the peat is again left to dry, and then divided into oblong squares by means of a kind of rake. After a time the divided pieces are taken up with spades and placed in rows and heaps until completely dry, which usually takes about three months, and then brought to market. When the low peat-bed is worked out nothing remains but water, which, after having been surrounded by an embankment, is pumped out by windmills, and the ground underneath, with the help of the upper crust of the peat-bed which was previously removed, converted into arable land.

Mr. Consul Newnham says that he has been informed by Irish landed proprietors that the peat or turf of their country is far inferior to that of the Netherlands.

The Pharmaceutical Journal.

SATURDAY, AUGUST 2, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BRITISH ASSOCIATION AND PHARMACEUTICAL CONFERENCE.

WITHIN six weeks from the present time, the meetings of these bodies will have commenced at the town of Bradford, one of the centres of our worsted manufacture, itself presenting in that respect many features of interest for the visitor, and surrounded on all sides with some of the most remarkable examples of industrial and commercial enterprise. In the town there are the enormous factories and palatial warehouses, in which goods are stored. In the neighbourhood, within easy distance, are the extensive works and town of Saltaire, as well as the celebrated iron-works of Low Moor and Bowling.

In connection with the local Mechanic's Institute, there will be an Art Treasures and Industrial Exhibition, which will remain open during the continuance of the meetings.

The natural attractions of the locality are also considerable for the lover of fine scenery; there is the charming valley of the Wharfe, with its varied features of river and of wood, with the old abbey of Bolton to add the zest of antiquarian and traditional interest. Abundant entertainment will also be found for the botanist in the Scar or Mountain Limestone district of Craven; and for the geologist in the great fault of the limestone at Malham Cove and the caves of Ingleton.

A reception room, a meeting room, and news room will be open for Members of the Conference at the Institute, on Monday, Tuesday, and Wednesday, the 15th, 16th, and 17th of September.

As yet no details are published respecting the excursions to be made by members of the British Association, but it is expected that an excursion to Bolton Abbey will be arranged for the Pharmaceutical Conference, on Friday, the 19th September, and the local committee will organize a Conference dinner at the Victoria Hotel, for Tuesday evening, the 16th. Early application should be made to the Local Secretary for tickets by those desiring to be present.

The general business of the Conference will be commenced at 10 a.m. on Tuesday, the 16th of September, in the lecture hall of the Church of England Literary Institution, under the presidency of Mr. BRADY, by the delivery of the usual introductory address, and then the reading and discussion of papers will be continued until the afternoon of the following day. Members intending to be present are requested to communicate with the local secretary of the Conference, Dr. R. PARKINSON, 8, Sun Bridge, Bradford, or with the local vice-president, Mr. F. M. RIMMINGTON, Ivegate, Bradford, who will give all information concerning hotel accommodation, railway routes, etc.

The British Association will meet on Wednesday, the 17th September, and information as to lodging accommodation may be obtained from the local secretaries, the Rev. J. R. CAMPBELL, D.D., RICHARD GODDARD, Esq., and PEILE THOMPSON, Esq. Owing to the illness of the President-elect, Dr. JAMES PRESCOTT JOULE, he will be unable to perform the duties of President, and Professor WILLIAMSON, of University College, has been selected to fill his place.

EXAMINATIONS MADE EASY.

AN ingenious young gentleman, whose future profession is that of medicine, has developed a new industry which in these days of "struggle for existence" deserves the widest publicity. In the Liverpool papers there recently figured an advertisement to the following effect:—"£1 may be earned in a day by any gentleman possessing a good knowledge of mathematics.—Apply immediately to ALPHA, Upper Hope Place." Appearances, to say the truth, are rather against this invitation, savouring as it does of the obtrusive generosity of the Cheap Jack with his "gold snuff box filled with the best snuff, and all for a penny." Curiosity, however, may have induced certain people to respond to "ALPHA," and accordingly a shower of answers arrived at the newspaper office—one of them from a Cambridge B.A. in temporary impecuniosity being preferred by the advertiser. To him, therefore, "ALPHA" immediately addressed himself in the following terms:—

"—, Upper Hope Place, Liverpool.

"Dear Sir,—I want to find a gentleman with a thorough knowledge of the first two books of Euclid and Algebra up to simple equations, and if you are quite master of these I shall be glad to further (*sic*) you with information, but it will be *strictly confidential*, and what I say to you must not be revealed. And if you are anxious to earn one pound, it will necessitate on your part a journey out of town, but I shall pay your expenses. A line by return will oblige, yours, etc.,

"ALPHA."

The "£1 in a day" which the Cambridge man perhaps rashly concluded to be £1 every day, or £300 a-year, dwindles down to £1 altogether; but even that sum seems to have been a consideration, for he replied at once to "ALPHA" wanting further particulars. That gentleman's response came to hand by return of post, and runs on this wise:—

"—, Upper Hope Place, Liverpool.

"Dear Sir,—Yours just to hand. And now you have assured me that I may place the utmost confidence in you I will explain matters more fully, and hope you will do what I want of you. Well, about eighteen months ago I

went to Glasgow for an examination in general education, and succeeded in everything but mathematics; and as I intend entering at St. Thomas's Hospital, London, this July, it will be necessary for me to get the mathematics passed before entering, and *I* cannot possibly get away to go myself, or I should do so. And unless I get it passed this month it will throw me back nearly a year, so I want you to go to Glasgow about the middle of July, *and pass the mathematics in my name* (*!*). I shall pay your fare both ways and give you one pound for the journey! You will be only one whole day away. So just say whether you will go, and I will call some evening this week to see you, unless you can come over here. Of course I wish *you to personate me, and no one will be any the wiser!* Now please keep this a profound secret, and oblige, yours most truly, ALPHA.

"P.S.—You can leave Lime Street Station on July 18th, get to Glasgow on Saturday morning—the examination is on Saturday—and return from Glasgow on Saturday night. What is your age? Let me have a line on Tuesday afternoon. What is the nearer ferry to your house—Tranmere or Woodside?"

But the Cambridge man, though impecunious, was honest; so his reply to this last communication of "ALPHA'S" took the form of a note to the editor of one of the Liverpool papers, enclosing the entire correspondence. His silence, however, increased the astonished "ALPHA'S" importunity, and the two following missives reached him in close succession:—

"—, Upper Hope Place.

"Dear Sir,—I should be glad of a reply to my last note at your earliest convenience.—Yours, etc.,

"ALPHA."

"—, Upper Hope Place,
4th July, 1873.

"Dear Sir,—I should be glad to know AT ONCE whether you will undertake that little affair, and, if so, I will run over and see you about it to arrange matters. By letting me have a line this evening or to-morrow morning, you will oblige.—Yours truly, etc.,

"ALPHA."

Deception is never armed at all points; so "ALPHA," though concealing his name, gives his address which has, we believe, set the police on his traces, with what result we shall soon learn.

This fraud, proposed with such signal coolness, does not always, we fear, incur such prompt exposure. Instances must be numerous in which examining boards have unconsciously been assisting at a 'Comedy of Errors' and passed the wrong DROMIO for the right one. The "industry" of which "ALPHA" must be an accomplished *chevalier* is surely an extensive one. On no other hypothesis can we explain the business-like *sangfroid* with which he states the fee, and that a small one, for "value received." If one pound will secure the imprimatur of a body like Glasgow University for proficiency in mathematics alone, the same fee we suppose would enable the donor to pass in each of the other subjects, and so embark on the professional part of medical study as destitute of the "education of a gentleman" as an army or navy surgeon in the days of RODERICK RANDOM. Much as may be said, therefore, in support of the view that preliminary examinations should not be conducted by professional examiners but that degrees in art and certificates of having passed such local examination boards as those of Oxford and Cambridge should suffice, the risk of being imposed upon by such *chevaliers d'industrie* as "ALPHA" must be guarded against before that view can be universadopted in practice. Other professions besides the medical might be victimized by "ALPHA" and his accomplices, whose examiners would find themselves in the predicament of the Athanasian heresiarch—"confounding the person," while "ALPHA." "divided the substance."

THE BRITISH MEDICAL ASSOCIATION.

FOR the second time during its forty years of existence the British Medical Association is to hold its annual meeting in the metropolis, and during the coming week London will be visited by many medical gentlemen, who will avail themselves of the opportunity thus afforded them of seeing old friends and making new ones among their professional brethren. As is well known, the objects of this Association are very analogous to those sought by the Pharmaceutical Society and the Pharmaceutical Conference, and are connected with the elevation of the profession to which its members belong; whilst in its custom of varying the locality where it holds its annual meetings it has an additional similarity to the Conference. We are glad to observe in the report of an address recently delivered by Dr. QUAIN before the Metropolitan Counties' Branch that the increase in the number of members during the last six years has been very great, and that, while eight years ago the Association only numbered 2000 members, they now fall little short of 5500, a result justly attributed, by Dr. QUAIN, in great measure to the influence exercised by the ably conducted journal of the Association.

The meeting will be commenced on Tuesday morning, by a service at St. Paul's Cathedral. At three p.m. the members will meet at King's College, to hear the address of the President-elect, Sir WILLIAM FERGUSSON, Bart., F.R.S., to receive the report and to transact other business. In the evening the LORD MAYOR will hold a reception of the Association at the Mansion House. The meetings of the various sections will be held on Wednesday, Thursday, and Friday, at King's College. On Wednesday there will also be a reception by the President and Council of the Royal College of Surgeons; on Thursday, the Association Dinner; on Friday, a soirée at University College; whilst Saturday will be devoted to the carrying out of various excursions that have been planned.

ON Saturday last the twelfth annual dinner in connection with the firm of BURGOYNE, BURBIDGES, and Co., took place at the Downs Hotel, Epsom. There were present twenty-six visitors and eighty-two *employés*. Several valuable prizes were competed for by the visitors and *employés*, and the proceedings throughout the day were marked by the most unqualified enjoyment.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The fifth annual meeting was held at the Society's rooms, Exchange Buildings, on Friday evening, June 20th. Mr. Atherton, President, in the chair. The Secretary's report was read, congratulating the Society on the termination of a successful session. Dr. Souter had delivered a course of lectures and practical lessons on "The Chemistry and Botany of the Pharmacopœia." Contrary to usual custom, the Council, with the consent of the lecturer, arranged for their delivery in the morning instead of evening. This had been followed by good results in attendance, but not, apparently, by equal success in attaining knowledge, as only five students presented themselves for examination out of an attendance of nineteen.

Another new feature in the last session has been the "Conversazione," to which many rare and valuable articles were kindly lent by friends of the Society. A number of microscopic objects of interest to chemists were exhibited and explained by members and friends who were kind enough to bring their instruments.

The number of members has slightly increased; but it is a matter of regret that the associates are so few; also that the attendance of members at the monthly meetings has been so small. This failure has had the effect of limiting the number of papers. It is but a poor compliment to be asked to read a paper to empty benches.

As an experiment, the retiring president has promised to obtain papers and lectures from various gentlemen on interesting subjects for every meeting during the next session, and the Council earnestly hope that members and associates will make an effort to attend them.

The Council takes this opportunity of acknowledging with gratitude the very timely aid to the Museum expenses afforded by a grant from the Pharmaceutical Society of £15.

The statement of accounts, showing a balance to treasurer of £3 4*s.* 7*d.*, was examined and audited by Mr. FitzHugh and Mr. Williams. The officers for the year were then elected :—President, Mr. R. FitzHugh; Vice-President, Mr. W. H. Parker, re-elected; Treasurer, Mr. J. Rayner, re-elected; Council, Messrs. Abbey, Atherton, Jackson, Lewis, Mayfield, Smith, White, and Wilford; Secretary, Mr. W. P. Williams.

After a vote of thanks to the Chairman, the meeting broke up.

BALANCE SHEET.—SESSION 1872-73.

DR.	£	*s.*	*d.*
To 51 Town Members (7*s.* 6*d.*)	19	2	6
,, 3 ,, Arrears	1	2	6
,, 5 County Members (5*s.*)	1	5	0
,, 2 ,, Arrears	0	10	0
,, 22 Associates (2*s.* 6*d.*)	2	15	0
,, 4 ,, Arrears	0	10	0
,, Collected at Conversazione...	1	12	6
,, Grant from Pharmaceutical Society	15	0	0
,, Balance due to Treasurer	3	4	7
	£45	2	1

CR.	£	*s.*	*d.*
By Rent	21	5	0
,, Gas	0	5	7
,, Plumber	0	2	6
,, Printing	1	12	6
,, Refreshments at Conversazione and Meetings	2	7	0
,, Cleaning Rooms	3	0	0
,, Carriage	0	8	0
,, Gasfittings, Joiner's Work, and Glass Cases to Museum	15	5	6
,, Sundries	0	16	0
	£45	2	1

Proceedings of Scientific Societies.

ACADEMIE DE MEDECINE.

NITRATE OF POTASH IN PLANTS.

At the sitting of the Academy of Medicine, on Tuesday, July 8, M. Chatin read a communication upon the very general presence of nitrate of potash in plants. Long since recognized in some plants (*Parietaria*, *Urtica*, *Borago*, *Isatis*, *Chenopodium vulvaria*) it has been indicated recently in the *Amaranthus blitum*, by M. Boutin, who made it the subject of a communication to the Academy of Sciences. M. Boutin found 11 per cent. of nitre, which he supposes to be produced at the expense of the nitrogen in the air. Further investigation of the subject by the author has led him to the following conclusions :—

(1) The small number of plants in which the presence of nitre has hitherto been noticed belong to the species of decumbent plants called "ruderals."

(2) All ruderal plants are strongly nitriferous, like the substratum upon which they grow by preference.

(3) Species of rupestral plants, those especially of porous, calcareous rocks, are nitriferous, like those of the walls.

(4) Species of the meadows (meadow-sweet) and of the woods (belladonna) contain nitrates no less than those of the rocks and walls.

(5) Many plants of the fields (fumitory, knot-grass, etc.) are rich in nitrates.

(6) Among cereals, wheat, barley, oats and rye scarcely contain nitre; the contrary is the case with buckwheat, and especially maize.

(7) Species of certain natural families (*Chenopodiaceæ*, *Solanaceæ*, *Amarantaceæ*, *Papaveraceæ*, and *Fumariaceæ*), have a greater tendency than those of other families to form nitrate of potash.

(8) It may be said, under some reserve, that the dicotyledons are more nitriferous than the monocotyledons; that the mosses are true nitrifers; and that algæ, fungi, and lichens contain only traces of nitrates.

(9) Exhausting cultivated plants (*Gramineæ*), are in general much less nitrated than fallow crop plants (lucerne grass, clover and papilionaceous plants in general).

(10) It is in the herbaceous parts, sometimes in the roots, that the nitrates accumulate.

(11) That the proportion of nitre diminishes towards the time of fructification.

The author stated that by Boussingault's process (sulphate of indigo) he had found in some plants as much as from 5 to 7 per cent. of nitre. In others the quantity was smaller, and in some almost infinitesimal.

THE POSITION OF MILITARY PHARMACISTS.

M. Broca read the report of the commission appointed to consider the letter of the Minister of War, touching the respective positions of the medical men and pharmacists in the service. It commenced by stating that the three pharmacists who had been appointed on the commission (MM. Bussy, Poggiale, and Gobley) had thought fit to retire after the first sitting, and had not voted on the conclusions of the report. The report recommended that the whole health service of the army should have an autonomic constitution, under the responsibility of a chief chosen from its members, who should be under administrative control. As to whether the person to be chosen to superintend the service should be a medical man, a pharmacist, or an administrative officer, it stated there was no doubt the direction should be given to a medical man as the most necessary member of the health service, and also the most competent and most popular with the army. The subordination of the pharmaceutical to the medical element would be the natural consequence of this system, but it was urged that this would not cause any lowering of the position of the pharmacien militaire, the fact being that instead of being subordinate to a subintendant, pharmacy would be subordinate to the chief of the health

service in the same manner as the medical and administrative portions of the service. The opposition to this change on the part of the military pharmacists, was described as the result of long habit rather than of the common interest, and their willingness to continue the present system was ascribed to their not having, like the medical men, daily occasion of seeing its inconveniences.

QUEKETT MICROSCOPICAL CLUB.

The eighth annual general meeting was held on Friday evening, July 25, at University College, Gower Street, Dr. Braithwaite, F.L.S., F.R.M.S., President, in the chair. The report of the committee for the past year was read and testified to the continued prosperity of the club, which now numbers 570 members. The President delivered the annual address, in the course of which he noticed the progress of microscopical investigation in botany and zoology during the past year. The ballot then took place for the election of officers. Dr. Braithwaite was re-elected President. Dr. Matthews, Messrs. B. T. Lowne, T. W. Burr, and C. F. White, Vice-Presidents, and Messrs. Bywater, Crisp, Hailes, Hind, Waller, and T. C. White were elected to fill the six vacancies on the committee. Mr. J. E. Ingpen succeeded Mr. T. C. White who retires from the office of Hon. Secretary (owing to increase of his professional duties) after four years of unremitting and valuable service. The proceedings terminated with the usual conversazione. The next meeting will be held on Friday, August 8.

SOCIETY OF ARTS.

On the Energies of the Imponderables, with especial reference to the Measurement and Utilization of them.*

BY THE REV. ARTHUR RIGG, M.A.

Lecture II.

The Energy of Gravity, with especial reference to the Measurement of it.

(*Continued from page 77.*)

The apparatus that Cavendish used was double the size of this which you see before you, but it was similar in construction. He had two balls of lead, similar to these large ones, suspended from a very light bar, that bar being trussed, as it is called, by a kind of triangle of wires, and the whole being attached to a hook in a pulley, round which he passed a cord, by means of which the balls of lead can be moved to any position you please. In order to exclude every external influence, the apparatus was enclosed in a room of its own, and to observe the phenomena that took place within that closed room lamps were applied at small orifices, and telescopes were placed at others. In addition to this apparatus with the two balls of lead, which weighed about three cwt. each (as far as my memory serves), he had another apparatus placed below the other, as you see here. From a centre immediately under the pulley to which a frame carrying the leaden balls is attached, was suspended by an exceedingly fine wire a light rod with two little balls less than bullets, and these balls held a certain position, and could not move from it beyond certain limits. Being placed in the aforesaid enclosed room, where there were no draughts or variations of temperature, or anything external to affect them, after they had been left for some time—say, for 24 hours—they became stationary, and would not move unless some external force were applied to them. At the end of the light bar carrying these small balls was an ivory scale and a pointer, and upon this was directed the light of a lamp from outside the room, whilst a knob was also placed outside, by turning which the motion of the large leaden balls could be controlled. At another orifice was placed a telescope, by means of which the motion of the pointer could be observed. After the little balls had become quite stationary, by the cord he very gently swung the larger balls to a position close to the small ones, and after a certain lapse of time, varying from a quarter-of-an-hour to an hour, he observed the space through which the small balls were moved from the position they had occupied. It may be well to state that a thorough examination had been previously made as to whether any influence could be due to magnetism.

This experiment had to be repeated very frequently, because of the minuteness of the range of these balls and the magnification of it. The application of the results was to be so important. He therefore made three experiments on each occasion, and observed the position that the balls took. He also observed another matter which is of great consequence, the number of oscillations made by the small balls before they come to rest. These balls oscillate like a pendulum, and by the number of times they swing before coming to rest certain calculations of great importance to the inquiry may be made. These calculations completed, the conclusion he arrived at was that the earth was 5·4 (say 5½ times) heavier than water.

Now it is only right that you should be told how from these balls the density of the earth can be deduced. The mass or quantity of matter in these balls is known; their attraction upon the little balls is known from observation. The mass therefore of any other ball being known, we can tell the attraction that it would have upon these balls. It is quite clear that if this large ball had double the mass it would have double the attraction at the same distance; if treble the mass, treble the attraction, and so on. Again, if the mass of the little ball was known and the attraction of the great one known, and the mass of the great one known, then if the mass of another ball is known, we shall get the attraction of the other ball. It should also be attempted to make clear how from these two balls we can weigh the earth, and probably it will keep your interest alive in the matter if informed that, in 1835 (Cavendish's experiments being made at the close of the last century, about 1798), Mr. Baily, the founder of the Astronomical Society, repeated them. Mr. Baily had been a stockbroker in London; he retired from business, and purchased a house in Tavistock Place, the one, I believe, in which Mr. Digby Wyatt now lives. He there made many experiments, and some most extraordinary calculations, and did a large amount of astronomical work. Amongst other things he undertook to weigh the earth, and he weighed it as Cavendish did, namely, by an apparatus constructed on the same principle as the one before you. He swathed the box or chamber, in which the balls were, with flannel, and put a gilded cover over all. He also lined the inside with tin-foil and connected it by a copper wire with the earth. These precautions were intended to neutralize, as far as practicable, changes in atmospheric temperature and terrestrial electricity. How important he considered it, you may judge from this that he made more than 2500 experiments with balls of this character; he sat watching them for 1200 hours, and that number of experiments extended over some years. The repetition was planned in 1835, commenced in 1837, and concluded in 1842. The result of these 1200 hours of watching, exclusive of the calculations which followed, led to the conclusion that Cavendish was right within a fraction of 2-10ths., that is to say, Cavendish concluded that the density of the earth was 5·4 times that of water; Baily concluded that it might be 5·6 times that of water.

It may be permitted to repeat the reasoning in order if possible to make clearer the principle on which it proceeds. From the weights we know the masses of the large ball and of the small one. We know that the small balls in relation to the large ones were free from the influence of gravity; we also know by observation how much the one attracts the other. Double the ball, and you get double the attraction, and so on. Now, we know the size of the earth, and by placing this little ball on a spring balance, we know how much the earth will attract it. Therefore, the weight of the little ball being known, and the size of

* Cantor Lecture, delivered February 10.

the earth being known, there is nothing left except the attraction to find, and, as we have the attraction from these two balls, we can, by a simple arithmetical operation, determine that the earth is 5·6 heavier than water.

This seems the best opportunity to mention that the present Astronomer-Royal (Prof. Airy) investigated by very different means and on very different principles this question of how much heavier than a globe of water the earth is. Qualifying the conclusions from his experiments as himself suggests, consequent upon certain geological considerations, it may be asserted that Cavendish's result is very nearly correct.

Time passed by: Cavendish's experiment was made, as I told you, about 1798, and Baily repeated it about 1835. We must now go back, as a matter of history, to Cavendish's time, and the next step we arrive at in determining the energy of gravity was the experiment that was made by Atwood, who was born in 1746. He was a fellow of Trinity College, Cambridge, and was the first to entertain the idea of devising some plan of measuring the force of gravity. Let me endeavour to make this matter clear. Cavendish determined the density of the earth, but he did nothing whatever as to determining the force of gravity. Force, as stated in the first lecture, can only be measured by motion. We can easily obtain motion from the action of gravity, but we must observe that motion in order to measure force. If a weight be let fall it falls far too quickly to permit of an estimate of the rate at which it falls. That rate is due to gravity. Atwood thought, as Galileo had previously done, that by causing the fall to be delayed he might be able to draw a conclusion as to the exact force of gravity, and the plan he adopted was this. You are aware that the intervals between the ticks of a pendulum vary according to its length. Here is a pendulum, and you see the rate at which it is going; if, now, the pendulum weight be lowered, so as to lengthen the rod, you may observe that the pendulum ticks more slowly—in fact, it is now beating seconds. You were told in the first lecture, that we must have a certain unit of measurement, and the *second* is the unit of measurement usually taken for time. If we want smaller measurements, for it is easy to divide the second into a hundred parts, they are taken by another contrivance. A very simple and sufficient one is a clepsydra, or water-clock, arranged specially for this purpose.

What Atwood thought of doing in order to measure the force of gravity, having, you remember, no previous measurements to guide him (for Galileo did not touch the problem that Atwood proposed to solve), was to take two weights evenly balanced over pulleys such as these, the apparatus being most delicately made. You see that these two small weights are exactly balanced, one being at each end of a cord which passes over pulleys at the top of the apparatus, so that the weight in descending passes down in front of a graduated scale. These weights, then, are exactly balanced. Here are three very small weights, fractional parts of the ones which are suspended. If one of these small weights falls by itself, it would fall so rapidly that its rate of falling could not be observed; but if, whilst it is falling, it is caused to bring this mass of matter with it, the rate of falling will be retarded, whilst the law of the rate remains the same, *i.e.*, the law which governs the rate of falling will be similar, although the mass moved is increased. If now there be placed upon one of these balanced weights two of these little fractional weights, there is a something that will cause the connected mass to move, and this platform at the bottom will be struck about four seconds after the motion commences. The usual plan is to let the motion be commenced by electricity, which at the same time sets the pendulum in motion. You can count the strokes of the pendulum from the commencement to the end of the motion. You can see this mass of matter has been moved through eighteen spaces in four seconds. If the measure be altered, you will readily understand that these fractional weights would carry it through a different space in the same time; if other weights be put on, they would carry it through other spaces. The experiment as made before the apparatus was brought here shows that the force of gravity is such as to cause a body to fall through about 32 feet in one second, the meaning being that if this small weight had not been required to bring the other weights along with it, then it would have fallen from rest through 32 feet in the first second. That was the first attempt of estimating by measurement the force of gravity.

But Atwood's apparatus, though exceedingly good as matter of illustration, falls very far short indeed of that which Captain Kater adopted; and all that we have, and all that we know, of the form of the earth, and the true kinetic measure of gravity, spring from Kater's experiments, and not from either Cavendish's, Baily's or Atwood's. Kater felt that if instead of weights; falling as they have fallen in the experiments of Atwood, he could observe the effect of gravity upon the weight falling without associating it with other weights; if it could be kept distinct, and if in any way he could cause gravity to repeat the operation slowly and deliberately without any interference whatever, we might get at the conclusion much more rapidly than Atwood could by his arrangement, because the friction of the wheels, the weight of the cord, and other incidental matters affect the problem. What Kater did was to design a pendulum, of which this is a copy. It was from a pendulum like this that not only was the force of gravity determined in all parts of England, but also the form of the earth itself has been decided and estimated. Our standards of weights and measures all come from a pendulum like this. If, in fact, the standards were all lost, it would be from such a pendulum they must be restored. Let me anticipate the conclusion by stating that when the standards were lost in the burning of the Houses of Parliament they were restored by seeking for copies, because the great number of corrections and the great difficulty of counting this pendulum and freeing it from interfering causes are very serious obstacles. Few are aware of the enormous difficulty there is in placing a pendulum so as to be free from external influences, and counting the oscillations of it.

Whilst upon weights and measures, your attention may be directed to a small piece of wood here, which is a model of the standard one pound weight of Great Britain. It is one which a committee of learned men obtained, and this in my hand is a copy. The real standard is made of platinum. It is a cylinder 1·35 inches high and 1·15 inches in diameter. Observe there is a groove turned in it, and there is an ivory fork by which it is to be lifted—these standards are not to be touched. There are only five of them made, and if ever the one pound weight is lost in England it is to be recovered, not by repeating Kater's experiments, but by copying one or other of these five standards. The five are kept—one at the Exchequer Chambers, at Westminster, one at the Royal Mint, one with the Royal Society, one at the Royal Observatory, Greenwich, and one is immersed in the sill of the recess on the east side of the lower waiting-hall of the New Palace at Westminster.

To return, then to Kater's experiments. He had first to determine a pendulum which should vibrate seconds in the latitude of London. He did it in the house of Mr. Brown, in Portland Place, which house has an astronomical bearing from Portland Chapel of 74 deg. 38 min. 50 sec. west from north, the distance being 283 feet, and therefore the house is about half way up Portland Place on the left-hand side. In that house the pendulum was first adjusted. Nothing seems easier than to deal with a simple vibrating ball on a string. It is not, however, so easy as it seems. It can not be made to swing in the same plane as this one now appears to do. If left free to choose its plane of vibra-

tion it is seldom contented. It will not have a dozen swings in the same plane, it must, therefore, somehow or other, be made rigid, and so prevented from such vagaries. Here is a small vessel of lead, hanging by a bundle of untwisted fibres from a hook, and you might think nothing could be easier than to let it swing backwards and forwards on the same path, but it will not swing for two minutes in the same path; hence, pendulums are all compelled to act in restrained paths, and generally supported on knife edges. French clocks have two strings of silk to the pendulum. These are fastened to two hooks at the top, and the pendulum rod being hung from the junction of the two silken cords, it is constrained to describe a path in a plane at right angles to that in which are the silk threads.

To return to the leaden vessel. It is now filled with fine white sand, and at the bottom there is an opening, out of which the sand can trickle whilst the vessel swings freely. The figure caused by the sand falling on a board beneath will show the path that the vibrating body describes. It shall now be let go in what appears to be a straight line. If you watch that path you will see it is a very curious one. The sand at once indicates that the ends of the line are travelling round, also that the line itself is becoming wide in the middle. In fact, a straight line is seldom formed by the falling sand from such pendulums. Even if a circular path be commenced you will find it cannot be retained. It reminds one very much of one of the secular astronomical changes, that is, our year of 365 days and a fraction results from this gradual advance of the perihelion path of the orbit of the earth; observe it tends first to a straight line, then through an ellipse to a circle, and then a return action commences, and it will repeat this process from the straight line opening out again, and so pass on through various phases until it comes to rest. Hence, a pendulum constructed of a simple form is of no value, and yet it is in its simple form we require it. It was needful to assume for the purpose of the calculation that we can make a pendulum do that which this swinging vessel of sand is not doing.

Captain Kater was the first to deal with the case of converting the compound pendulum into a simple one. A pendulum is said to be a simple one when it consists of a heavy particle at the end of a very light thread. Such is almost an imaginary pendulum. All pendulums that we see are compound ones. Now, by pursuing the plan adopted by Captain Kater, he was able to obtain from the compound pendulum what would be the length of an equivalent simple pendulum. His pendulum has two pairs of knife-edges, a pair at the upper end, on which it swings, and a pair at the lower end. He placed one pair of these knife-edges on a smooth, hard surface, so that the pendulum might vibrate without anything causing it to continue its vibrations except the force of gravity. Now, if you look to this diagram you will see the motions of a compound pendulum. If it were short it would move thus, and if it were longer it would move more slowly. The black dots in the diagram represents the lower ends of pendulums of different lengths. Assume that the black dots are the ends of separate pendulums, one behind the other, from the same support, they will then occupy those places after the same interval of time from rest; if, however, these pendulums are united, then the one is kept by the action of the other; now they are really united in a compound pendulum. There is, however, some point or other at which, if all these masses were concentrated, the velocity at that point would be the velocity of the mass, therefore such a pendulum would vibrate in the same time, and it would be called a simple pendulum. Kater found that this collected point, which is called the centre of oscillation, and this at which the pendulum is suspended, are interchangeable, in fact, he found that if the pendulum was accurately adjusted by means of these moveable weights, he could suspend it upon a pair of the knife-edges, and he could get a certain number of vibrations in a minute or a second. Then, if he turned it upside down, assuming the pendulum to be right, and caused it to swing as before, upon the other pair of knife edges, it would make the same number of vibrations. Those two points he marked, and the distance between them is the length of an equivalent simple pendulum. With such a compound pendulum as now described, and of which the one before you is a copy, counting the number of vibrations it makes, you can always deduce the length of a simple pendulum that would make the same number of vibrations.

What Kater did, then, was this—he had a clock kept going, strictly to truth, that is, to true astronomical time. The clock was furnished with a gridiron pendulum of the construction shown in the diagram, and so carefully arranged as not to be altered in length in consequence of change of temperature. On the bob of the pendulum, in front, was a white speck, as on the pendulum bob of this clock. He placed the compound gravity pendulum, which has been described, in front of the clock, the clock pendulum beating 86,400 strokes per mean solar day. The rate of the clock was determined by astronomical observations, and therefore, on any part of the earth's surface, it would be possible to so arrange the solar pendulum that the clock should always record 86,400 beats in a mean solar day.

Now let us turn to this two-ended pendulum of Capt. Kater. It is of an invariable length, and acted upon directly by the force of gravity; there are no weights or clockwork in connection with it. When it is up on one side, it is the power of gravity that causes it to fall, and it is gravity which keeps it going. If, for example, a powerful magnet be placed under that pendulum, then it will come to rest sooner than it would otherwise do, because it is pulled down with greater force. If, therefore, gravity changes in its pull on this pendulum, it will tell on the rate of its vibrations. The rate of vibration of the equivalent simple pendulum is known, because it has been calculated from this compound one; hence, if this compound pendulum be placed in front of the clock keeping astronomical time, and if the vibrations of the pendulum be counted whilst the vibrations of the clock pendulum are being recorded, it might be ascertained whether the force of gravity varied in different places.

The means by which Kater compared these vibrations are very simple. You see the white speck, previously referred to, on the bob of this gridiron pendulum. He took a telescope and placed it at some distance on a level with that white speck. Between the white speck and the telescope, and near to the gridiron pendulum, swung the gravity pendulum, which moved slower than the other, being made a little longer. Keeping his eye upon the telescope, and directed upon a narrow piece at the end of the gravity pendulum, which was the same width as the white circular speck upon the bob of the clock pendulum, he could tell when the two coincided. As one pendulum swung slower than the other, it was quite clear that a coincidence must take place, and he noted the time of the coincidence. That was the beginning of counting vibrations, and he then waited until they separated and until the coincidence again took place a second time, which gave the number of the vibrations in a given time as recorded by the clock. Experiments like these were repeated very frequently and carefully, until at length the average was obtained as to the number of vibrations that this gravity pendulum made, compared with the vibration that the one on this mean solar clock made. Within the tube of this telescope there are crossings of very fine wires—so fine as to be hardly visible to unaided vision; the threads of a spider's web were formerly used for this purpose. A spider is taken in the fingers, then, if shaken he would run his web out to save himself, and this web was placed in the focus of the eye-piece, and the threads were so that the crossing of them was in the axial line of the telescope. It was by looking along that axial line that the time was observed when the coincidence of these two pendulum marks took place. The accuracy with

which that was done is more easily to be imagined than realized.

Assuming that this has been accomplished, let us look for a moment to other elements which would disturb the result. In the first place, the pendulum vibrated in air; and you were told, in the first lecture, that a body weighed in air and weighed in any other medium is not balanced by the same weight. Hence the effect of the air upon the pendulum has to be considered. Then the pendulum is vibrating in a changing atmosphere, sometimes warm, sometimes cold, and a change of the temperature causes an expansion or contraction, hence the effect of that expansion was to be considered. And, simple as it seems, to estimate whether a pendulum is longer or shorter is really very difficult. Indeed, great was Captain Kater's perplexity about it.

He measured the length of his pendulum thus: he formed a box similar to the one on the table, and laid his pendulum in it, and applied a microscope over one of each pair of opposite knife edges, placing behind them a piece of white paper, so that the edge might be seen. He then applied the microscope. Again he put beneath them a piece of black paper, and he found that the measurement with the white paper was never the same as the measurement with the black paper. After describing how with microscopes he attempted to measure between knife-edge and knife-edge, by placing them when white on a black ground, and when black on a white ground, he adds:—"In one case, the knife-edges seemed to start forward to each other." This difficulty is summed up thus:—"On the cause of this extraordinary fact I can hazard no conjecture, and it remains an interesting subject for future investigation."

We now know that this resulted from a phenomenon called "irradiation." Hence he was bound, even in looking through those microscopes to strike an average of the apparent errors.

Another error that occurred, which he also found great difficulty in remedying, and indeed never did remedy, so that in fact the experiments he made are liable to some infinitesimal corrections still, was this:—If a pendulum vibrates, as this one was doing just now, the air clings to it, and is carried along with it, from what is called the "viscosity" of the air. That viscosity is such, that if you were to put a short piece of gold leaf projecting edgeways upon the face of the pendulum bob, you would find that the gold leaf moved with the action of the pendulum, and was carried along with it, so that it turned neither to one side nor the other. If, however, the gold leaf projected beyond a certain distance, then you would find it bend with the air. Therefore the atmosphere in immediate contact with the bob was dragged along with the pendulum, and that particular element Captain Kater was not aware of. Government, some years ago, in order to set this question at rest, had large vacuum chambers erected, and pendulums set vibrating in them, to ascertain how great an error was caused by the viscosity of the air.

Captain Kater having determined the length of this pendulum in the latitude of London in 1818, it was thought of great consequence to ascertain how far the force of gravity varied in different latitudes.

A memorial was presented to the government in 1818, in order to ascertain by means of a pendulum how gravity varied throughout the British Isles, and Kater was commissioned to take steps for the purpose. Government placed at his disposal certain members of the Royal Corps of Engineers, with whom he set out to the north of Scotland, and made experiments at various places. He went up to Unst, in the Shetland Isles, then he came down to Portsey, then to Leith, then down to Clifton in Yorkshire, then to Ashbury, then to London, and then to the Isle of Wight, and in each of those places he made certain experiments based upon the principles now too briefly described. This lecture would extend far beyond the allotted time if it entered into details with reference to local arrangements and special calculations. It may suffice to refer to the table on the wall for particulars of the results. The following is a copy of the table:—

Name of place.	Latitude of place.			Vibrations in a mean solar day.	Length of a pendulum to vibrate seconds.
	deg.	min.	sec.		
Unst	60	45	28·2	86·096·90	39·17146
Portsoy	57	40	58·65	86·086·05	39·16159
Leith Fort ..	55	58	40·8	86·079·40	39·15554
Clifton	53	27	43·12	86·068.90	39·14600
Ashbury hill..	52	12	55·32	86·065·05	39·14250
London	51	31	8·4	86·061·52	39·13829
Shanklin, or rather Dunmore	50	37	23·94	86·058·07	39·13614

From this table it will be seen that the length of a pendulum vibrating second in the places respectively entered is that given in the last column.

These lengths are sufficient to enable a mathematician to calculate the force by which the pendulum is caused to swing. Now, as the only force causing this swing is that of gravity, such a calculation determines the force of gravity at that place in relation to its powers to produce motion. Hence is deduced those 39 inches, which in ordinary expression is thus broadly stated to be the length for pendulums vibrating seconds in the latitude of London. Captain Kater deduced that 39·13829 inches was the length of the pendulum vibrating seconds in Mr. Brown's house in London. This length requires to be reduced to sea-level. Now, the rooms of the Royal Society, at Somerset House, are 81 feet above low water, and by the aid of a mountain barometer, made by Ramsden, Kater found the room in Portland Street to be two feet below those of the Royal Society, and as the length of pendulum above the floor was four feet, the elevation of pendulum above sea-level is 83 feet.* Now, gravity varies inversely as the square of the distance of the place from the centre of the earth, therefore, the length of pendulum must be increased in this proportion; and taking the radius of the earth for the latitude of Portland Place to be 3954·583 miles, we have 39·1386 inches for pendulum vibrating seconds at the level of the sea in the latitude of London.

The greatest difference between the mean and that of any of the sets of experiments is only ·00028 of an inch, or $\frac{1}{139959}$ of length of pendulum. The length 39·1386, as thus determined, is that required to perform one vibration in $\frac{1}{86400}$ of a mean *solar* day, under the circumstances described, and at the level of the sea.

Finding how much could be obtained from this, with regard to the British Isles, Government commissioned Captain Sabine to go to different places on the east coast of Africa, the Island of Ascension, Bahia, Trinidad, Jamaica, New York, Greenland, and Hammersfest, in Norway, and repeat Captain Kater's experiments. These experiments are repeated, and then, by an arithmetical process, which need not be referred to in detail, it was very easy, having given the number of vibrations of this invariable pendulum (for the distance between these knife edges did not vary) performed in a solar day, to calculate the power that was pulling it; and from that calculated power could be obtained the mass of the earth beneath the place where it was being pulled, making, of course, all the allowances for corrections and other circumstances. That calculated power gives the thirty-two feet which we are all acquainted with as the measurement of gravity. The meaning of which is, that gravity will generate in a 1lb. weight, in one second, a velocity of thirty-two times greater than that which it is agreed shall be called the unit or absolute measure of force. Put con-

* There is reason to conclude that these measurements require to be corrected.—A. R.

versely—the absolute unit of force is equal to the weight of $\frac{16\text{ oz.}}{32{\cdot}2} = \frac{1}{2}$ oz. nearly.

Captain Foster afterwards repeated these experiments, and made others, and from them has been obtained the figure of the earth, and calculations of all kinds used in scientific investigations throughout the globe depend upon them. Captain Foster was unfortunately drowned in the river whilst observing some of his experiments, but Mr. Baily undertook to tabulate his results, and completed the calculations on the data which had been obtained by Captain Foster's observations. The calculations Mr. Baily made for this purpose occupy many closely-printed quarto pages of figures. The result was solely to ascertain the length of the pendulum, and so deduce the figure of the earth. Great beyond all ordinary estimate is the amount of care, patience, perseverance, and anxiety that attends experiments of this kind.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

The Juries Bill.

On Monday, July 28, the Attorney-General announced the intention of the Government to withdraw this Bill, and the order was accordingly discharged.

The "Chlorodyne" Dispute.—Browne v. Freeman.

(*Before the Lords Justices of Appeal.*—July 23, 1873.)

This was an appeal against a decision of the Lord Chancellor exercising his original jurisdiction in hearing the causes set down before the Master of the Rolls. The bill in this suit was filed by Dr. Collis Browne for an injunction to restrain the defendant, a chemist in the Kennington Road, from advertising, or in any other way representing, that by the decision of Vice-Chancellor Wood, he was entitled to the sole right to use the word "original" as a prefix to cholorodyne. It was the third suit between the parties. The plaintiff began to supply the public with chlorodyne in 1855, having invented it, as he stated, in 1846, and used it with success in his practice in the East. The first bill was filed in May, 1862, to restrain the defendant from using the name of chlorodyne as descriptive of a medicine prepared by plaintiff; but on the defendant putting in an answer, claiming to have discovered his preparation in 1844, and denying that he had ever advertised it except as Freeman's chlorodyne, the plaintiff dismissed his bill. The second bill was filed in December, 1862, to restrain the defendant from advertising his own preparation as "the original chlorodyne, manufactured by the inventor, Richard Freeman." In 1864, Vice-Chancellor Wood dismissed this bill, on the ground that, as far as the name of chlorodyne went, the plaintiff had, by acquiescence in the use of it by other persons, lost the right to treat it as his own trade mark, and that the defendant had not actually represented that his chlorodyne was of the manufacture of the plaintiff; but, as his Honour disapproved the course pursued by the defendant, he dismissed the bill, without costs. There was no appeal from this decision. In January, 1872, the present or third suit was brought in consequence of some advertisements issued by the defendant, one of which was as follows :—

"The original chlorodyne and only genuine invented by Richard Freeman, pharmacist, entitled by the decision of Vice-Chancellor Sir W. Page Wood, January 11, 1864, to the sole right to use the word 'original' as a prefix to 'chlorodyne,' which decision was confirmed July 12, 1864." The plaintiff also complained of the defendant's representing that the genuine chlorodyne is only sold under the protection of Government authority, with a stamp bearing the words "Freeman's Original Chlorodyne," and that without such stamp no chlorodyne is genuine; and that several testimonials to the efficacy of chlorodyne as a remedy for various disorders which were really given in favour of the plaintiff had been appropriated by the defendant and printed on the wrappers of his bottles. The Lord Chancellor thought the matter was virtually concluded by the former suit, and that the defendant's misrepresentation of the effect of Vice-Chancellor Wood's decree gave the plaintiff no right to any relief. His Lordship also thought that no case had been made out as to the testimonials, and the bill was dismissed, with costs. The plaintiff then presented a petition of rehearing.

Sir R. Baggallay, Q.C., and Mr. B. B. Rogers were for the plaintiff; Mr. Southgate, Q.C., and Mr. Stirling were for the defendant.

Lord Justice James said he thought the suit was an entire experiment, it had been instituted without any authority. Probably it might have answered the object of the plaintiff as another advertisement of the superiority of his chlorodyne over any other. It had been long ago settled in this court that the word "chlorodyne" had become the mere name of an article, which it was open to anyone to use. Freeman was as much entitled to say that his was "the original" chlorodyne as was Browne. Freeman always placed his own name upon what was sold by him. It was simply the case of two rivals in trade selling their own manufactures under the same descriptive name. It appeared to their Lordships (though the defendant had not been heard) that the defendant had misrepresented the effect of Vice-Chancellor Wood's judgment. But still this afforded no ground for the interference of the Court; there was no representation that Freeman's manufacture was the same thing as Browne's. If it amounted to anything, it was a slander on the plaintiff; but it was not a violation of any trade mark or of any right of property which this Court would interfere to protect. His Lordship thought the decision of the Lord Chancellor was quite right.

Lord Justice Mellish was of the same opinion. He thought the decision of the Lord Chancellor was quite right upon the ground on which he had put it. The advertisements complained of had been first published during the pendency of the former suit, when an application might have been made to the Court by the plaintiff, and the defendant having continued them ever since, it was now much too late for the plaintiff to complain. At the same time his Lordship (the Lord Justice) did not see how the plaintiff could be entitled to any remedy. There could be no right of action at law, for all the advertisements plainly stated that what the defendant sold was manufactured by himself. If an action was maintainable at all, it would be on the ground that there was a slander of title or of the plaintiff as a professional man. But the difficulty was that the advertisements did not allude to the plaintiff at all—the utmost they did was to make a false statement. Puffing advertisements often did this, and they might no doubt prejudice a fair dealer who did not care to go to the expense of issuing such things. But this was no ground for the interference of the Court. In this case both the parties were advertisers, and had done the best they could for themselves in that way. The petition of rehearing must be dismissed, with costs.

Conviction of an Assistant for Theft.

At the Woodbridge Petty Sessions, on July 23rd, Joseels Boulton, late assistant to Mr. B. D. Gall, pharmaceutical chemist, of Woodbridge, Suffolk, appeared on remand charged with embezzling 3*s.* 6*d.* The prosecutor stated that having a suspicion that he was being robbed he communicated with the police, and through their agency purchases were made from the prisoner, serving in Mr. Gall's shop, to the extent of 7*s.* 6*d.*, which were paid for with marked money. This should have been put in the till which was kept locked by the prosecutor; but upon ope ng the till only 4*s.* of marked money was found. Upon being spoken to prisoner produced the missing 3*s.* 6*d.* from under some paper in a drawer. The prosecutor asked to be allowed to withdraw the case as since the first hearing the offence had been acknowledged by the prison r and he did not wish him punished further.

This however the magistrates refused to allow, and the prisoner having pleaded guilty was sentenced in deference to Mr. Gall's appeal for leniency, to two months' imprisonment with hard labour.—*From the Woodbridge Reporter.*

Adulteration of Mustard.

At the Epsom Petty Sessions, on Monday, July 21, Mr. William Moore, grocer, of Headley (Surrey) appeared in answer to a summons charging him with selling mustard as pure and unadulterated, which, upon examination, was found to be adulterated with flour and turmeric. Mr. Sherrard, Solicitor, appeared for the defendant. John Page, an inspector appointed under the Adulteration of Food Act, said that on the afternoon of the 3rd inst. he called at Mr. Moore's shop, and purchased two ounces of mustard, for which he paid 2*d.* He told Mrs. Moore, the wife of the defendant, that he wanted it for the purpose of having it analysed. She said, "We sell the mustard the same as we get it, and if it is adulterated we cannot help it." On the following day witness took the same mustard which he had purchased at the defendant's to Dr. Stevenson, of Guy's Hospital, to be tested. On the afternoon of Saturday, the 12th inst., he received a certificate from Dr. Stevenson, showing that the mustard was adulterated by the admixture of flour and termeric. In answer to Mr. Sherrard the witness said Dr. Stevenson did not tell him what was in the mustard, but sent him his certificate. Witness told Mrs. Moore that he intended to take the mustard to Dr. Stevenson on the following day to have it analysed, but made no appointment with her to attend. Witness did not think that he had ever tasted pure mustard. He was not aware that pure mustard was uneatable. Mr. Sherrard, on behalf of the defendant, contended that the prosecution would fall to the ground, owing to the inspector not having complied with the requirements of the Act, and given the defendant notice of the day on which the analysis was to take place. He did not asked for pure mustard, and everyone knew that pure mustard could not be eaten. Mr. Sherrard then called Mr. W. J. Bellville, of the firm of Keen, Robinson, and Bellville, the manufactures of the mustard, who deposed that upon all their tins was the following notice:—"This is an admixture in which no injurious ingredient has been used." There was a large quantity of genuine mustard sold, but it was at a very much higher price than the other. They used the best wheaten flour, which made the mustard white, and turmeric was used to colour it. The only fault in the mustard would be that persons could eat more of it, but then they paid a much lower price for it than they would for the genuine article. The magistrates said they were of opinion that the charge was proved. They considered that sufficient notice was given to the defendant, and therefore would inflict a fine ot 3*s.* and costs. The money was paid.—*Grocer.*

Sudden Death of a Chemist and Druggist.

An inquest has been held at Bournemouth to inquire respecting the death of Mr. John Mason, chemist and druggist, of that town. Evidence was given by the housekeeper of deceased that between five and six in the morning she heard a strange noise in the deceased's bedroom, but she had heard a similar noise before, and deceased upon being spoken to respecting it said it was only the nightmare. In the morning as deceased did not come down the door of his room was opened and he was found lying in bed dead.

Mr. Nunn, surgeon, deposed that he was sent for a little before eight, and when he arrived Mr. John Mason appeared to have been dead about two hours. There was nothing in the appearance of the body to show the cause of death. A *post-mortem* examination was therefore ordered and at the adjourned inquest Mr. Nunn stated that the heart was so diseased as to cause death by syncope and that he had no doubt that was the cause of death. A verdict in accordance with this evidence was accordingly returned.

Poisoning by Ammonia Solution.

An inquest has been held at Pendleton on the body of George Gaythorp, aged 24 years, a billiard marker, who died from the effects of a quantity of ammonia solution which he drank inadvertently on the afternoon of Friday, the 11th of July. Deceased, after eating a good dinner, went to bed and slept some time. On awaking he got up and drank from a cup on a table a quantity of ammonia solution which his wife had got to clean his coat. He immediately vomited and became seriously ill. Medical attendance was called, but deceased became worse and died. It seems that he had had some nettle-beer for his dinner, and that a quantity had been left in a cup on the table, close beside the cup containing the ammonia. Before his death, deceased twice affirmed that he had taken the ammonia by mistake, and his relatives and friends had no reason to doubt his statement. The jury returned a verdict that the deceased came to his death by misadventure.—*Manchester Courier.*

Supposed Death from Morphia.

An inquest has been held at Newton Abbot touching the death of an infant three weeks old. It appeared that a girl had been sent to Mr. Ponsford for some medicine for the child, who was troubled with the wind. Medicine was sent, with written and verbal instructions that a teaspoonful should be given. The nurse could not read, and the messenger either delivered a wrong message or the nurse misunderstood. Two teaspoonfuls—or a double dose—were given, and the child died.

There being some doubt as to the cause of death, the inquest was adjourned to allow an analysis of the medicine to be made. At the adjourned inquest it was stated that the medicine had been analysed by Dr. Stevenson, of Guy's Hospital, who reported that it consisted of a solution of a preparation of morphia in dill water, together with sugar or syrup. The quantity of morphia present was so small that it was found to be impossible to separate enough to weigh. He made experiments, however, which satisfied him that the medicine contained not less than one-fifteenth of a grain of a salt of morphia per ten drachms of the medicine. If two doses of the medicine had been taken, one seventy-fifth part of a grain of a salt of morphia would have been swallowed.

Dr. Gaye said it would be impossible to say whether 1-75 part of a grain would cause death. Children had been known to take more without death ensuing, and others have died from taking a less quantity. It would depend on the health of the infant. The discolouration was owing to impeded circulation. Generally speaking, he did not believe the dose given would cause death. If the dose was given to the child according to the label—half-a-teaspoonful—the quantity of morphia (150th part of a grain) would not kill. Convulsions would not be a sign of death by morphia. As described at the former inquiry, the appearance of the child gave symptoms of poisoning by morphia in the last stage. There was a case on record of a child dying by taking a hundred and twentieth part of a grain.

The jury retured a verdict of death from "Natural Causes."

Obituary.

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

On the 23rd July, 1873, Mr. Alfred Rook Squire, Pharmaceutical Chemist, of the firm of Barron, Squire, and Co., Bush Lane. Aged 27.

On the 5th May, 1873, Mr. William John Wright, Chemist and Druggist, of Hastings.

On the 22nd July, 1873, Mr. John Vincent Nunn, Chemist and Druggist, of Bury St. Edmund's.

Correspondence.

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

The Society's Examinations.

Sir,—Being on a visit to London, and having a little business to transact with the secretary of our Society, I called at Bloomsbury Square for that purpose. It so happened that candidates were undergoing the Minor examination, and, by virtue of the office I hold as local secretary at Wolverhampton, I was invited to enter the room where the examinations were going on, in order that I might judge for myself of the system that was adopted. I was much pleased with everything that I saw, and as it is now seventeen years since I underwent the ordeal for both Major and Minor, I noted several important improvements.

They have a most excellent collection of prescriptions neatly arranged in books, and these prescriptions do not seem to be selected on account of their difficult nature, but are a fair representation of what would be met with in the ordinary run of a dispensing business.

There is also a much better collection of Materia Medica specimens; these I find are not accessible to students as formerly, so that they do not run any risk of being handled and crushed, as the old collection used to be.

The dispensing counter is quite new since I was there, and offers to the candidate a most excellent means of showing a practical knowledge in the preparation of mixtures, emulsions, powders, pills, etc., even to the wrapping up and finishing off of each article.

I was shown the result, in two cases, in the preparation of an emulsion from the same prescription, and with drugs out of the same bottles, one was beautifully mixed, and as much like milk as possible; the other almost looked dirty and badly mixed. There can be no doubt about the utility of this department, as well as of the fairness with which it is conducted.

In the botanical department I saw a collection of fresh medicinal plants, gathered that morning, also a collection of dried specimens, and on inquiry I found the latter were for those candidates who never had any facility for studying from fresh plants. This I thought was quite right, for I know something of the great difficulty that exists in some parts of obtaining some of the fresh specimens of plants of regular use.

Although there were many candidates to be examined, I was much struck with the patient and quiet manner in which everything was conducted, and however nervous a candidate may be before he enters the room, it certainly ought to disappear when he experiences the nice familiar way that each examiner accomplishes his task, as no one but the examiner and his candidate can hear what is said, in fact, it more represents two gentlemen engaged in a quiet drawing-room conversation, and I can imagine the pain it must cause when a badly-prepared candidate presents himself—but this should be avoided as much as possible.

But it is very evident that many go up too soon—they try to do in about two months what ought to have occupied a period of two or three years. Let the apprentices of the present day get a good ground-work of chemistry and botany by attending classes and lectures for that purpose, and then when they come to prepare for their examination they will find their work comparatively easy, and the examination easier still; but it is to only such as these that the remark will apply.

Those of our local secretaries who have not yet seen how the examinations are managed, I should advise by all means to take the first opportunity of doing so.

W. Y. Brevitt.

The Sale of Patent Medicines.

Sir,—I should like, with your permission, to bring before the council of the Pharmaceutical Society and of the trade generally the following facts. An enterprising draper in a leading West End thoroughfare displays in one of his shop windows all the most ordinary patent medicines ticketed 10¾*d.* the 1*s.* 1½*d.* article, and 2*s.* 3½*d.* the 2*s.* 9*d.* Seidlitz powders 7½*d.* the box of twelve; citrate of magnesia, 6¾*d.* the 1*s.* bottle; bottles holding apparently 3 oz. of tincture of myrrh, 7¾*d.*; of syrup of Tolu, 5¾*d.*; while drugs, such as camphor, borax, precipitated chalk, etc., are retailed inside at 10 per cent. above the wholesale price list. Such a mode of doing business appears to me to be far more injurious to us than a co-operative store. All our lady customers visit drapers' shops, and if they are there offered Steedman's powders at 10¾*d.* and Rowland's macassar at 1*s.* 11½*d.*, before many months are over the occupation of a chemist will be confined to the dispensing of prescriptions and the sale of poisons, and the annual returns of the so-called first class family and dispensing business diminished by about one half.

Now, Sir, if the whole trade were to combine under the leadership of the council of the Pharmaceutical Society surely something might be done to check the progress of this gigantic evil. A West-End Chemist.

The Sale of Fly Papers and the Pharmacy Act.

Sir,—Some time ago you had a series of letters from correspondents on the sale of "vermin killers" as affected by the Pharmacy Act. There is one phase of the question not then mentioned I should like to see cleared up., viz., the sale of "fly papers." How are they affected by the said Act? May we sell any quantity of paper saturated with strychnine or arsenic as heretofore to customers of all sorts and sizes? Or ought they to be registered same as vermin killers? "Papier moure" and others of the fly papers are as much preparations of strychnine and arsenic as Hunter's or Butler's vermin killers are preparations of these poisons and would be as effectual for criminal purposes as either of the latter. That being so, what about the registration? Are we to go through all the forms of registration for the sale of a single paper which is oftenest wanted, or are we to increase the danger by forcing the public to take half-a-dozen or more in order to remunerate us for our extra trouble, or are we to sell as use and wont and defy the Act, its pains and penalties.

Dundee, 23rd July, 1873. William Laird.

M.P.S.—The Tinct. Ferri Perchloridi, B.P., is an unsatisfactory preparation, the spirit being looked upon in some quarters as unnecessary, useless, and deleterious, for unless the liquid contain an excess of acid, the ferric chloride is decomposed, and an insoluble oxychloride of iron is formed; while, on the other hand, if the tincture be acid, there is after some time a formation of ether. The subject was discussed at the last meeting of the British Pharmaceutical Conference (Pharm. Journ. iii. 234), when Mr. Schacht stated his opinion that the change taking place in this tincture was due to deficiency of chlorine, and he found all difficulty could be avoided by the following plan:—Instead of adding the whole quantity of nitric acid and then heating until exhalation of red fumes, he first heated the acid protochloride and then added the nitric acid gradually, and only until the red fumes were given off. It has been suggested to do away with the tincture altogether and use the liquor; but it must not be forgotten that the tincture in which the formation of ether has taken place is sometimes specially prescribed both in this country and America, whilst sometimes the water in the liquor, as instanced by Mr. Haselden, would be incompatible with the other ingredients in a mixture.

W. Wilkinson.—Received with thanks.

Messrs. Edmonds, Davies, and Co.—The advertisement has been handed to the publisher.

If "*Omicron*" sends his name and address, he will be supplied with the information asked for.

H. Arnold Woolnough.—The new regulations respecting the Jacob Bell Memorial Scholarships state that after the competition in 1873, "Candidates must be Registered Students or Apprentices of the Society under twenty-one years of age, and have passed not less, or been engaged for not less, than three years in the pharmacy of a Registered Pharmaceutical Chemist or Chemist and Druggist." You are recommended to communicate with the secretary.

Mr. B. P. Guest.—The report we give at p. 98 we think will be sufficient.

T. Garside.—Yes; the licence is the same.

Communications, Letters, etc., have been received from Dr. Royle, Mr. J. Walker, Mr. Jackson, Mr. Harper.

ARTIFICIAL ICE.

The utility of ice for a great variety of purposes is now sufficiently well known not to require especial elucidation, and few of our readers are unaware of the enormous extent to which the ice trade has developed during the last few years. For domestic purposes however the use of ice is much less general in this country than it is in America, where it is regarded almost as much a daily necessity of life as tea, coffee, milk, or bread, and in some cities of the Western Continent is supplied to the residents with the same regularity as those commodities.

The fact that the natural production of ice takes place only in places or at the season when there is no particular need for it as a cooling agent necessarily involves either its storage in such a manner as to resist thawing until such time as it is wanted, or its transport from those cold latitudes where it is permanent. Both plans are costly, and they have also the further disadvantage of not being easily adapted to the varying relations of supply and demand. Hence it may happen that ice sometimes commands a price three times as much as it can be bought for at other times.

These circumstances are naturally suggestive of the production of ice by artificial means which could be set in operation at will whenever required. One of the earliest attempts to attain this end was described in the PHARMACEUTICAL JOURNAL for 1856-57, vol. xvi., 477, also vol. xviii., 30. That plan, in common with most others which have been tried, was based upon the fact that when a volatilizable liquid is converted into vapour there is always absorption of heat, or in other words heat is employed to maintain the state of vapour and thereby becomes latent. In vaporizing liquids for various industrial purposes the heat thus requisite in the formation of vapour is supplied by the combustion of fuel, as in evaporation or distillation, but if the formation of vapour be managed in such a way that the requisite heat be taken from that determining the temperature of the liquid vaporized, there will then of course be a reduction of its temperature such as is felt when a few drops of ether are allowed to evaporate in the hand.

By evaporating with sufficient rapidity a liquid requiring a considerable amount of latent heat for the formation of vapour, such a reduction of temperature may be produced as to freeze water surrounding the vessel in which the vaporization takes place, the sensible heat of the water being transferred to the evaporating liquid and rendered latent in the formation of vapour. This is the whole theory of ice making, but practically there are some difficulties to be overcome. In the first place it is necessary to have a liquid which combines with high latent heat of vaporization such a degree of vapour tension that it will evaporate rapidly enough within the range of temperature at which the operation of ice-making has to be conducted.

Taking for instance ordinary alcohol, which has a latent heat of vaporization about one-third that of water, the tension of its vapour at 32° F. is only one-tenth what it is at its boiling point, and the facility with which it is vaporized at those temperatures differs in the same degree. In the case of ether the difference is not so great, the vapour tension at 32° F. being one-fifth what it is at its boiling point; consequently ether is a much more efficient material for ice making than alcohol, although its latent heat of vaporization is not quite half that of alcohol.

But even with ether the rate of evaporation at the low temperature necessary for ice making is too slow under ordinary conditions, and in order to maintain a sufficiently rapid vaporization it is necessary to employ an exhaust funnel, working in such a way that the ether vaporizes as if into a vacuum, and every stroke of the pump removes a quantity of vapour corresponding to its capacity. In the reverse stroke of the pump the vapour is forced into a condenser, where it is liquefied and introduced into the refrigerator for use again.

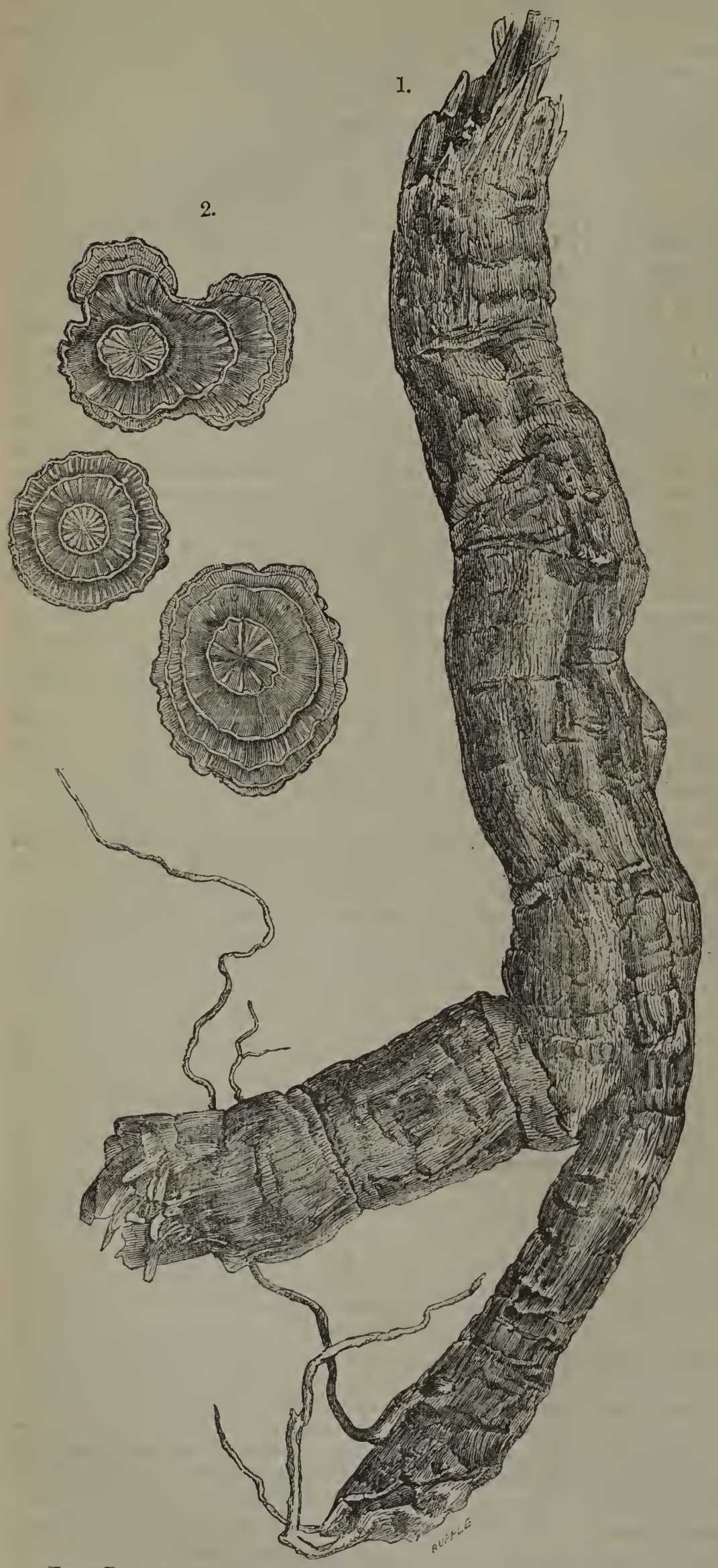
Hitherto ether is the material that has been most successfully used in the artificial production of ice; but there is another material which possesses characters such as to indicate the probability that it may prove far more efficient than ether. This is liquid ammonia—not solution of ammonia but the dry gas liquefied. In the case of this material the difficulty attending vaporization at a low temperature almost disappears, for its boiling point under normal pressure is −29° F. and the tension of its vapour between 50° and −4° F. is about eighteen times as great as that of ether vapour. At the same time the latent heat of vaporization of liquid ammonia approaches very near to that of water. Ammonia is therefore a material eminently suited for the production of ice artificially, and it has for some years past been employed for that purpose by Carré in the following manner:—a concentrated solution of ammonia in water is heated in a vertical boiler under a pressure of 100 to 135 lbs. on the square inch. The ammonia gas thus produced, mixed with about one-third its weight of steam, passes off through an ascending coil of tube attached to the upper end of the boiler into a tubular condenser, where it is cooled and liquefied under the same pressure, collecting in a receiver, from which it passes at a regulated rate into the vessel which is used for cooling. This vessel—the refrigerator—somewhat resembles a steam boiler with vertical tubes; its upper end is connected by means of a pipe with a vessel termed the absorber, into which the vaporized ammonia is from time to time discharged and brought in contact with a jet of water, by which it is absorbed, forming a solution that is continuously pumped away to supply the boiler, where ammonia gas is produced. By an ingenious arrangement the hot liquor, exhausted of ammonia in the boiler, is made to flow through a system of pipes, outside of which flows, in the opposite direction, the fresh solution of ammonia from the absorber, and thus an exchange of temperature takes place, the solution of ammonia being heated while the water is cooled sufficiently to be used for absorbing ammonia gas in the absorber. The operation of this apparatus is therefore continuous, as in the case of the ether machine. The main defect of this apparatus is, that not more than $\frac{1}{2}\frac{1}{4}$ of the ammonia is really usefully employed in cooling. For example, the liquefied ammonia produced contains about 25 per cent. of water, and since water at a temperature of 22° to 40° F. is capable of retaining in solution its own weight of ammonia, it follows that only two thirds of the ammonia in the liquid supplied to the refrigerator can be available for cooling, and that the residual solution must be from time to time run back again to the boiler. Again, since the liquor in the boiler is not entirely deprived of ammonia, but still retains 25 per cent.; it will, after cooling, only absorb 5 per cent. more ammonia, and it will be necessary to supply six times as much of this liquor to the absorber as would be needed of pure water.

(To be continued.)

ON PAREIRA BRAVA.

BY DANIEL HANBURY.

(*Concluded from page* 83.)



True PAREIRA BRAVA—ROOT OF *Chondodendron tomentosum.**

* 1. From a sample purchased in London in 1862. 2. Sections of roots received from Mr. J. Correa de Mello.

The root of *Chondodendron* cannot be confounded with the stem, which is woody and fibrous and of a different structure. Geoffroy's description of the former which I have translated at page 81 is correct so far as it goes. I may add that the numerous specimens I have seen present but little variation. All are portions of a tortuous, branching root, wrinkled longitudinally and having transverse fissures, constrictions, or ridges. The root is externally of a blackish-brown, and light yellowish-brown within. In Mr. Francis's drug there are young roots having the remnants of green aerial stems rising from their upper part. In Mr. Peckolt's specimen the aerial stems are fully preserved, as thick as the finger and many feet in length. The root seems to be gorged with juices so that under the penknife it cuts more like a very hard fat or wax than as a fibrous wood. In transverse section it does not display zones of the same regular and beautiful definition that one sees in ordinary Pareira Brava. In the root of Chondodendron there is a large well-marked central column composed of wedges diverging from a common axis, around which are arranged a few concentric rings intersected by wedge-shaped rays which are often irregular, scattered, and indistinct. The axis is not often eccentric.

In *Cissampelos Pareira* the root and stem are nearly alike in structure, and in transverse section show no concentric rings. Those received from Jamaica, which were the largest that could be collected, were rarely so much as an inch in diameter, and in many localities it is difficult to obtain the stem or root thicker than a goose quill.

TRANSVERSE SECTION OF STEM OF *Cissampelos Pareira L. From a Jamaica specimen.*

The Pareira Brava of English commerce is mostly of larger size than the root of *Chondodendron*, and is a much more woody substance. Its internal structure, which is familiar to most druggists, is very remarkable, consisting of a series of layers which are often developed exclusively in one direction. Nothing is known of the botanical origin of this drug, beyond the fact that the structure of the wood is that of the order *Menispermaceæ*.

Of late years even this sort has become rare, and its place has been taken

by a drug completely devoid of medicinal power. This latter consists of cylindrical woody truncheons which have an internal structure not very diverse from that represented below, though generally less eccentric, with always a distinct central pith. The wood is tasteless, and often seems to have been in-

ROOT (?) COMMONLY KNOWN AS *Pareira Brava*, AND ERRONEOUSLY REGARDED AS DERIVED FROM *Cissampelos Pareira* L.

jured by damp. It should be rigidly excluded from pharmaceutical use.

Several other sorts of Pareira Brava are known—at least in South America. One, of which there is a parcel now in the London market, is remarkable for its large size, and for being internally of a fine yellow. As it is also very bitter, it probably contains berberine.

Another sort is derived from *Abuta rufescens* Aublet, a well-marked plant growing in Guiana and North Brazil. Specimens of a thick woody root, marked *Abutua grande* or *Parreira Brava grande*, and attributed to this species have been sent to me by Mr. Correa de Mello; they exhibit numerous concentric layers traversed by very distinct, darik medullary rays, the inter-radial spaces being whte, and rich in starch. It is apparently a well-marked sort, and one I have not seen in commerce.*

In conclusion I strongly advocate returning to the use of the root of *Chondodendron*, which is the drug on which the reputation of Pareira Brava was originally founded.

In Brazil this root is regarded as the legitimate sort, and is still held in the highest esteem.

Though it has not been clearly recognized by European writers, is not altogether unknown. Guibourt† seems to nave been acquainted with it and even correctly surmised its botanical origin. It is the root figured by Göbel and Kunze,‡ and there is an old specimen of it in the Pharmaceutical Society's Museum marked *Pareira Brava*. I myself met with it in the market in 1862. Lastly Dr. Squibb has pointed out§ that some small lots of Pareira Brava imported into New York in 1871 consisted in large part of a drug entirely different from any previously seen, and that he at first supposed it an adulteration; but that subsequent examination had shown him that the drug in question agreed well with the older descriptions of Pareira Brava, and especially with Pomet's figure, so that he was convinced it was true *Pareira Root*. From Dr. Squibb's description I feel sure that the drug before him was the same as that to which I have called attention in the present paper.

There can be no doubt that it would become plentiful if the demand should arise, and that it would advantageously replace the worthless kind now found in the drug trade.

THE PHARMACY OF THE UNITED STATES' PHARMACOPŒIA.

BY WILLIAM MARTINDALE, F.C.S.,

Demonstrator of Materia Medica in University College, London.

(*Concluded from page* 84.)

Syrupus rhei aromaticus is made by adding to simple syrup a tincture prepared from rhubarb, cloves, cinnamon, and nutmeg, by percolation with diluted alcohol. *Syrupus sarsaparillæ compositus* is intended to represent the famous French *Sirop de Cuisinier*. It is made by macerating and percolating sarsaparilla, guaiacum wood, pale rose petals, senna, and liquorice-root, all in moderately fine powder, with diluted alcohol, evaporating, mixing with water, and in that dissolving the sugar, lastly, the oils of sassafras, anise, and gaultheria are mixed thoroughly with the syrup so produced. *Syrupus scillæ* is much the same as ours. *Syrupus scillæ compositus* is intended to represent an old popular

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* When Aublet was in Guiana, 1762-64, the stems of *Abuta rufescens* were shipped to France as *Pareira Brava blanc*. He says there is a variety of the same with the woody parts reddish, which is known in Cayenne as *Pareira Brava rouge*. He also describes and figures a plant he calls *Abuta amara* or *Pareira Brava jaune*, which has the wood yellowish and very bitter.

This last is, I think, identical with the yellow wood of which, as I have said, there is a quantity now on sale as "*Pareira Brava*."—See *Hist. des Plantes de la Guiane Françoise*, i. (1775), 618-21, tab. 250-51.

† *Hist. des Drog.*, ed. 4, iii. (1850) 671.

‡ *Pharm. Waarenkunde*, ii. (1830-34) tab. 13. fig. 1, b-c.

§ *American Journal of Pharmacy*, March 1, 1872, 107.

nostrum in America, known as Coxe's Hive Syrup. It has the following composition :—

Syrupus Scillæ Compositus.

Take of Squill, in moderately fine powder,
Seneka, in moderately fine powder, each, four troyounces ;
Tartrate of Antimony and Potassium, forty-eight grains ;
Sugar, in coarse powder, forty-two troyounces ;
Diluted Alcohol,
Water, each a sufficient quantity.

Mix the squill and seneka, and having moistened the mixture with half-a-pint of diluted alcohol, allow it to stand for four days. Then transfer it to a conical percolator, and pour diluted alcohol upon it until a pint of tincture has passed. Boil this for a few minutes, evaporate it by means of a water-bath to half-a-pint, add fourteen fluidounces of boiling water, and filter. Dissolve the sugar in the filtered liquid, and having heated the solution to the boiling point, strain it while hot. Then dissolve the tartrate of antimony and potassium in the solution while still hot, and add enough boiling water, through the strainer, to make it measure three pints. Lastly, mix the whole thoroughly together.

There is also a *Syrupus acaciæ*.

Tincturæ.—Fifty-seven formulæ. The following note precedes the formulæ :—

"When tinctures are prepared by percolation, great care should be taken to observe the directions given at page 3 ; so that the substances treated may be, as far as possible, exhausted of their soluble principles, and a perfectly clear liquid obtained. When prepared by maceration, they require to be frequently shaken during the process, which should be conducted in glass bottles, well stopped."

The general strength of simple tinctures is such that eight fluidounces of tincture represent one troyounce of drug. The following are exceptions :—

Name of Drug.	Troyounces.	Produce of Tincture, fluidounces.
Aconitum	12	32
Arnica	6	32
Benzoinum	6	32
Cannabis (Ext. Indian)	¾	16
Cantharis	1	32
Capsicum	1	32
Castoreum	2	32
Cinchona (yellow)	6	32
Cinnamon	3	32
Guaiacum	6	32
,, (ammoniated)	6	32
Humulus	5	32
Iodium*	1	16
,, (compound)*		
Iodum, Potassium Iodidum	½, 1	16
Jalapa	6	32
Kino	¾	32
Krameria	6	32
Myrrha	3	32
Nux vomica	8	32
Opium (in powder)	2½	32
,, (,, deodorized)	2	20
,, (,, acetated)	2½	32
Quassia	2	32
Rheum		
Rheum, Cardamomum	3, ½	32
Balsamum Tolutanum	3	32
Veratrum viride	16	32
Zingiber	8	32

* Tincture of iodine is the same as the old P.E. preparation, and the compound nearly the same as P.L.

All except the following are made by percolation : —*Tr. aloës, Tr. assafœtidæ, Tr. benzoini, Tr. benzoini composita, Tr. cannabis, Tr. castorei, Tr. ferri chloridi, Tr. guaiaci ammoniata, Tr. iodinii, Tr. iodinii composita, Tr. opii acetata, Tr. opii camphorata, Tr. opii deodorata, Tr. rhei et sennæ, Tr. tolutana, Tr. valerianæ ammoniata.*

Alcohol, sp. gr. 0·835, is the solvent used for making the following tinctures :—

Tinctura.	Tinctura.	Tinctura.
Aconiti	Castorei	Nucis vomicæ
Aloës et myrrhæ	Guaiaci	Tolutana
Assafœtidæ	Iodinii	Veratri viridis
Benzoini	Iodinii composita	Zingiberis
,, composita	Lupulinæ	
Cannabis	Myrrhæ	

Diluted alcohol, sp. gr. 0·941, is used for the next list :—

Tinctura.	Tinctura.	Tinctura.
Aurantii	Cubebæ	Opii camphorata
Belladonnæ	Digitalis	Quassiæ
Calumbæ	Gallæ	Rhei
Cantharidis	Gentianæ composita	Rhei et sennæ
Capsici	Hellebori	Scillæ
Cardamomi	Humuli	Serpentariæ
,, composita	Hyoscyami	Stramonii (seeds)
Catechu	Krameriæ	Valerianæ
Colchici (seeds)	Lobeliæ	
Conii (leaves)	Opii	

Tr. arnicæ (flowers), *Tr. cinchonæ* (yellow bark), *Tr. cinchonæ composita* (with red bark, bitter orange peel, and serpentary root only—no saffron or cochineal), and *Tr. sanguinariæ*, are percolated with a mixture of three volumes of alcohol (sp. gr. 0·835) and one of water ; in the case of *Tr. arnicæ* diluted alcohol is used in displacement.

In making *Tr. cinnamomi, Tr. jalapæ*, and *Tr. kino*, two volumes of alcohol and one of water are used, and for *Tr. aloës* three of water and one of alcohol ; this also contains liquorice (commercial extract). *Tr. ferri chloridi* is about the same as our *Tr. ferri perchloridi. Tr. guaiaci ammoniata*, and *Tr. valerianæ ammoniata* are prepared with *spiritus ammoniæ aromaticus.*

Tr. opii contains one grain of powdered opium in about thirteen minims. In making it, the opium is first macerated three days in water, then the same quantity of alcohol is added and the maceration continued three days longer ; it is afterwards transferred into a percolator, and, when the liquid ceases to pass, diluted alcohol is poured upon it until the required quantity of tincture has been obtained. *Tr. opii deodorata*—a watery fluid extract of opium—is treated by agitation with ether, the ether decanted off and the liquor evaporated till all traces of ether have disappeared, it is then diluted with water, and alcohol—the latter forms one-fourth its volume ; it is of the same strength as the ordinary tincture. *Tr. opii acetata* is one in ten (six of distilled vinegar and four of alcohol) made by maceration. The *elixir proprietatis* of Paracelsus—*Tr. aloës et myrrhæ*—contains no saffron as the old P.L. formula did. *Tr. rhei et sennæ* is composed of rhubarb, senna, coriander, fennel, liquorice (commercial extract), raisins and diluted alcohol. Macerate seven days.

Trochisci.—Thirteen formulæ. These are, chalk (four grains), cubeb* (half a minim of oleoresin), subcarbonate of iron (five grains), liquorice and opium

* These resemble Brown's bronchial troches.

(extract of opium $\frac{1}{20}$ grain), ipecacuanha ($\frac{1}{4}$ grain)' morphia and ipecacuanha (sulphate of morphia $\frac{1}{40}$ grain and ipecacuanha $\frac{1}{12}$ grain), chlorate of potash (five grains), santonin ($\frac{1}{2}$ grain), bicarbonate of soda (three grains), and there are also troches of ginger made with the tincture and syrup of ginger.

Unguenta.—Twenty-nine formulæ. Fifteen have lard alone as a basis, viz. : *ung. acidi tannici, ung. antimonii, ung. belladonnæ (c. ext.), ung. benzoini (c. tinct.), ung. creasoti, ung. gallæ, ung. hydrargyri nitratis, ung. iodinii, ung. iodinii compositum, ung. potassii iodidi, ung. stramonii (c. ext.), ung. sulphuris, ung. sulphuris iodidi, ung. tabaci (c. aq. ext.), ung. veratri.*

Seven ointments have simple *unguentum*—eight parts of lard and two parts of yellow wax—as a basis, viz. : *ung. acidi carbolici, ung. hydrargyri ammoniati, ung. hydrargyri iodidi rubri, ung. hydrargyri oxidi flavi, ung. hydrargyri oxidi rubri, ung. plumbi carbonatis* and *ung. plumbi iodidi. Ung. picis liquidæ* is the same as P.L.—equal parts tar and suet. Cold cream is official under the name of ointment of rose water, and bearing this authority I insert the formula for it :

Unguentum Aquæ Rosæ.

Take of Expressed Oil of Almond three troyounces and a half ;
Spermaceti a troyounce ;
White Wax one hundred and twenty grains ;
Rose Water two fluidounces.

Melt together, by means of a water bath, the Oil, Spermaceti, and Wax ; then gradually add the Rose Water, and stir the mixture constantly while cooling.

Ung. benzoini is prepared by adding the tincture of benzoin to melted lard and applying heat to drive off the spirit ; it is used as a basis for *ung. zinci oxidi. Ung. cantharidis* is *ceratum cantharidis* (our emplastrum) diluted with *ceratum resinæ*—this formula reminds one of two blacks making one white. *Ung. hydrargyri* is twenty-four ounces of mercury with the same quantity of basis—equal parts of suet and lard. *Ung. mezerei* is prepared by adding the fluid extract of mezereon to melted wax and lard and heating to drive off the spirit. On making *ung. hydrargyri nitratis* the solution of nitrate of mercury is directed to be added to the melted lard (*sine* olive oil) at a temperature of 200° F. and stirred, etc., to form an ointment.

Vina.—Nine formulæ. The basis of all the *vina* is sherry—in *vin. rhei* a little diluted alcohol is ordered —three are prepared by percolation—*vin. colchici radicis, vin. opii* (c. pulvere opii, cinnamomo et caryophyllo), and vin. rhei (c. canellâ). *Vin. ipecacuanhæ* and *vin. ergotæ* are made by mixing the fluid extracts of ipecacuanha and of ergot with sherry. *Vin. ipecacuanhæ* will be above double the strength of ours. The following are made by maceration—*vin. aloës (c. cardamomo et zingibere), vin. antimonii,* (as B.P.,) *vin. colchici seminis* and *vin. tabaci.*

Casting a final glance at the work, which possesses much interest pharmaceutically, one cannot but admire its simplicity of arrangement, and the desire to obtain definiteness and uniformity. It is essentially a book of instructions for the pharmacist to prepare his medicines by ; it is not a "cram" book —the student must make his own table of the strengths of preparations and the medical practitioner his of doses, and each will thus become more conversant with it. Free use has been made of the processes in the British Pharmacopœia without any acknowledgment—and I think the compilers have assumed the existence of more skill—and percolators —than will be found in the majority of drug stores in the United States. The result will be that certain makers will acquire a reputation for a few preparations, their make will be nearly always indicated on prescriptions and on a large scale these manufacturers will ignore the pharmacopœia processes entirely as not being adapted for their purposes.

How does the work reflect American pharmacy generally ? I fear not as completely as it might do. Where are the elixirs of bark, the syrups of the phosphates and the eclectic preparations ? But perhaps

"'Tis wisely done ;
What would offend the eye, in a good picture,
The painter discreetly casts into shade."

IS THERE A THIRD ALKALOID IN HYDRASTIS CANADENSIS ?*

BY A. K. HALE.

Whilst preparing hydrastia from an aqueous percolate of *Hydrastis canadensis*, from which the berberine had previously been removed as hydrochlorate, the author noticed the product obtained by adding solution of ammonia as long as a precipitate was thrown down, filtering, dissolving the precipitate in and crystallizing from alcohol, was coloured by and intimately mixed with a yellow powder. To a fresh quantity of percolate, therefore, he added only sufficient ammonia to render it neutral, and the precipitate thus obtained, upon crystallizing from alcohol, formed well defined prismatic crystals of hydrastine, free from yellow matter. Ammonia was then added to the percolate until it was strongly alkaline, which caused the separation of a fresh precipitate, darker than berberine, and neutral in alcoholic solution. Compared with berberine it was less soluble in cold nitric acid, but both formed a red solution when the acid was heated. In water at 60° and cold liquor potassæ it was the least soluble of the two, but both dissolved in hot water. In hot sulphuric acid, berberine formed a yellow, the new substance a reddish-brown solution. Dissolved in hot hydrochloric acid, berberine crystallized abundantly in bright yellow needles while the acid was still warm ; the new body sparingly in darker and larger needles only when the solution was nearly or quite cold. Dissolved in warm water berberine gave with iodohydrargyrate of potassium an abundant yellow precipitate ; the other body gave one less abundant, very light yellow, and almost straw coloured. In order to ascertain whether the new product was a modification of berberine by the action of ammonia, some of that alkaloid was submitted to the influence of ammonia during several days without any change being noticed.

NOTE ON THE REPUTED VALUE OF POLYGONUM AVICULARE, L. FOR STONE.

BY JOHN R. JACKSON, A.L.S.

Members of the order Polygonaceæ are far from being rare, either to the British, Continental, or American botanist ; least of all, perhaps, is the knot-grass (*Polygonum aviculare*), which generally flourishes best where its presence is not wanted, and defies eradication. With such quantities of this weed at our very doors, it seems somewhat ludicrous to import it from ever so short a distance, let alone from Russia, but such is the case that amongst the numerous contributions of vegetable products, "good, bad, and indifferent," which are constantly being received at Kew, a bundle of knot-grass recently arrived from Berdiansk, with a wonderful account of its extraordinary power of curing stone and gravel diseases. Our correspondent says his attention was attracted to it by a case which fell under his own observation—that of a

* Abstracted from a paper in the *American Journal of Pharmacy* for June, p. 247.

man who suffered so excessively, that he was told by the doctors he must undergo an operation ; in the meantime, a quantity of the *Polygonum* was given him by a person who happened to hear of the case, the sufferer drank two tumblers full of the decoction, and, in about fifteen minutes, he felt an intense pain in the bladder and surrounding regions, as if the parts were being torn to pieces, this was immediately succeeded by an irresistible desire to pass water, which was done with great pain, but nothing could check the force of the bladder in ejecting the water, which brought away with it a great quantity of gravel and bits of stone, some of the pieces passed were very large, but the instant they came out they opened into flakes and broke up into thin plates. The man is stated to have quite recovered, and the person who gave him the *Polygonum* is said to have been distributing it in all such cases that have come under his notice for the last thirty years, and always with success.

The following is given as a suitable way of taking the medicine :—Take a good, liberal handful and boil gently in six tumblers of water, till it is reduced to about four tumblers. The dose is one or two tumblers to be taken in the morning on an empty stomach. In bad cases it is given several times throughout the day, but diet must be strictly kept. As a purifier of the blood, one tumbler of a weaker decoction is recommended to be taken every morning.

The discovery of such an apparently valuable medicinal agent by anyone not sufficiently acquainted with plants to recognize it must have been a source of much gratification. Emetic, carthartic, and diuretic properties have been ascribed to many of the Polygoneæ, and even to *P. aviculare* itself. At one time it was stated that the plant was an excellent febrifuge, and it was used in Algeria, and other parts of Africa, as a substitute for quinine. In 1845, a French doctor reported upon it as being an excellent remedy for chronic diarrhœa, the means of applying it being in form of a strong decoction.

At the present time the only really valuable medicinal product of the *Polygoneæ* is rhubarb.

GLYCERITE OF GINGER.*

BY J. B. MOORE.

There is, perhaps, no aromatic more popular or more highly prized for its therapeutic properties than ginger. And as a domestic remedy, in the form of the officinal "tincture," under the well known title of "Essence of Ginger," there is scarcely a preparation of our Pharmacopœia more extensively or more universally used. The "Tincture of Ginger" is, for many purposes, a most excellent and trustworthy preparation of the drug, yet in many cases of children and delicate persons, its strongly alcoholic character disqualifies it for use, and this especially in diseases of the stomach and bowels when irritation or an inflammatory condition exists. The "Syrup of Ginger," as made by the U. S. P., is too weak to possess much medicinal value, and even in its use as a flavour it is of but trifling importance. So there would seem to exist a necessity for a preparation of ginger intermediate in strength between the tincture and syrup, and at the same time free from alcohol. The "Glycerite of Ginger," a preparation whose formula I here present, is admirably adapted to supply this want. It is about triple the strength of the officinal syrup of ginger (U. S. P.), contains no alcohol, and mixes in all proportion with water and syrup without precipitation or turbidity.

The following is the formula and process for its preparation :—

℞	Ext. Zingiber. fluid	f℥i.
	Magnes. Carbon.	℥x.
	Glycerin.	f℥xvj.
	Aquæ	q. s.

Mix the glycerin with an equal measure of water

* From the *Pharmacist*, vol. v., p. 172.

Triturate the fluid extract of ginger thoroughly with the magnesium carbonate. Then add, very gradually, one pint of the mixture of glycerine and water, rubbing well after each addition of liquid, and strain the mixture through strong, close muslin with strong expression. Rub the residue in like manner with the remaining part of menstruum. Then transfer the mixture to a half gallon bottle containing the expressed liquid first obtained and shake the whole vigorously together. Lastly, filter through paper, passing sufficient water through the filter to make the filtered liquid measure 32 fluid ounces.

To insure a good preparation, such as the formula and process will afford, if properly manipulated, it is necessary that some care and judgment be exercised in its manufacture. In the first place the fluid extract of ginger, if purchased, should be of known reliable quality, or else it should be prepared by the pharmacist himself. Secondly, the fluid extract and magnesium carbonate must be thoroughly triturated together before the menstruum is added, which adding must at first be very gradual, with much rubbing after each small addition. The straining and expression directed after the incorporation of the first pint of menstruum, being a little troublesome, may be omitted, and the whole of the menstruum supplied in successive portions at once, and the whole afterwards well shaken in a bottle. But the manipulation directed in the process insures the most reliable product, and I would advise that it be carried out.

The "Glyceritc of Ginger," prepared as above directed, contains the activity of 15 grains of ginger to the fluid ounce, and is about the colour of sherry wine, and possesses the characteristic flavour and pungency of the ginger very strongly marked. Both of which, however, are somewhat marked and blunted by the glycerine.

It will prove an excellent corrigent addition to the various tonic, diarrhœa and stomachic mixtures. It can be associated in prescription with almost all kinds of mixtures. For pain in the stomach, accompanied by sickness, acidity or flatulence, and for many other purposes which may suggest themselves to the physician, the following formula furnishes an excellent combination, and is not an unpalatable mixture :

℞	Sodæ Bicarb.	℥j.
	Liq. Morph. Sulph.	℥ss.
	Tr. Cardamom. Comp	f℥ij.
	Sp. Ammon. Aromat	f℥ij.
	Sacch. Albi	℥iij.
	Glycerit. Zingiber	f℥ij.
	Aquæ Menth. Pip. q. s. ut ft.	f℥iv.

For an adult, one tablespoonful as required. The physician may, of course, vary the ingredients and their proportions to suit his own views. In cases of diarrhœa and other lax conditions of the bowels, Tr. Krameriæ, Tr. Catechu, Tr. Kino or other astringent remedies may be added, and the desired quantity of Tr. Opii or Tr. Opii Camph. substituted for the Liq. Morph., as these preparations are generally preferable to morphina in astringent mixtures. In cases of diarrhœa, etc., accompanied by tenesmus, a little castor oil, say from one to two fluid drachms, will be found a valuable addition to the above. The castor oil can be formed into a smoother mixture with the other ingredients, by the addition, also, of about two drachms of powdered gum arabic. By omitting the solution of morphine from the formula as it stands, and adding one fluid ounce of Comp. Tinct. Gentian., it will form a most elegant and efficient remedy in certain forms of dyspepsia and other disordered conditions of the stomach. As an astringent addition to the above preparation, I would recommend the tincture of Krameria as perferable to either the Tinct. of Catechu or Kino. It being, as far as my experience and observation has gone, not only equally efficient, therapeutically, with either of the latter preparations, but at the same time more agreeable to the taste and forms a more elegant mixture with this and other similar combinations.

The Pharmaceutical Journal.

SATURDAY, AUGUST 9, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SCHOOL OF PHARMACY.

NEXT October the opening of the thirty-second session of this School will take place under conditions essentially different from those which have previously obtained. As will be seen from the Report of the Council proceedings (page 111), the whole course of instruction has been very considerably modified, and a prospectus is to be issued by the Society to all members of the trade, setting forth what is proposed, and giving a syllabus of the several lectures, demonstrations, etc., as well as the regulations affecting prizes, scholarships, etc., and attendance in the reading-room and museum.

What we desire to call especial attention to here are the introductory remarks, serving as a preface to this prospectus which will soon be in the hands of our readers. Starting with the axiom that the object of the Society in promoting a School of Pharmacy was to provide sound instruction in the principles on which the practice of pharmacy should be based, it is stated that the Council of the Society will still retain a controlling influence over the arrangements of the School, and that they are determined to maintain its high character.

It may therefore be assumed that the intentions thus expressed are to be accepted as a guarantee against any such depreciation of the standard of instruction as has been apprehended as likely to result from the modified curriculum which the Council has thought it desirable to authorize.

In the communication from the Privy Council Office (p. 109), it will be seen that a suggestion is offered in respect to an interval of three years between the Preliminary and Minor Examinations being made compulsory. This suggestion, occurring as it does simultaneously with the issue of the prospectus above referred to, adds additional force to the opinion therein expressed by the Council, that it is of the utmost importance for all youths to pass the Preliminary Examination prior to apprenticeship or pupilage, and that during this period they should by study, no less than by the acquisition of such practical knowledge as the shop or dispensary may afford, prepare themselves for taking full advantage of the instruction provided by the School of Pharmacy.

We earnestly recommend these suggestions to the attention of both apprentices and those in whose charge they are placed, for we feel sure that due regard to them cannot fail to be of advantage to both, as well as conducive to the general interests of the drug trade and the advancement of pharmacy.

THE BRITISH MEDICAL ASSOCIATION.

THE Annual Meeting of the British Medical Association has come off, in some respects with greater *éclat* than the most distinguished of its predecessors. It was peculiarly happy in its President, whose general popularity infused a genial influence over the Sections, and whose address, shrewd with the sense and racy with the humour characteristic of his countrymen, struck an effective key-note between the theoretical and the practical. The social features of the gathering were also successful—the banquet in Lincoln's Inn Hall being graced by the presence of the PREMIER, fresh from the cares of office and full of the animation of holiday. The papers were of more than average merit, and the discussions they evoked were marked by the temper and toleration proper to science. Two of the leading deliverances, however, were characterized by an intelligence, power, and finish, which dwarfed the others by contrast. We refer to the address of Dr. E. A. PARKES, of the Netley School of Medicine, and to the speech of the President of the Conference of Medical Officers of Health, Mr. ERNEST HART.

Dr. PARKES gave a comprehensive and luminous survey of the progress of medicine during the last forty years, touching less, however, on its therapeutic development than on its advances in diagnosis and pathology. The recognition of kidney-degeneration by BRIGHT, and the device of auscultation by LAENNEC were the first great triumphs of the epoch, but destined to be equalled if not surpassed by the discoveries of later years. The splendid induction of VIRCHOW, whose presence at the meeting was one of its most attractive features, has, in its demonstration of embolism, that is, of the effect of minute capillary blockage, proved most pregnant in results. It has separated one form of apoplexy from other apoplectic forms; but it has also accounted for the production of morbid growths by the transference of cells, and their arrest in other parts. The cognate doctrine of thrombosis, that is, the spontaneous clotting and interception of the circulation, is another of the same pathologist's invaluable contributions to medicine. The knowledge of entozoic diseases, such as trichiniasis for instance, which has often been mistaken for specific fevers, has yet further enlarged the physician's power; while the recognition of the implantation of those minute bacteroid bodies, still called plants, opens up a vast field for the diagnosis and treatment of many hitherto unknown or misinterpreted maladies. And so the lecturer proceeded in his enumeration of the triumphs of pathological research till he came to a natural halt at the threshold of preventive, "the child of curative, medicine."

The practical deduction from the address of Dr. PARKES was necessarily this: that "those who are conducting the vast plans which the Legislature has devised for improving the national health, may remember that the profession which has so far searched out the causes of individual and national ill-health must be entrusted both with the execution of the plans and the continued search into a subject which is still in its infancy." The Association was thus well prepared for the vindication of its claims on the Local Government Board, which was next day delivered by Mr. ERNEST HART. Speaking as Chairman of the Parliamentary Bills Committee, that gentleman traced the progress, if such it could be called, effected in Public Health administration since 1872. Now, what does such administration imply? First, the necessity of medical officers whose local position gives them special knowledge of unhealthy localities; in other words, the Poor Law medical officers. But, essential as these functionaries are to any such organization, they cannot be the only element—their area of action being too small, and their means inadequate. Union areas and the Union medical officers must be grouped together under a consolidated board with the assistance of a consultative medical health officer, possessing as complete a familiarity as possible with hygienic science. Public health being matter of imperial concern, it is necessary to bring these two elements of local administration into relation with the Central Board. Inspectors must be employed to this end who shall consult with the local authorities and their officers, and ultimately report to the department of the Local Government Board which decides. Such was the obvious groundwork open to Mr. STANSFELD in his Public Health Bill, and no pains were spared to lay before him its constituent facts. But with what result? His own health officers were never consulted by him. The wide and accurate knowledge they alone possessed he ignored. The Local Government Board designedly sought to aggrandize itself at the expense of the very bill it had itself framed. The inspectors, through whom it was to be brought into relation with the district authorities, it selected from every class but the medical—from men who, whatever their intelligence in other respects, had neither knowledge, reading, instruction, nor experience in public hygiene. To them it intrusted the task of organizing a health administration throughout the country, with what result it would be alternately ludicrous and distressing to relate. Their diverse and conflicting action is perhaps the least of their misdoings.

Mr. HART carried along with him the great bulk of his numerous audience, and a motion was introduced and adopted expressive of its adhesion to his policy, and of its desire to see medical officers replacing the present lay inspectors in administering the provisions of the Public Health Act. *In suâ arte cuique credendum*—a wise saying, but one which the Local Government Board has yet to appreciate. The British Medical Association has done good service to the community in many ways; but not the least is its impressive appeal to the better judgment of the Legislature, in the imperial question of sanitary administration, just made by its spokesman, Mr. ERNEST HART.

THE WORKING OF THE ADULTERATION ACT.

Now that there is so much said and written about the position of scientific men, and one of our leading scientific journals has raised almost an outcry about the endowment of research, it is unfortunate that there should have been a succession of miscarriages on the part of several individuals holding positions in the scientific community, and that this should have happened in what might fairly be regarded as the ordinary exercise of their business. We refer to the cases under the Adulteration Act, in which the analysts' reports have either been withdrawn by themselves, or have failed to bear the test of criticism. One such case is reported in this week's Journal, where it is evident that there must have been either great want of care in taking the samples or else serious error in the analytical operations to which they were subjected for the purposes of the Act. Thus, we find Dr. THORPE reporting, in the first instance, that butter contained 19·5 per cent. of curds and farinaceous matter, and 19·4 per cent. of water; while, on the other hand, Dr. WALLACE reports only 1·1 and 1·5 per cent. of curdy matter. Then, on the reference of this question to other chemists, we have reports that the amounts of curd are 1·01 and 0·97 per cent. from one chemist, and 0·91 and 0·94 per cent. from another; while the amounts of water are given as ranging from 4·73 to 8·52.

In the now celebrated Liverpool case, also referring to butter, there is the same unsatisfactory state of things and similar discrepancies between the testimony of chemical witnesses. Whatever foundation there may be for the statement of Dr. CAMPBELL BROWN respecting the detection of foreign animal or vegetable fats when mixed, as adulterants, with butter, this much is certain, that there is no published, or, as we believe accessible, account of the evidence on which Dr. BROWN'S statements are based. Moreover when Dr. BROWN'S chemistry is, by his own showing, manifestly so little creditable to the degree he holds, it is not surprising that there should be reluctance to accept his statement unsupported.

We might refer to other cases in which there have been similar unsatisfactory results, but as they probably have not yet been finally disposed of, we will merely express our regret that any apparent justification should thus have been furnished for the notion that chemists' opinions and evidence might be obtained one way or other, according to circumstances.

WE are requested to state that in consequence of the alterations now being made, the Library will be closed during August and September.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

August 6th, 1873.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Greenish, Hampson, Mackay, Owen, Radley, Robbins, Sandford, Savage, Schacht, Shaw, Stoddart, Urwick, and Williams.

The minutes of the previous meeting were read and confirmed.

British Pharmaceutical Conference.

The President said the members of Council were doubtless aware that in consequence of the meeting of the British Association for 1874 being arranged to take place at Belfast, a question had arisen whether, in the present unsettled state of the position of Pharmacists in Ireland, it was advisable for the Pharmaceutical Conference to follow its usual course, and hold its meeting in the same place as the British Association. As the possibility of the meeting being held in London had been suggested, he would move—

"That in the event of the members of the British Pharmaceutical Conference deciding to hold their meeting next year in London, the Council authorize the President of the Pharmaceutical Society to write to the President of the Conference, offering the use of the Society's rooms for the purposes of the meeting, and the Council further desire to add that they will be happy to afford every facility for promoting the success of the meeting."

The Vice-President seconded the motion, which was carried unanimously.

Mr. Williams said that in the event of the meeting being held in London, it would be desirable to fix a day not so close as usual to the meeting of the British Association, and no doubt this would be done, as some members of the Conference, being also members of the Association, would otherwise be prevented from attending both.

The Privy Council and the Board of Examiners.

The Secretary read the correspondence which had taken place with the Medical Officer of the Privy Council, with reference to the appointment of Mr. Haselden as an examiner. Mr. Simon stated in reply to a letter sent by the Secretary, pressing the desirability of sanctioning the appointment, that the Privy Council must adhere to the decision already arrived at, not to approve the appointment of any gentleman as examiner who within twelve months had been a member of the Council. He also stated that the Privy Council were not aware at the time they sanctioned the appointment of Mr. Edwards that he had been so lately a member of the Council.

The New Bye-Laws.

The Secretary also read a letter from the Medical Officer of the Privy Council, acknowledging the receipt of the amended Bye-Laws, and suggesting that they should be further amended, inasmuch as clause 6, sec. 10, appeared intended to render the last year's President and Vice-President eligible for the Board of Examiners, which the Lords of the Privy Council could not accept. He therefore recommended the omission of the words: "other than the President or Vice-President," after which amendment the Privy Council would be prepared to approve the present alterations. At the same time, he begged leave to suggest, for consideration, a further alteration in clause 16, to the effect that the Preliminary examination should, in all cases, be passed three years prior to coming up for the Minor examination.

The President remarked that if these alterations were made the Bye-Laws would have to be passed at three Council meetings, and submitted to a general meeting.

Mr. Mackay said that the latter suggestion, however valuable it might be at some future time, would at present often work very great hardships.

Mr. Sandford thought the Privy Council would not object to substitute a period of six months instead of twelve during which late members of Council were disqualified, and if that were acceded to the Council might be content to give up the exception in favour of the President and Vice-President. The other suggestion was a very valuable one, but it could not be entertained at present without going through a repetition of the formalities necessary for new laws.

Mr. Mackay suggested that those members of the Council who previously saw Mr. Simon on this subject be requested again to wait on him and settle the wording of the new bye-law.

This was agreed to, and the President reminded the members that at the next meeting it would be necessary to elect an Examiner in place of Mr. Haselden.

An Associate who had neglected to pay his subscription within the proper time was ordered to be restored to his original status on payment of his subscription and a nominal fine.

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

Ball, George.
Baynes, James, jun.
Brookes, Frederick James.
Cottam, William Procter.
Crundall, Augustus Horton.
Fletcher, Frederick William.
Goulden, Herbert.
Hart, Thomas.
Hawkes, Richard.
Hulme, Richard Gleave.
Jones, John.
McJannet, James.
Mumby, Charles John Everitt.
Rimmington, George.
Roberts, William.

Elections.

MEMBERS.

Pharmaceutical Chemists.

Baynes, James, jun. .....Hull.
Butten, Joseph ....Penzance.
Crundall, Augustus Horton.....Kensington.
Dowty, Robert .....London.
Gibbs, James.....Tenby.
Gilmour, David.....Edinburgh.
Goulden, Herbert .....Canterbury.
Hart, Thomas ....Manchester.
Hawkes, Richard .....Ely.

Chemists and Druggists.

Butler, Thomas Edward, jun....Somerset East, Cape of Good Hope.
Butterfield, Richard Brigham ...Shipley.
Lloyd, John Walters .....Swansea.

ASSOCIATES.

The following having passed their respective examinations, and being in business, were elected "Associates in Business" of the Society :—

Minor.

Spong, Douglas Morton .....Biggleswade.

Modified.

Coker, Owen Cole.....Plymouth.
Cregeen, James Henry.....Bayswater.

The following having passed their respective examinations, were elected "Associates" of the Society :—

Minor.

Baikie, Peter..... .....Belfast.
Birchall, Thomas Barrow.....Preston.
Birkett, John Robert.....Morecambe.
Bowling, John Henry ....Pembroke Dock.

Carter, Arthur Joseph..... ...London.
Coleby, Frederick .....Surbiton.
Elwood, William, jun. .....Grimsby.
Gadd, William Fletcher .....Oxford.
Gordelier, John Thomas .....Sittingbourne.
Gould, William Robert .....Southsea.
Hall, Ralph .....Kingsland Road.
Haller, Frederick William .....Hull.
Hambridge, Thomas.....Lower Tottenham.
Hindle, John.....Gorleston.
Hunter, Frederick Neish .....Durham.
Jinks, John.....Tipton.
Kemp, Harry.....Salford.
Law, Alfred .....Towcester.
Marten, Cruttenden .....Liverpool.
Metherell, Kinneard.....London.
Norman, Joseph Slaughter .....Royston.
Osborn, William Henry .....Tewkesbury.
Peacock, Walter .....Oxford.
Pendrigh, John Cuthbertson ...Sanquhar.
Pitts, Thomas Cruso.....Norwich.
Robertson, John .....Inverness.
Sharp, Robert Henry .....Portobello.
Smith, William.....Gosport.
Sprake, David Lewis .....Carmarthen.
Staning, Walter .....Hull.
Stead, Thomas Albert .....Heckmondwike.
Storey, John Charles .....Hull.
Strang, Peter.....Perth.
Tebb, Henry .....St. Ives.
Thompson, Lawrence Joseph ...Thirsk.
Ward, Charles Thomas .....London.
White, William Charles ....Barnstaple.
Willis, Blankley William.....Kidderminster.
Wolstenholme, John, jun.....Bury.
Wyles, William.....Grantham.

Modified.

Andrew, Ablett Ashworth ...Clitheroe.
Brodie, Robert .....Glasgow.
Holttum, Richard .....Maidstone.
Stones, William.....Manchester.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination were elected "Apprentices or Students" of the Society :—

Barlow, Joseph Alexander ... ..Rochdale.
Beswick, Jesse ..... Liverpool.
Brewer, James Curtis .....Hereford.
Cardwell, Ernest .....Lytham.
Coleman, Alfred .....Southampton.
Cooper, Henry .....London.
Elliston, Augustus Frederick ...London.
Epps, James .....Upper Norwood.
Evans, Robert Daniel .....Liverpool.
Exley, John, jun. .....Leeds.
Fletcher, Frederick John.....Wolverhampton.
George, John Irving.....Tunstall.
Grant, Alexander .....Cullen.
Henderson, Christopher .....Hoylake.
Holden, William Henry ... .Staithes.
Lloyd, John .....Hereford.
Mayger, William John.....Northampton.
Olden, Loathan .....Romsey.
Perry, Horatio Nelson .....Gravesend.
Phillips, George.....Dowlais.
Pridmore, Walter Snape .....Hinckley.
Purdy, James Robert .....Morpeth.
Ridgley, Thomas .....Newport, I. W.
Shilton, James .....Sutton Coldfield.
Stacey, Peter.....London.
Stephens, George Thomas ..... Hereford.
Swinbank, John.....Ferryhill.
Thomas, John Tubbs .....Newark.
Thomson, John .....Edinburgh.
Walker, George Edward .....Royston.
Winn, John Christopher .....Hurworth.

GIFT OF A PRIZE FUND BY THE PRESIDENT.

The PRESIDENT said he had much pleasure in presenting to the Society another Russian bond for £100, the interest of which was to be applied to giving a prize of books to each candidate who passed the Minor examination first in honours at the ordinary examinations in Edinburgh. The conditions would be the same as had been announced on a former occasion, viz., that such books should be given as would be of assistance to the student in preparing for his Major examination. This gift as he had before stated was simply to make up the amount which he had hoped would have been received for the sale of the engraving of Mr. Jacob Bell's portrait. The result of the publication had not been so successful as he had anticipated, and he therefore had much pleasure in making up the amount.

Mr. MACKAY begged to propose that the most cordial thanks of the Council, and in particular of the North British Branch, be offered to the President for his munificent donation.

The VICE-PRESIDENT seconded the motion, adding the thanks of "the rising generation" to those of the Council and the North British Branch, and the motion was then passed by acclamation.

The SECRETARY said it was only right to add that the President had handed him £2 10*s*., the amount of dividend last received on the bond.

FINANCE.

The report of the Finance Committee was received and adopted, and sundry payments were ordered to be made.

BENEVOLENT FUND.

The report of this Committee was read. It included a letter from Mr. Balkwill, of Plymouth, giving particulars of the satisfactory manner in which he had been able to apply a grant of £10 recently made for the benefit of the wife and family of a member at Torquay afflicted by mental alienation.

Upon the recommendation of the Committee a grant of £10 was made in each of the following cases :—

The widow of a member of the Society formerly residing at Yoxall.
A member of the Society residing at Halifax.
A registered chemist and druggist residing at Kibworth.

The report and recommendations of the Committee were received and adopted.

PARLIAMENTARY.

The report of this Committee was read. It appeared that the Registrar had written to six persons who had been reported to be infringing the Pharmacy Act, and had received replies from two only, one of whom had taken steps to be registered, and the other assured him that the offence would not be continued. He had been directed to write again to the remaining four before further proceedings were taken. The report was adopted.

HOUSE.

The report of this Committee consisted mainly of the estimates which had been obtained for repairing and painting the premises, including replacing the windows on the ground and first floors with plate glass, and the opening of the three sham windows in the library, and consequent alteration in the shelving. There were considerable variations in the estimates, and the Committee recommended that the tender of Messrs. Patman and Fotheringham be accepted.

Mr. MACKAY suggested that a little more consideration should be given to the matter before £100 and upwards was expended on the alterations in the Library, the simple effect of which would be, as he understood, to give more light.

Mr. BETTY supported the recommendation. He thought it would be very bad taste when making such important alterations and improvements in the premises to spoil the whole thing for the sake of a little extra expense. There was hardly enough accommodation in the library at present, either for readers or books, and by the proposed

alteration, and the adoption of the modern system of bays or recesses, this would be secured. He would put it to the Council how they would like to see a notice to this effect affixed to the last plate glass window in Great Russell Street—

"Beyond this, penury refused to go,
They glazed the rest but here they stuck stucco"?

He would only add that he had on a former occasion himself gone to the expense of obtaining an architect's opinion on this subject, when he received a report recommending the scheme now brought forward, and which had received the strongest approval of the Society's architect.

Mr. SAVAGE doubted the advisability of the alterations, as he did not think there would be any gain of accommodation, seeing the blank space would be destroyed.

Mr. MACKAY said it was not his intention to move an amendment on the subject; he simply wished to draw attention to what seemed a large item of expenditure for an insufficient object. He had never noticed any deficiency of light in the library.

Mr. WILLIAMS said this subject had been discussed on several previous occasions, and he thought it was now the almost unanimous opinion that the windows should be opened.

Mr. SANDFORD had been throughout opposed to this alteration, and did not see any necessity, even as a matter of taste, for it. Neither did he think any more light was required. It must also be remembered that the bays would necessarily be so narrow that any one reading at the tables therein would have to move if the librarian required a book from the shelves. He did not really think the Society was justified in expending so much money for such a purpose.

Mr. SCHACHT said the whole question turned upon whether the library would be substantially improved. He had hitherto taken this for granted, but from what was said by Mr. Sandford, he somewhat doubted, and should like to hear particulars of the measurements.

Mr. SAVAGE said he believed the opening would be about 5ft. 6in. in width.

Several members of the Council having inspected the library, Mr. Savage moved an amendment that the alteration of the library be not carried out, but on being put only four members voted for it, and the resolution was then put and carried.

REPORTING PROCEEDINGS AT THE PHARMACEUTICAL CONFERENCE.

The SECRETARY having reported the steps which had been taken in former years with reference to this matter,

The PRESIDENT said he considered it very important that the proceedings should be fully reported in the Journal, and suggested that the Council should vote a sum not exceeding ten guineas for the purpose, the report to be published in the Journal.

Mr. SAVAGE seconded the proposition.

Mr. HAMPSON said he presumed it would be left in the hands of the Editor to make arrangements for the report.

Mr. GREENISH did not understand why the expense should be so great as ten guineas.

Mr. HAMPSON thought a copy of the proceedings must be taken for the Conference, which the Society might have the benefit of.

Mr. SCHACHT said he was quite sure the Conference, who had no money to spare, would not be prepared to vote ten guineas for the purpose of a report, and probably they would have to fall back on the amateur labours of some of the more enthusiastic members, with such local assistance as could be obtained.

After some further conversation, the resolution was put and carried.

LIBRARY, MUSEUM, AND LABORATORY.

The report of this Committee was read, recording the proceedings which had taken place at several meetings with reference to the future arrangements for the Society's educational department. The professors had attended the meetings, and a prospectus or syllabus of the school had been prepared. This had undergone considerable discussion in the Committee, and it was now submitted for the consideration of the Council. It was prefaced by a letter signed officially by the Secretary and Registrar.

The PRESIDENT said this was a very important subject, and as all members of the Council had a copy of the prospectus, he should be glad to hear any remarks upon it, especially by those who had not attended the Committee.

Mr. WILLIAMS said it might save time to first state the position in which matters stood. As would be gathered from the report of the Committee, the acceptance of the document now produced was not at all unanimous on the part of the Committee. In fact a great deal of discussion had taken place, whether it should be published at all, and only as a kind of compromise was it agreed that it should be recommended to the Council to be published with the authority of the Society, but for this year only, the publication not to be taken as a precedent. He thought, therefore, it would be well for the Council in the first place to decide whether they would publish such a prospectus at all in the name of the Society, especially as the Committee were not unanimous upon the matter. Of course, the wish of all the parties was that they should retain the power of promoting a scheme of education for the purpose of advancing the science of pharmacy in its higher and better sense, not merely a system of instruction which would probably produce the best commercial results; because it was obvious that what might pay the professors best would be simply to pass as many young men as possible through the school in such a way as to pass the examinations of the Society. The Council, however, would, he thought, agree that that was not at all desirable, the end to be aimed at being rather a high standard of education than success in passing students through their examinations. He did not for one moment suggest that the professors did not agree in that view of the object of the school, but the question was whether sufficient guarantees had been taken to insure the supremacy of that idea. It rather appeared to him that the publication under the authority of the Council of such a syllabus as the one laid before them would tend to attract young men to the school with the idea of passing their examinations rather than for the purpose of obtaining real scientific knowledge. That was why it was opposed by some members of the Committee who did not consider such a course consistent with the honour and position of the Society. As now presented, however, the prospectus was much improved to what it was when it first came before the Committee, and he did not see the objections to it now that he did at first. Appended to it, however, there was a list of names of all those who had gained prizes in connection with the school. He did not think it at all desirable to publish such a list, seeing that it would induce other parties to publish similar lists in rivalry, and thus a complexion would be given to the matter which was not at all desirable. There were one or two other points which would have to be discussed, namely, whether the library and reading-room should be open to all students attending the classes whether connected with the Society or not; but he thought the first thing to be decided was whether any prospectus at all should be published.

Mr. MACKAY agreed with Mr. Williams, and said there appeared to him to be three main points to be taken into consideration; first, whether such a syllabus should be published at all with the authority of the Council; secondly, whether or not the list of prize students should accompany it; and, thirdly, whether all students should be admitted to library and museum. Now, on the first point, considering that the Council had already decided on a change of a very sweeping character with regard to the School of Pharmacy, a change now about to be inaugurated, and one which would last certainly a year, he thought it would be only fair to themselves, to the Society, and to the professors, to issue some such pros

pectus at the commencement of this new experiment, though he apprehended the Council would still retain the power of changing the *modus operandi* of the lectures hereafter if it seemed desirable. The prospectus would put not only those connected with the Society, but all chemists and druggists, in a position to understand what the Council had done. It was not their province to speculate as to what might be the ultimate result of the change. The reducing a ten months' session to five, might have the effect that many young men who had not come up for the longer period would find it comparatively easy to spend five months in London, and in that way get some good and solid addition to their pharmaceutical knowledge; therefore, while he was not prepared to say what might be done in future years, he would move—

"That a circular containing a general description of the school of pharmacy be issued to pharmaceutical chemists and chemists and druggists generally throughout the country, by authority of the Council, and at the expense of the Society, prior to the opening of the ensuing session."

Mr. SAVAGE seconded the resolution.

Mr. SCHACHT said the resolution as proposed did not imply that there was to be any statement prefixed to the prospectus similar to that now accompanying it, stating the Society's views upon the matter.

Mr. HAMPSON said the resolution was general, and it would be quite competent to the Council to make verbal alterations afterwards.

After some further conversation, Mr. Betty moved that the circular as printed be taken into consideration. This was seconded by Mr. Urwick and agreed to.

The VICE-PRESIDENT said one or two verbal alterations in the opening letter had suggested themselves to him.

Mr. SCHACHT said the letter did not make any reference to the scheme which followed it; there was no sequence in it.

Mr. BETTY said that arose from their having to adopt a letter drawn up by other persons. It was really written by the professors, who thought it would be advisable to have something of that sort to introduce the syllabus. The Committee had curtailed it to some extent, and they must not be supposed to criticise it too keenly. If, however, any verbal alterations could be suggested to improve it, there could be no possible objection to accepting them. He originally objected to publish it at all, but that having been carried, they must do the best they could with it.

Mr. SHAW said the issue of the prospectus did not necessarily include the accompanying letter.

Mr. WILLIAMS said he would move that the letter be not published, inasmuch as it really committed the Council to a course of instruction which might possibly not turn out exactly what they desired.

Mr. ATHERTON having seconded the motion,

Mr. MACKAY suggested that they had better first decide on the broad principle whether any letter or not should accompany the syllabus.

Mr. WILLIAMS suggested that this was a matter which really ought to be discussed in Committee, and that the reporter should be requested to withdraw.

Mr. SCHACHT said he should object to that.

Mr. BETTY said there was no objection to another letter being drawn up.

Mr. SANDFORD said they were now about to pass over a school which had existed for thirty years to the professors, endowing their chairs, and calling them the professors of the Society. If they wished to keep up the high character of the school, it would appear to be a very ungenerous act to launch it forth without one single word of recommendation. He thought there should be some authoritative introduction of the school by the Council.

Mr. MACKAY said he was prepared to move that a letter accompany the syllabus.

Mr. SCHACHT said it was important that the letter proposed to be sent should be before them.

The VICE-PRESIDENT proposed that the letter already printed, with one or two slight verbal alterations, be issued.

Mr. ROBBINS supported the proposition.

Mr. SCHACHT said they were about introducing a most important change, and he could not see that this letter was at all a proper introduction to the matter. He considered that the object of the founders of the Society was to establish such a system of instruction as should form a standard in pharmacy, and it was because he believed that standard was about to be lowered that he regretted the change. This change however was now an accomplished fact, and he did not intend to say any more about it; but it was necessary to state plainly what the change was, so that all might clearly understand it. Here he thought the letter was deficient, as no allusion was made to the great changes which were now being introduced. He would therefore move as an amendment:—

"That the letter to accompany the Syllabus of the School of Pharmacy be referred back for reconsideration to the Library, Museum, and Laboratory Committee."

After some further discussion the amendment, which was seconded by Mr. Savage, was negatived, but in order to meet if possible the views of those who were dissatisfied with the wording of the letter, the Vice-President and Mr. Betty were requested to withdraw into another room and see if they could suggest any amendment. On their return, the letter as amended was approved, and a resolution passed authorizing its circulation together with the prospectus. [This document is not inserted here, as it would occupy much space, and it will be in the hands of all the members shortly.]

Mr. URWICK desired to raise a question relative to the prize regulations, namely, whether all students should be eligible to compete for the prizes, although not connected with the Society as associates or students. They might have young men attending the classes who were devoting their whole time to the study of scientific botany or chemistry, and it hardly seemed fair that they should be allowed to compete with others who might be engaged in business.

Mr. SANDFORD remarked that it was very difficult to draw the line so as to place all competitors on perfectly equal terms. Some two years ago an extra medal was awarded to a student not connected with the Society, because it was not clearly defined who were eligible.

Mr. MACKAY said they ought not to lessen the attractions of the School of Pharmacy by excluding any one from the prize competition. At the same time he should like to see a special prize offered to first year's students only, because it was quite possible that young men who had studied or attended courses of lectures in the country might come up year after year and carry off the bronze medal from those who could only attend the classes of their own professors. He would suggest that those who had previously attended lectures, either at this or any other school, should be ineligible for the bronze sessional prizes.

Mr. WILLIAMS thought they had no right to handicap the students in that way. They simply offered such and such prizes to the most able students, and they could not disqualify those who had attained their knowledge in a particular way.

Mr. RADLEY remarked that many of the country schools were not so efficient as the one in Bloomsbury Square, and it would be unfair therefore to disqualify young men who had attended them.

Mr. BAYNES added that such a regulation would act very prejudicially on the provincial schools.

Mr. GREENISH proposed, and Mr. RADLEY seconded the proposition—

"That a bronze medal be given to the second prizeman of the ten months' or Sessional Course in Chemistry and Pharmacy, and Botany, and Materia Medica."

The motion was negatived.

A long discussion next ensued with regard to the proposed regulation stating that the library, museum, and reading-room of the Society would be open to all students in the School of Pharmacy.

Mr. WILLIAMS objected to the clause. The fees were now the same for all students attending the lectures, and it would be only right that those who wished to avail themselves of the advantages of the Society should pay a small fee of 10*s.* 6*d.* per annum. If it were not so, the Society would lose £500 a-year.

Mr. MACKAY doubted the last statement. He should like to know how the Society would lose that sum by admitting all the students to the library and museum.

Mr. BETTY said he could prove it. This was an important question, and he hoped it would be thoroughly discussed. When the Society had been so liberal to the school, endowing the professors' chairs, granting the free use of the laboratory and lecture room, and so on, it was very hard that it should be also called upon to perform this crucial experiment, to prove whether or no it would sacrifice £500 a year. It simply resolved itself into this, if some inducement were not held out to young men to join the Society, more particularly at the commencement of their career, the position of the Society must be endangered, seeing that simple registration now gave a man the right to carry on business? The financial position of the Society was the keystone of its success, and they must be cautious in meddling with it. For the session 1872-3 there were 113 students, of whom only 25 were not connected with the Society, and at least one-third of them afterwards joined, leaving only 17 outside students; was it then worth while to run such a risk for the sake of 17 students, or to attempt to loosen any bond which still attached young men to the Society? If students unconnected with the Society were absolutely denied admission to the library and museum, they would be only doing what was done in every medical school in London, but he did not propose any such restriction as that. He simply objected to giving such men the *right* to the advantages of the Society, but should be quite willing to afford them every facility, as a matter of courtesy, on application to the Secretary. What was given away lavishly was always lightly valued, but the young man who entered the museum by the courtesy of the Society would think a great deal of the honour or privilege accorded him. Again, a person who paid four guineas for perpetual admission to the lectures would, according to this regulation, be entitled to walk in and out of the library or museum whenever he pleased for the term of his natural life, but he doubted the power of a Council sitting only from year to year to grant such a privilege for absolutely no consideration. The Committee were unanimous in their opinion that this recommendation, which came from the professors, should not be agreed to, and he hoped the Council would support the Committee.

Mr. MACKAY still failed to see how the Society would lose £500 a-year. The whole thing was now changed, and whereas hitherto students had joined for the sake of attending the lectures at half-fees, the simple right to use the library and museum was now relied upon to bring an immense number into the ranks of the Society. However, if it were understood and published that admission would be granted as a matter of courtesy on application to the Secretary, he had no objection. He believed young men would join the Society from a feeling that it was an honour and privilege to be allowed to do so, and the PHARMACEUTICAL JOURNAL also was an inducement. He did not think, therefore, anything would be lost by liberality in this matter.

Mr. ROBBINS said it was never intended to exclude young men altogether. The matter had been fully discussed in Committee, and the only question was whether or not the privilege should be granted without any condition. They might find in a few years many persons coming to avail themselves of the lectures and laboratory instruction who had no connection with the Society or the trade whatever, and then the members might very naturally complain of the school being supported at their expense.

Mr. BAYNES said they had already settled the principle that they would make no difference between the students who were and who were not connected with the Society.

Mr. HAMPSON was sorry to oppose Mr. Betty in this matter, but he was convinced that the safest policy was that of liberality in this matter. He could not think that the Society would lose anything in the long run by it, or, if so, it would be a very small sum. On the other hand, it would save a great deal of trouble to have no distinctions between the different students.

Mr. GREENISH had advocated a liberal policy in Committee and must still continue to do so.

After some further conversation it was unanimously decided to pass the regulation in the following form :—

"The Library, Reading-room, and Museum of the Pharmaceutical Society of Great Britain are open to all students connected with the Society. Other students may obtain orders for admission thereto by application to the Secretary."

The proposition to append to the syllabus the list of prizemen was then negatived without a division, and resolutions were passed stating the conditions on which the professors were to have the use of the apparatus, etc., belonging to the Society.

It was then resolved—

"That the prospectus of the School of Pharmacy, as now amended, be issued, and a copy sent to each registered chemist and druggist. Such issue, however, is not in any way to be considered as a precedent."

GENERAL PURPOSES.

The Report of the General Purposes Committee on the Reports of the Board of Examiners and of the Professors on the competition for the Jacob Bell Scholarships and Sessional Prizes was received, and the following awards made :—

JACOB BELL MEMORIAL SCHOLARSHIPS.

The Board reported that *one* candidate presented himself for the Senior Scholarship, and *eight* for the Junior.

On the recommendation of the Board it was resolved—

" That the Senior Scholarship be awarded to

Sydney Plowman,

and the Junior Scholarship to

Edmund John Henry Thring,

with free laboratory instruction and materials for the Session 1873-74, in the School of Pharmacy, and free admission for the same period to the lectures on Chemistry and Pharmacy, Botany and Materia Medica, and Systematic and Practical Botany."

SESSIONAL PRIZES.*

The Board reported, that during the past Session *sixty-three* candidates had passed the Minor Examination, and *nineteen* the Major Examination in Honours, of whom *fourteen* competed for the prize of Books, and *five* for the Pereira Medal.

On the recommendation of the Committee it was resolved—" That the

Pereira Medal

be awarded to

Sydney Plowman,

and that the

Prize of Books

be awarded to

Walter Tearle.

On the Reports of the Professors on the results of the competition for the Prizes offered by the Council, the Committee recommended, and it was

Resolved—" That the following awards be made."

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* The Sessional Prizes and Certificates will be distributed at the Evening Meeting on the 1st October next. Successful candidates will be expected to attend. An address to the students will be delivered by Mr. G. W. Sandford, of London. Ladies are invited to be present.

Chemistry and Pharmacy.

Silver Council Medal .....Sydney Plowman.
Certificates of Merit ... { Edward Lawrance Cleaver. / Frederick Bascombe.

Botany and Materia Medica.

Silver Council Medal .....Sydney Plowman.
Bronze Council Medal ...Edward Lawrance Cleaver.
Certificate of Honour .....Frederick Bascombe.
Certificates of Merit..... { Arthur Pearson Luff. / Henry George Greenish. / Arthur Compton.

Practical Chemistry.

Silver Council Medal .....Sydney Plowman.
Bronze Council Medal ...Frederick Bascombe.
Certificates of Honour... { Charles Alexander Blake. / Frederick Wm. Fletcher. / Thomas Edward Greenish.
Certificates of Merit ... { George Rimmington. / Alexander Wood.

Botanical Prize.

Upon the Report of the Professor of Botany, and the recommendation of the Committee, the following awards were made—

Silver Medal .....John Henry Bibbings.
Certificate of Honour ... ..Conrad William Wright.

Mr. SCHACHT drew attention to the remarkable fact that so small a number of the individuals attending the classes presented themselves for examination. The Secretary had kindly furnished him with the returns, showing that in the chemistry and pharmacy classes the number of students had been, last year, 82, and only 5 examined; the previous year 75, and 15 examined; the year before 76, and 11 examined. In Botany and Materia Medica, last year 107, and 9 examined; the year before 113, and 16 examined; the year before that 102, and 13 examined. This was certainly not very creditable, and it was very desirable it should be altered if possible. In Bristol they would consider it a great reflection on the management of the school if such a result occurred; but there, although the classes were not numerous they were enthusiastic, and 18 or 19 out of 20 or 21 attending the chemistry class went in for examination. The botany class was small, but with one exception all the students were examined and passed with more or less honour. Possibly the reason of so few going in for the examination might be that knowing the superiority of Mr. Plowman, and being able to pick out the second-prize men with tolerable accuracy, the students felt it useless to compete and were thus discouraged from presenting themselves. To meet that difficulty it might be worthy of consideration whether the plan adopted at Bristol should not be followed, of giving a small prize, a book, or something of that kind, to every man who passed in the first class. He suggested that the whole arrangements with regard to prizes should at some future time be considered by a committee with a view to increase the number of competitors.

Mr. GREENISH said that this subject had for some time occupied his attention, and it was within his knowledge that many of the younger pupils attending Professor Bentley's lectures were quite disheartened with regard to the prizes, remarking that it would be useless for them to compete with students who, having passed their Minor and Major examinations, had proved that they already possessed competent botanical knowledge for these two ordeals. He would confine the Bronze Medal for the five months' course essentially to first year's young men, and if a student had attended a course of lectures previously, either in the Metropolis or elsewhere, attendance in that course shall render him ineligible to compete, on the same principle that it would operate against a student who had attended one course at Bloomsbury Square. The subject was too important to be settled off-hand, and he hoped it would be remitted to a committee for consideration. Their object should be to encourage young men to present themselves in the classes as early as possible, but under the present arrangements the inducement was rather to wait until they were a year or two older, when they would have a better chance of gaining the prizes. He hoped the Council would also consider the question of calling in independent professors in the various subjects to examine the students, of course putting into their hands the syllabus of the lectures upon which they would found their examination. And would urge on the Council, that every sessional prize given by the Pharmaceutical Society, whether it be for Chemistry and Pharmacy, Botany, or Practical Chemistry in the Laboratory, should be the result of a report from special examiners on the different subjects.

Mr. STODDART thought the last suggestion a very good one, and desired to add to what had been said by Mr. Schacht, that young men in the country were in the habit of noticing the small number of Bloomsbury Square students who took prizes, and drawing unfavourable comparisons.

Mr. GREENISH said that at the last competition for the Botanical Prize, there were eight candidates, of whom two being Bell scholars, three had passed their Major examination. In Professor Redwood's class there were five competitors, of whom three had passed the Major.

Mr. BAYNES said that in Leeds a very fair proportion of students went in for examination, but they were divided into two classes, and those who had been upwards of three years in the business were not allowed to compete with juniors.

Mr. MACKAY said it was scarcely fair to a young man that he should have to compete with one who had attended three or four courses of lectures previously. The prize regulations now provided that those who had done so should be ineligible.

Mr. SHAW said that only referred to the five months' sessional prizes, and did not refer to classes or lectures elsewhere. It was a very good proviso so far as it went, but a young man might attend lectures in Liverpool and then come up to London and very probably carry off the prizes. This seemed unfair, but he did not see how it could be avoided.

REPORTS OF EXAMINATIONS.

July, 1873.

ENGLAND AND WALES.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	20	15	5
Minor	117	66	51
	137	81	56

Preliminary Examinations.	Candidates. Examined.	Passed.	Failed.
England and Wales, etc. ...	331	187	144
Scotland	33	17	16
	364	204	160

Certificates received in lieu of the Preliminary Examination :—

Royal College of Surgeons	1
University of Cambridge	1
University of Oxford	1
College of Preceptors	1
	4

The SECRETARY said the Board of Examiners had arranged, subject to the approval of the Board in Scotland, that in future the names of successful candidates in the

Erratum.—On p. 14, col. ii., line 13 from the top, *omit the asterisk* preceding "Galloway, George Ross, Inverness."

Preliminary examination should be published in two divisions, the first consisting of those who had obtained a certain proportion of marks, and the second of those who did not come up to that standard, though they were entitled to pass. This it was hoped would prove a stimulus to young men to exert themselves. He had written to the Board in Scotland on the subject, and they cordially agreed n the suggestion.

The Board also reported that they found it impracticable to conduct the examinations for the Pereira Medal and the Prize of Books satisfactorily in the country, and they therefore suggested that in future candidates should be required to attend either in London or Edinburgh.

Mr. SANDFORD said they could not discuss that question at so late an hour, but he should be prepared to propose a motion on the subject at the October meeting of the Council, based on the suggestions of the Board of Examiners.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

ON THE ENERGIES OF THE IMPONDERABLES, WITH ESPECIAL REFERENCE TO THE MEASUREMENT AND UTILIZATION OF THEM.*

BY THE REV. ARTHUR RIGG, M.A.

Lecture III.

On the Energy of Vitality, with especial reference to the Measurement and Utilization of it.

The "Energy of Vitality" is a manifestation by motion of the unknown and unseen power which is associated with life—indeed that which may (perhaps) be said to constitute life itself. This vital power (some may call it force) is presented to our notice in two forms, the animal and the vegetable; hence the two sciences of zoology and botany.

In seeds, in eggs, in frozen toads, in suspended animation, in hybernating animals, are examples of the potential energy of vitality. The power is there, but it awaits those surroundings which may convert this potential or dormant energy into kinetic or active energy. So long as a body lives, it possesses kinetic energy; it has power to move. Such a power is not possessed by any dead body, although from external sources it may be introduced into one.

The energy of vitality is converted into the energy of affinity in the assimilation of food, into that of electricity in muscles and muscular action, into that of light as in glow-worms and certain fishes, and into that of heat as in warmth of the body. One peculiarity of this vital power is the ability to seize on that which is material, and to adapt or select therefrom whatever may be suited for its special purpose. The earliest or most elementary of the animal forms in which this vital power of adaptation displays itself is called a protoplasmic germ. This germ, or, as it may be described, this microscopical cell, if placed in congenial surroundings, manifests an energy of growth or reproduction which adapts these surroundings in a way and under an influencing power quite unknown to us. The power of gravity enclasps all matter, the power of vitality exercises a selectiveness from matter; gravity influences all matter but changes the shape of none; vitality changes the form of all it influences. For example: the process of fermentation is one in which a minute molecule possessed of a vital power can communicate a similar power to another molecule, this again to another, in each case appropriating or attaching the molecule to itself for a while, and so producing a rapidity of what we call growth, which seems almost as a process of crystallization when the water of solution is being evaporated.

Between the development of a crystal, however, and of life, there is this marked difference. A crystal grows by appropriating *like* molecules, and deals with them according to laws unknown to us; a body having vitality not only appropriates various molecules, but re-combines, re-forms, and rejects. This the crystal cannot do. The growth of a crystal is a phenomenon in physics—the growth of an animal is a phenomenon in chemistry. In both cases the powers of reproduction or enlargement are mysterious. Although under the influence of vitality many forms of matter are produced, yet the crystalline one never appears; as soon, however, as the excretory process is completed, or the vital power is withdrawn, then commences work of a crystalline character.

How vitality is transferred, or what it is, or in what contained, how nourished, or how destroyed, we know not. With the energy of vitality, as manifested in the processes of reproduction and growth, we are not this evening required to deal. Within that frame thus mysteriously developed, there are combinations of mechanical and chemical apparatus fulfilling conditions with which we are deeply concerned. This apparatus, however, does not from year to year retain the same power. Owing to the vital action, the apparatus with which we are to deal, whilst in incessant fluctuating change, yet attains a climax, then slowly subsides, then follows that phenomenon, even more mysterious (if possible) than any other of the vital ones, viz., their sudden cessation, which we call death. Neither in its earliest development nor in its mysterious cessation are those phenomena presented which are consequent upon energies we can either measure or utilize. Whence that comes which imparts vital energy, and whither it goes, are problems rather for human faith than human understanding. When an engineer has to estimate the power of a steam-engine, he does not ask of its early formation and past biography, nor does he speculate upon its future uselessness; he regards it as he finds it. So with animal vitality. We have to regard the animal as an engine, and in lieu of steam we have vitality. The engine is constructed so as to be utilized by the power of vitality, as that other engine is by the power of heat. Animals are much more economical engines than any man has made. The Creator's work is still far in advance of the work of the creature. Count Rumford showed that the amount of work done by a horse is much greater than could be obtained by employing its food as fuel for a steam-engine.

Note, also, what an economical conserving of energy there is in hybernating animals, which store up in summer that which they expend in winter in maintaining animal heat. To those who intend to offer the results of their ingenuity in the economizing of fuel for the gold medals and fifty pound prizes offered by this Society, in December next, may be commended for especial study this property of hybernating animals. Your lecturer has no authority to make the statement, but he can with some confidence assure them that, if successful in teaching us to economize fuel as they do, they will win not only the prizes of the Society, but also the thanks of the nation.

An animal body is, indeed, a wonderful self-acting and self-regulating machine. It is a structure composed of moveable parts, yet firm, and at the same time locomotive. Its hinges are well fitted with self-acting lubricators; its furnace supplies itself with fuel, and can regulate the supply to the demand; its telegraphic communications are extensive, rapid, and need no superintendence; in its laboratory are performed experiments in the very highest departments of organic chemistry.

There are two forms of vital energy which have so much of a kinetic character that we may utilize them. Indeed, one form is self-utilized; vitality seems to have engaged its exclusive services, and whether the animal be waking or sleeping, vitality claims all those services from

* Cantor Lecture, delivered February 17.

the machinery of the body which are rendered in the circulation of the blood, the digestion of the food, the operation of breathing, the propelling action of the heart. These all are motions resulting from some impressed laws, which have hitherto been hidden from our powers of research. That they continue, and that we are unconscious of them; that we cannot stop them, and even if we could by any means measure them, that we could not transfer them to any other purpose is clear without demonstration.

Therefore, since for scientific physiology the study of this form of vital energy is of paramount importance, it very naturally and properly would rank as one of the chief subjects for medical students. Indeed, the minds of physicians are necessarily often guided by circumstances to meditate upon its operation, and they are called upon to accelerate its action here and to retard it elsewhere. Hence the observant anatomist becomes, if not a kinetic, at least a static mechanician; the thoughtful physician reflects and harmonizes the external evidences of these internal energies, and combining the events which fall under his notice, he deduces conclusions which link the laws of vital energies in their operations with those of the other imponderable influences which pervade all the universe.

Under such circumstances as these Dr. Mayer of Heilbron, in Germany, was led to conclusions in respect to the relations between heat and work which the further investigations of others by very different processes—processes in which the energy of vitality does not enter—have established as correct.

There is another form of vital energy similar to this over which we have control, and which we employ as we please within the limits which the vital power and the construction of the apparatus through which it acts permit. This is that to which we usually give the name of "muscular energy."

The qualifying words, "within the limits," are essential, for the limit is in each case a hard and fast line, and we cannot overstep it. This limit is perhaps more admirably arranged in the animal frame than in any construction of man's devising. Although there are hundreds of muscles, yet their names, shapes, and businesses are very varied. Throughout all these changes one remarkable principle applies: every muscle is exactly adapted to the work it is likely to be called upon to perform.

There is a principle in mathematical science called the "Principle of least action." It may be explained thus—Given an object to be accomplished, then "the principle of least action" should teach how, with the smallest quantity of material and with the least expenditure of power, that object would be done. The more the muscular system is examined under this guidance, the more we are lost in wonder how exactly every portion of the body is suited for its specific work, and for the amount of work it is likely to be called upon to discharge, and more curious still, how (in special cases) the muscle may develop in order to meet certain requirements, as, for example, the muscles in the arms of a smith, as well as other muscles. And, further, how perfectly these muscles are varied in form and construction so as to meet the requirements of their respective occupations, and, if called upon by prospective emergencies, to be ready for more than ordinary exertion. Certain muscles are so prepared for extraordinary exertion, and then relapse into their normal state, thus strictly carrying out the "principle of least action."

As an illustration of this principle of least action, look at that most extraordinary muscle of all in the animal economy—the heart. Although certain features of its action should come under notice at a later portion of the evening, yet it bears upon the present subject, in that it is a bundle of small muscular fibres. There are probably more than a million of them, complex in their arrangements and perplexingly curious in their relative and combined actions, and yet this, regarded as one muscle, weighs on an average, in man, only 9·39 ozs. Its screw-like construction is such that at each action it propels forward the whole of its contents, leaving no filled-in corners. It has power to propel these contents to the vessels in the extremities of the body. Were not this muscle "up to the mark," these extremities would die for want of nourishment; if "beyond the mark," then some of the vessels along which the blood is driven might be burst in consequence of a liquid pressure greater than that they were calculated to sustain.

The balances required are perfect, and this little muscle of 9·39 ozs. sends life to all parts of the body—by day and by night—from birth to death. Now, the work it is continually performing is as though it lifted its own weight through nearly twenty thousand feet in an hour. The height of St. Paul's Cathedral, from the ground to the top of the cross, is 404 feet, therefore the heart could place itself on the top of St. Paul's Cathedral nearly fifty times in one hour. Let a man consider how often in an hour he could ascend, even on the assumption that he was never tired, and then he may obtain an idea how much more work his heart is doing than he can do. Put otherwise, the heart, regarded as we regard a locomotive, can raise itself through a vertical height of nearly four miles in one hour. The most powerful locomotives, built specially for the ascent of gradients, can only raise their own weight through about half-a-mile, or one-eighth of that which the heart can do. The directors of an Alpine railway (that from Trieste to Vienna) offered a prize for the locomotive which could lift its own weight through the greatest height in one hour. It was allotted to the locomotive (Bavaria), which lifted its own weight in one hour through 2,700 feet, or about half-a-mile. The experiment was simply made by means of inclines on railway lines; the subject this evening does not warrant a larger reference to this matter.

By no contrivance can we make a machine which shall bear such proportions between size and work as the heart does. Here is a little machine, weighing say ten ounces, put in action and worked by vitality, as a steam-engine is worked by heat; and this little engine, which we could easily put in our pockets, can lift itself twenty thousand feet high in an hour. There must indeed have been a master-mind that designed and executed the manufacture of the animal machinery, and so perfectly carried out the "principle of least action."

By careful anatomical and mathematical investigations similar to those which are to be alluded to near the close of this lecture, the daily work of the heart can be shown to be one hundred-and-twenty-four foot tons. This is nearly one-third of the daily labouring force of the whole body.

This muscle of the heart is not only capable of exerting this wonderful power through the action of the vital force, but it seems not to need any rest, and yet it does not wear out, for the muscles in the heart of an old man are apparently as sound and healthy and fit for continuous work as those in the heart of a youth. How through life they have been so maintained, how as other muscles in the frame lose somewhat of energetic power, yet these fail not, is one of the many perplexities to science. That muscular power is, as we may say, restored by rest and food, any one who cares to think upon what he experiences and witnesses will readily admit; indeed, further, the nature of the work and the character of the food must be suited each to the other. Now the muscles of the heart never rest. The variation in their energy is within very narrow limits, so narrow that we may say that any series of observations however long continued and whenever taken—as a series—would always average the same result. Hence the inference that in the animal economy these muscles possess the power (peculiar probably to themselves) of at one and the same time parting with energy and restoring it. This ever-balanced and ever-exerted energy, this actual external utilization of energy, coupled with a perfectly self-recuperative operation, is what the searcher for perpetual motion, like

the asymptote to the hyperbola, is ever approaching but never attaining.

If men can find out how these particular muscles are exempted from the laws of muscle, with which laws these Cantor Lectures are mainly concerned, they will have advanced further in solving the problem of perpetual motion, which some enthusiast in every generation pursues with commendable but hitherto unsuccessful zeal.

(*To be continued.*)

Parliamentary and Law Proceedings.

The Glasgow Butter Case.

At the fortnightly meeting of the Glasgow Police Board on the 14th July, the minutes of the Health Committee were read, in which a report of the Sanitary Inspector was referred to stating that, as directed at the meeting held on 26th May last, he had forwarded to Drs. Anderson and Macadam one half of each of the samples of butter produced in the case against Daniel Gibson, and submitting the following reports by these gentlemen on their analyses, and also a memorandum by Professor Thorpe :—

"Report on the analysis of two samples of salt butter—marked No. 19, 8th April, 1873, and No. 26, 9th April, 1873—sent by Kenneth M'Leod, Esq., Sanitary Inspector.

"I have carefully analysed two samples of butter contained in two small tin boxes, the lids of which were pierced with small holes, and find their composition to be as follows :—

	No. 19.	No. 26.
Water	6·72	6·10
Curdy matter	1·01	0·97
Salt	11·57	15·06
Fats	80·70	75·87
	100·00	100·00*

Both these samples are undoubtedly of very inferior quality. Their smell is rancid, their taste unpleasant, and their appearance to the eye very far from satisfactory. They are entirely free from starchy matter, such as mashed potatoes or any similar vegetable substance. The quantity of water which they contain is not very considerable, and probably not in excess of what is to be found in average samples of salt butter. It is to be observed, however, that these samples have now been kept for about two months, and if during the whole of that time they have been preserved in the boxes in which I received them, there can be little doubt that the percentage of water must now be considerably less than it originally was. The proportion of salt in both samples is decidedly much in excess of that found in average samples of good salt butter. I believe the ordinary practice is to mix one ounce of salt to each pound of butter, which quantity amounts to 5·88 per cent. of the mixtures. The salt, however, is too generally used merely by guess, so that considerable variations may be expected in the percentage found in different samples of genuine butter, and I notice that Dr. Hassall, who has examined a large number of genuine butters, gives 8·24 as the largest quantity found. There is no doubt that the use of an excessive quantity of salt is as much an adulteration as that of a deleterious or absolutely poisonous substance, but as there is no authoritative declaration of the proper quantity of salt which a genuine butter should contain, it is impossible to tell where its legitimate use ends and adulteration commences ; or at least, it must be a matter of individual opinion. As an individual, I think the quantity present in both samples is clearly above the legitimate quantity, which should not, in my opinion, exceed 7 or 8 per cent., and I should, therefore, describe both these samples as adulterated, though, of course, not to a large extent.

"Thomas Anderson, M.D.

"University of Glasgow,
"21st June, 1873."

"Analytical Laboratory, Surgeons' Hall,
"Edinburgh, 14th June, 1873.

"I hereby certify that I have carefully analysed two samples of butter forwarded to me by the local authority of Glasgow, through Mr. Kenneth M. Macleod, on the 4th instant. These samples were each wrapped up in paper and enclosed in tin canisters, which were covered with paper and sealed. They were respectively labelled "19 (8th April, 1873)," and "26 (9th April, 1873)." The analysis of each sample separately gave the following results :—

	"19 (8th April, 1873)."	"26 (9th April, 1873)."
"Butter	79·56	75·17
Curd of milk	0·91	0·94
Chloride of sodium (common salt)	11·01	19·16
Water	8·52	4·73
	100·00	100·00

"These results prove that the samples of butter under examination are of genuine quality as 'salt' butter, and contain less water and not more common salt than which are found in the average samples of genuine salt butter. No potatoes, starch, or other adulterant were present.

"Stevenson Macadam, Ph.D., F.R.S.E., F.C.S.,
"Lecturer in Chemistry.

"*Note.*—The amount of curd present in butter varies much according to the care taken in the preparation of the butter. It is simply the casein or cheese matter of the milk which has not been thoroughly separated from butter, and in the bad butter the quantity approaches but does not exceed one per cent. As the samples under examination contain respectively 0·91 and 0·94 per cent., the amount of curd may be regarded as the nominal quantity. The proportion of common salt added to butter for its preservation from rancidity, ranges from 5 to 25 per cent. in salt butters. There is no fixed proportion. The respective quantities of 11 and 19 per cent. found in the butters '19' and '26' are, therefore, not excessive. The amount of moisture in the samples is below the average proportion in salt butter, which I have determined to be 10 per cent. The smallness of the percentage, especially in No. 26, is probably due to absorption by the paper in which the butter was wrapped up, and possibly to exposure to the air. The absence of farinaceous matters, such as potatoes, raw or boiled, and starch in the samples "19" and "26" was placed beyond doubt by microscopic, as well as by chemical tests. When potatoes are present the cells are recognized under the microscope, whilst the starch is detected by the iodine tests; and where the potato starch is alone present, the chemical test at once identifies it. I have never failed to indicate the presence of the adulterants, where only 2 per cent. of the potatoes or starch were added to butter.

"S. M."

"Andersonian University, Glasgow,
"July 7, 1873.

"To the Hon. the Lord Provost and Members of the
"Police Board.

"Gentlemen,—Mr. Macleod, the Sanitary Inspector,

* The figures here given are quoted from the *Glasgow Herald*, but there appears to be some error, as their total amount is only 98·00.

has forwarded to me, through Mr. Paterson, copies of the reports of Professor Anderson and of Dr. Stevenson Macadam on the nature of the butter which was analysed in my laboratary in connection with the recent prosecutions under the Adulteration of Food, etc., Act. Considerable discrepancies are likely enough to occur in the numerical results of the analysis of butter from the heterogeneous nature of the matter analysed and from the impossibility of properly sampling and mixing it. Thus no constituent of butter is more easily and more accurately determined than the salt, and yet the amount of this substance in the same butter, as determined by Drs. Anderson, Macadam, and Wallace, is as follows :—Salt—Professor Anderson, 15·067 ; Dr. Macadam, 19·167 ; Dr. Wallace, 13·57. The portion of the sample of the same butter analysed by me contained only a trace of water (not more than one per cent.) It contained, however, a considerable quantity of a white substance which was distributed very irregularly throughout the mass. (See report of case in *Herald* of April 23.) I purposely selected the portion of the sample left by the inspector in which this matter seemed present in largest quantity, as I wished to ascertain its nature after the separation of the fatty matter. In my report to the Sanitary Inspector I described it as made up of curdy and starchy matter. It was impossible to estimate the relative quantity of the two substances by any exact quantitative process. Some misconception has arisen as to what I actually said respecting the nature of the white substance. I distinctly stated when under examination that I was unable to satisfy myself of the exact nature, and, further, that I could not swear whether it consisted of potatoes. (See report of evidence in *Herald* of April 23.) No mention was made of potatoes in my report to the Sanitary Inspector. I was asked (I believe by the bench) to state the manner in which curdy or starchy matter could have been introduced. I quoted the evidence of the Mayor of Cork (Sir John Gordon) given before the Parliamentary Committee on Adulteration, as to the addition of curds; and I mentioned, among other methods by which starch could be introduced into butter, that the addition of potatoes boiled until they acquired a pulpy or gelatinous consistency was a form of adulteration extensively practised on butter—the manner of effecting the admixture has been described to me by butter merchants of this city. I quite concur with the remarks of Professor Anderson respecting the use of excessive quantities of salt, although I do not go quite so far as Professor Calvert, who, in evidence given before the Parliamentary Committee above referred to, stated that butter ought not to contain more than $2\frac{1}{2}$ per cent. of salt. A large quantity of salt is frequently added to butter which is already unsuited for food, with the futile object of arresting its decomposition or of disguising its badness. Dr. Macadam is of opinion that butter may contain 25 per cent. of salt and yet be considered of good quality. I have examined many samples of butter, some of them of very doubtful character, but I never met with one to which the maker had thought fit to add salt to the extent of one-fourth of the weight ; nor among the analyses of butter which had been published have I been able to find an example in which the amount of salt was stated at more than 14 per cent.—I have the honour to be, gentlemen, your obedient servant,

"T. E. THORPE."

Mr. Ure moved the adoption of the minutes. The members would notice that the minutes were burdened with very long reports upon the analyses of the butter on which the case recently before the Police Court was founded. They would observe that the two first-named chemists pretty much agreed upon the analyses, and disagreed with Professor Thorpe, but that gentleman gave a memorandum of explanation why he should come to an opposite conclusion.

Mr. Osborne thought as a member of the Board, of the Health Committee, and of the trade, it was unfortunate that the case had fallen through in the way it had done. He was of opinion that it would have been much better had Dr. Thorpe's report been unwritten, or, as he wished, unread. Dr. Thorpe had there mentioned that some members of the butter trade in Glasgow had told him that some adulteration went on in the city ; the members of the butter trade did not know that, and were very desirous to discover it. He thought that the Board and the Health Committee must have felt very great sorrow at the break-down of the first case that had followed upon the report of their analyst. Many people believed that butter was largely adulterated, but he did not share in the belief. It was a great mistake for any member of the community to suppose that all cheap butter was adulterated. There was no doubt that in the case in question, as the price indicated, the butter was inferior. To say that it was over salted, and therefore adulterated, was a mistake on the part of Dr. Anderson. Great difference of opinion existed as to what constituted oversalted butter. The action had been unfortunate, both as regarded the Health Committee, the analyst, and the individual who was the victim ; and it was, perhaps, most unfortunate for the poor man who was the victim of the prosecution. It was unfortunate for the Board that having appointed an analyst in whom they should have the utmost faith, he should have gone so carelessly about his work. He thought Dr. Thorpe must have gone carelessly about it, because the Board could not have appointed a man who was so incompetent as to give such an absurd analysis of an article. The reports of the two medical gentlemen, which had been read, were confirmed by Dr. Hassall, of London and another medical man in the city. The matter was very unfortunate for the victim of the prosecution—Gibson, who was a man in a humble trade, but who, he believed, was an honest man, who was dealing honestly, no doubt in inferior qualities, but by no means spurious butter. He sold butter deteriorated a little from age, but he was doing an honest trade. The butter was honest butter, made honestly by the manufacturers, though it had a little too much salt in it, and bought honestly, and being sold honestly by the retailer. In less than a fortnight after the trial of Gibson's case, he was obliged to close his shop, his customers having left him, and he lost very much indeed. Now, Gibson was a ratepayer—entitled to the protection of the Board, and it was hard that he should have suffered so much as he had done at the hands of the Board. The action had also been very unfortunate for Dr. Thorpe. To say that he should continue their analyst now, and think of raising other actions, would be a very great mistake indeed. He trusted Dr. Thorpe would have the good sense himself to retire, for he had no hesitation in saying that, if any other similar case was brought by Mr. Lang before the Police Court the public would have no faith in Dr. Thorpe.—*From the Glasgow Herald.*

PROSECUTION UNDER THE ADULTERATION ACT.

At Marylebone Police-court on Saturday last, Mr. Christopher Kirby, grocer, of 212, High Street, Camden Town, was charged on an adjourned summons before Mr. D'Eyncourt, under the 3rd section of the Adulteration of Food Act, with selling cocoa adulterated with cane-sugar, arrowroot, and sago. Mr. Cooper, solicitor, prosecuted on behalf of the Vestry of St. Pancras ; Mr. St. John Wontner, solicitor, defended.

Mr. Bartlett, analyst, gave evidence as to the properties of cocoa. He stated that the admixture of sugar, farina, etc., in the cocoa did not add to its solubility, and certainly not to its wholesomeness. The cocoa nib in its pure state would be an equally useful article for public consumption. The nib could be roasted and ground pure by the manufacturer, and sold in that state, and it would take no longer to prepare for drinking than any of the so-called soluble cocoas. He believed that a large quantity of the nib was purchased by the public—in fact, it would be cheaper for the poor man to buy pure cocoa, and if he de-

sired to do so, add the amount of starch and sugar he considered necessary. Dr. Stevenson deposed to the correctness of his certificate as the result of his analysis of these samples. Sugar was much in excess. These ingredients were not necessary for the solubility of the article. Doubtless they made it cheaper. He gave about three shillings a pound for his cocoa, which he considered would be cheaper as a beverage for a poor man to buy than the cocoas at 8*d.* or 1*s.* a pound. It would go further, and was richer in nutritive value.

Mr. J. Holm, a partner in the firm of Dunn and Hewett, the manufacturers of the cocoa in question, said that cocoa was not really soluble in anything, however it might be prepared, and, in point of fact, there was no such thing as soluble cocoa. In the cook's sense, it was soluble when mixed in a certain way with sugar and arrowroot, these substances having been previously prepared, and it then formed an emulsion. The pure cocoa, nib was very inflexible if taken in large quantities. This was the reason why people did not care to buy it. Cocoa powder, commonly called soluble cocoa, had been sold to the public for fifty or sixty years. He considered the most wholesome and digestible form of cocoa to be that mixed with sugar and arrowroot, though he declined to say in what proportion, as this would be entering into a question of recipes, which they could not give up to other cocoa manufacturers. In the month of May, in the present year, his firm sold 43 tons of soluble cocoa, and 10 tons of chocolate to one ton of pure cocoa nib, without any admixture, and merely deprived of the husk. They made these preparations of cocoa, not for the purpose of increasing weight or bulk, but for the purpose of manufacturing an article which would be generally accessible to all classes of the community.

Mr. Kennet M. Morris, a seed-merchant in the Borough, who had formerly been traveller in the service of Messrs. Dunn and Hewett, said that soluble cocoa had been known in the trade for many years.

Mr. D'Eyncourt said that it was clear that the object of the cocoa being mixed with the sugar and sago was not a fraudulent one, unless it were carried to excess. What would have to be shown was that there had been an adulteration beyond all good use for general purposes, and that the retailer knew it. The preparation had been sold for many years, and there was no fraud at all in selling that which had been recognized in the trade for fifty years as cocoa. He felt it would be impossible to convict in this case, therefore the summons would be dismissed.

Review.

"Medical Notes and Queries."

With this title a weekly journal, price one penny, has been started under the auspices of "a large staff of eminent medical authorities," as they call themselves in the "Introduction." These "authorities profess to supply a desideratum "long felt in every family circle" — "a medium for the interchange of experience and thought that must prove of priceless value to the professional man."

The publication has now reached its sixth number, and after a perusal of its contents we must express our unqualified disapproval, both of its design and its execution.

The professional man has already access to three or four weekly journals for "the interchange of experience and thought." He is, as a rule, connected with societies (such as the branch societies of the British Medical Association) before which he can propound any inquiry or ventilate any theory he may think fit. So far from being in want of a medium of communication with his fellows, he suffers from a plethora of such, and if proof were required of his contentment with the same, it would be his "conspicuous absence" from the columns of *Medical Notes and Queries.*

Indeed, the bulk of the periodical is compiled, not always intelligently or judiciously, and certainly not neatly, from its older contemporaries, lay as well as professional. In general, its "leading matter" is in point of freshness well-nigh a week behind that of the *British Medical Journal* or the *Lancet*, and in point of style and tone inferior to them in all respects. Excerpts from newspapers, comic and serious, fill up the columns not reserved for "correspondence and replies;" and from the noble impartiality of the borrowing fully bear out "our motto," badly given (p. 44) from Terence, "*nil humani alienum puto.*" But the really mischievous part of the publication lies in its correspondence. Patients, real or imaginary, unfold their ailments to the editor, and that ingenuous philanthropist forthwith provides a prescription, or, with the careful injunction to "avoid all quacks as you would Satan," asks for "fresh particulars." It is a curious coincidence that a large proportion of the patients are like "Madoc" (p. 60) who is advised to "be a man," and assured that he "will soon get rid of this foolish weakness" if he follows "our advice," while the most conspicuous of the advertisements are those of medical electricity and 'Nervous Diseases and their Treatment,' accompanied by the names and addresses of the advertisers. One of these gentlemen has, according to the *British Medical Journal*, "attained an unhappy notoriety as a medical adviser." Another is the writer of a book on 'Revitalization,' of which the table of contents is highly suggestive of those bills which are sometimes found unerased in places of public convenience. The remainder of the correspondence and of editorial advice is of the most promiscuous kind, and must tax severely the resources of the "eminent medical authorities" who sit in conclave over all the "ills that flesh is heir to." We should like to know the results of so much "advice gratis." May we expect the periodical at the close of its first volume to announce the names of its correspondents as "specimens out of fifty thousand cures?"

Surely all this ill becomes a profession claiming the scientific and social status of the medical! The conductors of *Medical Notes and Queries* are careful to conceal their names, unless indeed these are to be gathered from its advertising columns. If the periodical maintains the vitality so freely promised to its readers in the advertisements, the General Medical Council, must be compelled to institute inquiries as to its responsible conductors. In neither of the sister callings of the Church or the Bar have we seen anything parallel to this publication, which proceeds from a profession claiming to be the equal and the auxiliary of both.

BOOKS RECEIVED.

A Manual of Practical Hygiene intended especially for Medical Officers of the Army and for Civil Medical Officers of Health. By Edmund A. Parkes, M.D., F.R.S. Fourth Edition. London: J. and A. Churchill. 1873. From the Publishers.

Pharmacopœia of the Hospital for Diseases of the Throat:—based on the British Pharmacopœia, 1867. Edited by Morell Mackenzie, M.D. Lond. Second Edition. London: J. and A. Churchill. 1873. From the Publishers.

Advice to Sanitary Authorities and to Individuals on the Threatened Approach of Asiatic Cholera. By John M. Fox. London: Simpkin, Marshall and Co. 1873.

Obituary.

We regret to announce the death, on the 3rd July, at Brighton, of Mr. Charles Davy, Pharmaceutical Chemist, aged 76, for many years a member of the firm of Davy, Yates, and Routledge, and one of the original founders of the Pharmaceutical Society.

Correspondence.

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

Examinations Made Easy.

My attention has been called to one of the editorial articles which appeared in your Journal of Saturday, regarding an attempted personation at the preliminary examination of the University of Glasgow. Of course this might happen before any board, but, that it was *not* Glasgow University which was to be imposed upon in this particular instance, the following letter from Professor Young, Dean of the Medical Faculty, which appeared in the *North British Daily Mail* of July 23rd will at once prove:—

"Sir,—The curious history, quoted by you on Friday last from the Liverpool *Porcupine*, appeals to the authorities of Glasgow University. The Registrar of this University has pointed out to me that the appeal is unnecessary, since the date of the examination at which the personation was to be attempted was the 19th July—a date at which no examination in preliminary knowledge is held here. Moreover, the University requires *three* books of Euclid: the Board before which "Alpha" has to appear requires only *two*.

"I am, etc.,

"John Young, M.D.,

"Clerk of the Medical Faculty.

"Registrar's Office, University of Glasgow, 22nd July."

The examination must have been that of the Faculty of Physicians and Surgeons which is simply a *licensing* and not an *educating* body, and has nothing more to do with Glasgow University than the Royal College of Surgeons of England has with London University.

I believe the Secretary of the Faculty has placed the whole matter in the hands of the police.

H. M.

The Sale of Fly Papers.

Sir,—As one of those "correspondents that wrote to you some time ago" on the sale of "Vermin Killers," I will trouble you with my opinion on the subject of "Fly Papers," mooted in your Journal by Mr. Laird of Dundee.

I think it right to observe that our Council did not include "Vermin Killers" in Part I. of poisons to be registered, till one or two murders, some attempted murders, and several suicides had occurred through the great facility with which such articles could be obtained from oilmen, grocers, and chemists, without any inquiry or registry. The public, through their coroners and the coroners' juries, called for more care in the supplying of vermin killers, because human life was sacrificed through the ready facilities for procuring the fatal dose, and not, *per se*, because such packets contained strychnia or arsenic. From these premises I deduce that there is no illegality or at any rate no penalty attached to the sale of fly papers so long as love-sick swains abstain from making a decoction of "papier moure" and swallowing it to settle their love, or spiteful servants-of-all-work do not chop them up to mix with their mistress's tea or coffee when they have been scolded for stopping out too late on bank-holiday, or failing in some of their manifold household duties.

James Slipper.

London, August, 1873.

The Sale of Carbolic Acid.

Sir,—I do not entirely agree with the remarks of a "Country Chemist" respecting the sale of poisons. He appears to consider that he has done all that is required when he has complied with the regulations of the Pharmacy Act. I conceive that something more is due from a careful chemist than just abiding by the strict letter of the law. Is it nothing to avoid the odium which attaches to a chemist even if he be guiltless and unblameable in the eye of the law, when death or severe injury results from some article he has vended? I contend that every precaution ought to be taken, whether specified in the Act or not, to avoid preventible mischief. After an experience of thirty years, during which I have invariably followed the plan of labelling *all* poisons very distinctly, besides giving verbal instructions, and even going the length of refusing to sell to some whom I did not know, or whom I judged to be very careless, I can say to-day that I have never yet had a serious accident with poisons of any kind. True, I have lost custom in many cases, where little huckster shops have got the benefit, but I have nothing to regret. As an instance, I may mention that, though emerald green and similar things are sold indiscriminately, I make a point of cautioning the purchaser. Strictly, I suppose, emerald green would come under the Act, as an arsenite of copper, but I have not heard of any one taking any notice of the fact.

I would, not merely as a matter of policy, with the view to establish the reputation of a careful man of business, but also on the higher ground of possibly saving a life, recommend to my brother chemists a stricter code in the selling of ordinary poisons than usually prevails. Know the persons to whom you sell, impress them with the consequences of carelessness or misusage, and do not consider that you have done all that ought to be done when you have merely kept within the confines of the Act; and the death-rate by accidental and even wilful poisoning will as a consequence assuredly be much lessened. There are people stupid enough to perform any silly trick no matter how careful you may be, and it was certainly a stupid trick to take the carbolic acid, as mentioned in the report. But supposing a red label with the word "poison" had been on the bottle, does any one suppose the man would have been fool enough to have taken it then? Certainly not, and thus lives may be thrown away, and still *nobody be to blame*.

Joseph Walker.

Pudsey, near Leeds, July 23, 1873.

"*The Dishonest Dipsomaniac.*"—We are informed that notwithstanding the condition upon which Mr. D'Eyncourt recently discharged the above individual he rang up one of the assistants at a West-end pharmacist's, on Sunday morning last, at 5 a.m., and asked for a supply of chloroform. Fortunately, he was recognized, and was got rid of by a threat to give him in charge.

"*Solution.*"—If you refer to the Pharmacopœia you will see that several simple solutions are described, and it is to the strength of these solutions, doubtless, that the words have reference.

"*Spes.*"—The equations are correct.

"*Mr. Slater.*"—We are obliged to you for forwarding the newspapers. We do not, however, think that there is much that is objectionable in the paragraphs in question.

R. C.—We have received a communication from *R. C.* complaining of the practice of enclosing within the package of a patent medicine circulars offering the supply of other articles by retail through the post. We agree with *R. C.* that it seems hard to be thus made the medium of advertising a competitor without one's consent being asked. We would remind our correspondent, however, that this is but another aspect of the question whether it is the business of the druggist to inquire what are the contents of such packages. We have also received a letter on this subject from a firm who make patent medicines. They admit that they adopt the practice above referred to, but excuse themselves on the ground that the price charged for the articles they advertise in the circular is the ordinary retail price. We cannot, however, view this explanation as fully satisfactory in regard to the gravamen of the complaint urged by *R. C.*, which is that, by the use of such circulars as he describes, the proprietors of patent medicines, to some extent, seek to deprive the vendors of their preparations of their legitimate business, in so far as they offer to supply their commodities through the post. Fortunately, the evil now complained of is one that allows of the application of a very obvious remedy, and one to which patent medicine manufacturers are as susceptible as most people.

"*Syrupus.*"—It would depend upon the conditions of the engagement, and whether they would allow of the young man attending the laboratory during the prescribed hours.

"*Nemo*" and *R. C. P.* are referred to the regulation respecting anonymous contributions.

Communications, Letters, etc., have been received from Dr. De Vry, Mr. J. N. Place, Mr. T. E. Gibb, "Sine Granâ Salis," "A Deceived One."

ANALYSIS OF SOME CINCHONA BARKS GROWN IN JAMAICA.

BY DR. J. E. DE VRIJ.

A few years ago I read in this Journal* an interesting paper on "The Introduction of Cinchona to the Island of Jamaica," and was, therefore, much pleased when recently the Crown agents for the Colonies sent to me, at the request of the Government of Jamaica, six samples of Cinchona bark, grown in that colony, in order that a quantitative analysis might be obtained of them. I quite agree with Dr. Hooker† "that the results obtained in one country cannot be correctly regarded as a gauge for the productiveness of the same species in another country," and take, therefore, much interest in the analysis of bark grown in different localities. As the Crown agents have not only no objection to the publication of the results contained in my report to them, but assured me that they would be pleased by it, I proceed now to the publication in this Journal.

The barks sent to me were derived from the following species :—

1. *C. Pahudiana.* 2. *C. officinalis.* 3. *C. succirubra* (from the locality called "Cold Spring"). 4. *C. succirubra* (from another locality). 5. *C. Calisaya, and* 6. *C. micrantha.*

1. C. Pahudiana.

a. 20 grammes of dry bark yielded 0·745 gramme of mixed alkaloid . . . . .
b. 20 grammes of dry bark yielded 0·749 gramme of mixed alkaloids . . . . .
} average 3·735 per cent.

Molecular rotation of the mixed alkaloids $[\alpha]\, j =$ 72°·1↖. Calculated from the facts $\frac{V}{p} = \frac{19{\cdot}8}{1{\cdot}494}$; $l =$ 100 ; $a° = 5°{\cdot}5$ ↖.‡

Alkaloids soluble in ether, 2·156 per cent. $[\alpha]\, j = 52°{\cdot}5$↖ Calculated from the facts $\frac{V}{p} = \frac{20}{2{\cdot}096}$; $l = 100$; $a° =$ 5°·50↖.

Alkaloids insoluble in ether, 1·579 per cent. $[\alpha]\, j$, not determined through an accident.

The 2·156 alkaloids soluble in ether yielded 1·707 herapathite = 0·601 per cent. crystallizable quinine, and 1·192 amorphous alkaloid, containing a new crystallizable lævogyre alkaloid. The 1·579 alkaloids insoluble in ether yielded 0·904 bitartrate of cinchonidine,§ = 0·608 cinchonidine, and 0·971 of a mixture of two alkaloids. This mixture consisted of a *new* lævogyre crystallizable alkaloid, very soluble in alcohol, and ordinary cinchonine.*

40 grammes of dry bark yielded 0·057 gramme of quinovic acid = 0·142 per cent.

Conclusion.

This bark contains 3·735 per cent. of mixed alkaloids consisting of :—

Crystallizable quinine	0·964	soluble in ether, 2·156
Amorphous alkaloid containing a new crystalline alkaloid	1·192	
Cinchonidine. . .	0·608	insoluble in ether, 1·579
Cinchonine and a new alkaloid . .	0·971	
		3·735

2. C. officinalis.

a. 20 grammes of dry bark yielded 0·166 of mixed alkaloids . . . . . .
b. 20 grammes of dry bark yielded 0·167 of mixed alkaloids . . . . . .
} Average, 0·832 per cent.

Molecular rotation of the mixed alkaloids $[\alpha]\, j =$ 179·°6↖. Calculated from the facts $\frac{V}{p} = \frac{19}{0{\cdot}67}$; $l = 300$; $a° = 19°$↖

The total amount of alkaloids at my disposal was too small to allow a separation by ether. From 0·832 gramme of the mixed alkaloids I obtained 0·814 herapathite = 0·46 crystallizable quinine. Although the amount of quinine could be ascertained without the least doubt, the small quantity of disposable alkaloids did not allow me to investigate the real nature of the other existing alkaloids, and it was only possible to ascertain the absence of amorphous alkaloid.

40 grammes of dry bark yielded 0·135 of quinovic acid = 0·337 per cent.

Conclusion.

This bark contains 0·832 per cent. of mixed alkaloids, consisting of :

0·46 crystallizable quinine and 0·372 other alkaloids.

3. C. succirubra (*Cold Spring*).

a. 20 grammes of dry bark yielded 2·17 grammes of mixed alkaloids . . .
b. 20 grammes of dry bark yielded 2·165 grammes of mixed alkaloids . . .
} Average, 10·837 per cent.

Molecular rotation of the mixed alkaloids $[\alpha]\, j =$ 0°↖

This is the first instance observed by me that the

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* Second Series, Vol. X., No. 111 (September, 1868), p. 166.

† Ibid, p. 167.

‡ Third Series, Vol. II., No. 1 (July, 1871). Since the publication of this paper I never analyse barks without using the polariscope, and, notwithstanding the still existing imperfections of this process, it affords to me not only a great aid in my analysis, but also controls its results. So, for instance, I discovered a new alkaloid, which without the application of the polariscope would have escaped me and increased the amount of cinchonine. Since Professor A. C. Oudemans discovered the influence of the menstruum, in which the active substance is dissolved, on its rotary power it is necessary to mention that in these determinations I always use a weak acid containing five per cent. of pure sulphuric acid.

§ Since the publication of my paper "On the Separation and Quantitative Determination of the Different Cinchona Alkaloids," in this Journal, Vol. ii., p. 642 (1872), I have made the following modification of my process. To the solution of the part insoluble in ether I add a solution of iodide of sodium, and, after separating the hydriodate of quinidine,—if that alkaloid be present—a solution of bitartrate of sodium is added to the filtered liquid, which precipitates the bitartrate of cinchonidine.

* After collecting the bitartrate of cinchonidine upon a filter, I precipitated the alkaloid from the filtered liquid by caustic soda, in order to collect the cinchonine. In testing, however, the supposed cinchonine by the polariscope I found it to possess only a very slight dextrogyre rotation, viz. $[\alpha]\, j = 14°$ ↗ which fact led me to the conclusion that it must be a mixture of two alkaloids, which supposition was confirmed by treating the precipitate with a little cold alcohol which dissolved a lævogyre alkaloid, whilst the undissolved part proved to possess the strong dextrogyre rotation of cinchonine, with which alkaloid is proved to be identical.

different rotations of the alkaloids exactly neutralized each other.

Alkaloids soluble in ether, 3·728 $[\alpha]\,j = 123°{\cdot}1\curvearrowleft$ Calculated from the facts $\frac{V}{p} = \frac{18}{0{\cdot}7306}$; $l = 300$; $a° = 15°\curvearrowleft$

Alkaloids insoluble in ether, 7·109 $[\alpha]\,j = 51°{\cdot}7\curvearrowright$. Calculated from the facts $\frac{V}{p} = \frac{14}{0{\cdot}632}$; $l = 300$; $a° = 7°\curvearrowright$.

The 3·728 alkaloids soluble in ether yielded 3·466 of herapathite = 1·958 crystallizable quinine and 1·77 amorphous alkaloid. This amorphous alkaloid presented the peculiar property, hitherto unobserved by me, that it proved to possess a lævogyre rotation, its molecular rotation being—

$[\alpha]j = 48°{\cdot}3\curvearrowleft$.* Calculated from the facts $\frac{V}{p} = \frac{6{\cdot}7}{0{\cdot}277}$; $l = 200$; $a° = 4°\curvearrowleft$.

The 7·109 alkaloids insoluble in ether yielded 2·564 bitartrate of cinchonidine† = 1·724 cinchonidine and 5·385 cinchonine, containing a very small quantity of an alkaloid which, in regard of its compound with hydriodic acid, has some analogy with quinidine, but is not identical with it.

40 grammes of dry bark yielded 0·103 gramme of quinovic acid = 0·257 per cent.

Conclusion.

This bark contains 10·837 per cent. of mixed alkaloids, consisting of—

Crystallizable quinine 1·958 Amorphous alkaloid . 1·770	soluble in ether .	3·728
Cinchonidine . . . 1·724 Cinchonine containing a trace of a new alkaloid . . . . 5·385	insoluble in ether	7·109
		10·837

4. C. SUCCIRUBRA.

a. 20 grammes of dry bark yielded 1·18 of mixed alkaloids . . . . . }
b. 20 grammes of dry bark yielded 1·154 of mixed alkaloids . . . . . } Average, 5·835 per cent.

Molecular rotation of the mixed alkaloids $[\alpha]\,j = 67°{\cdot}3\curvearrowleft$. Calculated from the facts $\frac{V}{p} = \frac{13{\cdot}5}{0{\cdot}802}$; $l = 100$; $a° = 4°\curvearrowleft$.

Alkaloids soluble in ether, 2·28 : $[\alpha]\,j = 6°{\cdot}3\curvearrowright$. Calculated from the facts $\frac{V}{p} = \frac{20}{1{\cdot}0524}$; $l = 300$; $a° = 1°\curvearrowright$.

Alkaloids insoluble in ether, 3·555 : $[\alpha]\,j = 88°{\cdot}3\curvearrowleft$. Calculated from the facts $\frac{V}{p} = \frac{14{\cdot}8}{0{\cdot}335}$; $l = 300$; $a° = 6\curvearrowleft$.

This fact that the alkaloids soluble in ether obtained from this bark are dextrogyre, whilst the alkaloids insoluble in ether are lævogyre is quite anomalous and deserves particular attention, as it proves how great the mistake is made by many chemists who consider the part soluble in ether to be quinine. The 2·28 alkaloids soluble in ether yielded 0·82 of herapathite = 0·463 crystallizable quinine, and 1·817 of a mixture of two alkaloids, the prevailing one being a new crystallizable alkaloid, whilst the second one was an amorphous alkaloid.

The 3·555 alkaloids insoluble in ether yielded 1·973 bitartrate of cinchonidine = 1·33 cinchonidine, and 2·225 of a mixture of two alkaloids, the prevailing one being a new crystallizable alkaloid, very soluble in alcohol and lævogyre, whilst the second was ordinary cinchonine.

The bitartrate of cinchonidine obtained from this bark crystallized in the same shape as that obtained from the former bark (No. 3).

4 grammes of dry bark forwarded 0·16 gramme of quinovic acid = 0·4 per cent.

Conclusion.

This bark contains 5·835 per cent. of mixed alkaloids consisting of—

Crystallizable quinine . 0·463 New crystallizable alkaloid and amorphous alkaloid . . . . 1·817	soluble in ether, 2·280	
Cinchonidine . . . 1·330 New crystallizable alkaloid and cinchonine . 2·225	insoluble in ether, 3·555	
		5·835

5. C. CALISAYA.

a. 20 grammes of dry bark yielded 0·551 of mixed alkaloids . . . . . }
b. 20 grammes of dry bark yielded 0·549 of mixed alkaloids . . . . . } Average 2·75 per cent.

Molecular rotation of the mixed alkaloids $[\alpha]\,j = 91°\curvearrowleft$. Calculated from the facts $\frac{V}{p} = \frac{15{\cdot}4}{1{\cdot}10}$; $l = 100°$; $a° = 6°{\cdot}5\curvearrowleft$.

Alkaloids soluble in ether 1·68 : $[\alpha]\,j = 128°{\cdot}2\curvearrowleft$. Calculated from the facts $\frac{V}{p} = \frac{20}{1{\cdot}6372}$; $l = 100$; $a° = 10°{\cdot}5\curvearrowleft$.

Alkaloids insoluble in ether 1·07 : $[\alpha]\,j$ not observed.

The 1·68 alkaloids soluble in ether yielded 2·24 of herapathite = 1·265 crystallizable quinine, and 0·415 amorphous alkaloid. The 1·07 alkaloids insoluble in ether yielded 0·26 of bitartrate of cinchonidine = 0·175 cinchonidine and 0·895 of a mixture of two alkaloids, the prevailing one being a new crystallizable lævogyre alkaloid, very soluble in alcohol and analogous to that obtained from the bark No. 4, whilst the second was ordinary cinchonine.

40 grammes of dry bark yielded 0·184 gramme of quinovic acid = 0·46 per cent.

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* In my former analysis of barks I generally found the amorphous alkaloid to possess a slight dextrogyre rotation, and inclined therefore to the supposition that perhaps it might be identical with Pasteur's quinicine, but a comparison with quinicine, which had been kindly given to me by Pasteur himself, proved that it was different from it. It appears now, by the observation of a lævogyre amorphous alkaloid, that I was right in using only the general definition, "amorphous alkaloid," and leaving to the future the further investigation of its real nature.

† As this bitartrate crystallized in quite another shape than I was accustomed to, I stated in my official report that the cinchonidine of this bark might be a modification of the ordinary cinchonidine. Since that time, however, further investigations convinced me that it was not a modification but quite identical with ordinary pure cinchonidine, which was also confirmed by my friend, Professor A. C. Oudemans, who at my request kindly investigated with the greatest accuracy its rotatory power. After dissolving the alkaloid, separated by me from the apparent abnormal bitartrate, in alcohol of 93 per cent., he found the molecular rotation *in that menstruum* to be $[\alpha] = j\ 116°{\cdot}7\curvearrowleft$.

Conclusion.

This bark contains 2·75 per cent. of mixed alkaloids consisting of—

Crystallizable quinine.	1·265	soluble in ether, 1·68
Amorphous alkaloid .	0·415	
Cinchonidine . . .	0·175	insoluble in ether, 1·07
New crystallizable alkaloid and cinchonine .	0·895	
		2·75

6. C. MICRANTHA.

a. 20 grammes of dry bark yielded 0·662 of mixed alkaloids	Average 3·402 per cent.
b. 20 grammes of dry bark yielded 0·690 of mixed alkaloids	

Molecular rotation of the mixed alkaloids [α] j = 28°·3↖.

Calculated from the facts $\frac{V}{p} = \frac{14·5}{0·512}$; $l = 100$; $a° = 1°$↖.

Alkaloids soluble in ether 2·202 [α] j = 25°·7↖. Calculated from the facts $\frac{V}{p} = \frac{20}{1,942}$; $l = 100$; $a° = 2·°5$↖

Alkaloids insoluble in ether 1·2 [α] j not observed.

The chemical investigation of the mixed alkaloids proved very unsatisfactory. As the whole amount of powdered bark at my disposal did not exceed 100 grammes I had only 3·4 grammes of mixed alkaloids. These would however have been sufficient for my chemical investigation if they had not proved to be very anomalous. They were very dark-coloured and contained a dark brown resinous matter which adhered very tenaciously to them so that a relatively great loss was sustained before they could be obtained sufficiently pure for further investigation.

The alkaloids soluble in ether yielded only 0·284 of iodosulphate which had much analogy with quinine-herapathite, but its appearance was however somewhat anomalous. I investigated this presumed herapathite accurately and the result was that I could not accept it as quinine-herapathite. But even if the 0·284 gramme of iodosulphate was, against my conviction, really quinine-herapathite, the amount of quinine in the 2·202 grammes of alkaloids soluble in ether would only be 0·16. From the mother-liquor of this presumed herapathite I obtained 1·105 of amorphous alkaloid, which had *no* action on the plane of polarization, and 0·938 of a brown resinous matter insoluble in diluted acids.

The alkaloids insoluble in ether yielded no bitartrate of cinchonidine, but, besides distinct traces of quinidine, a mixture of two alkaloids, the prevailing one being analogous to that obtained from the barks mentioned *sub* 4 and 5, whilst the second was ordinary cinchonine. Although I did not obtain any bitartrate of cinchonidine from the alkaloids insoluble in ether, I presume that this alkaloid was present in a very small quantity, which had been dissolved in ether by the aid of the relatively large amount of amorphous alkaloid, and to this supposed presence of cinchonidine I ascribe the formation of the mentioned iodosulphate, as this compound of cinchonidine has really much analogy with the quinine-herapathite.

Conclusion.

This bark contains 3·402 per cent. of mixed alkaloids consisting of :—

Crystallizable quinine (very dubious)	0·16	soluble in ether, 2·202
Amorphous alkaloids .	1·104	
Brown resinous matter .	0·938	
New crystallizable alkaloid and cinchonine, with distinct traces of quinidine	1·200	insoluble in ether, 1·200
		3·402

As the commercial value of cinchona barks for quinine manufacturers depends chiefly on their amount of crystallizable quinine, I give the following tabular review of its quantity in 100 parts of the different barks subjected to my investigation.

	Pure Quinine.		Crystallized Sulphate.
C. succirubra (Cold Spring)	1·958	=	2·50
C. Calisaya	1·265	=	1·612
C. Pahudiana	0·964	=	1·229
C. officinalis	0·46	=	0·586
C. succirubra	0·463	=	0·59
C. micrantha	? ?		

As the introduction of Cinchona cultivation in Jamaica dates only from 1867, I consider the results of my analysis of the bark obtained in that colony from *C. succirubra*, *C. Calisaya*, and *C. Pahudiana*, very satisfactory. Comparing the results of my analysis of the bark of *C. officinalis* with those obtained by me from barks of the same species grown in Ceylon and the Neilgherries, I have not much confidence in the success of the cultivation of that species in Jamaica. It is, however, possible that the low percentage of quinine in the bark is caused either by its being still too young or being grown at a not sufficient elevation above the sea, as it is proved that this species requires at Ootacamund, where it gives excellent results, an elevation of about 8000 feet. As to the *C. micrantha*, I have not the least expectation that it ever will produce a bark fit for quinine manufacturing.

THE MATERIA MEDICA OF THE UNITED STATES' PHARMACOPŒIA.

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

(Continued from Vol. III., page 1031.*)*

Having briefly reviewed the changes which have taken place in the U. S. P. since its last issue, it now remains to compare it with our own pharmacopœia, and to direct attention to any points worthy of notice which may present themselves.

The features of the materia medica of the U. S. P. which differ from those of the B. P. deserve a few passing remarks before entering into the difference in details.

The descriptions of and tests for the inorganic substances are, as a rule, much shorter than those of the B. P. and seem to have been written with a view to their being thoroughly practical. The forms of crystals are rarely described, and when they are, scientific terms are avoided. There are few perhaps, who, unless they have made crystallography a special study, could determine the crystalline form of a substance by mere inspection, without the aid of a goniometer, although they might perhaps recognize

the crystals from familiarity with their general appearance ; so that a description of the exact crystalline form is hardly necessary. The descriptions of the organic substances are much too short ; no descriptions or tests being given where they are really needed ; in many cases there is little more than an enumeration of the parts to be used, the quality of the article being left entirely to the honour of the pharmaceutist, who it is to be hoped never uses any but drugs of the best quality. As there is a public inspector of drugs in America there is perhaps not so much chance as there is in England for inferior drugs to find their way into the market, and this may perhaps account for the absence in so many cases of adequate descriptions and tests.

The class of remedies which more properly belong to the province of the nurse or cook is comparatively a large one, thus *avenæ farina*, *canna*, *icthyocolla*, and *maranta*, *sago* and *tapioca* find a place in it. Articles of this class were omitted from the last B.P., and with good reason, for although frequently ordered by medical men for their patients, they are rarely prepared by the dispenser or pharmaceutist, and unless the whole of the dietary commonly ordered by physicians be included in the materia medica they are better left out altogether. If they are admitted, Liebig's extract of meat, Ridge's and Neave's food, mutton broth and calves' foot jelly have an equal claim to a place in the pharmacopœia, as they are certainly more frequently ordered than sago or tapioca.

There are a few more flavouring agents than there are in the B. P. Anything that tends to make medicine more palatable and at the same time does not diminish its efficacy must be regarded as an useful addition. The articles of this class in the B. P. offer but a limited choice to the physician who may be anxious to disguise the taste of castor or cod-liver oils, etc.

The number of articles in the U. S. P. exceeds that of the B. P. by 143. There are 402 in the former and 259 in the latter. This difference might naturally be expected in the materia medica of a country so much larger than Great Britain. It is not however really so important as it appears to be, for there are no less than 67 articles in the U. S. P. which have been dismissed from the pharmacopœias of this country during the last 150 years. It is rather singular that forty-two of these are to be found in the primary list. Among these may be noticed *allium*, *chimaphila*, *helleborus niger*, *marrubium*, *rosmarinus*, *ruta*, *salvia* and *cataria ;* and in the secondary list *achillea*, *tanacetum*, *rubia* and *delphinium consolida*. It is evident that these old-fashioned remedies are held in higher esteem in the United States than they are in this country. This is the more remarkable since America is by no means conservative in its tendencies. Twelve of the articles of materia medica in the U. S. P. have processes given for their preparation in the B. P. ; these are *acidum citricum*, *acidum muriaticum*, *acidum tartaricum*, *adeps*, *alcohol dilutum*, *aqua ammoniæ fortior*, *magnesii carbonas*, *plumbi acetas*, *potassii chloras*, *potassii permanganas*, *zinci sulphas*, and *zinci valerianas*.

There are 117 articles altogether which have never appeared in the pharmacopœias of this country, seventy of which are obtained from plants indigenous in America. The remainder of the 117 includes among other articles several now introduced into the U. S. P., and a few derived from plants which are indigenous in this country, but which, so far as I can discover, have never been used in medicine here, although species closely allied to them are familiar herbs in England. The plants alluded to include *geum rivale*, *rumex crispus*, *ranunculus bulbosus*, and *matricaria chamomilla*. The remaining articles of the materia medica, 206 in number, are *common to both pharmacopœias*. This fact may interest those who are anxious for the formation of an universal pharmacopœia. If this desirable work is to become a fact in the future, one of the first steps towards its accomplishment must be to ascertain the number of articles of materia medica and of preparations which are common to all pharmacopœias.

The following summary will show at a glance the comparisons made above :

	U.S.P.		B.P.
Formerly official in B. P. . .	67		
In preparations in B. P. . . .	12	Do. in U. S. P. . .	18
Indigenous in U. S. and not in B. P.	70	Do. in B. and not in U. S. P. . .	8
Not indigenous in U. S. and not in B. P. . . .	47	Do. in B. . . . Do. in B. P. . .	27
Common to U. S. P. and B. P. . .	206	Do.	206
	402		259

Most of the indigenous plants which are official in the B. P. are used also in the United States, the following being the only exceptions : *cochlearia armoracia*, *lactuca virosa*, *quercus pedunculata*, *rhamnus catharticus*, *papaver rhœados*, *rosa canina*, *sambucus nigra*, and *ulmus campestris*. Some of these however are represented by American plants in the U.S.P., thus—*quercus alba* takes the place of *Q. pedunculata ; sambucus canadensis* that of *sambucus nigra*, while *lactuca virosa* is represented by *lactucarium*.

The seventeen articles of materia medica of the B. P. for which processes are given in the U. S. P. are acidum benzoicum, ammonii bromidum, aqua aurantii florum, creta preparata, ol. anisi, carui, caryophylli, copaibæ, cubebæ, juniperi, lavandulæ, menthæ piperitæ menthæ viridis, pimentæ, rosmarini, rutæ, sabinæ, and potassii carbonas.

The twenty-seven articles of the B. P. which do not occur in the U. S. P. are the following :—

Acidum aceticum glaciale.
Anethi fructus.
Arnicæ radix.*
Belæ fructus.
Cadmii iodidum.
Catechu pallidum.*
Ecbalii fructus.*
Elemi.
Farina tritici.
Hemidesmus.
Hirudo.
Lac.
Laurocerasi fol.
Mica panis.
Mori succus.
Oleum anethi.
anthemidis.
coriandri.
myristicæ expressum
sinapis essentiale.
Sapo mollis.
Sassafras radix.*
Scammonii radix.
Senna, Tinnevelly.†
Sumbul.
Thus.
Vinum aurantii.

With the exception of acidum aceticum glaciale, cadmii iodidum, oleum sinapis essentiale and scammonii radix, vinum aurantii, and the few which are

* Represented by similar substances in the U. S. P.
† Included under senna in the U. S. P.

represented by other articles of a similar nature in the U. S. P., the remainder might without any great loss be banished from the B. P. altogether, as they are mostly but little used in this country.

Of the 206 articles which are common to both pharmacopœias, those tests and characters of inorganic substances only will be mentioned which are not found in the P. B., as the tests given in the two works are, for the most part, very similar; those of the U. S. P. being, as a rule, rather less full than those of the B. P. Omissions in the U. S. P. of tests or descriptions of organic substances—descriptions of which occur in the B. P.—will only be noticed in such cases as they appear to be of importance; the comparisons now made being principally intended for the purpose of bringing forward any points of interest to the British pharmaceutist.

Before commencing this comparison, it will be well, perhaps, to notice the difference which occurs in the two pharmacopœias in the nomenclature of several of the articles :—

U. S. P.	B. P.
Citrus vulgaris.	Citrus bigaradia.
Galipea officinalis.	Galipea Cusparia.
Angustura bark	Cusparia bark.
Myrospermum peruiferum	Myroxylon perciræ.
——— toluiferum.	——— toluifera.
Barosma crenata.	Barosma betulina.
Calx chlorinata.	Calx chlorata.
Jateorrhiza palmata, Miers.	Jateorrhiza Miersii.
Agathotes chirayta, Don.	Ophelia chirata.
Chiretta.	Chirata.
Momordica elaterium.	
Ecbalium agreste, Richard	Ecbalium officinarum, Richard.
Gambogia.	Cambogia.
Glycerina, glycerin.	Glycerinum, glycerine.
Myristica fragrans.	Myristica officinalis.
Flaxseed meal.	Linseed meal.
Melaleuca cajuputi.	Melaleuca minor.
Oleum amygdalæ expressum.	Oleum amygdalæ.
Phasianus gallus.	Gallus bankiva, var. domestica.
Simaruba excelsa.	Picrœna excelsa.
Rheum palmatum, etc.	Rheum, undetermined species.
Cassia acutifolia.	Cassia lanceolata, D. C.
Scilla maritima.	Urginea scilla.
Veratrum sabadilla.	Asagræa officinalis.
Artemisia Cina.	Artemisia, undetermined species.
Koosso.	Kousso.

With regard to cusparia or angustura bark, it is said by Royle to be the produce of two species, cusparia bark being produced by *G. cusparia* and angustura by *G. officinalis*. Other authorities, however, state that the two plants are but varieties of the same species.

It will be observed that rhubarb is attributed to *rheum palmatum* in the U. S. P. Its true source (*R. officinalis*) was not known at the time the work was published, and, for a similar reason, santonica is attributed to an undetermined species of artemisia in the P. B. It is rather unfortunate that the two pharmacopœias do not agree as to the gender of glycerine—one making it a feminine, and the other a neuter noun. Students will be puzzled as to the correct termination of the word in reading prescriptions. No difficulty, will be felt, however, as to the correct pronunciation of this and other words, seeing that all the names are accented in the index. This was formerly the case in pharmacopœias in this country, only that the materia medica list was accented instead of the index. It is much to be regretted that this was discontinued. At the present time, many names are pronounced according to the fancy of the speaker without any definite rule, sometimes according to the derivation of the word, sometimes Anglicised, and often contrary to any known rule whatever. In the absence of a pronouncing dictionary of scientific names and terms this attempt at uniformity of pronunciation is well worthy of imitation.

In comparing the articles in the two pharmacopœias, it will be more convenient to consider them under the sections above given; hence the 206 common to both will be first noticed, then those which do not occur in the P. B., and are not indigenous in America, and, finally, those which do not occur in the P. B., and are indigenous in America :—

Acidum accticum.—This is slightly stronger than that of the P. B. (about 2 per cent.), the sp. gr. being 1·047, while that of the P. B. is 1·044. The only test not given in the P. B. is, that after neutralization with bicarbonate of potassium the liquid should be free from an acrid taste.

Carbolic acid.—Essential oils are mentioned as solvents for this, and the additional tests are that its solution coagulates collodion, and combines with alkalies, from which combination any weak acid, even carbonic, displaces it.

Acidum muriaticum.—This, as well as the nitric and sulphuric acids, are of the same strength as in the B. P. The gold leaf test for free chlorine is given under muriatic acid, in addition to those in the P. B.

Aconiti folia and *radix* have no direction appended as to the best time to gather them. This is an important omission, for it is well known that both the root and the leaves vary according to the time at which they are gathered; thus the root contains twice as much aconitine after as it does before flowering, so that the tincture made with roots gathered at different periods is liable to considerable variation in strength—a matter of no small importance in the case of so powerful a remedy as aconite.

Alcohol.—The sp. gr. is given as 0·835, thus being a little stronger than that of the P. B., 0·838. Alcohol dilutum is directed to be made by mixing the above with an equal measure of distilled water. The sp. gr. of the mixture is 0·941, and is consequently rather weaker than the proof-spirit of the P. B. This slight difference cannot diminish the solvent properties of the spirit to any material extent, while the convenience of mixing equal quantities is very great, so much so indeed as to lead in this country to the very frequent use of spirit mixed in these proportions. Possibly the excess of profit thus yielded may in some measure influence those who adopt this practice, but I am charitable enough to believe that if these proportions were ordered in the P. B., the strength of the rectified spirit being stronger, a larger proportion of water than ordered would not then be used.

Alcohol Amylicum.—Additional tests are—it does not take fire by contact with flame, and does not leave a permanent greasy stain when dropped upon paper.

Ammonii carbonas.—Additional test—its odour should be free from empyreuma.

Aqua ammoniæ fortior.—This is not quite so strong as that of the P. B., its sp. gr. being 0·900 (P. B., 0·891).

This is one of those articles which might readily and reasonably be made of equal strength in both pharmacopœias.

Belladonnæ folia and radix.—No directions are given as to the best time to gather the leaves, but the roots are directed to be gathered from plants more than two years old, a direction not to be found in the P. B.

Calx chlorinata.—The following is given as a test of its strength. When forty grains, triturated with an ounce of distilled water, are well shaken with a solution of seventy-eight grains of crystallized protosulphate of iron and ten drops of sulphuric acid in two fluid ounces of distilled water, a liquid is formed which does not yield a blue precipitate with ferricyanide of potassium. It is also very properly described as a dry powder, it being often sold in a damp and much deteriorated state.

Capsicum.—This is described as the fruit of the *C. annuum*, *C. fastigiatum*, and of other species of capsicum.

Cardamomum.—This is simply described as the fruit, so that it would appear that the husk, which forms a considerable proportion of the weight, is to be used as well as the seed.

Catechu.—That prepared from the wood of the *Acacia catechu*, and known in commerce as Bombay or black catechu, is directed to be used. It contains $2\frac{1}{2}$ per cent. more tannin than the *Terra japonica* (pale catechu) official in the B. P.

Cerii oxalas.—The following tests are given:—"Insoluble in water, alcohol, and ether, soluble in sulphuric acid; the solution, mixed with chloride of ammonium,* yields a precipitate with caustic potash, insoluble in excess of the precipitant. Exposed to heat, the salt is decomposed, and leaves a black powder which, in contact with the air, burns to yellow peroxide of cerium." The blackish powder here mentioned is only formed if the oxalate is heated in a *closed* vessel.

Cinchona rubra.—It should contain not less than 2 per cent. of alkaloids which yield crystallizable salts. The B. P. is content with 1·5 per cent. The latter is too small a percentage, as good red bark is stated to yield 2·5 per cent. of quinine and nearly $1\frac{1}{2}$ per cent. of cinchonine.†

Cinnamomum.—The use of cassia is authorized by giving both *C. zeylanicum* and *C. aromaticum* as sources of cinnamon. This must cause some little annoyance in dispensing, if cassia has been used at one establishment and cinnamon at another, the odour and taste, although similar, being quite distinct.

Colchicum.—The best time for gathering this corm is not mentioned, although it varies greatly in strength at different seasons of the year, nor are any characters given by which to judge of its quality.

Creosotum.—Its sp. gr. is given as 1·046. That of the B. P. is 1·071. Additional test—"It does not coagulate collodion when mixed with it, and does *not* impart a blue colour to a slip of pinewood, dipped first into an alkaline solution of creosote, and then, after, drying, into muriatic acid." It is stated in the B. P. that both creosote and carbolic acid produce the greenish-blue colour.

Digitalis folia.—These are directed to be obtained from plants of the second year's growth. Like most other biennial plants their activity is greater then than during the first year.

Elaterium.—No test for ascertaining its strength is given. This is an important omission, good elaterium being such an extremely active drug.

Glycerine.—Additional tests—"Not soluble in ether. When mixed with twice its bulk of cold sulphuric acid it does not produce a brown colour. When diluted with water it does not afford a precipitate with hydrosulphate of ammonia, ferrocyanide of potassium, nitrate of barium, oxalate of ammonium, or nitrate of silver. It combines with potassa and baryta, and also with sulphuric acid." In the P. B. there is no test given for ascertaining its freedom from impurity.

Guaiaci lignum.—The dark portion, or heart-wood, is ordered instead of the whole of the wood, as in the B. P.

Hydrargyrum.—Additional tests—A globule made to roll over white paper leaves no trace. It is dissolved without residue in nitric acid. Sulphuric acid agitated with it and afterwards evaporated leaves no residue.

Hyoscyami folia.—No distinction is made in the value of the leaves of the annual or biennial plant.

Kino is described as the inspissated juice of *Pterocarpus marsupium* and of other plants. Thus the kino from *butea frondosa*, *coccoloba uvifera*, and *eucalypta resinifera* may all be considered as official articles.

Krameria.—It may be here noticed that a large quantity of *krameria ixina* or savanilla rhatany is met with in commerce in this country, and appears to possess greater astringency than the official species.

Oleum cinnamomi.—This does not include the oil of cassia, as might be supposed from the two barks being official under one name.

Oleum limonis.—No test is given for the purity of this or other essential oils, either in the P. B. or U. S. P. This is to be regretted, as many essential oils are very subject to adulteration.

Oleum morrhuæ is described as the fixed oil obtained from the liver of *gadus morrhua* and of *other species* of *gadus*. This is more correct than that given in the P. B., for a large portion of the oil met with in commerce is not derived from the codfish alone. Some specimens of this oil are probably much more efficacious than others, for the writer has found that some specimens cannot be emulsified by shaking with liquor potassæ, while others readily form a permanent emulsion with it. Specimens of the former kind are hardly likely to be readily absorbed into the system of a patient with weak digestion.

Oleum olivæ.—It is a pity that no test is given either in this pharmacopœia or our own to test the quality of an article so frequently adulterated, and so variable in quality.

Pareira is simply described as the root of *cissampelos pareira*. If there is one article of materia medica more than another which requires a definite description, it is pareira brava. The roots and stems of several different plants are now and then met with in the drug market which have a kind of family resemblance, but which are evidently the produce of different plants. It has already been shown by Hanbury that the root and stem met with in commerce is not that of *cissampelos pareira*,* and that the greater proportion of the pareira brava met with in commerce is not a root at all, but the stem of a plant at present undetermined. The root formerly imported, and described by Pereira, has lately appeared in commerce again, and has been determined to be the produce of *chondodendron tomentosum*, another menispermaceous plant. The true root yields about 25 per cent. of extract, while the false root or woody-stem yields only about 5 per cent., which, however, has by no means the sensible properties of the former.

Potassii bitartras.—Additional tests: freely soluble in a hot solution of potassa, anything that remains undissolved being impurity.

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* Chloride of ammonium would detect lead or silver, and the formation of the double sulphate of cerium and potash as an insoluble precipitate is a characteristic test for cerium.

† Royle, Mat. Med., p. 513.

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* See ante, p. 81 *et seq.*

Potassii permanganas.—According to the U. S. P., forty grains of crystallized sulphate of iron, acidulated with two fluid drachms of diluted sulphuric acid, are sufficient to completely decolorize a solution of five grains of permanganate of potash; but forty-four grains of the *granulated* sulphate are required to effect the same result, according to the P. B.

Sarsaparilla.—The description given permits the use of any of the commercial varieties, as sarsaparilla is stated to be the root of *smilax officinalis*, and of *other species* of *smilax*.

Scammonium.—According to the U. S. P., ether dissolves at least 75 per cent. of it; while, according to the P. B. it should dissolve from 80 to 90 per cent. of it. Additional test: the residue of the evaporation of the ethereal solution, dissolved in a hot solution of caustic potash, is not precipitated by dilute sulphuric acid.

Senna is simply described as the leaflets of *cassia acutifolia*, Delile, *cassia abovata*, D. C., and *cassia elongata*, Lemaire—thus allowing the use either of pure Alexandrian senna, E. Indian, or Tinnevelly.

Serpentaria is described as being the root of several species of *aristolochia*, of which two are mentioned by name—*A. serpentaria* and *A. reticulata*.

Spiritus vini gallici.—It is described as containing from 48 to 56 per cent. by volume of absolute alcohol, being free from odour, and not less than four years old.

Syrupus fuscus.—This is better known to English pharmaceutists as theriaca.

Veratrum viride.—No characters are given by which to distinguish it from veratrum album, which is also official, and which it closely resembles in appearance.

Secondary List.

Brayera is described as the flowers and *unripe fruit* of *brayera anthelmintica*.

THE MOLECULAR CHANGES THAT ACCOMPANY THE MAGNETIZATION OF IRON.

BY W. F. BARRETT, F.C.S.

The following abstract of a lecture delivered at the London Institution, on the 23rd April, is taken from the *Journal of the London Institution* for July :—

The lecturer first briefly referred to the various theories of magnetism that have been suggested from the time of Thales to the present day, pointing out how magnetism is now generally regarded as a mode of electricity in motion. Putting aside all hypotheses, the object of the present discourse was to gather some of the scattered observations that have been made of late years on the molecular changes that are associated with the magnetization of iron. It was hoped that by bringing into juxtaposition the labours of eminent men in this direction, some conception might be formed of the architecture of a magnet;—at any rate, a clearer view would thus be gained of the broad distinctions between the molecular structure of iron before and after magnetization.

The various means of converting iron into a magnet were shown. In every case it was evident that the profound change which had passed over the iron was quickly, but not instantaneously imparted—*time*, as Faraday long ago pointed out, being an essential element in the phenomenon. No evidence of the nature of the change from unmagnetized to magnetized iron could be gleaned from a scrutiny of the iron; its appearance, temperature, weight, and density remained unaltered. Iron filings scattered round the iron revealed the direction of the force as it spread from the magnetized iron. Its direction *within* the magnetized iron was shown by constructing a hollow magnet along the axis of which the filings were seen to be arranged in parallel striæ. In these experiments the filings were scattered on dry glass plates and strips which had been previously gummed. After the filings had arranged themselves, breathing on these plates fixed the filings sufficiently to enable the plates to be used as a magic lantern slide, and thus the lines of force were shown on the screen. It was seen that the direction of the lines was from pole to pole within the magnet. Using still finer particles of iron—the magnetic oxide of iron in a state of chemical division, suspended as a cloud in water—the famous experiment of Mr. Grove's was exhibited: an experiment of special interest in this place, from its association with the London Institution. The cloud of iron and water was enclosed within a powerful helix, and the lime-light sent through its axis; the faint image on the screen became conspicuously brighter on magnetizing the helix. Here the setting of the iron dust axially permitted freer transmission of light than when it was scattered in every direction. Before magnetization it was a mere turbid liquid; after magnetization an end-to-end arrangement of the particles had occurred, and a definite structure was thus impressed. In like manner, though one might not be able to see through the confused mass of a mob, one could see along the lines of a regiment of soldiers.

This marshalling of the molecules which signalizes the magnetization of iron makes clear why concussion equally aids the act of magnetizing, and also lessens the power of a magnet. In the one case it mechanically assists the molecular movement, in the other it helps to destroy it when acquired. This is easy to comprehend. For example: tapping will help the formation of the magnetic curves, but, once formed, continued tapping will tend to destroy them. The high cohesive power of steel resists the molecular change due to magnetization, and retains it when impressed. Destruction of that cohesive power, by heat, renders steel as easily magnetized by induction as soft iron, whilst sudden quenching of the hot steel permanently fixes this otherwise transitory condition, So also, when the cohesion of steel is destroyed by reducing it to dust, mere agitation will overthrow the magnetized state. A long test-tube, filled with fine steel filings, was drawn over one pole of a magnet, and shown to be powerfully magnetized, behaving like an unbroken bar magnet. The test-tube was then shaken, and the magnetized state had disappeared. The filings now attracted both ends of a magnetic needle.

Variations in the quality of iron or steel affect its aptitude for magnetization. A cube of fibrous iron suspended between the poles of a magnet sets its fibre axially; as we might infer, magnetization is easier in this direction than any other, and so the cube turns its fibres from pole to pole. Magnetized in a given direction, and then demagnetized, a bar of steel is easier and more powerfully magnetized in its first direction than in any other. The fact, long ago pointed out by M. Marianini, has recently been again observed by M. Jamin.

The lecturer, hoping to reveal an altered structure in iron or steel by magnetization, submitted bars of hard and soft iron to the action of weak nitric acid. Each specimen of iron was cut in two lengths: one was magnetized during the experiment; the other not. No definite results were gained; the nitric acid, even after prolonging the action for weeks, seemed to act equally upon both bars. But the experiment is worth repetition with higher magnetic force.

The evidence that a molecular change accompanies magnetization is still further established by the remarkable discovery of Mr. Page. This American philosopher made public the fact that a *sound* was emitted by iron on magnetization, and again on demagnetization. Heightened by the resonance of a sounding-box, this magnetic click was palpably heard by the audience; several fine iron wires stretched within a helix and rapidly magnetized and demagnetized yielded the loudest tones. Too great a strain on the iron wires lessens the intensity of the sound, nor is any strain at all necessary. A poker inserted into a helix was heard to emit a sound, which vanished when the poker was withdrawn. Two massive bars of pure nickel

and pure cobalt, lent by Messrs. Johnson and Matthey' were also shown by the lecturer to yield a distinct sound, the cobalt giving a more decidedly metallic clink than iron. This was believed to be the first time the effect with these metals had been observed.

The famous discovery of Dr. Joule's, that iron *lengthens* on magnetization, was next experimentally shown, as affording some evidence of the nature of the molecular change that occurred on magnetization. The apparatus for exhibiting Joule's discovery was skilfully made for the lecturer by Mr. Yeates, of Dublin, and was a modification of an arrangement first employed by Dr. Tyndall. By a system of levers moving a mirror, on which a ray of light was thrown, the lengthening of the bar was made evident to the audience; a considerable movement of the reflected ray being apparent every time the iron was magnetized. It was noticeable that the return on demagnetization was comparatively small and slow, even the softest iron retaining for a long period some magnetism. The normal disposition of the particles of iron is slowly resumed after the sudden strain put on them by magnetization.

The apparatus here described is also adapted to show the effect of magnetization on the dimensions of nickel and cobalt, a subject at present under examination.

No absolute increase in bulk occurs in iron when magnetized; the method by which Dr. Joule established this being shown. An electro-magnetic bar was enclosed in a tube of water, furnished with a capillary ending: no alteration in the level of the water was perceived on magnetization. Hence iron contracts transversely as much as it expends longitudinally on magnetization.

This transverse contraction gives magnetized iron a greater density in that direction. This affects the conduction of heat and electricity. A sheet of iron covered with wax was heated through a hole in its centre by a hot rod; the wax melted in a circle. The iron was magnetized; the wax now melted in an ellipse, the major axis of which was at right angles to the magnetic axis. This fact, observed Dr. Maggi, had its precise analogue in the conduction of electricity in magnetized iron and nickel, as shown by Sir W. Thomson.

Other facts were briefly referred to in further support of the particular nature of the change caused by magnetization. M. Guillemin has shown that a strip of iron bent by a weight is partly straightened by the act of magnetization. M. Wiedemann has shown that an iron wire, hung in the centre of a helix and twisted, is more or less untwisted when a current traverses the helix and thus magnetizes the iron. Twisting a magnet lessens its magnetic force; but stretching a magnet slightly adds to its power, as has been proved by M. Matteucci. A powerful apparatus, designed by Mr. Gore, was shown, whereby the effect of strain on hard iron, slightly magnetized, was made evident. Straining the iron in the direction of its length was seen to augment its magnetic force; when the strain was removed the magnetic state of the iron reverted to its original condition. These changes were made obvious by the creation of an electric current in a long helix of wire surrounding the experimental wire, the presence and direction of the current being declared by the reflection of a ray of light from the mirror of a new form of Thomson's galvanometer.

The action of heat in destroying the magnetism of steel, and even the magnetic condition of iron, nickel, and cobalt, was then shown: nickel first losing its magnetic state, hen iron, and lastly cobalt, at a very high temperature. Associated with this, a remarkable experiment of Mr. Gore's was exhibited. An iron wire, heated, to whiteness, was so arranged that on its contraction an index was moved, visible to the whole audience. It was seen that at a particular moment of cooling, when the iron was at a red heat, the contraction was instantly reversed into a sudden and momentary expansion of the iron. The critical temperature at which this extraordinary molecular change in the iron occurred appeared to be that at which iron returns to its magnetic condition. An investigation of this important point, and also of the deportment of nickel and cobalt under like circumstances, has yet to be made.

From this body of experimental evidence, there can be no doubt a molecular change of a definite nature accompanies the magnetization of iron. M. De la Rive was the first to recognize this important fact.* Magnetized iron would seem to differ from ordinary iron by a state of longitudinal strain impressed on its molecules. Assuming that the molecules of iron have one dimension longer than another, the polar force given to each molecule appears to act in the direction of that longest dimension. The crystalline structure of iron, as well as its other physical properties, should therefore be matched by similar properties in nickel and cobalt. A strict inquiry into this point was made by the lecturer, and the extraordinary similarity of these three metals was undeniably evident. The accompanying table exhibits a comparison of some of these properties, wherein it will be noticed that both in physical and chemical characteristics these metals are allied. Over and above the well-known similar features of the iron group, there is seen to be a peculiar and subtle analogy running through the metals named.

Substance.	Density water=1.	Atomic weight H.=1.	Specific heat: water=1.	Atomic heat.	Dilatation by heat.	Lengthening by strain.	Conductivity for Heat: silver=1.	Conductivity for Sound; air=1.	Tenacity and melting point.
Iron ...	7·8	56·0	0·113	6·37	·0926	·0387	·168	15·0	v'ry high
Nickel...	8·3	58·5	0·109	6·38	·0899	·0394	·131	14·9	ditto
Cobalt...	8·5	58·5	0·107	6·26	·0981	·0436	·172	14·2	ditto

The lecturer concluded by remarking, his function in this discourse had been only that of a guide, not that of an explorer. If he had not altogether failed in the task he had ventured upon, he hoped that—on reviewing the ground they had traversed that evening—some line of light would be found, aiding the imagination towards a better conception of the inner structure of that wonderful thing called a magnet. We may justly hope that the researches of the next half-century will largely add to our present little stock of knowledge in this direction. But, after all, the utmost scientific inquiry can do is to transfer the phenomena of nature from what has been well termed "the region of disorderly mystery, which is ignorance, into the realm of orderly mystery, which is science."

GERMAN COMMISSION ON CHOLERA.

An Imperial Cholera Commission, including the most important scientific authorities on the subject in Northern and Southern Germany, has just been opened in Berlin. The Commission is charged to draw up a plan for inquiring into the nature of the disease, to be followed by all the Government physicians in the various countries. Another and equally important duty of the Commission consists in collecting, digesting, and criticising all the scientific material which can be provided bearing upon the mitigation of this frightful plague. Cases in Berlin as yet are very few, but mostly end fatally.

* And it was further developed by Dr. Tyndall in a lecture at the Royal Institution; a full report of which is published in Dr. Tyndall's work 'On Diamagnetism and Magnecrystallic Action,' p. 239.

The Pharmaceutical Journal.

SATURDAY, AUGUST 16, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

A DOSE OF DIGITALIS.

AN habitual drunkard incurs an attack of *delirium tremens* and a surgeon in the absence of his usual medical adviser is called in. The surgeon diagnoses the case as one of acute alcoholism and prescribes a grain of opium in pill. Finding his patient no better he prescribes half-an-ounce of digitalis and one and a-half ounce of distilled water, intending to repeat it in four hours' time if it failed of effect. The druggist to whom the prescription is sent declines to make it up—a fact which the surgeon ascertained only on his return, when he found the patient worse. The surgeon then gives a dose of morphia out of his own medicine chest; but it proves of no avail and the patient dies. At the coroner's inquest evidence is adduced to throw the blame of the patient's death on the druggist, and the jury in bringing in a verdict of "died from natural causes accelerated by excessive drinking" are of opinion that the chemist should have dispensed the prescription.

Such is the outline of a case which came before the Coroner at Ramsgate on Thursday the 7th inst.; and is more fully reported at page 135. We agree with the jury in their verdict, except so far as Mr. FISHER is concerned, and are of opinion that he was quite justified in refusing to dispense the medicine. He knew perfectly well that half-an-ounce of digitalis was an excessively dangerous dose; and that none of the authorities of the profession recognized its administration in such proportion. True, a Mr. JONES of Jersey, had treated certain cases of *delirium tremens* with such doses of digitalis, and the patients had recovered. But Mr. JONES' experience is not yet endorsed by the profession, and is still in the tentative stage of acceptance. Mr. FISHER exercised a wise discretion in declining to make up such a prescription, relying on the authority of the recognized standards, rather than the *ipse dixit* of a general practitioner. But for such an intelligent reluctance to make up fancy prescriptions as Mr. FISHER manifested, cases of poisoning would be innumerable—cases in which the raw assistant surgeon exceeded the proper dose, or the rash practitioner acting on a speculative or ill-established theory prescribed a poisonous drug in unrecognized proportions. We feel sure the public will side with Mr. FISHER, and congratulate itself that there are pharmacists who have the courage to adhere to the professional standards, and to decline to deviate from them, under any pretext whatever.

GERMAN TRADE WITH ENGLAND IN CHEMICALS, ETC.

AN interesting report has been published from Dantzig with reference to this subject, and an epitome of the most salient points contained in the report will be of interest to the readers of this Journal. The German manufacturers are good customers of England for soda and a variety of chemical products, and also of oils required by them in their numerous industries, all these articles being extensively imported into that country from the United Kingdom. The chemical products exported to Germany from the United Kingdom were valued at an average of £128,790 annually between the years 1867 and 1870, and at £271,938 in 1871. Our export of alkali to Germany consisted of 485,544 cwts. in 1870, and increased to 682,627 cwts. in the following year. So great and rapid appears to be the development of every branch of Germany industry that even the enlargement of the various chemical works (which is being carried out in numerous German towns) does not appear to adequately meet the increasing demand for these goods. It must be remembered, too, that chemical preparations of various kinds are extensively produced in Germany, and some of them enjoy even at the present time a remnant of protection in the form of a duty on the importation of certain foreign articles belonging to this class. There is, however, a pretty general desire amongst the manufacturers of Germany who employ these products that the trade should be completely relieved from the few taxes which have still been continued on foreign productions of this character. As German manufacturers have been extending their markets for the goods they produce in every quarter of the globe, they are obliged to look more and more to the means most conducive to cheapen the production of their goods, especially those which they have to send for sale to foreign markets. However unimportant, comparatively speaking, the remaining duties imposed in Germany on chemical products may be, as these goods enter largely for the use of German manufacturers, a desire to see the duties entirely abolished from the German tariff seems a very natural one, which cannot be too speedily and effectually carried into effect.

Statistics of this branch of trade show that the uses of fat, unctuous substances of every description, vegetable and mineral oils, tallow, etc., have of late years taken a vast development, and the expansion of the trade in this direction is very noteworthy. Thus, in 1860, olive oil was imported into the Zollverein for home consumption to the amount of 23,580 centals, while in 1871 the amount had increased to 54,163 centals, thus showing an important

augmentation in the consumption of olive oil. Paraffine and stearine, were imported in 1860 to the amount of 129 centals, and in 1871 to the amount of 7602 centals; turpentine oil in 1860, 63,612 centals, 1871, 105,552 centals; resin, 1860, 568,972 centals, 1871, 722,068 centals. A large increase is thus shown in the imports of all these articles; and it is still more remarkable that, whilst in 1860 there was no petroleum used at all in the Zollverein, in 1871 the imports reached the large total of 4,067,603 centals. It will thus be perceived that the growth of this article into use has been most rapid and considerable.

The duties still in force, since 1st October, 1870, on these goods are as follows, per German or Zoll. centals, equal to 110¼ pounds English :—on linseed oil, and fish train oil, and on other unenumerated oils—with the exception of cocoa and palm oil—and also on paraffine, spermaceti, or stearine oils, at the rate of 1*s.* 6*d.* (half-a-thaler) per cental. Cocoa, palm oil, all dregs or residue of oil, and also olive oil, the latter for manufacturing use only, and if properly rendered totally unfit for every other purpose, are now admitted free of all duty, with the two following exceptions: fish blubber pays at the rate of one mark or 1*s.* per cental, and olive oil (pure), whether in casks or bottles, at the rate of 2*s.* 6*d.* The produce of the duties thus levied on chemicals, including alkali, and on drugs, realized together the following sums, viz., in 1869, 380,621 thalers, or £57,093; in 1870, 384,775 thalers, or £57,716; in 1871, 387,789 thalers, or £58,168. In addition to these sums, about £14,000 annually is realized on other fat substances. On soda alkali the amount of duty realized was as follows :—in 1869, £22,573; in 1870, £26,306; and in 1871, £19,421. Judging from these figures, it seems evident that these duties might be repealed completely without making much appreciable difference to the revenue, and with very considerable advantage to those branches of industry most directly interested in the matter.

The value of the exports from the United Kingdom, direct by sea, to Germany of oil (seed), and foreign oils, is thus stated :—value of British oil, annual average between 1867 and 1870, £257,340: value of foreign oils, £255,212; total estimated value in 1871, British oil, £406,051; foreign oils, £288,865. It will be seen from these figures that the exports of these products from the United Kingdom to Germany have largely increased of late years; and doubtless there is abundant opportunity for still further enhancement in the future.

Generally speaking, the chemical trade of Germany with England appears to be in a very healthy and active condition, constantly on the increase, and capable of very considerable development. Assuredly, when everything in the shape of import duties is removed from the German tariff in respect to this class of goods, and all indications of the ill effects of "protectionist" ideas are abolished, this branch of the trade will make more advance than it has done in the past, and will become more valuable as a distinct branch of the commerce of the country, than it is at the present time. It is to be hoped, therefore, that an enlightened conception of the benefits of wise free trade policy will prevail in respect to this matter.

IMPORTANT CASE UNDER THE ADULTERATION ACT.

The St. Pancras Vestry, acting under the provisions of the recently passed Adulteration Act, have during the past few weeks issued summonses against tradesmen in that district for selling articles alleged to be adulterated, cocoa being generally the article selected as that upon which the charge should be based. One of the most important of these prosecutions was disposed of in the Marylebone Police Court on Saturday, Aug. 2nd. It was a summons against Mr. C. Kirby, a local grocer, for selling two samples of cocoa—one at 8*d.* and the other at 1*s.* a pound—which were certified by the analyst for the parish to be adulterated by admixtures of cane sugar, arrowroot, and sago. The importance of the case may be perceived from the fact that it was adjourned twice, in consequence of want of time to hear it. The manufacturers of the cocoa—Messrs. Dunn and Hewett and Messrs. Taylor Brothers—repudiated the charge of adulteration altogether. The contention of the defence was that this was no adulteration, and in fact that this very article had been recognized for a great many years as a pure and genuine article of commerce. Its sale was legalized by Act of Parliament in the reign of George IV., and as an article of sale it was generally recognized and known. More than two-thirds of the cocoa imported into this country in its pure state being manufactured into soluble cocoa.—Mr. D'Eyncourt, the magistrate, pointed out that he did not see anything in the third section of the Act which made the retail vendor guilty of fraud supposing he knew nothing of the fraud. They must first of all show that the fraud was committed by somebody, and then they must show that the retail vendor knew that the article was so mixed with fraudulent intent. He considered it appeared pretty clearly from the evidence that cocoa was never sold pure, that it was not desired that it should be sold pure, and if so sold would not be purchased. He also held that it was evident the mixture had been recognized for many years in trade; and that to say under these circumstances a retailer was guilty of selling an adulterated article in selling this mixture as cocoa was to convict a man of fraud when probably he was guilty of no fraud at all.

25,000 lbs. of opium was entered for home consumption at Melbourne, in 1871. The 25,000 Chinese in the colony must be large consumers at the rate of nearly one pound per head, for the consumption for medicinal purposes cannot be very large. A duty of 10*s.* per pound is levied on the opium.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The annual meeting was held at the Bristol Museum and Library, on Friday, the 1st inst., Mr. Charles Townsend, President, in the chair.

A copy of the following report had previously been sent to each member and associate :—

REPORT OF COUNCIL FOR YEAR ENDING JULY 31ST, 1873.

The Council of the Bristol Pharmaceutical Association have much pleasure in submitting to the members the report of another year's proceedings.

Circumstances have not yet enabled them to establish a Museum and Library. The difficulty of obtaining rooms convenient and suitable for the purpose has still to be overcome, but they hope that so important a project will continue to be kept in view, and that its accomplishment will not be long delayed.

The monthly evening meetings have been attended with considerable success, both as regards the numbers that have gathered to listen and the quality of the instruction afforded. The Council record their high appreciation of the kindness manifested by those gentlemen who have been good enough to render their voluntary services, and acknowledge their obligations to Mr. Coomber, Mr. Thomas Wills, Dr. Tilden, Dr. Armstrong and Mr. Carteighe, who during the year have so ably assisted them to carry out this portion of their scheme.

The discussion of subjects more distinctly pharmaceutical upon the evening devoted to that purpose was well sustained. The attendance was good, and interesting matters were introduced by Mr. Giles, Mr. Schacht, Mr. Stoddart and Mr. Little. Mr. Little was at that time a pupil of the Association, and his paper, entitled "Examination of some Samples of Ferrum Redactum," was deemed worthy of transcription into the scientific journals. The Council refer to this fact in the hope that it may encourage other junior members of the Association to similar efforts.

The courses of lecture upon Chemistry and Botany, delivered as heretofore by Mr. Coomber and Mr. Leipner, were in all respects equal to those of previous sessions; and the Council rejoice to be able to point to the success which continues to attend this department of the Association's work.

For the course on Organic Chemistry six students of the Association entered, and five of these presented themselves for the Government examination at the end of the session. The following passed :—

Mr. Jas. Goulter.....Elementary Grade.....1st Class.
Mr. Thos. Stubbs ... „ „ ..... „ „
Mr. A. H. Higgs ... „ „ .....2nd „

For the course on Inorganic Chemistry sixteen entered, and twelve presented themselves for examination. The following passed :—

Mr. C. J. Miles.....Advanced Grade.....1st Class.
Mr. Jas. Goulter ... „ „ .....2nd „
Mr. R. H. Nuttall . „ „ ..... „ „
Mr. A. H. Baldwin Elementary Grade ..... 1st „
Mr. Thos. Hall..... „ „ ..... „ „
Mr. A. H. Higgs... „ „ ..... „ „
Mr. A. Towerzy ... „ „ ..... „ „
Mr. J. H. Baker ... „ „ .....2nd „
Mr. H. J. Bliss ... „ „ ..... „ „
Mr. J. Morris ..... „ „ ..... „ „
Mr. C. E. Tritton „ „ ..... „ „

The foregoing results relate to the ordinary examinations in Chemistry. But Dr. Frankland, the examiner, following the plan he introduced last session, appended *special* questions for the purpose of testing the knowledge of the candidates in Laboratory practice. The following passed :—

Organic Chemistry.

Mr. Jas. Goulter.....Elementary Grade.....1st Class.

Inorganic Chemistry.

Mr. C. J. Miles.....Advanced Grade.....1st Class.
Mr. Jas. Goulter ... „ „ .....2nd „
Mr. R. H. Nuttall „ „ ..... „ „
Mr. A. H. Baldwin Elementary Grade ..... 1st „
Mr. Thos. Hall..... „ „ ..... „ „
Mr. A. H. Higgs ... „ „ ..... „ „
Mr. A. Towerzy ... „ „ ..... „ „
Mr. J. Morris ..... „ „ .....2nd „

For the Lectures on Botany (Vegetable Anatomy and Physiology, and Systematic and Economic Botany) five students of the Association entered, and three of these presented themselves for examination. The following passed :—

Vegetable Anatomy and Physiology.

Mr. A. H. Higgs ... Elementary Grade ... 2nd Class.
Mr. F. G. Taylor ... „ „ ..... „ „

Systematic and Economic Botany.

Mr. A. H. Higgs ... Elementary Grade ... 2nd Class.
Mr. F. G. Taylor ... „ „ ..... „ „

The Association is again indebted to Mr. Stoddart, the generous friend and supporter of every scheme having for its object the promotion of scientific pharmacy, for a course of lessons on Materia Medica, designed by him to assist students preparing for the examinations of the Pharmaceutical Society. The fees received for this course, amounting to the sum of seven guineas, have been added to the Museum and Library Fund. The Council desire, on behalf of the Association, to express in the warmest terms their sense of Mr. Stoddart's great kindness in this matter.

In conclusion the Council again confidently commend the objects of the Association to the consideration of their fellow-members, and earnestly invite a continuance of their support and co-operation. Whilst it is possible that the expectations of some have not been fully realized, the Council trust it will be conceded that they have directed the limited materials at their disposal to good purpose, and upon a plan that will admit of development to greater completeness. They trust, therefore, that no differences of opinion upon minor points will be allowed to imperil the efficiency of an Association which has unquestionably done good, and which is (as they believe) earning for itself a name in the pharmaceutical world.

The Treasurer's Report, duly audited, is as follows :—

THE TREASURER IN ACCOUNT WITH THE BRISTOL PHARMACEUTICAL ASSOCIATION, 1872 AND 1873.

Dr.	£	s.	d.
To Balance from last year	13	12	·
„ 61 Members' Subscriptions at 10*s.* 6*d.*	32	0	6
„ 39 Associates' Subscriptions at 5*s.*...	9	15	·
„ Lecture Fees	6	0	0
	£61	7	11

Cr.	£	s.	d.	£	s.	d.
By Lecturer's Fees, viz.—						
Mr. Coomber	7	7	0			
Mr. Leipner	7	7	0			
				14	14	0
„ Expenses Incidental to Monthly Lectures, viz.—						
„ Lecturers' Expenses	9	9	0			
„ Gas Fittings, etc.	3	7	0			
„ Carriage of Apparatus	1	2	3			
„ Mr. Westaway	2	11	0			
				16	9	3
„ Printing and Stationery				4	11	0
„ Miscellaneous Expenses				5	9	5
„ Treasurer of Bristol New Institution for use of offices, etc., for Meetings and Lectures				10	0	0
" Balance in the hands of the Treasurer				10	4	3
				£61	7	11

To Balance ... £10. 4*s.* 3*d.*

MUSEUM ACCOUNT.—1872 AND 1873.

1873.		£	s.	d.
	To Balance from last year	17	17	0
May 15	,, Cash from 7 Students who attended Mr. Stoddart's Lectures	7	7	0
		£25	4	0

The President in moving the adoption of the report and accounts, said that their Association had now been in existence for four years, a time sufficiently long to test its strength, and to form an opinion as to whether it had really taken root and become firmly established, and he thought they might fairly consider that it had done so; the number of members had not fallen off, and they had as many students as they could reasonably expect. He was happy to feel that the position of those engaged in the study of pharmacy in the city was better and higher than when the Society was established; and he believed that many who at first gave attention to the requisite studies only from a sense of the absolute necessity for doing so were now seeking knowledge for its own sake. The proportion of the students who went up for the South Kensington Examinations was very gratifying, and the proportion of those who passed, as would be seen from the report, equally so. Bristol had also taken a fair position in the recent Preliminary examination, but still, three out of eight failed. It struck him as somewhat remarkable, in looking over the published list, that the failures had been most numerous in several of the largest centres, where the facilities for study are presumably the greatest. Thus in Birmingham eight out of eleven failed, in Manchester eleven out of seventeen failed, and in Liverpool four out of eleven failed. Many of the smaller towns had done much better than this. With reference to the monthly meetings held during the past session, they had been highly successful; the lectures had been exceedingly good and interesting, and they had been attended not only by members and students of the Society, but by many of the leading members of the medical profession, and by other well-known scientific gentlemen. He (the President) trusted that they would be able to do even better in the future than they had done in the past, and gain a high position for the Bristol School of Pharmacy. They had all to thank their good and constant friend Mr. Stoddart, for his valuable help, and for the fund which formed the basis of the museum and library fund. The financial statement was upon the whole satisfactory, the expenses of the year had been somewhat larger than usual, but the receipts had not fallen off. His term of office was now nearly at an end, and he wished before retiring to express to the members of the association his very hearty thanks for the cordial manner in which they had invariably supported him. He had done his best, and he hoped that his successor, who would, he was sure, receive the same generous consideration, would be able to preside over the affairs of the society with as much pleasure and satisfaction as he had done.

Mr. Keevill seconded the motion. The President, he said, had alluded to all the topics which seemed to call for any comment. He was sure they must all feel gratified at the prosperity which had thus far marked the career of their association. No doubt that prosperity was in some measure due to their good fortune in possessing the services of gentlemen of considerable reputation and influence, not only on account of their high scientific attainments, but also because of the leading part they had always taken in promoting the progress of pharmacy. The associates seemed to be fully sensible of the opportunities for improvement held out to them. In looking over the report he had been struck by the large percentage of candidates who had succeeded in passing the examinations. He was also much pleased, as probably they all were, to hear of the distinction achieved by their late pupil, Mr. Little. The Treasurer's statement, he noticed, still showed a balance in hand. Altogether, then, they had every reason to feel satisfied, and he trusted that in the hands of the new Council the prestige and usefulness of the association would be fully maintained.

After some general observations by Mr. Giles and Mr. Schacht, in the course of which the latter alluded to the new regulations recently initiated by the Council of the Pharmaceutical Society.

Mr. Stoddart moved a vote of thanks to the retiring President. No one, he said, had served, or possibly could serve, the office better than Mr. Townsend had done. In selecting him the Council had indeed made a most fortunate choice, and the success of their proceedings had been materially enhanced by the judicious and courteous way in which he had presided over them. The motion was carried by acclamation.

An examination of the voting papers then took place, and the President announced the election of the following gentlemen on the Council for the ensuing year:—Messrs. Boorne, Boucher, Cuff, Giles, Isaac, Martin, Pitman, Schacht, Stoddart, Stroud, Taplin, and Townsend.

The re-appointment of Mr. Collings as auditor concluded the proceedings.

At a meeting of the Council, held on Friday, the 8th inst., the following officers were elected:—President, Mr. Schacht; Vice-President and Treasurer, Mr. Boorne; Honorary Secretary, Mr. Pitman. The arrangements for the coming session were discussed, and a sub-committee consisting of the President, Vice-President, and Honorary Secretary, appointed to confer with the Professors of Chemistry and Botany, and to draw up a scheme for the approval of the Council.

CHEMISTS AND DRUGGISTS' SOCIETY OF IRELAND.

A meeting of the above Society was held on Monday evening, August 4th, at 44, Molesworth Street. Mr. P. T. Bermingham, T.C., in the chair.

The following gentlemen were admitted to membership: Mr. J. Laird, Limerick, Mr. H. Bell, Waterford. After considerable discussion connected with the prices of various articles connected with the trade, and the vending of poisons by grocers, etc., it was agreed to publish a price list similar to the one issued by the Glasgow Chemists' Association.

Several amendments to the rules of an unimportant character were agreed to. The number of the committee was reduced from nine to six, three to form a quorum.

The election by ballot of officers for the next twelve months was then proceeded with, with the following results:

President, E. M. Hodgson, Esq.; Vice-President, Wm. Allen, Esq.; Hon. Treasurer, J. Goodwin, Esq.; Hon. Secretary, Wm. Hayes, Esq. Committee, P. T. Bermingham, Esq., T.C., W. L. Erson, Esq., J.P., G. H. Grindley, Esq., J. A. Ray, Esq., R. Simpson, Esq., W. F. Wells, Esq.

It was agreed to appoint a gentleman as assistant-secretary and librarian, and applicants were requested to communicate with the hon. secretary.

It is intended to establish a library and reading rooms, and to make arrangements for the delivery of lectures and formation of classes during the winter months.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

ON THE ENERGIES OF THE IMPONDERABLES, WITH ESPECIAL REFERENCE TO THE MEASUREMENT AND UTILIZATION OF THEM.*

BY THE REV. ARTHUR RIGG, M.A.

Lecture III.

On the Energy of Vitality, with especial reference to the Measurement and Utilization of it.

(*Continued from page* 117.)

The energy of vitality, as utilized and controllable by ourselves, is manifested chiefly through the agency of muscles. The physiologist regards these muscles, with their attached

* Cantor Lecture, delivered February 17.

tendons and nerves, as to the functions and offices they discharge in the economy of the individual; we are to regard them as to the external use to which they may be applied and the work to be obtained from them. How much we copy from nature may be concluded when we refer to the earliest attempt at locomotion from machinery. It was by basing the form and structure upon the muscles of animals. To thus imitate muscular action has hitherto baffled the ingenuity of man. If any one has not satisfied himself of the nature of this action let him put the hand on the muscles of the arm when it is in repose; they are soft and yielding. Let him now make an exertion with the arm, such as raising a weight; the muscles become tense and hard. The weight raised is extraordinary compared with the weight of muscle employed, for it may be from sixteen to seventeen thousand times its own weight.

The physiologist considers the striated and unstriated variety of muscle, the nucleated cells, the vitality in each cell, the electrical relations of various tissues. With none of these need we be concerned.

Engineers regard muscles as machines for doing work, and as it is needful to know the structure of a machine before we can say how it can be made to work, so now the structure of muscle, as a machine, must be considered.

When a muscle is examined after vitality has ceased, it is found to consist of a great number of separate parts, or strings. If this piece of string were a muscle, there would be a bundle of strings or fibres together, just the same as if I had doubled the string several times, and encasing them there is a covering or sheath, much the same as an india-rubber tube, which covering encloses a number of muscular fibres or strings. That covering has none of the contractile elements of the muscle in it; it is merely an elastic covering enclosing that which has the contractile powers. Then, side by side with this bundle of fibres or strings, in its case, is another one, also covered in the same way, and another, and another. These are kept in their place by the tubing or covering spoken of, and a combination of these is called a muscle, which consists then of these fibres, which again are separated into fibrillæ. With such a peculiar arrangement of contractile strings it is clearly a problem for the mathematician and the mechanic to obtain a solution to the question of how much work can vital energy do when operating through the means of such apparatus as is thus supplied. The muscles are so varied in form, combination, and number, that but little progress has hitherto been made to deduce results and bring them into measurement.

Now, no substance is known that can act the part of a muscle. A muscle left free is in the state of an india-rubber band when slightly stretched. It is called into action by contracting, exactly the converse to that of india-rubber, which is brought into action by being stretched. A number of these fibres are put together, and form a group like a number of india-rubber bands. Sometimes the groups act in a straight direction, sometimes they take a sloping form. If they take a straight form, and if we know the number of fibres and the power of endurance of one, it is easy to calculate the power of the whole; but if the muscle acts diagonally, then it brings in the parallelogram of forces, and we need the mathematician to deduce the amount of energy which can be utilized by this form. Sometimes the fibres are twisted like a screw, sometimes they spring from one point and spread out like a fan, and all these screws and fans the mathematician must get hold of and calculate; this is now being done.

Having endeavoured very briefly to explain the mode in which animal vitality can be utilized through the agency of muscle, it may, perhaps, be well to state that between that part of the system where the will is localized and the muscle, there are telegraphic ramifications of nerves. These nervous processes enter within the muscle, and by some means unknown to us, influence the muscle to exert its mechanical powers—convey, in fact, the will to that agent which is expected to do its bidding through the power introduced by vitality.

With this nerve power we are not concerned; the nerve, as a material substance, is intermediate between the will and the muscle; it has nothing to do with the amount of work done; its business is chiefly to connect the mental and the material processes of life. Of that which is the will, of that which travels along the nerve, in consequence of the will, we know nothing. Call it electricity; that is not any advance, for we know nothing of what electricity is. The first region in which the vital power gives a measurable evidence is when the muscle begins to act. Prior to that all is speculation, and furnishes a very pleasant hunting ground for physiological enthusiasts.

Whether muscle is a means or apparatus for the transformation of force, or whether it is the material out of whose chemical changes or electrical states force and consequent energy result, are beyond our present knowledge. A plant transforms light into energy, so may muscle transform what, for want of a better name, may be called vitality into energy, and yet not be itself consumed or destroyed. Although, for obvious reasons that energy which is localized in animals is called the energy of vitality, yet it must not be inferred that such energy or source of energy is self-existent. The animal extracts it in those wonder-working laboratories—the stomach and the lungs. By some unknown process it is deposited in the muscle as potential energy, and awaits the decision of the will as to when and how it shall become kinetic. Although ignorant of the analytic chemistry of vitality, yet we are not ignorant of the materials with which it experimentalizes. With this knowledge we must rest; we cannot repeat the experiments vitality makes. Given, every material and contrivance within reach, neither the physicist nor chemist, separately or jointly, can accomplish the phenomena with which the changes of these ingredients are concerned when they are associated with the vital principle.

To form an estimate of the number of the fibres in any muscle is an investigation requiring more of care and caution than of difficulty. Determining from a series of averages the magnitude of one—*i.e.*, the area of cross-section of one muscular fibre, and knowing the area of the section of muscle, the number is merely the quotient of the division.

The muscles are exceedingly small and delicate, and the way in which their size is calculated is by cutting a piece of cardboard exactly to the section of the muscle. Then another piece is cut out of the same cardboard to, say, a square form, and they are weighed against each other until the square card is exactly the weight of the irregular piece. Thus, when the weights are equal the areas are equal, and by calculating the area of the square piece, you are able to arrive at the area of the section of the irregular muscle. By the aid of a powerful microscope we can ascertain the size of a section of one of these fibrillæ—and it is found to be in men $\frac{1}{350}$ of an inch in diameter, so that in an inch there would be 350 of them, in women it is about $\frac{1}{450}$—*i.e.*, in one inch there would be 450 of them. It may here be mentioned that these elementary fibres are not circular but polygonal, owing to their mutual pressure, and at the angles of the polygons are the vessels which supply blood. Hence, it obviously follows that where these fibrillæ are very small, the supply of the blood, which is the food of the muscle, can get at them more readily than when they are very large. Where they are large, they have greater strength, that is, can lift heavier weights, but where they are small they will have greater endurance, because more freely and easily supplied with blood. Hence, as they are smaller in women than in men, the muscles of women have more power of endurance, but not the same strength as those of men. If a man wishes to test this, he has only to nurse

a child, and then compare the length of time he could do so without fatigue, with the length of time for which a mother can nurse it, and he will soon find the difference, and give a verdict adverse to himself.

There are two muscles in the arm with which we are especially concerned in estimating the measurement of such vital energies as we may utilize; indeed, it may suffice to consider that the muscles in the arms and legs are the only ones to which the subject of this evening's lecture directs attention, and we may illustrate the question of the great number of muscular fibres by calculating in the mode described their presence in the two most important muscles in the arm—viz., the one called "biceps," the other called "brachialis anticus." In the biceps there were found to be 449,000 elementary fibres; in the brachialis there were found to be 349,000; total, in these two muscles of the arm, 798,000 fibres.

Now, to examine these muscles—their fibres and their fibrillæ, to watch their action, and to speculate upon the causes of this action, is a department of science full of interest, and from which much that is valuable may be brought. The object of this lecture does not require that any such investigation should be made, and the competency of the lecturer is not equal to the task. Dr. Haughton, of Trinity College, Dublin, has for many years sought for means and opportunities, and availed himself of them, even at the risk of his own life, for determining accurate measurements of muscular force. This first mention of the name of one who for twelve or fourteen years has given that attention to this subject which enthusiasm alone could induce, must not be passed without this addition. In reply to a letter, towards the close of 1872, Dr. Haughton most kindly sent me 400 pages of the proof-sheets of a work on 'Animal Mechanics,' which has not yet been published.* This work is my authority for the figures relating to experiments in respect to muscular strength and endurance. With the results his careful and numerous opportunities have afforded him we are clearly concerned. How carefully these have been collected may be judged from the following. He writes: "This much I can guarantee, all the dissections, weighings, and observations have been made by my own hands, with every precaution of which I could think to ensure accuracy. My observations have also been made without preconceived hypothesis to guide them; and many of my most interesting results have been forced upon my notice by the facts placed before my eyes in the dissecting-room and laboratory."

First, as to the expression "co-efficient of muscular force." On the wall is a table of "co-efficient of muscular force."

In the arm . . .	94·7 lbs.	per square inch.
„ leg . . .	110·4 lbs.	„ „
„ abdomen . .	107·0 lbs.	„ „
Average . . .	104.0	

The term "co-efficient" is a word of common occurrence in scientific investigation, and is plainly attainable from "co-efficiency." When we speak of co-efficiency we mean "that two or more things combine to produce an effect." It is the figure by which a unit measurement is multiplied in order to produce a result. To find the co-efficient of muscular force is to find some quantity which may be so combined with a measured area of muscle as that we can have a result on which to rely in reference to the question proposed. Adopting the view which the lectures on energy and gravity propounded, it may suffice for the present to say that the table on the wall tells us that, knowing the number of square inches contained in the cross-section of any muscle, then multiplying these by the figures there stated, we obtain the weight which the particular muscle can, on sudden emergencies or for a very short space of time, sustain. It is the limit of endurance—it is the measure of load which is just sufficient to cause the muscle to break—if a small weight more be added then the muscular fibres will be broken. It is the very extreme tension to which muscular fibre may be subjected without actual rupture. It is obtained by treating muscle as engineers treat wrought-iron rods when they seek to ascertain what load they can carry by tension. This explains that the table does not give a co-efficient of work the muscle can do; such a co-efficient depends upon the energy that vitality (or vital force, if the term be preferred) can infuse into the muscle; but, however great that vital power may be, the work done by the muscle must be less than that obtained in the table to which these remarks apply. A few words in illustration may not be misplaced.

We find from experiments, which would occupy far more than an hour to narrate, that in order really to tear one square inch of muscle across it would require 94·7 lbs. in the arm, and in the leg 110·4 lbs. It is somewhat remarkable that in the arm, which does not carry the body, you have 94 as the strength of the muscle. When you come to those connected with the leg, which have to carry the body as well as do work, the fibres are very much stronger. Taking the average of the whole body, the co-efficient of one square inch of muscle in the human frame is 104. Therefore, if we know the size of any particular muscle and multiply it by 104, we get in lbs. weight the limit of strain it will endure before fracture.

Now the next question is, how much will it raise? In this view of the case motion enters. Supposing a fibre was in the form of a string, a very long one, and by contracting it will raise 2lbs. weight through 10ft. If, now, that fibre were doubled and only half the length, it would raise 4lbs., but it would only lift it through half the space, because its power of contraction would be diminished by the doubling. Now, the products of the weight raised, and the distance through which it is raised, are the same in both cases. If it raises 2lbs. through 20ft. 40 would be the measure of that muscular exertion; and if it raised 20lbs. through two feet, 40 would still be the measure; but the distances are different. After illustrating experimentally these statements, the lecturer remarked that if an ounce of muscle be distributed with large sectional area, then its contraction will be little, but the weight raised may be great.

Muscle has also another peculiarity different from anything with which we can deal. If a bundle of it be taken, as you are aware, it acts by contraction; but while it contracts it does not change its bulk. It does not swell out as we understand the word—it merely contracts. Thus if you had a long muscle acting in a vessel of water, and it contracted ever so powerfully, it would not in the slightest degree affect the level of the water in the vessel.

Now we come to the mode in which the mechanical action of these combined muscular fibres is to be brought to a question of simple calculation. As far back as 1798 Dr. Wollaston occasionally observed a peculiar sound in his ears, for which he could not account. He pondered over this sound until about 1808, when a faint dawn began to enlighten the gloom. In 1809 he made clear to his friends what he was about, and in 1810 the results were published in the Philosophical Transactions. What he then did is the basis of all our present knowledge of this subject of muscular power.

Dr. Wollaston began to surmise that the sound in his ears arose from muscular contractions. He stated that he

* Since the delivery of this lecture the work has been published, under the title of 'The Principle of Animal Mechanics,' by the Rev. Samuel Haughton, F.R.S., Fellow of Trinity College, Dublin. London: Longmans, Green and Co. Dr. Haughton states in the preface that "the work is offered to the public with the view of showing the mutual advantages obtainable by anatomists and geometers from a combination of the sciences they cultivate. Anatomists will gain by the increased precision which numerical statements must give to their observations, and geometers will find in anatomy a new field of problems opened out to their investigations."

was led to infer the existence of intermittent contractions, from a sensation perceptible upon inserting the extremity of a finger in the ear. A sound is then perceived which resembles most nearly that of carriages at a great distance passing rapidly over the pavement. The sound is not dependent upon the degree of pressure upon the tympanum, for when the ear is stopped with great force without the presence of muscular action no such sound is produced. For instance, if the head press with its whole weight upon the ball of the thumb no noise is perceived unless the extremity of the thumb be at the same time pressed against the head, or some other muscle be brought into play. To judge of the frequency of this contractile action, he contrived to imitate the sound, and to render the sound itself and the imitation audible by the same ear. It was accomplished thus. While the ear rested on the ball of the thumb the elbow was supported by a board lying horizontally, in which were cut notches about $\frac{1}{8}$ inch asunder, similar to those in this board. By rubbing a pencil along these notches with a regular motion he imitated pretty correctly the tremor produced, and by counting the marks and noting the time, he found repeated observations agree with each other as nearly as could be expected. He also varied the experiment. One variety was this—the ear was stopped by a cushion pressed upon by the end of a notched stick that rested on his foot and conveyed the vibrations from the muscles of the leg to the ear along with the tremor produced by friction upon the notches; and still the results were nearly the same, viz., that the muscular vibrations resembled the sound of carriages at a distance. He induced many friends to repeat the experiments, and by going through the form of the experiment anyone may, when convenient, satisfy himself. The humming sound will, of course, be perceptible only to the ears of the experimenter.

(*To be continued.*)

Parliamentary and Law Proceedings.

Unjust Censure of a Druggist.

On Thursday last an inquest was held at the Elms Hotel, Ramsgate, before J. C. Martin, Esq., coroner, and a jury, touching the death of Mr. J. H. Davidson, an ironmonger, etc., in that town, whose death took place under the circumstances adduced in the subjoined evidence. The jury having viewed the body, the first witness called was

Henry Turner, who said: I live in Alexandra-road, St. Lawrence, and am a porter. I knew the deceased, John Hector Davidson, and was his servant. I was employed at his place of business in King-street, Ramsgate. I saw deceased alive yesterday morning about half-past seven; he was then at the shop, and appeared to be rather excited and nervous; his eyes, I observed, were rather bright. I again saw him at half-past ten, when he appeared to be about the same. I was with deceased again about half-past ten last night: he was then in his bed; he appeared rather excited, but not from the effects of drink. A little milk and soda was given deceased. He died about half-past one or two this morning. He was not at all violent, but made noises, and bawled out once or twice. I have known deceased ever since he has been in Ramsgate, about seven years. He occasionally got intoxicated, but was never violent or excited on such occasions. Yesterday some medicine had been given deceased by Dr. Leake.

The foreman: You know, I presume, that deceased was addicted to freeness in drinking, and took rather more than was good for him?—Witness: Lately he has.

Foreman: Did deceased make any complaint as if in pain?—Witness: Not at all; but he made allusion to shadows of some persons being in the room, but was very quiet with it.

Jonas Richard Leake said: I am a surgeon on the retired list of Her Majesty's Army, a L.R.C.S.E., M.R.C.S.Eng., and L.S.A., and have now established myself in private practice in Ramsgate, and reside at Gertrude-villa, Ramsgate. I did not know the deceased. I was called in yesterday morning about half-past ten; he was then at his residence at Picton-road and lying on the sofa. He was in much excitement. He told me he had been out for a walk. He was very evidently suffering from alcoholic stimulants, and he told me he had already had some whisky and brandy that morning. I examined deceased, and ordered him to his bed, and I prescribed and gave him a pill containing a grain of opium. I then left him, but saw him again in the afternoon, when he was in a high state of excitement, but had had some sleep. I wrote a prescription for him, of which I have a copy. Deceased took some medicine in the middle of the day, which had a very good effect, and gave him about an hour's refreshing sleep, and he awoke much better. The visit to which I am alluding was my second call. In the evening, about 8 o'clock, I visited the deceased again. He was again in a state of much excitement. I then prescribed for him, which prescription Mr. Fisher refused to dispense; my object being to give deceased some hours of refreshing sleep, so that he might get up comparatively well. By way of diet I ordered him eggs and brandy. The direction on the prescription was that "at 10 o'clock this draught is to be given." From what I heard I understood Mr. Fisher had said no chemist in the town would make up the prescription, as anyone taking it would be a dead man (or words to that effect). The dose I prescribed was half-an-ounce of digitalis and $1\frac{1}{2}$ ounce of distilled water, which I intended to repeat in four hours' time if it failed in producing the desired effect. (The Coroner here interposed, and stated what he found prescribed in Squire's Pharmacopœia for a dose in similar cases.) I was told afterwards that the chemist had refused to make up the prescription; and therefore the onus of deceased's death must rest with Mr. Fisher. (The Coroner thought this was a mere question between witness and the chemist.) I wish this to be inserted. For an ordinary case of *delirium tremens* it is by no means an uncommon dose, and, in sober truth, it is considered efficacious. I ordered a rump steak to be provided for deceased when he woke up after a few hours' good sleep. At about half-past ten I was again sent for, and was told that the medicine prescribed had not been given, as no chemist would make it up, and that the chemist had said if anyone took it he would be a dead man. Instead of deceased sleeping, he was in a state of greater excitement in consequence. After half-past ten, knowing that the medicine could not be procured, I gave him something out of my own medicine chest—a dose of morphia; the only fault of which was that it was not strong enough, and had no effect. I then left him, but did not afterwards see him alive. About one in the morning I was summoned again to the deceased. I forgot to state that when I was summoned about eleven o'clock, in consequence of the message from Mr. Fisher, and from what had been stated, deceased's mother told me she had lost all confidence in me. In consequence of the medicine not being made up, I could give no more assistance in the case; but at half past eleven I was called up, and was told that the draught I had given deceased had not produced sleep, and I said that nothing else could be done for him. On inquiry, I was told that my directions were thoroughly disregarded.

The foreman: Is any case known in which a person has taken the dose you prescribed with good effect?

Witness replied in the affirmative, and even larger doses; and stated he had read a paper before the Medical Association at Leeds on the subject, and that it was quite an ordinary dose, and which he could prove from several medical authorities.

The foreman: And you have known it to have the desired effect?

Witness : Yes ; but this was an extreme case, and required an extreme remedy. The person responsible is the person prescribing, but I don't think chemists should dictate to physicians what should be prescribed.

Witness, in addition to the above, said : I refused my certificate in order to give Mr. Fisher an opportunity of explaining his conduct in the case ; considering it also due to the public and to the medical profession generally, and to my own reputation in particular.

The Coroner : It is your opinion that death was occasioned by natural causes ?

Dr. Leake : In my opinion he would have lived if he had taken what I prescribed. He died from exhaustion of the brain, in consequence of not having necessary sleep.

The Coroner : It appears to be a matter of opinion between two persons.

In reply to a juryman, witness said deceased's was an extreme case, and required an extreme dose. He had visited deceased five times during the day.

Witness further expressed his opinion that Mr. Fisher ought to be visited with censure, as the same thing might occur again. His clear duty was to have sent a messenger to his (witness's) house to make inquiry. In his opinion, if the medicine had been administered deceased would have lived.

The witness Turner was re-called, and in answer to a question from the Coroner, stated that the deceased was 34 years of age.

The Coroner stated that he understood Mr. Cresswell was deceased's ordinary medical attendant, but that he was in London on the previous day. They wanted to know the occurrences of yesterday and last night. Therefore, if they wanted further evidence, they must wait for the arrival of Mr. Cresswell ; but he did not think it would lead to anything useful.

Mr. Fisher, who was present, wished to ask the coroner's opinion as to whether he could say what he knew relative to that prescription.

The Coroner : I do not call upon you to do so.

Dr. Leake quoted the following authority in confirmation of his view, as one amongst many others :—"Mr. Jones, of Jersey, stated that for the last twelve years he has treated all his cases of *delirium tremens* by large doses of digitalis with a remarkable degree of success. He gives half-an-ounce of the tincture with a little water for a dose. In some few instances one dose is sufficient, but generally a second is required four hours after the first. Very seldom a third dose of two drachms is called for owing to the absence of sleep. The effect of this drug is to produce a warm skin, a more regular and fuller pulse, and six or eight hours' good sleep."

The Coroner informed Mr. Fisher that if he wished to make any statement he must be sworn.

Henry Augustus Fisher, on being sworn, said : I live in High street, Ramsgate, and am a registered chemist and druggist. (The Coroner here handed him the prescription, asking him to look at it.) Witness then proceeded : The prescription now produced is the one that I had handed into me last night, shortly after nine o'clock. The dose being a very excessive one of digitalis—eight times the dose recognized by Mr. Squire in his Pharmacopœia, and the same in the British Pharmacopœia—I inquired of the messenger who brought the prescription whom it was for. He replied that if I particularly wished to know he would tell me ; this he uttered in a most impertinent manner. (Witness, on being asked who the messenger was, said he believed it was the first witness, but he was a perfect stranger to him.) I told him it was a very strong dose, and sufficient to kill anybody, and, as he was so very impertinent, I refused to give it, and returned the prescription to him. Had I even known it was for Mr. Davidson I should have refused to give it. In answer to a question, witness said : My reason for so doing was simply that digitalis is a medicine of very uncertain result. I handed the messenger the prescription back again, as I did not like the responsibility of making it. Any medical man wishing to give such a dose as here indicated ought to wait on a chemist and state the case. The prescription was only signed with the initials of the medical man, and not in his full name.

The Coroner told witness that the inquiry was merely as to the cause of the death of the deceased.

Mr. Fisher : I have attended here voluntarily. But before the jury come to any decision I think I ought to call upon two chemists present to say that I was perfectly justified in refusing to make up the prescription.

The Coroner said it was not an inquiry into the particulars of the case. If deceased had died from taking poison they would have had to go into the medical evidence ; but this was a negative affair.

Mr. Fisher : My conduct has been called in question, and I think I ought to be in a position to call witnesses.

The Coroner did not concur in this view, remarking that it would have been otherwise if witness had laid himself open to a criminal prosecution. Witness could leave it to the press to give publicity to what he had said.

Witness's attention being called to the fact that Mr. Davidson's name appeared in the prescription, he replied he did not observe it, and it was the dose that attracted his attention.

The Coroner : This is irrelevant.

John Pearson Cresswell said : I am a surgeon, practising at Ramsgate. I knew the deceased, and was his medical attendant. I had attended him up to yesterday morning. I saw him the last time on Tuesday, and I prescribed for him yesterday morning. He was then suffering from a slight attack of *delirium tremens*, threatening to be very severe if he was not careful. I was not in Ramsgate yesterday ; and I did not see the deceased again alive. His habits of life were such as would tend to shorten his days. Deceased had two or three attacks of it, but there was nothing to lead me to the supposition that the symptoms which I saw on Monday and Tuesday would have been fatal, as deceased had been better. I learn that he went out yesterday morning, and that was what brought on the severe attack which caused his death. Deceased was perfectly convalescent from a case of that kind when I saw him.

The Coroner here handed witness the prescription, asking him, as deceased's medical attendant, whether he had any observations to make.

Witness replied that in some extreme conditions he would have no objection to prescribe or to give it. It was not an ordinary dose, but in the case of the deceased it would have been like throwing feathers upon him. He maintained that a large dose at once was far better than allowing him to sink from exhaustion ; but in such a case as the deceased's you must bring the man under its influence at once.

The foreman : You think the dose ought to have been administered ?

Witness : Most decidedly. In a case of that kind the dose ought to have been given at the time it was ordered him, as it would have been the only hope of saving his life. A man not taking it, the thing takes its own course, and the man dies from it, there being no help for it. It is not a remedy I should rely upon myself ; but different medical men have different opinions.

The Coroner asked Mr. Fisher if he had any questions to put to witness.

Mr. Fisher : As my character is at stake I should like the jury to hear what I have to say. I could bring sufficient evidence. I have two gentlemen here whom I beg you will hear. They would have refused to dispense the prescription ; but there is a difference of opinion. I was not bound to dispense that prescription by law.

A juror wished to ask, through the Coroner, as Dr.

Erratum.—Page 114, col. ii., line 26 from top, for *Leeds* read *Hull*.

Leake was a stranger in the town, whether a chemist would dispense the prescription.

The Coroner: Of course a chemist must use his own discretion in the matter.

The Coroner, in summing up, remarked that the first thing they had to consider was the cause of death. He thought they could have but little difficulty in arriving at the conclusion, on the evidence of the medical testimony, that the deceased had died from exhaustion and from natural causes. But if they gave any rider they were perfectly at liberty to do so. It was a question of a very delicate nature, and one they would hardly go in to. There was certainly a startling difference between ten to thirty minims and half-an-ounce. It was for them to consider whether they would put a rider to their verdict or not. They would consider the evidence; and if Mr. Fisher incriminated himself in any way, but certainly he did not think he had done so. He thought they would have no difficulty in arriving at a verdict, and that deceased had been suffering from *delirium tremens*, and that since last Tuesday he had brought on another attack which ended in his death.

The jury were left alone to consider their verdict, and after a short deliberation returned the following:—"That the deceased died from natural causes, accelerated by excessive drinking; and the jury are of opinion that the chemist should have dispensed the prescription of the physician."

*** In reference to this case the following correspondence has appeared in the *Thanet Advertiser*:—

"Sir,—Having been present during the inquest held at the Elms Hotel yesterday, as to the cause of the death of the late Mr. Davidson, and it having transpired in evidence that in the opinion of a medical witness that had the draught which he had prescribed been administered death would not have taken place, and that consequently great responsibility rested on the chemist to whom the prescription was sent, for refusing to dispense it; and upon such distinct evidence the jury felt it to be their duty to add a rider to their verdict to the effect that the chemist ought to have compounded the draught.

"Will you allow me, as the oldest chemist practising in Ramsgate, to say that in my judgment no chemist is justified in dispensing any prescription where unusually large doses of a strong preparation of a poisonous herb like foxglove, is ordered, without a *real* understanding of the intention of the prescriber; and one of the most important qualifications required of chemists is that of being able to detect *at a glance* unusual doses. Here was an unusual dose, 240 minims of tincture of foxglove in one draught, the ordinary dose of which, according to Squire, ranges from ten minims to a maximum of thirty minims. Dr. Pereira gives the dose as follows:—'The usual dose of the tincture for an adult is ten minims, cautiously increased to forty.' It is, however, well-known that tincture of foxglove has been given, in exceptional cases, even in larger doses than ordered in this draught. The late Dr. Pereira says:—'I have myself exhibited the tincture to the extent of half-an-ounce—240 minims—(never more) in not more than two or three instances. To my surprise there was no striking effect produced by it, but I did not venture to repeat the dose.'

"The prescription was written with the usual symbolic character for ½oz., and as the difference between the character used to denote the maximum dose in Squire—viz., thirty minims—differs only by a minute additional stroke of the pen from the character denoting 240 minims, it would be a tremendous responsibility indeed upon the chemist who, without understanding the full and indubitable intention of the prescriber, should supply to anyone in a single draught *eight* times the recognized maximum dose, especially when a less than a shorthand writer's stroke is all that distinguishes the symbols. If the writer's hand and pen were infallible, and could never make a minute mark in error, then it would have been the clearest duty of the dispenser to have fully ascertained the intention of the prescriber before entrusting the medicine to a patient. (Chemists usually take counsel with each other on prescriptions from a distant prescriber where a perilous doubt exists.) Some physicians write their intentions in plain figures and words, and trust not unusual doses to a symbol which might embarass the dispenser.

"If this draught had been dispensed, and the patient should not have recovered, what would have been the position of the dispenser, who, on the characteristic only, had caused to be taken 240 minims of tincture of foxglove, without having previously ascertained the intention of the prescriber to have ordered so large a quantity. Any medical practitioner can obtain whatever preparation he may need, and administer whatever amount his judgment may indicate, but a chemist who understood his duty could not, and ought not to dispense unusual doses without, by some means, previously ascertaining that the extraordinary quantity was intended to be administered.

"I am, sir, your obedient servant,
"Hy. Morton,
"Hon. Local Secretary of the
"Pharmaceutical Society.
"Ramsgate, August 8th, 1873."

"Sir,—The coroner's jury, which met yesterday on the occasion of the death of the late Mr. Davidson, having, on the *ex parte* statement of the medical men who attended, chosen to attack me for declining to make up a prescription containing a most extraordinary quantity of a virulent poison, viz., ½oz. of tincture of digitalis, I beg you will favour me by inserting in your paper the accompanying document.

"The handwriting was entirely unknown to me, and initialled only.

"Yours obediently,
"H. A. Fisher.
"August 8th, 1873."

[copy.]

"Ramsgate, Aug. 8th, 1873.

"We, the undersigned, think Mr. Fisher was quite justified in refusing to make up a draught containing such a very large dose of a poisonous drug without a further communication with the medical man prescribing. The prescription being initialled only.

Robt. Hicks,	Alfred Franks, Chymist.
C. Richardson, M.D.,	Reuben Baily, ,,
James Webster,	Henry Morton, ,,
Wm. Curling,	Silas Daniel, ,,
S. Woodman,	Edwin Balch, ,,
Josiah Austen,	Alfred Kent, ,,
T. A. Henderson, M.D.,	
E. B. Walford,	
J. B. Thomson.	

Cases under the Adulteration Act.

At Lambeth Police Court, Mr. William Parnell, baker, George Street, Camberwell, was summoned for selling bread containing rice. Mr. Clarke was for the prosecution, and Mr. Straight defended. The present proceeding was taken under the second part of the second section of the Adulteration of Food Act (35 and 36 Vict., c. 74), which provides that any person selling as unadulterated any article of food or drink which is adulterated shall be liable to a penalty not exceeding £20. A loaf purchased at the defendant's shop was found to contain a quantity of rice. A witness for the defendant stated that the flour was used as received from the miller's. Mr. Clarke relied on the case of "Fitzpatrick v. Kelly," in the *Weekly Reporter*, where a person was convicted of selling for butter an adulterated article at a small sum. Mr. Straight submitted that the case cited was not analogous to the present. It was not intended by the Legislature that a tradesman should be liable for selling an article which he believed to be genuine, but which happened to be adulterated. If the magistrate held this to be the law the sooner it was

amended the better. Mr. Ellison was of opinion that the offence was proved; to hold otherwise would open a wide door to offences. He imposed a fine of 10*s*.

George Orgle, milkman, Summer Road, Peckham, was summoned for selling adulterated milk. It was proved that the pint of milk purchased contained water and was very poor. The defendant said it was sold by his wife as a "mixture." The inspector said it was sold as milk and he knew nothing of a "mixture." The defendant said it was sold at 3*d*. per quart in a poor neighbourhood. Mr. Ellison fined the defendant £2 and costs.

Three Deaths from Poison.

The following inquests were held in Liverpool on the 26th July :—

On the body of Frederick Green, 22, who died on Thursday morning. The deceased was a chemist, residing at 22, Wavertree Road, and it appeared from the depositions that he had been in the habit of taking opiates. On Wednesday he took some laudanum to make him sleep, and after doing so said he had taken enough to kill six men. On the following morning he was found in his bed insensible, and black in the face. Medical assistance was of no avail. A *post-mortem* examination of the body showed that the deceased had died from narcotic poison, and the jury returned an open verdict.

On the body of Malachi West, who died on Thursday. The deceased resided at No. 41, Kirkdale Street, and was an engineer on a steamer. Recently he had been subject to pains in his head and chest, and he occasionally took laudanum for relief. On Thursday last he went home about two o'clock, and three hours later he was found insensible on the sofa. Efforts were made to restore him to consciousness, but without effect. The jury returned an open verdict.

Also on the body of David Herbert, son of the late H. B. Holmes, bookkeeper. The deceased child was five years of age, and recently had been staying at the house of Charles Percival, Queen's Road—a relative. On Thursday morning Mrs. Percival saw him asleep and in good health, but in a short time she saw him lying in a room insensible. It was afterwards discovered that he had drunk a small quantity of oil, which he had got from a bottle which had been standing on the bedroom shelf. The child died the same day. At the inquest it was stated that the oil had been purchased to use for rheumatism, and Mr. Percival was not aware that it was poison. The jury returned a verdict to the effect that the deceased had been accidentally poisoned, and expressed regret that such dangerous articles should be placed within the reach of children.

Infringement of Proprietary Rights.

Lancashire Chancery.

In the suit F. J. Clarke, Lincoln, *v*. Geo. Clarke, Manchester, Vice-Chancellor Malins has awarded a perpetual injunction, restraining the defendant, or his servants and agents, from using the words "Blood Mixture," or any other colorable imitation of the plaintiff's trade mark ("Blood Mixture,") in or upon any bottles, labels, handbills, or advertisements sold, printed, and used, or issued by the defendant, and from in any other way representing any medicine, compounded by or for him, to be "Blood Mixture."

Dispute about a Cholera Mixture.

Mr. Thomas Martin, chemist and druggist, Copperas Hill, applied to the Court for an order to restrain Messrs. William Jones and Co., chemists, Great Howard Street, Liverpool, from selling a cholera mixture in bottles with labels bearing the words, marks, and description of a cholera mixture of which Mr. Martin had the exclusive right of sale. Mr. Robinson appeared for the applicant, Mr. Martin. It was stated that Mr. Martin had the exclusive right to sell "Priest Parker's Cholera Mixture." It came to his knowledge that Messrs. Jones were selling a mixture with a label the same as that used by Mr. Martin, with the exception that instead of being described as "Priest Parker's Mixture," it was called the "Rev. Mr. Parker's Mixture." As this was an imitation of the article sold by Mr. Martin, and, as he contended, an infringement of his rights, he asked the court to make an order preventing Messrs. Jones from continuing the sale.—After the reading of some affidavits, his Honour said it did not appear that a bottle had been opened to try the merits of the mixtures. (A laugh.)—Mr. Robinson: We have had no experiments upon that. (Laughter.)—His Honour: I should have some evidence upon that point.—An affidavit by Mr. Martin was read, in which he stated that he exported considerable quantities of Priest Parker's Mixture; that it had become very well known and highly valuable, and that it was of great importance that he should obtain the exclusive right of selling the mixture.—An affidavit was read from a person (sent by the plaintiff) who went to the defendants and asked for "Priest Parker's Mixture." He got some bottles of the defendants' mixture, bearing the labels complained of, a person in the shop saying, "I am much obliged to you for the number of bottles you have purchased, and for pushing the business. I will not forget you hereafter." (Loud laughter.)—His Honour: In his prayers?—After some conversation his Honour made an order as asked for, and it was understood that the defendants would have leave to come before the court to answer the allegations made against them. Since then, however, an arrangement has been come to between the parties in the matter, and will receive the sanction of the court: —"The defendant agreeing to cease using the labels which he has hitherto used on bottles of his mixture called 'Cholera Mixture'; to destroy all such labels in stock, and all the bottles which bear upon them the words 'Rev. Mr. Parker's Cholera Mixture,' or other words referring to the Rev. Mr. Parker, or the words 'Priest's Mixture'; to destroy all handbills, signboards, and documents used by him or in his possession bearing the name of the Rev. Mr. Parker, or the words 'Priest's Mixture,' and hereafter in all respects to comply with the injunction granted in this case; to pay all costs incurred by the plaintiff as between solicitor and client; the plaintiff also agrees to discontinue the proceedings without prejudice, however, to his right to recommence or continue such proceedings, and to take all legal steps for enforcing the injunction, in the event of the defendant at any time hereafter failing to comply strictly with all the terms on his part." The defendant also adds:

"To Mr. Thomas Martin.

"Sir,—In consideration of your withdrawing the proceedings you have taken in Chancery against me, I have to-day entered into an agreement not again to use the name of the Rev. Mr. Parker, or to call any mixture which I may sell the "Priest's Mixture;" and I admit that the preparation which I have hitherto sold in the name of the Rev. Mr. Parker's Mixture is a preparation of my own, and that I do not know the component materials of your "Priest Parker's Cholera Mixture." I regret having sold my mixture under labels which might cause the public to mistake it for your mixture.—Yours respectfully, "(Signed) William Jones.

"Liverpool, Aug. 12, 1873."

Review.

Marienbad Spa and the Diseases Curable by its Waters and Baths. By A. V. Jagielski, M.D., Berlin. Late Physician to the Prussian Army. London: Trübner and Co.

This work is published with the intention of extolling the waters of Marienbad, which lies in the district Eger, Bohemia, about 108 English miles from Prague. According to Dr. Jagielski, "the air of Marienbad is not relax-

ing in the summer, and is, moreover, rich in ozone, which, with the healthy exhalations of the surrounding coniferous forests, favours increased activity of the vital forces." Thus Marienbad is truly favoured. The two chief springs are Ferdinandsbrunnen and Kreuzbrunnen; from these alone, in 1872, 800,000 bottles of the waters were exported. The virtue of the springs lie in being sulphatic and chlorinated alkaline. Ferdinand's spring contains :—

Per kilogramme.	Grammes.
Sodic sulphate	5·0477
Potassic sulphate	0·0424
Sodic chloride	2·0048
Sodic bicarbonate	1·8229
Lithic ,,	0·0144
Calcic ,,	0·7840
Strontic ,,	0·0010
Magnesic ,,	0·6900
Ferrous ,,	0·0850
Manganous ,,	0·0216
Basic aluminic phosphate	0·0018
Neutral calcic ,,	0·0019
Silicic acid	0·0965
	10·6140
Compounds of fluorine and bromine } soluble organic matter	Traces.
Free carbonic acid	1·972

Another speciality at Marienbad are the mud-baths. "The mud consists of a wet, soapy, smeary substance, blackish-brown colour, of a particular, bituminous, slightly sulphurous odour, and astringent bitter taste." Ten cubic feet, the quantity used for one bath, when dried by air exposure, contain chiefly from ten to twelve pounds of "Iron vitriol," fourteen drachms of formic acid, and seventeen drachms of other volatile substances. Its other peculiarities are its tough, fatty, smeary consistency, like an emollient poultice; its specific gravity, which increases the skin action and indirectly influences the deeper-lying organs; its development of gases giving it the properties of a gas and vapour bath; its retention of warmth keeping the longer so on account or its being a bad conductor of heat. Also in the neighbourhood there is abundance of gas issuing from the ground having the composition per 1000 cubic centimetres :—

Co_2	990
N	7·4
O	2·6
SH_2	traces.
	1000·0

When collected, the gas is used by persons suffering from nervous or from skin diseases; the application of the gas giving a varying feeling of warmth and of pricking to the members.

If, as Dr. Jagielski says, "*Epidemics never approach, and cases of severe or dangerous illness usually terminate favourably*," then surely a course of water at Marienbad is a *sine quâ non* for all patients.

BOOKS RECEIVED.

Workshop Appliances : including Descriptions of the Gauging and Measuring Implements, the Hand-Cutting Tools, Lathes, Drilling, Planing, and other Machine Tools used by Engineers. By C. P. B. Shelley, C.E., etc. (Text-books of Science.) London : Longman, Green, and Co. 1873. From the Publishers.

On the Dissemination of Zymotic Diseases by Milk. By John Dougall, M.D. 1873. From the Author.

Lectures on Practical Pharmacy. By Barnard S. Proctor. London : J. and A. Churchill. 1873. From the Publishers.

Local Botany. By Mr. C. B. Allen. Reprinted from the Annual Report of the Royal Cornwall Polytechnic Society. 1872. From the Author.

Scientific Handicraft : A Descriptive Illustrated and Priced Catalogue of Apparatus suitable for the performance of elementary experiments in physics. By J. J. Griffin, F.C.S. London : Griffin and Sons. 1873. From the Publishers.

Memoir of Sir James Y. Simpson, Bart., M.D., D.C.L., etc. By J. Duns, D.D., F.R.S.E. Edinburgh : Edmonston and Douglas. 1873. From the Publishers.

Notes and Queries.

PERCHLORIDE OF IRON AND GLYCERINE.—Dr. Snow, in a letter to the *British Medical Journal* (June 28) calls attention to the fact that a small quantity of glycerine covers the astringent metallic taste which remains in the mouth after tincture of perchloride of iron has been taken. Dr. Boggs, in the issue of the following week, corroborates this statement, and adds further that glycerine counteracts the astringent action on the bowels where this is not needed, and suggests that it might be substituted for syrup as a vehicle for the various preparations of iron, cinchona, rhatany, etc., which have a tendency to constipate.

TESTS FOR PURITY OF IODIDE OF LEAD.—P. Carles reports (*Bull. Soc. Pharm. Bord.*, XIII., 171) that he has met with specimens of iodide of lead containing as much as 30 per cent. of oxyiodide of lead, the therapeutic action of which would be far inferior to that of the pure iodide. The contamination is the result of the use by some manufacturers of a basic acetate of lead, instead of the nitrate in its preparation. He therefore proposes the following tests :—(1.) When the iodide has a dull whitish yellow appearance, raising doubts as to its purity, 5 decigrams should be suspended in distilled water, and a few drops of acetic acid added. If the iodide be pure there will be no change of colour; but the yellow colour will immediately become brighter if any oxide be present. (2.) The second process is to exhaust the iodide by treating a grain of the suspected iodide with two or three successive quantities of boiling distilled water. If pure it will dissolve entirely, but should there be a dull yellow residue it will consist of the oxyiodide, which may easily be collected, dried and weighed.

BLACK ALDER BARK.—It having been suggested by Professor Maisch that the yellow colour of the bark of *prinos verticillata* (black alder or winterberry) might be due to the presence of berberine, a series of experiments was undertaken by Mr. William J. Lerch with a view of clearing up the point. The result being (*Amer. Journ. Pharm.* [4], iii., 255), that he failed entirely to detect any trace of berberine in the bark. The bark of *prinos verticillata* is in the secondary list of the United States Pharmacopœia.

[349] IROCH ACIDI CARBOLICI.—Would any reader kindly oblige me with a formulæ for the above ?—*W. N. G. L.*

[350]. ERASMUS WILSON'S HAIR WASH.—Required a formulæ for this preparation.—*A. C.*

[351]. PIL. CHRISTISONI.—*T. S. J.* requires a formulæ.

*** We believe that Pilulæ Colocynthidis et Hyoscyami is intended. It was often prescribed by Sir R. Christison, and we understand that it was on his suggestion this formulæ was inserted in the present pharmacopœia.—Ed. Pharm. Journ.

Correspondence.

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

Benevolent Fund.

Sir,—In looking over the weekly numbers of the Pharmaceutical Journal composing the last volume, one of the first thoughts that arises (with me) seems to be a feeling of indebtedness to the Editor for the amount of information and instruction therein contained, and for his courtesy in allowing so free a discussion of so many important subjects, each more or less bearing upon the true interests of our trade.

Some of the proposed alterations and improvements seem to have been satisfactorily carried out, others appear to be left in abeyance, or to have been quietly shelved.

Among the latter is a subject of great importance, and one which I should like to see kept constantly before our notice, until it receives something like a satisfactory adjustment. That subject is the "Benevolent Fund," and although we were treated to some very spicy and quite sensational articles upon the matter, all ended in sound, the fund itself seems to be neither better nor worse for all that was said about it.

Now, were I even possessed of the pens of these ready writers, on the present occasion I should not think it needful to put forth their powers.

In your last weekly issue, something is said of a principle in mathematical science, called the "principle of least action," and it seems to me that if this principle were more extensively *understood*, even amongst some of your numerous correspondents, neither the pages of the Pharmaceutical Journal would not suffer in consequence, nor the cause they have at heart.

We will, therefore, come to the point at once by saying that the present available resources of the Benevolent Fund are very inadequate for meeting the claims made upon it. And as this will not be disputed, we shall pass it as *proven*.

We then go on to say that it is our firm conviction that the fund can and may be made sufficiently strong to meet all legitimate demands.

And further still, that this may be accomplished by first allowing the present funded capital to remain as it is, and as regards the future, adding all donations to this reserve, but allowing all annual subscriptions to be made use of for the year's requirements, merely putting by the surplus, should there be any.

If this can be decided upon then let an appeal be made (through the local secretary) to every member of the trade for a contribution, and if this be properly carried out, there need not be much fear of being obliged *in the future* to reject four out of five approved candidates for want of funds.

I mention the local secretaries as the most proper persons, because they are in the position of being the accredited agents of the Society, but they would easily find others to help them, where by reason of the size of the town the labour might be too great for one.

I could say a good deal upon the subject of "Local Secretaries," but will satisfy myself with saying that there ought not to be a town or city in the kingdom (of any importance) where a chemist could not be found ready to take the office and to carry it out efficiently, and that those who feel but little or no interest in the Society do injustice to its interests by continuing to hold, or by accepting the office.

I do hope this matter will receive the thoughtful attention of the Council and of the trade at large, and that something may be done (as it easily might) largely to extend the benefits of this much needed fund, for meeting the wants of all deserving cases.

One who has known the Drug Trade more than Thirty Years.

The Examinations.

Sir,—I see that in the meeting of the Council last week, Mr. Schacht makes a comparison between the numbers attending the Sessional Examinations at Bloomsbury Square and those attending at Bristol, greatly to the depreciation of the former.

May I draw attention to one or two features in connection with the fact? First, the examinations are held at the end of the session, when a very large number of students have left town. I believe the numbers 82 and 107 represent all the students at the respective courses, though several only enter for one or two of the three parts; and practically, the number attending the last two or three weeks was only twenty, or less, in each class.

Further, the examinations take up the whole (almost) of two days, and a good many of the students are in employment, and would be unable to obtain leave for so long a time.

The large attendance at several of the written examinations which Professor Bentley gave this session tends to corroborate my solution of the question.

Edmund J. H. Thring.

August 11th, 1873.

Excessive Competition.

Sir,—I read the letter by "A West-End Chemist" with much interest. I knew that the trade was cut up largely by the co-operative stores and interfered with seriously, though perhaps to a less extent by the grocers, but now a new enemy seems to have entered the lists against us, the drapers, who, with their characteristic fondness for farthings, ticket a 1*s.* 1½*d.* "article" 10¾., 1*s.* bottle of citrate of magnesia 6¾*d.*, and so on, *ad nauseam*.

Registered chemists may sell the dangerous compounds, which do not bear a larger profit than the most innocuous drugs, and take all the responsibility, while these vampires pursue the "even tenor of their way" with perfect safety.

The question is: Are we to be put to the trouble and expense of passing compulsory examinations and yet be at the mercy of every trader who may choose to cut in at us?

I think the same law which protects the public by allowing none but properly qualified men to swell the ranks of chemists and druggists should, at least, by preventing undue competition, allow them to pursue their arduous calling with a fair prospect of success.

J. R. Place.

Highgate, August 6th, 1873.

Dispensers.—Army Hospital Corps.

Sir,—Will you kindly grant me space in your columns to say a few words with regard to the advertisement that appeared in the Journal of a short time back, and brought forward the letter of "Indignans" in your issue of July 26th.

I myself have been one of the many deceived ones, and when reading the advertisement, thinking it such a good opportunity for improving my position, I resolved to apply personally at Whitehall Yard, and find out what were the duties, etc.

In the course of the following week, I carried out my intention, and, upon entering, was received by the sergeant, who, when informed of my business, told me that the staff officer was not at the office, but that he would give me all necessary information. I was told that I should be required to enlist for a term of twenty-one years, do the drilling, and perform all the duties of a common private, and also be required as well to attend in the hospital, and perform the duties of a kind of assistant-surgeon in the way of attending to any accident, not of a serious kind, that might be brought in; after having been in that way engaged for a time, I should have to undergo an examination on bandaging, strapping up wounds, etc., and if found competent would then be allowed to enter on the duty that, from the advertisements, anyone would think they had solely to perform, viz., "dispensing," and moreover I should then have to wait my chance of being promoted in the ranks by degrees before I attained the rank of sergeant, and then get the pay of £60 a-year.

This, I was given to understand, was the German mode of selecting dispensers, which was found of so much service in the late Franco-German war.

A Deceived One.

London, August, 1873.

Arthur Cooper.—See "Notes and Queries."

George Brown.—Decidedly not, nor do we think any one would be.

Mr. Abraham.—Received with thanks.

G. V. Druce.—Your request shall have attention.

Ovis.—We are not aware whether the composition you refer to contains a poison included in the schedules of the Act.

mental lens of three feet diameter and three feet focal length, after one or two unsuccessful attempts, was able to detect a heating effect due to the moon's rays collected at its focus. Then about ten years later (Aug., 1856), Mr. Piazzi Smyth, while on Teneriffe, on directing his pile armed with its polished conical reflector alternately towards and away from the moon, satisfied himself that the radiant heat was appreciable.

In 1861 Professor Tyndall experimented with a thermopile armed with a large tin conical reflector; but the smoke and heated air from the surrounding chimneys, which were rather less numerous in the direction of the moon than in that to which he turned away his pile, completely masked, or rather overpowered, the heating effect from the moon.

Professor Joule, in 1863, by means of a cylindrical glass vessel, divided in a vertical direction by a blackened pasteboard diaphragm, which extended to within one inch of the cover and of the bottom of the vessel, and in the upper of which spaces was delicately suspended a magnetized sewing needle furnished with a glass index, was able to detect the heat from a pint of water heated 30°, placed in a pan at nine feet distance, also that of a moonbeam, admitted through an opening in a shutter, as it passed across the apparatus.

In the autumn of 1869 M. Marie-Davy, with a refractor of nine inches aperture, detected the moon's heat in the focus, and estimated the rise of temperature of the face of his thermopile at about twelve-millionths of a degree (Celsius); and a little earlier Mr. Huggins worked with the thermopile, but directed his attention more to the fixed stars than to the moon.

During the course of the year 1868* an arrangement was prepared for measuring the heat in the image of the moon formed by the mirror of the three-foot reflector at Parsonstown. For the purpose of further concentrating the heat of this image of 2·9 inches mean diameter on to the face of a thermopile $\frac{1}{3}$ of an inch diameter a concave mirror of $3\frac{1}{2}$ inches diameter and 3 inches focal length was employed; a rock-salt lens being objectionable from its condensing moisture on its surface, and, moreover, being hardly procurable of sufficient size.

To secure greater steadiness of the needle than was otherwise obtainable, a second similar concave mirror and thermopile were placed by the side of the first, the similar poles of the thermopiles being connected with each other, and the others with the terminals of the galvanometer. Thus the deviations due to the moon's heating effect were proportional to the *sum* of the effects due to each pile separately, and those arising from disturbing causes, acting on the two piles, to the *difference* of the effects due to each pile. To secure still greater steadiness of the needle, the two piles of four pairs each which, having been made at *different* times by Messrs. Elliott, were not of equal power were replaced by two more equal thermopairs constructed on the spot.† The apparatus was enclosed on all sides, except on that towards the mirror of the telescope, with a box of tin and glass, and the lattice-tube was covered with a cloth to keep draughts of air from the piles. Two covered wires led from the thermopiles to the galvometer in the observatory, and the heating effect was determined by directing the telescope so that the moon's image fell alternately for the space of one minute on each of the two small concave mirrors.

The observations made during the seasons 1868-69 and 1869-70, were found to follow pretty well Lambert's law for the variation of light with phase. It was found also that a piece of glass which transmitted 80 per cent. of the sun's rays suffered only about 10 per cent. of the moon's rays to pass through; thus a large amount of absorption before radiation from the moon's surface was shown to take place.*

In the earlier experiments no attention had been paid to the correction to be applied for absorption of heat by the earth's atmosphere; but, as the apparatus was gradually improved, it became indispensable to determine the amount of this correction before attempting to approach more nearly to the law of variation of the moon's heat with her phases than had been done in the earlier investigation.

By taking long series of readings for lunar heat through the greatest ranges of zenith distance available, a table expressing the law for decrease of heat with increase of zenith distance, closely following that deduced by Siedel for the corresponding decrease of the *light* of the stars, was obtained.† By the employment of this table, the determinations of the moon's heat at various moments of the lunation were rendered comparable and available for laying down a more accurate "phase-curve" than had been previously obtained. This curve was found to agree more nearly with Professor Zöllner's law for the moon's light, on the assumption that her surface acts as if it was *grooved* meridionally, the sides of the grooves being inclined at the uniform angle of 52° to the surface, than with Lambert's law for a perfectly *smooth* spherical surface.

The distribution of light on two white globes, constructed in accordance with Lambert's and Zöllner's hypotheses, on which a beam from the electric light was thrown, was shown to be very different in the two cases; the brightest spot on the former being at the centre, and on the latter at 52° on each side from the centre at the time of full moon, and at other times on the former at the bright limb, from which it gradually decreases towards the terminator; while on the latter there is a rapid decrease from the bright limb to a minimum about half-way to the terminator, after which it increases again, and then fades away on approaching the terminator.

On examining the phase-curve which had been obtained, a certain want of symmetry on the two sides of full moon was perceived, which was ascribed to the unequal distribution of mountain and plain on the lunar surface, as was shown by a rough diagram of the lunar surface with its so-called "seas." It had also been found that the percentage of the moon's heat transmitted by a sheet of glass diminished from 17·3 per cent. at full moon to about 13·3 per cent. at $22\frac{1}{2}$°, 11 per cent. at 45°, and 10 per cent. at $67\frac{1}{2}$° distance from full moon; a circumstance which might have been accounted for by supposing that there is

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* See Proc. Royal Soc., 1869.

† In the construction of the thermopairs which were substituted for the thermopiles previously employed, the requisite sensitiveness was obtained by making the cross-section of the two elements small compared with the area of face, so that a smaller proportion of heat might be lost by conduction along the bars. On being compared with two of the ordinary construction they were found to be of about equal power, and, therefore, from the simplicity of construction they would appear to be deserving of the attention of physicists. (See Proc. Royal Soc., 1870.)

* Assuming Wollaston's estimate of 800,000 : 1 to be the correct value of the proportion between sunlight and that of full moon, and the percentage of heat transmitted by glass to be 10 per cent. for the moon's rays, and 80 per cent. for the sun's (the difference being due to absorption before radiation from the moon's surface), the corresponding ratio for solar and lunar heat deduced was 80,000 : 1. The later observations on lunar heat would require some modifications of this value, but in the present uncertainty as to the value for the proportion between sunlight and moonlight for which

Woolaston gives the value	. . . .	801,072
Bouguer ,,	. . . .	300,000
Bond ,,	. . . .	470,980
Zöllner, 1st method ,,	. . . .	618,000
2nd method ,,	. . . .	619,000

further examination of the question would appear unprofitable.

† Following the reasoning from which Pouillet concluded that the earth's atmosphere absorbs solar heat as if it were a medium of uniform density of height equal to $\frac{1}{10}$ of the earth's radius, we deduced from the measurement of the moon's heat, a height of $\frac{1}{50}$ of the earth's radius.

a constant amount of radiant heat coming from the moon in addition to that which, like the light, varies with the phase, had it not been found that as the moon approached tolerably near the sun, as, for instance, on March 27th, 1871, when her distance from full was 138°, no perceptible amount of heat radiated from her surface.

The less rapid decrease of the moon's heat than of her light on going farther from full moon, and the increase of percentage of heat transmitted by glass towards the time of full moon, may probably be explained on the assumption that when the sun's heat and light strike the moon's surface the whole of the former and only a certain proportion of the latter, depending on the intrinsic reflecting power or "Albedo" of the surface, leave it again, and consequently the shaded portions, which are inclined more towards the position of the earth at quadrature than at full moon, reflect a larger amount of heat as compared with the light at the former than at the latter time, and a greater flatness of the heat- than of the light- phase-curve is the result.

With the view of obtaining a decisive result on the question, whether or not the moon's surface requires an appreciable time to acquire the temperatures due to the various amounts of radiant heat falling on it at different moments, simultaneous determinations of the amount of the moon's heat and of her light were made, whenever the state of the sky allowed of it, during the eclipse of November 14th, 1872. The eclipse was a very partial one, only about $\frac{1}{40}$ of the moon's diameter being in shadow; but although this circumstance, coupled with the uncertain state of the sky, rendered the observation far less satisfactory than it would otherwise have been, yet it was sufficient to show that the decline of light and heat as the penumbra came over the lunar surface and their increase after the middle of the eclipse were sensibly proportional.*

Rather with the view of finding the value of the galvanometer readings in terms of the radiation from a surface of known temperature, and capable of being reproduced by any one at any future time, than in the expectation of getting more than the roughest approximation to the temperature of the lunar surface, readings of the galvanometer were taken when the faces of the piles were alternately exposed for periods of one minute to the radiation from two blackened tin vessels filled with water of different temperatures. It was thus found that were the atmosphere removed, the surfaces of new and full moon might be respectively replaced by blackened tin vessels of equal apparent area to that of the moon, and at temperatures of 50° and 247° Fahrenheit.†

In conclusion, Lord Rosse expressed a hope that among the many subjects which engage the attention of astronomers that of radiation of heat from the moon might not be entirely lost sight of, more especially by those who live in a more favourable climate for such observations than that of the British Isles.

CHLORIDE OF MERCURETHYL.‡

BY J. M. MAISCH.

This compound, it appears, has recently been introduced in Europe into medicine, and it is claimed for it that it may be used in the same doses and for the same purposes as corrosive sublimate, over which it has the advantage of not precipitating albumen, no matter in what solution the latter may be, whether as egg albumen, in the serum of blood, in urine, etc. Schering and Co. have introduced it under the name of *Hydrargyrum æthylochloratum.*

It was discovered by Strecker* and by Dünhaupt† in 1854. The former chemist started with iodide of ethyl, preparing therefrom as the first step the iodide of mercurethyl; the process of the latter involves the previous preparation of bismuth-triethyl, which, being decomposed by corrosive sublimate, yields the compound in question, besides chloride of bismuth-ethyl. Whichever course is followed, the process, or rather series of processes, are tedious and complicated; but that of Strecker appears to offer better advantages in utilizing all the material.

Iodide of ethyl or hydriodic ether (C_4H_5I) was discovered by Gay-Lussac in 1815, and prepared by distilling absolute alcohol with hydriodic acid, and separating the compound from the distillate by water. Serullas‡ subsequently improved the process by using iodine and phosphorous with alcohol, and Personne§ found the use of amorphous (instead of ordinary) phosphorus very advantageous, using again absolute alcohol. The latter process was rendered more practical in 1862 by Reith and Beilstein,‖ who proposed to put one part of red phosphorus into five per cent. of alcohol, spec. grav. 0·83, placing the flask with the mixture into cold water, adding 10 parts of iodine, distilling after 24 hours, shaking the distillate with soda solution, and removing the oily liquid which is rendered anhydrous and rectified. Lieben communicated, in 1868, to the Vienna Academy of Sciences, his observations that the chlorides of the alcohol radicals are converted into the iodides on being heated to about 130° C., with an excess of concentrated hydriodic acid. Wanklyn¶ and De Vrij** have simplified the preparation of iodide of ethyl very much by using absolute alcohol, to which a little more than one molecular weight of iodide of potassium is added, after which dry hydrochloric acid gas is passed into the liquid; or the hydrochloric acid is first passed into the alcohol and sufficient iodide of potassium added afterwards; after 24 hours the mixture is distilled, the iodide of ethyl separated by water and purified by washing, drying and rectifying.

Iodide of ethyl is a colourless oily liquid of 1·93 spec. grav. at 15° C. (60° F.), of a strong and peculiar odour, and boiling at about 70° C. (158° F.) When digested with mercury or some other metals, ethyl compounds of the metals are obtained. In this manner and by taking advantage of the influence of diffused light, Strecker prepares the iodide of mercurethyl, recrystallizing the product from alcoholic ether. It forms then colourless iridescent scales, subliming at the temperature of boiling water, fusing at a higher temperature, of an unpleasant odour, and being decomposed by direct sunlight finally into mercuric iodide; its composition is C_4H_5HgI. If its alcoholic solution is precipitated by nitrate of silver and the filtrate carefully evaporated, crystals (or a crystalline mass) of nitrate of mercurethyl are obtained, which are readily soluble in water and almost as freely in alcohol.

This nitrate is easily converted into the chloride by adding to the aqueous solution of the former muriatic acid or chloride of sodium, nitric acid, or in the latter case nitrate of sodium being separated in the aqueous solution.

Chloride of mercurethyl has the composition of C_4H_5HgCl; it forms white thin scales with an almost silvery lustre, and of a peculiar ethereal unpleasant odour; it is very sparingly soluble in cold water, little in ether and cold alcohol, but freely in boiling alcohol, crystallizing again on cooling; it sublimes at 40° C. (122° F.) without fusing previously, and condenses in thin laminæ; exposed to the air it evaporates completely, and heated in a water-bath it may be fused to a clear oily liquid, which evaporates without leaving any residue. When rapidly heated upon platinum foil it burns with a

* Both were reduced to about one-half what they were before the eclipse.

† In fact, assuming Dulong and Petit's law of radiation to hold, the change of radiation on going from new to full moon was the same as that produced by raising the temperature of the water through 197°, the initial temperature being 50° Fahrenheit.

‡ *American Journal of Pharmacy* for August, 1873.

* *Ann. d. Chem. und Pharm.*, xcii., 57.
† *Journ. f. prakt. Chemie*, lxi., 399.
‡ *Ann. de Chim. et de Phys.*, xxv., 323; xlii., 119.
§ *Compt. Rend.*, lii., 468.
‖ *Ann. d. Chem. und Pharm.*, cxxvi., 250.
¶ *N. Jahrb. f. Pharm.*, xxxi., 169.
** *Polyt. Centralbl.*, 1867, 675.

slight flame, the vapours having a disagreeable odour and a metallic taste. Being very poisonous, it must be handled with great care on account of its ready volatility. Schering regards it as pure if it is readily and completely volatilized, dissolves without residue in boiling alcohol, yields in alcoholic solution but a faint reaction of chlorine, and, with alkali, does not produce a precipitate.

It remains to be seen whether its inactivity upon albumen renders this new claimant for medical favour so much superior to corrosive sublimate and similar mercurials that its good qualities would more than outweigh the dangers and uncertainties that must result from its ready volatility at our usual summer temperature.

CAMPHOR.*

The camphor of commerce comes from Formosa, Sumatra, Borneo, Japan, and China. It is obtained in crystalline masses already formed, and also in grains by distillation. The tree which produces the former kind is a near relative of our basswood, which we know as a charming tree, perfuming the air and yielding the finest honey in the world. It grows on the Diri Mountains in Sumatra, and in Borneo. It towers upward more than a hundred feet, and has been known to obtain a girth of fifty feet. The spirited persuasion of the axe draws from this forest monster the white treasures secreted in longitudinal fissures in its heart wood, sometimes, though rarely, in a layer as large as a man's arm, but more frequently in small fragments to be carefully extracted by some sharp-pointed instrument. It is not an abundant bearer. Twenty pounds is a rare yield for a great tree; ten pounds is a good harvest from one of medium size, and many are felled and split that furnish no camphor. This, however, is not an entire waste, since the wood is easily worked and is never attacked by the voracious myriads of Eastern insects which destroy all other varieties except the teak and calambuco. House and ship timber are made from it, besides many articles of furniture, and the aromatic trunk is extremely valuable to the housekeepers of our colder climate. This kind of camphor seldom finds its way to Europe and America. The Chinese ascribe to it marvellous medicinal properties, and pay for it enormous sums, thereby securing the entire yield.

Common camphor is obtained by distillation from the root, stem, and leaves of certain species of *Lauraceæ*, but more especially from the *Laurus camphora*. This tree is of good height but not gigantic, is many-branched, with evergreen lanceolate leaves on short stalks, and small yellowish blossoms in long clusters at the end of the flower stems. Of this, also, there are two varieties. The Chinese or Formosa camphor is carried in junks to Canton, and there packed in square chests lined with lead, whence it is sent to the different Eastern ports, where we procure it. It is of a grayish colour with a grain like sugar, and usually unattractive in appearance. The Dutch or Japan camphor is prepared in Batavia, is packed in tubs securely matted, is pinkish in hue, and coarser than the Chinese.

Both kinds need purification before using. The Venetians first and afterwards the Dutch monopolized the labour and profit of refining it for a long period, and it is only of late years that other nations have succeeded in obtaining it in its crude state.

Camphor is slightly soluble in water, but yields freely to alcohol, acetic acid, ether, and the essential oils. A pretty experiment may be tried with it which the young people will find amusing. Scatter a few pieces of clean camphor upon pure water, and they will whirl and sail about, keeping up the dance sometimes for hours. Drop among them some greasy matter, and the merry little performers will stop on the instant.

The loss of refining runs from 8 to 16 per cent. In a camphor refinery at Rumney, New Hampshire, United States, where from six to seven hundred pounds of camphor are refined daily, there are two large furnaces, the tops of which are covered with heavy iron plate, and about an inch of sand to regulate the heat. There are also 56 square and 38 round pans, which are filled every morning, and in twenty-four hours are ready to be emptied. These have tin globe-shaped covers, with a tubular vent in the centre, and as the heat dissolves the camphor into a liquid, it rises in the form of vapour, and attaches to the covers, the impurities falling to the bottom of the pans. It requires long experience to know just the amount of heat required so as to secure the purest article with the least loss.

It requires about one quarter of a cord of wood per day to run these furnaces, a day's work averaging 15½ hours. After cooling, the contents of the square pans, clear as crystal, are packed in boxes of one hundredweight each, and those of the round ones into barrels carefully lined, and are then sent to market, and from thence into every dwelling in the land.

* From an article on "Camphor Refining," quoted by the *Boston Journal of Chemistry* from *The People*.

CLINICAL TEST FOR THE DETECTION OF MERCURY IN URINE.*

BY MM. MAYENÇON AND BERGERET.

The analytical process adopted by the authors consists in placing in the urine an iron nail, suspended from a platinum wire, and adding a few drops of sulphuric acid. After half-an-hour's contact, the mercury, if present, is deposited upon the platinum. The platinum and iron couple is then taken from the urine, washed with pure water, and after being dried in the air, is plunged into an atmosphere of chlorine. The couple is afterwards agitated in the air, to rid it of chlorine, and the platinum wire is then passed over a sheet of cigarette paper, slightly moistened with an aqueous solution of iodide of potassium at 100° C. If there be any mercury, a brick-red ray of biniodide of mercury is produced. According to the authors, this process allows of the recognition of $\frac{1}{150000}$ part of a soluble compound of mercury.

The authors have experimented upon patients, and upon rabbits, and find as the result of their experiments, (1) that mercury or mercurial salts, taken in a single small dose, are eliminated promptly (four days) and completely from the organism; (2) that mercury or salts of mercury, taken during a certain time, even in small doses, require several days for their complete elimination; (3) that bichloride of mercury, injected under the skin, spreads through the whole organism in half an hour; (4) that the kidneys and the liver appear to be the organs where the mercury is found in the greatest abundance. The elimination of the mercury appears to take place in all the excrementitial humours. Iodide of potassium has a marked action in clearing the system of the mercury which it may contain.

* *Journ. Pharm. Chim.* [4] vol. xviii. p. 148, from the *Lyon Médical*.

BROMINE.

The following particulars respecting the production of bromine in the United States, which has during the last few years become of considerable importance, are quoted from the *Boston Journal of Chemistry* :—

The first bromine discovered in this country was detected by Professor Silliman in the bittern of the salt-works at Salina, New York.

At the salt-works near Freeport, Pennsylvania, the first attempt was made to manufacture it on a large scale, and for many years proved a profitable undertaking to the projector. The next factory was started at Natronia, Pennsylvania, by a Swedish chemist, but by this time the demand for the article was so great that the facilities then possessed proved insufficient to meet the demand, and under the auspices of one of our great manufacturing

firms, a systematic search was made for it, which resulted in the location of several extensive establishments for its manufacture, in the great salt regions along the Ohio River, both in Ohio and Western Virginia. The bittern at these wells is of such richness, that this region alone can supply the market of the world, and at a price that renders competition from other quarters impossible.

The factories established in this region are very extensive, and their united production does not fall far short of 5000 lbs. of bromine per week. Their bearing upon the business done in this article can be judged from the fact that since their establishment the price of the article has declined from six dollars and eight dollars per pound to less than one dollar per pound. The fact is that the Ohio River salt regions alone can more than supply the entire consumption of this article, and unless it should find some new and unexpected application in the arts, even the factories already established can supply the demand without increasing the present facilities.

It seems almost incredible that such an enormous amount of this article should be consumed as a remedial agent alone, yet such is the case; for, excepting the trifling amount annually used in the art of photography, it has as yet found no application in the arts.

In the form of bromide of potassium, large quantities are annually exported from this country, as the danger, risk, and expense incurred in the shipping of the crude article make the bromide more profitable for the European consumer and manufacturer.

Before it is even properly concentrated, the bittern of this region yields as much as *one ounce to the gallon*. It further enjoys the advantage of being very fine, and almost wholly free from iodine. The process employed in the manufacture of bromine is a very simple one. The bittern, or uncrystallizable liquor left after the extraction of the salt, is taken by suitable pipes directly from the salt works to the adjacent bromine works, and, still hot, is run into shallow iron pans, where it is rapidly boiled down to a high gravity. During this operation a dirty, pasty, and very impure salt subsides, which is removed by means of iron shovels. Having been thus concentrated, the now highly caustic liquor, containing a large amount of the bromides of soda, lime, and magnesia, is run into leaden or earthen stills, and having been mixed with a fixed percentage of black oxide of manganese and oil of vitriol, the chlorine thus liberated sets free the bromine, which, by the application of a gentle heat, readily distils over into receivers of cold water.

THE OUTBREAK OF TYPHOID FEVER IN MARYLEBONE.

Another remarkable instance of a localized outbreak of typhoid fever, similar to that detected by the sagacity of Dr. Edward Ballard in 1870,* has recently occurred, the locality being again in the metropolis, but situated at Marylebone instead of at Islington. On this as on former similar occasions there is a tendency to connect the outbreak of fever with the distribution of infected milk.

The circumstances attending the present outbreak, as far as they may be gathered from published reports, are briefly as follows:—On July 22 some children belonging to the household of Dr. Murchison, residing in Wimpole Street, Cavendish Square, were taken ill. On the 25th July the two eldest children and a baby were sent into the country, and a few days afterwards three other children took the fever. Naturally after past experience attention was then turned to the milk supply; but as the younger children who drank the largest quantity of milk were attacked after the elder ones this did not at first appear to be the cause. Closer inquiry however revealed the fact that milk had been daily received from the dairy in separate cans, one sealed and containing "nursery milk," which had been used for the baby and younger children; the other containing milk for the ordinary house supply. When it was found that after the baby had left town the supply of "nursery milk" had been stopped, and that the younger children of the family who had previously drank it, had instead drank that supplied for the household and six days afterwards had sickened with typhoid fever, the coincidence of the change and the seizure was too striking to be overlooked.* Dr. Murchison made inquiries and in one day found that ten neighbouring households, wherein cases of typhoid fever existed, had been supplied with milk from the same dairy. Dr. Whitmore, the Medical Officer of Health for Marylebone, was communicated with, and he in turn informed the managers of the dairy of the suspicions attached to their milk. Confirmatory information became plentiful, and soon two hundred cases of typhoid had been reported, all of which with one exception occurred in households that had been supplied with milk by the same company.

Whilst this information was being collected the distribution of milk from the inculpated dairy still went on. Although repeated notices had been sent to the managers to suspend the sale they evidently did not feel convinced by the evidence placed before them that it was their duty to make the sacrifice. Mr. Simon, the Medical Officer of the Local Government Board, having been appealed to, promptly dispatched Mr. J. Netten Radcliffe to make an investigation into the occurrence. Mr. Radcliffe immediately arranged to inspect, with Dr. Whitmore, the eight farms from which the milk company obtained their supplies, and at the request of the company Dr. Corfield and Mr. Henry Morton accompanied them. After six farms had been inspected with only negative results, one was found to be situated in a neighbourhood where enteric fever had been epidemic. More than this, the late proprietor of this farm had died in the early part of June under circumstances that, although they at first led to his death being attributed to heart disease, leave little doubt that it was due to collapse during convalescence from typhoid fever. Dr. Corfield's report states that the well from which the water used for washing the cans and similar purposes was drawn is lined with uncemented bricks, and situated at the lowest part of the yard, eight feet from a ditch which receives the drainage of the yard itself, the privy if it should overflow, the pig-sties, the dairy, and a manure-heap, into which the house slops were thrown. The privy itself is situated at the highest portion of the yard, 56 feet 6 inches from the well, and has the ordinary privy pit, which is perhaps as much as two or three feet above the level of the top of the well.

Such being the facts of the case, and supposing the poison of enteric fever to be upon the premises, it was considered that there were several ways in which it might have got into the milk. Before visiting this farm, upon becoming acquainted with some of the above details, the inspectors on behalf of the company had sent a telegram to the proprietors of the dairy in London, advising the immediate cessation of the distribution of milk from that farm, a request that was immediately complied with, the milk on hand being disinfected and thrown away. Credit is due to the owners of all the inspected farms, as well as the proprietors of the dairy, for the assistance and facilities offered to the inspectors. It is worthy of remark that Dr. Corfield states that, without exception, it was "apparent to the inspectors that no intentional admixture with water took place at any of the farms, at any rate, with the consent or knowledge of the farmers themselves."

Some of the circumstances recorded in connection with this typhoid epidemic are very remarkable. In one house, where four servants had been left upon board wages, two of them had purchased milk from the company, and

* See PHARM. JOURN. [3] vol. i. p. 617.

* It is worthy of notice however that Dr. Corfield, in his report upon the visit to the farm from which the suspected milk was supplied, states that all the "infants' milk" came from that particular farm, and connects this with the fact that it is children who have been so especially attacked in London.

two used condensed Swiss milk. The former were attacked by the fever, the latter were not. A young lady on a visit to Seymour Street drank freely of the milk, returned home to Gipsy Hill on the 23rd July, and was taken ill on the 26th. In one family, where there are three children, the eldest drank tea in the morning and orange wine and water at night, the younger two had bread-and-milk in the morning and cold milk at night; both the latter have typhoid fever, the former, who takes no milk, has escaped. Again, two families living next door to each other were supplied with milk from the same can, yet while in the one there have been two cases (one fatal) of fever, in the other there has been none. The explanation appears to be that in the latter case the whole of the milk was boiled before being used. Besides these, several cases of fever have occurred in houses not supplied with the suspected milk, but the patients have been found to have drank it in some other place.

This frequent coincidence between the occurrence of typhoid fever and the consumption of milk admittedly derived from a source where it was liable to infection is, at any rate, startling, more especially since it is consistent with prevailing views as to the communication of typhoid fever.

In reference to this subject, Mr. Alfred Smee, F.R.S., has addressed a letter to Mr. Simon, suggesting the existence of a connection between the use of sewage-grown grass as fodder and the production of milk which readily becomes putrescent and capable of causing disease. The appearance of this letter in the daily papers naturally brought forward Mr. W. Hope, as being prominently connected with schemes of sewage irrigation, and also with the Dairy Reform Company, to controvert the opinion expressed by Mr. Smee; but his criticism is even less conclusive in disproving the connection between epidemic typhoid and unwholesome milk than Mr. Smee's argument in favour of it, or the coincidence above referred to. Several further letters have since appeared, but they do not throw more light on the question that is of public importance, though they bear evidence that the discussion now opened will not be a mere "milk and water" controversy. Possibly it may at last add a feature of interest to the report of the British Association committee on the treatment and utilization of sewage, which may be looked for at the coming meeting at Bradford.

From the mass of correspondence on the subject that has appeared in the daily press, we extract the following letters, which have been addressed to the *Times* by Mr. Sedgwick:—

"Sir,—The attention which has been directed, since the publication of Dr. Edward Ballard's paper on a Localized Outbreak of Typhoid in Islington in July, 1870, to milk as the vehicle by which the poison of typhoid fever is often conveyed into the system, has served to elicit some valuable information on the mode in which epidemic diseases may be spread in districts where sanitary rules have been neglected; and the present outbreak of typhoid fever in Marylebone, which to some extent appears to be in like manner connected with milk supplied from a well-known dairy, will probably tend to confirm the general correctness of the observations made on that occasion. It was satisfactorily established by Dr. E. Ballard that, while the milk supplied to the families who suffered from typhoid fever at Islington was obtained from a particular dairy, the radical source of contamination was the water supplied from an underground and defective tank. This dairy tank was found to be constructed of wood which had become rotten and burrowed by rats, in consequence of which there was communication established between it and some old drains. The milk in this case might have been contaminated either by direct admixture with the polluted water used for the purpose of adulteration, or by the water being simply used for cleansing the milk cans. But, apart from such direct contamination, it is not unreasonable to assume that milk may be rendered injurious from the cows having been allowed to drink the tank water.

"In one of my papers on Cholera, which was read at a meeting of the Royal Medical and Chirurgical Society, November 12, 1867, attention was specially directed to this source of danger, and I had occasion to state that "it is a curious fact that even milk itself, the secretion of which is commonly supposed to be altogether exempt from any choleraic influence, may in like manner undergo some unrecognizable change by which it acquires deleterious properties capable of producing symptons of poisoning, which are sometimes analogous to, and even identical with, those of cholera. Among the more noticeable cases of this description is that which occured in 1826 at Aurillac, a village in France, and which Professors Orfila and Marc were commissioned by the French Academy of Medicine to investigate. In this case 15 or 16 customers of a particular dealer in goat's milk were attacked on June 13 with all the symptoms of cholera. Professors Orfila and Marc, in their report, stated that in parallel cases which had been reported to them by the police of Paris they had been unable to detect any mineral poison; that none of the received explanations were, in their opinion, satisfactory; and that they were disposed to ascribe the poisonous alteration of the milk to new principles formed by a vital process. As an appendix to this case, it may be mentioned that on Oct. 13, 1856, about twenty persons in Malta were seized with violent vomiting and other symptoms of cholera, ascertained by the police physician, Dr. Felice Calleja, to be caused by drinking the milk of two goats."

"It has been observed that the milk of cows kept in stables attached to distilleries is very often injurious, and in certain parts of North America, to the east of the Alleghanies, milk at certain seasons of the year produces a disorder which is popularly known by the name of "milk sickness," or "trembles." It is not necessary, on these occasions, to assume that the animal from which a noxious secretion has been obtained has been itself injuriously affected. Poisonous honey may be secreted by bees which have fed with impunity on certain flowers; and there is no physiological reason why milk capable of developing either typhoid fever or cholera should not be secreted by cows which have drunk with impunity water unfit for our own use."

"Sir,—Since public attention was first called to the connection between typhoid fever and impure milk, there have been eight local outbreaks of the disease in this country within the brief interval of three years, all of which have been more or less successfully traced to this source; and it may now be hoped that the anxiety and alarm caused by the present wide-spread occurrence of the disease, together with the frequency with which these outbreaks occur, will prevent the subject from being, on this as on former occasions, altogether shelved as soon as it has been proved that the milk was contaminated with impure water. I have stated, in my former letter that there is reason to believe these limited outbreaks of typhoid fever, analogous in their occurrence to many correspondingly limited outbreaks of sporadic cholera, are at least to some extent due to milk as it comes from the cow, apart from any fraudulent mixture with contaminated water, being occasionally unfit for our use; and I am glad to see that the subject is likely to attract further notice; for there seems to be in some quarters a tendency to discredit the opinion which has been advanced, that local outbreaks of typhoid fever, as well as of other diseases, may be due to an infected secretion, as distinguished from an artificial contamination, of milk.

"I have referred to cases in which outbreaks of sporadic cholera were due to goat's milk which had acquired poisonous properties, and I have no hesitation in stating, from a somewhat extensive acquaintance with the literature of this subject, as well as from personal observation, that the poisonous properties of the milk, in a large proportion of such cases, are due to something ex-

ceptional and injurious in the animal's food. If your well-known and distinguished correspondent, Mr. Alfred Smee, will consent to direct his attention to the remarks of M. Beaugrand on "Milk rendered toxic by poisonous plants," in the '*Dictionnaire Encyclopédique des Sciences Médicales*,' art. "Lait," he will find much curious and useful information on this subject. The inquiry is of the very highest importance as regards public hygiene; and great as our progress undoubtedly has been, during the last few years, in this as in other directions, we appear as yet to have reached only the threshold, so to speak, of the temple devoted to sanitary science.

"Goats, as rule, are allowed more liberty than cows in selecting their food, and it is probably owing to this fact that the milk of the former is more liable than that of the latter class of animals to acquire in this way injurious properties. Previous to the year 1870 little if any attention had been paid in this country to cow's milk as a cause of disease, while for many years previous to that date the use of goat's milk had been observed to be not unfrequently followed by dangerous symptoms. In a case, for example, of a woman and five children, which occurred some years since, choleraic symptoms showed themselves soon after drinking buttermilk obtained from a goat which appears to have fed on fool's parsley; and Dr. Mackay has published a report of some cases of poisoning by goat's milk to which it may be useful on this occasion also to refer. It appears that on the 27th of November, 1861, some ten or eleven of the ward-room officers of Her Majesty's ship Marlborough, including Dr. Mackay himself, were simultaneously attacked with symptoms which were at first supposed to be attributable to some poisonous matter having been accidentally mixed with some of the dishes of which they had partaken at breakfast. Among the symptoms described were extreme faintness, nausea, violent bilious vomiting, and diarrhœa; coldness of the extremities and cramps. They were found to be referrable to goat's milk, rendered poisonous by the animal having fed on the common sea-spurge. Many similar cases could be cited, if necessary, to prove that not the milk only, but also the flesh of these animals, may, through improper feeding, become unfit for our use; and, as such is the case with regard to goats, it would be a very curious and a very exceptional fact in physiology if it should be discovered that the milk of cows is seldom, if ever, liable to be injuriously affected in this country by bad water or by improper food.

"As regards local outbreaks of typhoid fever, primary importance has already been assigned to direct admixture of the milk with contamimated water; but it is important, at the same time, to bear in mind that milk may be injuriously affected through something wrong in the food or drink supplied to the animal by which it is secreted. Before the Royal Commission on the utilization of sewage, it was, I think, elicited that typhoid fever was produced by milk from certain dairy farms to which sewage had been applied. The grass crops on these farms were unusually rich, but the cows, in feeding on them, had probably swallowed some of the sewage matter with the grass, and yielded milk similar to that described by Mr. Smee; similar also to that which has been lately supplied to some of the customers of the London dairy referred to in connexion with the present outbreak of typhoid fever.

"The practical conclusion to be drawn from such observations is that, in order to secure wholesome milk, cows should be protected from contaminated water and improper food as well as ourselves. Science, like fashion, seems to be occasionally liable to excess; and in the fertile, but as yet imperfectly cultivated department of sanitary science there has lately been a somewhat overzealous search after contaminated water used simply for adulteration as the exclusive cause in these cases of disease; and attention has in consequence been diverted from other, and, in some respects, not less important, sources of mischief."

THE PREPARATION OF GELATIN.*

In the ordinary manner of making light-coloured gelatin, thin skins, sinews, cartilages, and bones are employed, which must be treated with muriatic acid and lime before being dissolved. These have furnished a good article, but at a high price. The expense of this process therefore induced F. Hense, of Berlin, to thoroughly investigate the subject of its manufacture in the hope of producing an equally good article at a lower price. The material employed was the brown, or almost black, glue of very poor quality, which is a by-product in a Berlin neatsfoot-oil manufactory, and which sells for five dollars per hundredweight. This substance does not swell up in cold water like glue, but forms a gummy mass, dissolving as a thick, syrupy liquid, not very adhesive, but resembling that of which printers' rollers are made. It is now used only in making cardboard and as a dressing for very dark-coloured fabrics.

In preparing this glue, the feet are first freed from hoofs and the more solid bones of the leg, which are used for turning into buttons and ornaments, and washed. They are then exposed for three hours to the action of superheated steam under a pressure of two atmospheres in a closed vessel; and after standing quietly half an hour, the liquid is drawn off. After skimming off the supernatant grease, the strong ammoniacal glue solution is strained and evaporated on a steam bath, and then furnishes the before mentioned blackish glue. When perfectly dry, it is very brittle and easily rubbed off between the fingers. Attempts to bleach it have yielded unfavourable results. It shows that it is already decomposed and is no longer gluten, or contains only very little of it. A large quantity of sulphurous acid partially bleaches it, but to employ this on a large scale would involve many technical difficulties. The fragile apparatus for making sulphurous acid would soon be broken in the hands of the workmen. Sulphite of soda could be dissolved in a very dilute glue solution, and muriatic acid added to decompose this salt, if the quantity of the sulphite of soda required were not too large; but fifty kilograms of glue would require at least 2500 grams sulphite of soda and 2250 grams muriatic acid. The salts formed, which are sulphate of soda and chloride of sodium, as also the free acid, would in no case improve the quality of glue, but on the contrary would render it utterly useless for many purposes in the arts. The process of bleaching with mineral acids would also destroy the iron evaporating pans, so that this method must be given up entirely.

All attempts at giving to the glue, when finished, the colour desired having failed, no other course remained but to ascertain the cause of its becoming so dark-coloured. The presence of sulphur and of considerable quantities of ammoniacal salts in the glue solution was too striking to escape notice very long. They could only have been caused by allowing the steam to act too long and too violently, whereby not only were the cartilages and gristle converted into glue, but the hair too had been dissolved, and thus caused the dark colour. In order to reduce the decomposition of the glue and formation of ammonia to a minimum, the process may be varied in such a manner that, instead of drawing off the contents of the digester once at the end of every three hours, they shall be drawn off hourly. On standing a little the grease rises to the top and can be skimmed off, and then a quantity of fresh wood charcoal mixed with 25 per cent. bone black is put into the liquid and left overnight for the purpose of absorbing ammonia and other impurities. The following morning it is heated to a temperature at which gelatin melts, about 70° to 85° Fahr., strained and evaporated to the desired consistency. The amount of charcoal necessary is about four per cent. of the quantity of glue in solution.

* *Amer. Journ. Pharm.* from *Scientific American*.

The Pharmaceutical Journal.

SATURDAY, AUGUST 23, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BRADFORD MEETING OF THE CONFERENCE.

THE Local Committee for the Pharmaceutical Conference meeting at Bradford have requested us to impress on intending visitors the desirability of early application being made to the Local Secretary for lodging accommodation, and that it would facilitate their efforts to secure such if their friends would state whether or not they propose remaining for the meeting of the British Association. This is necessary, as the hotel and lodging accommodation in Bradford is very limited, and the necessity is especially felt at a time when so large a number as usually attend the British Association have also to be provided for.

We desire to draw the especial attention of our readers to these very reasonable demands of the Bradford Local Committee, and may refer to the recent experience of the British Medical Association Meeting in London as a justification for doing so. On that occasion the attendance of members was so far in excess of any anticipation entertained by those whose duty it was to organize the proceedings, that it proved impossible to accommodate more than a fraction of the visitors. To distribute tickets for the dinner it was necessary to have recourse to drawing lots, and in the several excursions there was almost an equal difficulty in providing for all who wished to join.

Under such conditions there must of course be a considerable amount of individual dissatisfaction, and those who chance to be disappointed are often much disposed to censure sorely-taxed officials rather than admit that they are themselves to a great extent to blame for not having adopted the obvious plan of intimating their intention to take part in the proceedings.

On the same day (Tuesday, September 16) on which the British Pharmaceutical Conference is to commence its proceedings at Bradford, the twenty-first annual meeting of the American Pharmaceutical Association will commence in the city of Richmond, Virginia.

As this will be the first meeting of the kind held in the Southern States, there is a great desire that the several sections of the country may be fully represented, so that there may be evidence of the national character of the association, and of a continued growing interest in it.

An exhibition of objects relating to pharmacy is to be held in connection with this meeting, towards which contributions of articles to be exhibited in the following classes are solicited:—(1) Crude Drugs and Derivatives; (2) Pharmaceutical Preparations; (3) Chemical Preparations; (4) Pharmaceutical and Chemical Apparatus and Appliances; (5) Shop Fixtures, Soda-water Apparatus, etc.; (6) Druggists' Sundries, New Toilet and Fancy Articles; (7) Plants, officinal, useful, and ornamental; (8) Pharmaceutical Literature: New and Rare Books. A similar coincidence in the time of meeting of the two Societies occurred in 1870, and was then the occasion of the exchange of some pleasant courtesies by submarine telegraph.

THE WORKING OF THE ADULTERATION ACT.

IN the article which appeared under this heading two weeks ago we expressed the opinion in reference to the Glasgow butter case that there was either great want of care in taking the samples or else serious error in the analytical operations they were subjected to. Objection has been taken to this by Mr. A. H. ALLEN, the analyst for Sheffield, in a letter to be found in our correspondence columns, and he writes to correct what he believes to be an erroneous view of the question.

We regret that we cannot agree with Mr. ALLEN or accept his intended correction. If Mr. ALLEN will refer to the report of the case published in the Glasgow papers and extracted thence into our columns, he will find that two separate half-pounds of the butter were handed, sealed up, to Dr. THORPE for examination. One of those samples still sealed up was produced in court; the other was examined by Dr. THORPE who reported it to contain 19·5 per cent. of curdy and farinaceous matter, and 19·4 per cent. of water. At the same time Dr. WALLACE had examined two other samples of butter from the same kit and he found in them respectively only 1·1 and 1·5 per cent. of curdy matter without any farinaceous matter. There might be some doubt whether these different samples represented the same butter, and the magistrates reasonably enough took that view.

But there still remained the question, fairly put by Mr. ALLEN, whether the two samples of butter examined were adulterated with some curdy and starchy matter, and to solve that question the Glasgow Police Board directed the sanitary inspector to forward to Professors ANDERSON and MACADAM one half of each of the identical samples of butter produced in the case against GIBSON.

The reports of these gentlemen agree in representing the amount of curdy matter to be only about 1 per cent., as well as in affirming the total absence of farinaceous matter, thus corroborating the report of Dr. WALLACE in these respects. So far, therefore, it seems to us impossible to avoid the alternative conclusion to which we came when commenting on this case, and there does not seem to be any foundation for Mr.

Allen's opinion that the evidence of Professors Anderson and Macadam and Dr. Wallace proves nothing but variation in the samples, for their analyses agree in regard to the only points in which comparison is possible, viz., the amount of curdy matter and of water.

Some clue to the discrepant results might perhaps be found in Professor Thorpe's statement that he purposely selected that portion of the butter in which the white substance very irregularly distributed throughout the mass seemed present in largest quantity, but we purposely refrained from any allusion to this remarkable admission, since our object in drawing attention to this case was merely to show the importance of extreme care not only in the analytical operations to which articles are subjected for the purpose of the Act, but also in the taking of samples in the examination of which the reputation of dealers is at stake no less than the rights of the public.

FRENCH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Our readers can hardly have forgotten the brilliant success with which the French Association for the Advancement of Science was held last year at Bordeaux. The first volume of the Transactions, a portly octavo of some thirteen hundred pages, is just out, and contains some of the more memorable papers read and discussed before the meeting, notably Dr. Alphonse Guérin, "Sur la Communauté du Sang," M. Levasseur "Sur la Géographie commerciale," M. Paul Broca "Sur l'Homme préhistorique," and others hardly less attractive. The only objection to the meeting was that its sections were overweighted with matter in the form of papers and their inevitable discussion, so that scarcely two-thirds of the programme was carried out.

This year the Association meets at Lyons, a city selected, and justly so, over its two competing rivals, Lille and Havre. Lyons, besides its commercial importance, has the additional claim that it contributed twenty foundation-members to the Association, while its number of adhesions increases almost every day. The bureau of which M. Quatrefages, the distinguished naturalist, is president, and M. Adolphe Wurtz, the still more distinguished chemist, vice-president, includes some of the most eminent *savants* in France. Their exertions for the accommodation and entertainment of visitors have been unwearied, and all their arrangements give promise of a gathering even more successful than its immediate predecessor at Bordeaux. They have procured from the municipality the temporary use of the Palais de Saint Pierre and the Hôtel de Ville *ad hoc*, while they have so contrived as to limit the number of papers to a manageable amount. In addition to the general conferences and the detached sections, the guests will be invited to assist at a series of excursions well-devised to suit the tastes of the different schools of *savants*. There will be excursions to spots rich in geological and botanical features; excursions to the industrial basin of the Loire; excursions to the various iron-mines and foundries in the Ardèche. Add to this that the railway companies have reduced the fares for the meeting of the Association, and have also arranged with other lines for cheapening the cost of communication with Vienna and its Exhibition—and the attractions of the Lyons meeting of the French Association for the Advancement of Science will prove neither few nor small. The only point in which the bureau have laid themselves open to criticism is their tardiness in announcing the date of the sittings, the opening day having been fixed for Friday, the 22nd (yesterday).

EUCALYPTUS GLOBULUS.

Mr. Broughton, the Government quinologist at Ootacamund, in a report to the chief secretary of Government, Fort St. George, makes the following remarks on the supposed value of the *Eucalyptus globulus*. He says, "Much has lately appeared in the papers and quasi-scientific journals concerning the valuable qualities of the *Eucalyptus globulus* as a febrifuge. In the *Lancet* for April 20th, 1872, a notice is given of the uses of this tree medicinally, in which it is stated that all parts are most valuable as a febrifuge medicine, and also that the leaves, when smoked, are most efficacious in allaying pain, calming irritation, and procuring sleep. This article furthermore informs us that Professor Vauquelin obtained an alkaloid from the bark which crystallized like quinine as a sulphate, and which yielded the ordinary reaction of quinine with chlorine water and ammonia." Mr. Broughton further says: "I have examined the bark and leaves of the *Eucalyptus globulus*, and have the honour to state that neither quinine, quinidine, cinchonidine, nor cinchonine is contained in the plant in any proportion."

In the Journal of the Austrian Apotheker-Vereines there is a report of the results of some experiments made to ascertain the resistance to melting of ice from different localities and artificial ice. From these results it appears that blocks weighing two hundredweight melted under like conditions as follows:—

Ice from Switzerland	107 hours.
„ Norway.	115 „
Artificial ice made in Carre's machine	150 „
„ „ „ Tellier's „	144 „

Previous experiments have also indicated that artificial ice melts less freely than the best kind of natural ice.

Mr. John Wiggin, Pharmaceutical Chemist, has been appointed, under the provisions of the Adulteration of Food, Drugs, etc., Act, public analyst to the Corporation of Ipswich. The salary is to be £25 *per annum*, and a payment of 10*s.* for each analysis.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.—SESSION 1873-4.

The Council of the Bristol Pharmaceutical Association announce that they have made arrangements by which they are enabled to offer to their fellow members and associates the following complete course of instruction in Chemistry, Botany, and Materia Medica.

CHEMISTRY.—A course of thirty lectures, by Mr. Coomber, F.C.S., on *Inorganic Chemistry*, every Tuesday, at 8 p.m., commencing October 14th. A course of thirty lectures by Mr. Coomber, F.C.S., on *Organic Chemistry*, every Thursday, at 8 p.m., commencing October 16th.

BOTANY.—A course of sixty lectures, by Mr. Leipner, on *Botany: Elementary, Systematic, and Physiological*, every Monday, at 7.30 p.m., commencing September 8th.

At the conclusion of the session in May next, an examination will be held in each subject, at which every student is required to present himself. In connection with that examination the Council offer a series of prizes, particulars of which are appended.

Tickets for either of the two subjects—Chemistry or Botany—will be five shillings for members and associates, provided the holder complies with the condition of presenting himself for examination, and shall have attended not less than twenty-five lectures in each course, in accordance with the regulations of the classes; otherwise the fee will be ten shillings. Students are earnestly advised to abstain from entering for more courses than they can reasonably expect to follow up.

Tickets for the above lectures may be obtained of the following gentlemen:—Mr. Boorne, 4, Union Street; Mr. Stoddart, North Street; Mr. Schacht, Clifton; Mr. Martin, White Ladies' Road; Mr. Pitman, Redcliff Hill, who will give any further information which may be desired.

The kindness of Mr. Stoddart enables the Council again to announce a course of lessons on the Materia Medica of the Pharmacopœia. Mr. Stoddart declines, as heretofore, to accept any payment for his labours, but concurs in the propriety of requiring a fee of £1 1*s.* for attendance, the proceeds to go to the augmentation of the museum and library fund. An examination will be held, and prizes awarded, at the conclusion of the course. The lessons will be on Friday evenings, at nine o'clock, commencing October 3rd. Tickets to be obtained only at Mr. Stoddart's, North Street.

A course of practical laboratory instruction will be conducted by Mr. Coomber on Friday evenings, at the Laboratory, in Nelson Street. The fee (inclusive of apparatus and chemicals) will be £1 1*s.* per quarter. Tickets to be obtained of Mr. Coomber only.

As the lectures will soon commence, it is hoped that every principal will at once acquaint the assistants and apprentices of his establishment with the facilities offered for their scientific culture, and will do his best to further the efforts of the Council, some member of which will shortly call respecting this announcement.

Arrangements are also being made for the renewal of the monthly evening meetings, which appeared to give general satisfaction in previous sessions. The first of the series will be held in October.

SCHEME OF PRIZES FOR SESSION 1873-74.

The Council announce their intention to offer the following Prizes for competition among the students attending their classes in Chemistry, Botany, and Materia Medica:—

Chemistry (Inorganic.)

A prize to the student who passes the best examination in the elementary grade.

A prize to the student who passes the best examination in the advanced grade.

Chemistry (Organic.)

A prize to the student who passes the best examination in the elementary grade.

A prize to the student who passes the best examination in the advanced grade.

Botany (Elementary and Systematic.)

A prize to the student who passes the best examination in the elementary grade.

A prize to the student who passes the best examination in the advanced grade.

Botany (Structural and Physiological.)

A prize to the student who passes the best examination in the elementary grade.

A prize to the student who passes the best examination in the advanced grade.

Only those students who obtain a first class in their respective grades will be eligible for the above prizes.

Materia Medica.

A prize to the student who passes the best examination.

A prize to the student next in merit.

The examinations in Chemistry and Botany will be those of the Science and Art Department, ordinarily held in May.

The examination in Materia Medica will be conducted under the direction of the Council.

The prizes will be presented at the annual meeting in July, and will consist of books, apparatus, or instruments, at the option of the successful candidates.

Students are also reminded that in connection with the examinations in Chemistry and Botany, the Science and Art Department awards annually medals and prizes of books, particulars of which are fully described in the Science and Art Directory.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

ON THE ENERGIES OF THE IMPONDERABLES, WITH ESPECIAL REFERENCE TO THE MEASUREMENT AND UTILIZATION OF THEM.*

BY THE REV. ARTHUR RIGG, M.A.

Lecture III.

On the Energy of Vitality, with especial reference to the Measurement and Utilization of it.

(*Continued from page* 135.)

Put the first finger of each hand to the ears, not pressing them tightly, resting the elbows on a table thus, and then clench the fists firmly, you will immediately throw the muscles of the arm into action, and as soon as they are brought into action there is a peculiar humming sound perceptible. That is a sound caused much as the sound of flies, when buzzing about, is caused, or as humming birds cause their sound; it is caused by an intermittent action; in this case of the muscles, and upon that action the rest of this lecture will turn. There is, however, a better plan even than that for observing this phenomenon. When you go to bed, if you are particularly bent on scientific research, and will lay your head on the pillow so as to entirely exclude all external sounds from the ear, then clench the teeth firmly; those muscles which are concerned in masticating the food are brought into play, and you hear the sound most distinctly. Now, that sound gives a musical note, and from that musical note all our knowledge of muscular action springs. All musical notes are caused by the frequent repetition of a vibration at equal intervals. Take a glass tube of some length, and a little jet of lighted gas. If the tube be placed over the gas light you hear a musical note. That is caused by the light being extinguished and relighted a certain number of times per minute, as you can see by watching the reflection in the mirror. If, now, the mirror be shaken behind the light, a number of separate flames appear; if these are counted, we can ascertain how often they occur in a minute or an hour. Therefore, we know the number of

* Cantor Lecture, delivered February 17.

beats which produce that musical note. Here is an instrument for causing a sound by the frequent interruption, at equal intervals of time, of a stream of air. The number of interruptions in a given time are recorded by the wheel-work and indicated on these dials. It is called a "Siren." Again, here is a gyroscope, which does the same thing. If some string be wound round, and it is set in rapid rotation, and then a piece of cane or quill be pressed against the little wheel at one end of the axle, the note produced will vary according to the speed of the rotation. Another illustration may be had from the heating of metals of certain peculiar shaped surfaces, and laying them on cold metal, sometimes a peculiar humming sound is heard.

When Dr. Haughton was suffering from a singing in the ears after an attack of fever, he produced a sound by exercising the muscles of the jaws; this sound was in unison with the singing in the ears, but separated from it by several octaves. Dr. Haughton was struck, like Dr. Wollaston, with the resemblance of the sound to distant cabs. He measured the intervals of the granite pavement, and found them about four inches apart. This gave three impulses in the foot. If the cabs were driven at eight miles per hour, we have 35·2 impulses per second. An organ-pipe with a moveable stop was tuned in unison, and thus 35 1-3 vibrations per second were deduced.

From this rate of muscular contraction Dr. Haughton deduces the amount of work stored up in human muscles. It may facilitate a more thorough comprehension of the subject, if, in as simple and clear a manner as in my power, the mode of conducting the experiments is described. Remember, the object is to make clear to all not only the mode, but also the principles on which these experiments rest. Therefore, every technical or professional term must as far as possible be avoided.

If the arms be held out horizontally, being raised direct from the sides, and not brought forward, they will be supported in that position by two muscles in each shoulder—or rather the portions of the two shoulder muscles which support them can be clearly defined and measured. The length of time for which this position can be maintained will of course vary considerably. The other evening I could hold mine in this position for only six minutes, that is to say, they became exhausted in that space of time. Therefore the sole power of the muscles employed was expended in maintaining the arms in that position for six minutes. Eight minutes will be found more near to the average.

Now let us consider what was happening whilst the arms were so held out. Clearly the muscles were giving off this note, that is to say, they are always giving it off when they are in action, and, therefore, the arm literally was swinging up and down, or vibrating, though to a very small and invisible extent. It would do so much more but for this peculiar arrangement; whilst the muscle contracts and produces the action that we usually call muscular action, that contraction does not take place through the entire mass of muscle at the same time. Each fibre contracts, but not in the same portion of the muscle and at the same time; there are waves succeeding waves, and the consequence is that there is, to all appearance, a steadiness in the arms through the continuity of these waves. But, as regards the action, it is the same as though that wave passed along at once. Now, if the wave passed along at once, then the arm would fall, because it would oscillate or move up and down as a wave does. Knowing how often that wave passes, you would know how often the arm fell. The arm falls thirty-two times per second. It falls as if it were perfectly free, and if perfectly free we can easily calculate the space through which it would have fallen in the 32nd part of a second, namely, the $\frac{1}{64}$th of a foot; in other words, we have reached this stage, that the action of a muscle is such that it allows the arm to fall through the 64th part of a foot in the 32nd part of a second. Now let us get to another stage. The cause of its falling is the action of gravity upon the whole mass of the arm. You may remember that when dealing with the pendulum, it was explained that in a compound pendulum different portions fell through different spaces, but that there is one point which we call O, termed the centre of oscillation, which may be regarded as representing the whole mass. Now, assuming a shoulder to be the point of suspension of the pendulum, it is the point O in the arm which would fall through the 64th part of a foot in the 32nd part of a second, and that point O, by a mathematical calculation, can always be found. Regarding the arm as a perfect cylinder, this point is at two-thirds of the length of the arm from the shoulder.

Again, the work done depends on the mass moved, or supported, and the mass moved is that which is calculated as at the centre of gravity, which for this purpose is about the elbow—about eleven inches from the shoulder. Therefore, assuming the arm to be twenty-four inches, then the point O, at sixteen inches from the shoulder, falls through the 64th part of a foot, in the 32nd part of a second, and it is very easy from that to ascertain how far the point at eleven inches from the shoulder, representing the whole weight of the arm, would fall in the same interval of time. We have, therefore, got the centre of gravity, the weight of the arm, and the distance it falls.* We consequently have all the elements wanted. We have the mass, the weight of the arm, the space (the 1-64th of the foot), and the time (1-32nd of a second). Without going into the question of mathematics, the work done under these circumstances, as regards my own arm, was this, that I was able to do with both arms 1980 lbs. in the six minutes that elapsed before fatigue came on; in other words, the work done was the same as though I had lifted 1980 lbs. one foot high—1980 lbs. is very nearly 18 cwt. That is to say, the work that these two arms did in falling through that space, and being lifted back again, was very little short of a ton. If any one wants to know how much work the human arm is capable of doing when working on its own account, he may raise weights amounting to 9 cwt. on to a stool, a foot high, and he would then ascertain the exact work that each arm did when left to support itself. Such is an outline of the mode in which the calculation is made. If there are any persons interested in it, as a question of actual calculation, a table in the foot-note may be of interest.†

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* Dr. H. calls his and many other similar experiments "Statical," although reference is made to motion, because the muscles are kept in continued contraction until tired out, and undergo no translation in space, although a rapid and active molecular movement takes place within the muscles to which the work done is altogether due.

† To find the work done in holding the arms horizontal, time before exhaustion being six minutes:—

From measurement, length of each arm is 24 inches.

From weighing, weight of each arm is 8 lbs.

From muscular note, vibration of each arm is 32 times per second.

From tables, centre of oscillation of each arm is $\frac{2}{3}$ of 24 inches, or 16 inches from shoulder.

From inspection, centre of gravity of each arm is 11 inches from shoulder.

Now from the usual expression—

$$S = \tfrac{1}{2} G T^2$$

$$\text{In this case } S = \tfrac{1}{2}\, 32 \left(\frac{1}{32}\right)^2$$

$$= \frac{1}{64} \text{ foot.}$$

Therefore centre of oscillation falls through $\frac{1}{64}$ foot in $\frac{1}{32}$ of a second, or centre of oscillation falls through $\frac{60\ 32}{64}$ *i.e.*, 30 feet in one minute.

If at 16 inches from the shoulder there is a fall of thirty feet per minute, then at 11 inches from the shoulder there is a fall of $\frac{11\ 30}{16}$ feet per minute.

The arm in this case was held steady, and doing what may be called static work, as distinguished from that which is dynamical or kinetic. Dr. Haughton took very great pains to ascertain the exact weight of these muscles in the shoulder. This was done thus :—There is a large muscle called the "deltoid" muscle; a portion only of this muscle is engaged in the work. After careful examination in various ways Dr. Haughton concluded that 10-36ths of this muscle is employed in the experiment. It would be out of place to enter into these details here ; it may, however, be of general interest to place this investigation before you in a tabular form.

	oz. avoir.
Average weight of superspinatus muscle	1·671
Average of portion of deltoid.....	2·830
	4·501

Therefore 4·5 oz. perform, on an average, 1206·5 ft. lbs.
" 1 oz. performs 268 ft. lbs. before being exhausted.
As this exhaustion is complete in 8·29 minutes, the average duration of endurance, 1 oz. in 1 minute does $\frac{268}{8{\cdot}29} = 32{\cdot}3$ ft. lbs.

On one occasion these muscles were weighed and measured within 40 minutes after the execution of a criminal, so as to ascertain the exact size of them under circumstances where there had been no wasting from exhaustion. With the shoulder unloaded, the muscle was tired out in 8·29 minutes on an average of experiments. The weight of the muscles employed was 4½ oz., and the work they did on an average was equivalent to the lifting of 1206 lbs. through a foot. The weight lifted through one foot for one ounce of muscle would be 32 lbs. He then put a weight of 2 lbs. in each hand, and held them out as before until fatigued, and he found the muscles were exhausted in four minutes, but the amount of work which each ounce of muscle did was 46 lbs., so that it did more work than it did before. Now, the power of the heart to send blood into the muscles, to keep up the action there, is not, in this case, equal to the action or work required from them ; hence they began to fail in four minutes, whereas, in the other case, they kept at work for eight minutes. In fact, the power exactly balanced the work in the eight minutes; but it fell rather short in four minutes. An experiment was tried in another form, namely, hanging a weight on the wrist and keeping the elbow close to the side, a different muscle (biceps) came into play. This muscle weighs about eight ounces ; the power lasted 9¼ minutes, and the weight, per ounce of muscle, lifted was 41.

Statical Work done by Muscles.

Muscles used.	Work in foot pounds.	Duration of labour, in minutes	Weight of muscles in ounces avoir.	Rate of work in foot lbs. per oz. per min.
Unloaded muscles of shoulder.....	1206	8.29	4.50	32.3
Loaded muscles of shoulder	842	4.05	4.50	46.2
Loaded muscles of forearm	3170	9.29	8.21	41.5

Now, coming to dynamical work, when the muscles are engaged in producing motion, the muscles of the trunk of the body are employed simply in supplying the other muscles with that upon which they live during the time they are at work; they do no external work themselves. This was alluded to in an early part of the lecture, when it was said that there are certain muscles which act involuntarily; for example, if the heart cannot propel blood as fast as the muscle needs it, and if the will insists upon that muscle doing further work, then the heart is called upon to do what it cannot do, and death ensues. The two must be harmonized ; and where this harmony is broken, as sometimes happens in a boat race and other cases of violent exertion, accident or death results.

Dynamical Work done by Muscles of the whole Body.

Kind of Work.	Quantity of work in foot pounds.	Duration of labour in minutes.	Weight of muscles in oz. avoirdupois.	Rate of work in ft. lbs. per oz. per minute.
Boat race	61,040	7	575	15·17
Barrow lift.....	2,038,400	480	575	7·39
Running with load	10,091	155	575	35·11
Day labour.....	792,400	600	575	2·30

This table shows the results of experiments on different kinds of work. First, there is the case of a boat race which was rowed in seven minutes. The whole weight of the muscles employed in actually doing the work, viz., those in the arms and legs, was 575 ounces ; the work done, making all allowances for the weight of the boat and the people in it, etc., was equivalent to 61,040 lbs. raised through a foot, giving an average of only 15 lbs. per ounce per minute, so that the contrast is very great between static work and dynamical work, the former being three times as great. Next comes an instance bringing into play all the active muscles of the body. It was a plan adopted in some railway works, raising rubble from a great depth. There was a pulley at the top of a shaft, over which passed a rope, and a stage at each side large enough to carry a barrow. One barrow was filled at the bottom, then a man stepped into the empty barrow at the top, and his weight in falling to the bottom of the shaft lifted the barrow full of earth. He then ran up a ladder to the top, and was ready to descend again. By that means his own weight lifted up the full barrow of earth. With work like that a man worked for 480 minutes; and he did two millions of units of work. Compared with the boat race he was only half as industrious, and the length of time was very much greater, but he only did 7·39 foot lbs. per oz. per minute. In the next case a man ran with a load upon his shoulders, and his muscular power was knocked up in half a minute, but the work he did was 35 foot lbs. per minute, approaching very nearly the static work. Last comes a day labourer, who generally takes it very easy, and it appears he only does 2 foot lbs. per oz. per minute, so that if he complains of getting small pay he does little work for it ; it must be remembered, however, that he works for 10 hours a day at it.

Time warns me to close. It may, however, be of interest to state that, calculated as machinery would be calculated, the heart receives and propels the whole amount of blood in the human body in forty-two seconds.

To those who care for the subject of the present lecture, and have not altogether laid aside their mathematical knowledge, the information in Dr. Haughton's book will prove both instructive and interesting. To follow up the investigation, they may study the action of a horse in walking and drawing a load, also the construction of carriages so that the animal may most easily raise a loaded cart over an obstacle on the road, and, further, decide upon the inclination of the traces to the roadway. These being done the investigator will find much

Therefore the work done by one arm is $\frac{8{\cdot}11{\cdot}30}{16}$ ft. lbs. per minute.

Therefore the work done by one arm is 165 ft. lbs. per minute.

Therefore total work by both arms before exhaustion is 165.6.2 ft. lbs., or 1,980 ft. lbs., that is nearly 18 cwt. lifted through one foot in six minutes.

scope for original works in examining the various ways in which horses are harnessed so as to utilize their vital energies. This done, boats and bicycles, as means of utilizing muscular energy, are worthy of thought. Perplexity and confusion seem to be stamped upon modern usages in these matters, and the conclusion is forced upon us that the utilization of the vital energies has not yet been reduced to a system.

Parliamentary and Law Proceedings.

The Dispute about a Cholera Mixture.

The following correspondence respecting the Cholera Mixture, which, as reported in last week's Journal, was recently the subject of an injunction, has appeared in the *Liverpool Daily Post* :—

"THE REV. MR. PARKER'S CELEBRATED CHOLERA MIXTURE.'

"Sir,—You report to-day an application by Mr. Thomas Martin asking the Chancery Court of Lancashire to restrain Mr. W. Jones, of Great Howard Street, from selling a mixture under the title of 'Rev. Mr. Parker's celebrated Cholera Mixture.' Mr. Martin stated that it was a colourable imitation of a medicine prepared by himself; that he had the only recipe for it, and had prepared it for twenty years. If you think it is a matter of sufficient interest to your readers, we beg to furnish you with a copy of the prescription, which we have been in the habit of preparing and supplying for a period much longer than that named by Mr. Martin under the name quoted, and also under that of 'St. Mary's Powder.' It was prescribed by the late Dr. Murphy, of Upper Parliament Street, for the Rev. Mr. Parker, a Catholic priest. It is a very good remedy for diarrhœa and for the premonitory symptoms of cholera, and is as follows :—Take,

Confection of Opium	1oz.
Aromatic Confection	1oz.
Precipitated Chalk	½oz.
Powdered Gum Arabic	½oz.
Carbonate of Ammonia	¼oz.
Oil of Peppermint 60 drops.	

"Make a powder. Dose : A teaspoonful in a little cold water every four hours.

"Yours, etc.

"CLAY AND ABRAHAM.

"Liverpool, Aug. 12, 1873."

"PRIEST PARKER'S CHOLERA MIXTURE."

"Sir,—In your issue of to-day there appears a letter from Messrs. Clay and Abraham, with reference to an injunction in Chancery which I obtained, restraining Messrs. Jones and Co. from selling or preparing Priest Parker's cholera mixture. This letter appears to me so utterly uncalled for, and the information it purports to give so erroneous, and calculated (whether intentionally or not) to do me serious injury in business, that I am sure you will do me the justice of permitting this reply. And first I may be permitted to ask what Messrs. Clay and Abraham have to do with the legal proceedings which I successfully took to prevent Messrs. Jones infringing my rights? If their object was to do public good and not private wrong I could honour them; but whilst they are generous enough to give the public the recipe, they take care to inform them that they prepare it, thus advertising themselves as the vendors of Priest Parker's mixture, of which composition I am about to prove they are as ignorant as Messrs. Jones themselves, who admit they don't and never did know the compound.

"The first requisite in a dispensary chemist is accuracy, and when there is so much inaccuracy as is shown by Messrs. Clay and Abraham in the present instance, one does not wonder that gross and sometimes *fatal* errors in compounding are made. Had Messrs. Clay and Abraham had the ordinary precaution to have a bottle of my medicine before them they could not have failed to see that the compound of which they gave the recipe was in no respect like mine.

"To begin with, theirs is a powder, whereas Priest Parker's mixture is a liquid containing several active tinctures, which are entirely absent from their preparation, and the one principal ingredient is absent. To prove the simple truth of my statement, I have placed my mixture in the hands of the corporation analyst, Dr. Brown, and have had it also analysed by three competent chemists. Their testimony tends to establish my statement.

"I must further add that the powder known as 'St. Mary's Powder' was not written for the Rev. Mr. Parker, nor by Dr. Murphy, but was written by a Yorkshire physician for the Rev. Mr. Shepherd, at St. Mary's (hence its name), but is in no way identical with the cholera mixture made up by me, according to Dr. Murphy's own instructions, for Father Parker.

"Yours, etc.

"THOMAS MARTIN.

"Liverpool, Aug. 14, 1873."

"PRIEST PARKER'S CHOLERA MIXTURE.

"Sir,—Mr. Thomas Martin is good enough to inform your readers that the mixture which he sells under the above name is different from that of which we gave you the prescription. The conclusion which we draw is that he gives his medicine a *wrong name*. To prove that his is different he gives—not the prescription for his mixture to compare with ours, but—his assurance that he has placed his medicine for analysis in the hands of four competent chemists.

"It appears that Mr. Martin's preparation is a liquid mixture; that which we call by the same name is a powder. Any chemist could convert the powder into a liquid, and it may be more convenient in that form, but the question put forward was the use of the name, and to that question only we have addressed ourselves.

"What we have said, and what we repeat, is that we have for twenty or thirty years made a powder which has been known as 'St. Mary's Powder,' 'Priest Parker's Powder,' for cholera and diarrhœa, etc. We could have told more about it twenty years ago than we remember now; but we find a note that, for the precipitated chalk, Dr. Murphy sometimes substituted compound chalk powder.

"Yours, etc.,

"CLAY AND ABRAHAM.

"Liverpool, 15th August, 1873."

Prosecution of a Chemist and Druggist under the Medical Act.

At the Ipswich Police Court, on Thursday, August 7, Mr. James John Young, registered chemist and druggist, of Carr Street, was charged by Dr. B. Chevallier with "unlawfully, wilfully and falsely taking and assuming the name of surgeon contrary to law."

On behalf of the prosecution it was stated that Dr. Chevallier,—who on the passing of the Medical Registration Act in 1858 was requested to act as Secretary in Suffolk,—had in December last called upon Mr. Young and asked him if he was qualified to assume the name of Dr. Young and to practise as he was doing, and whether his name was registered. Mr. Young admitted that he was not registered, but said he was trying to be. On the following day he saw Dr. Chevallier and promised not to circulate any more handbills stating that he was a registered surgeon. About two months after that Mr. Young exhibited in his window a paper on which he styled himself a practitioner, and gave the public to understand that he was fully qualified to act. A few days after that he took that paper down and put another up, which stated that he was not only a surgeon and practitioner, but that he was a registered practitioner. Under those circum-

stances Dr. Chevallier felt that, as secretary, he had no other course open to him than to issue a complaint against defendant, who was liable to a penalty of £20.

In defence it was acknowledged that an irregularity had been committed, but it was urged that Mr. Young was studying for the medical profession, and that through the loss of some documents at sea he had been prevented from being registered. It was also stated that the business did not really belong to the defendant but to a Mr. James Young, who was then in Scotland on business.

The magistrates suggested that the solicitors should come to some arrangement, and, after a short consultation, the defendant pleaded guilty, and was fined 40*s.*, and 20*s.* costs.—*From the Suffolk Chronicle.*

Prosecution under the Adulteration Act.

At the Greenock Police Court, on Monday, August 11, Robert Rennie, a dairyman, was charged with selling milk which had been adulterated with skim milk and water. After the purchase of the milk had been deposed to, Mr. Ogilvie, public analyst, read a report of an analysis of the milk, stating that it was adulterated with 36 per cent. of skim milk and 14 per cent of water, and that these adulterants though not such as to injure the health of persons partaking of the milk, yet by increasing its bulk without proportionally increasing the normal constituents deteriorated the value of the milk as food for infants or young children. The standard adopted was 87½ per cent. of water in pure unadulterated milk. For the defence it was contended that the milk was sold as it was received from the farm, and that the poorness of the pasture upon which the cows fed might affect the quality of the milk. The adulteration was held to be proved and the defendant was fined 10*s.* 6*d.* and 12*s.* costs.—*From the Greenock Telegraph.*

Reviews.

On the Dissemination of Zymotic Diseases by Milk. By John Dougall, M.D., Medical Officer of Health for the Burgh of Kinning Park, Glasgow. Reprinted from the *Glasgow Medical Journal.* 1873.

Dr. Dougall's intelligent paper appears opportunely. Starting from the position which he regards as being sound, that enteric fever may be disseminated over wide areas by the milk supply, he proceeds to consider the probability of zymotic poison being generated in milk *de novo*, the probable nature of zymotic poisons, and the questions whether milk affords a congenial *nidus* for the propagation of such poison, and how it may become infected with the same.

Milk, he holds, cannot generate zymotic poison *de novo*. There is no instance of its producing the symptoms either of fermentative poisoning on the one hand, or of narcotico-irritant poisoning on the other. On the contrary, an eminent Glasgow practitioner is in the habit of feeding his enteric patients with butter-milk, or, as it might be called, fungoid milk—a beverage often used in Scotland to allay the thirst in other zymotic diseases—and actually preferred as an aliment in the preparation of home-made bread. The milk, moreover, supposed to have caused the outbreaks of enteric and scarlet fever was not fermented but fresh.

As to the probable nature of zymotic poisons, Dr. Dougall maintains that while they must be animal or vegetable solids, it does not follow that they must be either fungi or microzoa, or both ; nor, because they are neither gaseous nor liquid, that they are incapable of suspension in air or in fluids. In spite, however, of incessant observation and discussion, the nature of zymotic poison has yet to be ascertained, the only contribution to our knowledge of it being that of Chaveau and Burdon Sanderson, who proved that in vaccine or variolous matter the only contagious part is not the liquid but the solid particles, not larger than $\frac{1}{20000}$ of an inch in diameter.

Unfermented milk is a congenial *nidus* for the propagation of zymotic disease. The mammalian offspring, subsisting solely on mother's milk, rapidly increases in weight during the first few months after birth. The liquid, in other words, containing as it does all the elements, and in the due proportion and combination, for building up the tissues of the young animal, is simply a solution of the young animal's body as regards the identity of all their chemical elements and also as regards most of their chemical compounds. This being postulated, it follows that just as a child or adult is susceptible of being poisoned with small-pox, with scarlatinal, or with enteric virus, so also, and in a much higher degree, must milk when subjected to the same influence ; for while the living organism has vital force to resist the toxic attack, the absence of that *vis vitæ* in milk, which is dead organic matter, renders it peculiarily non-resisting and open to contagia. The readiness with which milk will contract the odour of any article which happens to be near (boiled fish, for example, tainted meat, onions, and so forth) is thus explained, while its fluidity greatly enhances its fertility as a zymotic soil. Now, of the milks sold, that mixed with colostrum or "beasting milk," and diseased milk or that from a diseased cow are the most congenial *nidi* for zymotic putrefacts, butter-milk being the least so.

Such being the case Dr. Dougall comes to the last question he puts to himself—"How may milk get infected with zymotic poison ?" First, he answers, by impure water ; secondly, by impure air. Water is so commonly and easily tainted from the infiltration of organic matter (call it liquid manure, human excreta, or sewage) that its addition to milk whether intentionally for adulteration or unintentionally for rinsing the milk cans, cannot fail to impregnate the fluid with zymotic germs. Impure air, suspending certain specific contagia, also infects the milk, as in the Leeds outbreak of enteric fever, when the water was found blameless and nothing but a reeking mass of liquid manure in the vicinity could evolve the poisonous particles.

What is the practical deduction from these facts? To keep the zymotic seed from the milk *nidus*, and the milk-*nidus* from the zymotic seed. Easy in farm-houses, this precaution is very difficult in large towns. It is common in these life-centres for parties to live and rear families in rooms behind shops, through which the sole access lies, and in which groceries, milk, provisions, fruit, sweetmeats, and so forth are sold. When infectious disease enters such a family, can it fail to be the source of quite peculiar risk to the public ?

It is much, however, to know the cause of danger ; the remedy will follow in time. In England alone 100,000 deaths are annually due to the zymotica ; but, thanks to the refined modes of modern research, higher microscopical powers, and the mutually assisting sciences of chemistry and physiology, we may ere long be able to put our finger on every source of such poison, and anticipate its developement without waiting to destroy it in the germ.

Memoir of Sir James Y. Simpson, Bart., M.D., D.C.L. Oxon., One of her Majesty's Physicians for Scotland, Professor of Medicine and Midwifery in the University of Edinburgh. By J. Duns, D.D., F.R.S.E. Professor of Natural Science, New College, Edinburgh. Edmonston and Douglas. 1873.

Simpson's life had much to attract and not a little to repel the biographer. He was, as Macaulay says of James the First, "made up of two men." One was the indomitable surmounter of obstacles, social and scientific ; the versatile, much-contriving questioner of Nature ; the devoted teacher and the public-spirited townsman ; the genial friend, and the affectionate husband and father The other was the intermeddling schemer, the vindictiv

enemy, the mischief-making colleague, and the inveterate notoriety-hunter. In the first aspect the biographer's task is a delightful one. He has only to narrate and he is sure to please. Humble as to birth, though respectable as to parentage, young Simpson soon gave evidence of the stuff he was made of. The scantling of classics and mathematics which the Scotch parish school places within the reach of every boy, prepared him for the University of Edinburgh, where, thanks to the generosity of a brother, he was enabled to enter in his fifteenth year. That brother, by-the-way, is one of the noblest figures in the present book—a true Proculeius :—

" Notus in fratres animi paterni,
Illum aget penna metuente solvi ;
Fama superstes."

At the classes Simpson took a place inferior to that of duller lads whose opportunities had already been greater. He never made himself a scholar in the strict sense of the word. He could grope his way through an ordinary Latin author, and, with the help of the dictionary, construe a bit of Greek ; but it was with no more culture, if, indeed a smattering of mathematics and moral philosophy can be called such, that he began the study of medicine. Here, however, he could cope with his fellow-students on equal terms. Level at the start, he soon made the running, and came in in a canter. He was fortunate, moreover, in his companionship with John Reid, also a "Bathgate bairn," whose counsel, and still more whose example, kept him straight. His teachers, too, were men of vigour, whose intellectual touch was inspiration. Knox made anatomy and physiology a romance, while Liston impressed all his pupils with his power ; and Thomson's fine analytical talent fostered inquiry and induced reflection. Simpson became a member of the Royal College of Surgeons, and at once sought practice ; but in vain, though the situation he aspired to was that of a country practitioner. Returning to the classes he graduated as doctor of medicine in 1832, and by his thesis was lucky enough to attract the attention of Thomson, who made him his assistant. He settled in practice in Edinburgh—the field of his choice being Obstetrics ; and rapidly drew to himself the regard, not to say the jealousy, of his compeers. A visit to London and Paris, described with animation in his diary, broke agreeably the dull routine of practice. Then came an extra academical lectureship, followed by marriage—a step in all respects advantageous to him—and finally his election to the chair of midwifery by a majority of one. Up to 1840—the date of this triumph—his career commands nothing but admiration. It flows purely and sparklingly. But as it widened it took in grosser ingredients till, broad and imposing as it grew, it ran turbidly and chafingly, reflecting much sunshine and many a cloud.

Now begin Dr. Duns' difficulties, and, we must say, he gets over them with tact, if not always with complete success. The jealousy of Simpson's colleagues, undisguised during the election struggle, were but thinly veiled under collegiate relationship. Squabbles deepening into feuds quickly cropped up. Amidst it all, however, Simpson buckled manfully to his work ; made his class the most attractive in the University ; and extended his *clientèle* day by day. So numerous indeed were his patients that he often failed to attend them, thereby incurring much censure not always undeserved. A fierce controversy with Professor Syme came in to complicate his anxieties. But his rise was steady and sure till in 1847 he was made one of her Majesty's Physicians for Scotland. That year, however, was memorable for a far greater episode in his career : his discovery of the anæsthetic virtues of chloroform. Previously to this, sulphuric ether had been employed to induce anæsthesia. But there were serious objections to it, and Simpson deeply impressed with the conviction that other agents would be found capable of being introduced with rapidity and success into the system, through the channel of pulmonary absorption, had directed his attention especially to this subject, trying among other things upon himself and others the inhalation of volatile fluids, in the hope of finding some one with the advantages of ether and free from its disadvantages.

The trial of chloroform appears to have been almost accidental according to the following account of the first occasion on which Simpson detected its anæsthetic effects :—

"The scene was an odd one. I had had the chloroform beside me for several days, but it seemed so unlikely a liquid to produce results of any kind, that it was laid aside, and on searching for another object among some loose paper, after coming home very late one night, my hand chanced to fall upon it, and I poured some of the fluid into tumblers before my assistants, Dr. Keith and Dr. Duncan, and myself. Before sitting down to supper, we all inhaled the fluid, and were all 'under the mahogany' in a trice, to my wife's consternation and alarm. In pursuing the inquiry thus rashly, perhaps, begun, I became every day more and more convinced of the superior anæsthetic effects of chloroform, as compared with ether."

This conviction was also shared by his butler Clarke, who seems to have had a high opinion of the properties of "chlory," for on finding Simpson one day lying apparently unconscious from the effects of a recent experiment, he remarked to some friends who were watching him with a good deal of alarm, "He'll kill himsel' yet wi' thae experiments ; an' he's a big fule, for they'll ne ver find onything better nor chlory." This appreciation had indeed gone so far as to lead the butler into trouble, for among other experiments, Dr. Simpson had got an effervescing drink prepared with chloric ether in aerated water. At a dinner party this was brought forward and tried, pronounced to be very pleasant, but rather heady. The butler took the remains of this new beverage down-stairs and gave it to the cook, saying it was champagne. Shortly after drinking it, she fell on the floor insensible. The butler rushed into the dining-room, saying, "For God's sake, sir, come doun ; I've pushioned the cook." Dr. S. with some others ran down-stairs, and found their patient lying on the floor, snoring heavily. The butler explained that he had given her a glass of "the new champagne chlory." As there was no danger, the incident created a hearty laugh.

"Claimants" to the discovery, however, were not slow in presenting themselves. Objectors on theological grounds (*credite posteri !*) to its use lifted up their voices. Among the former was Dr. Glover of Newcastle ; but he was soon disposed of. In a letter to him Simpson showed unanswerably that his previous experiments with chloroform had nothing to do with "its anæsthetic properties as produced by inhalation." More formidable was Dr. Morton, of Boston, U.S., who had employed sulphuric ether for anæsthetic purposes ; but, in spite of persistent and *ex parte* "vindications" on the part of his friends, notably Dr. Bigelow, Morton's claim amounts to no more than having superseded nitrous oxide. Dr. B. W. Richardson in the *Lancet* (May 1870) sums up the whole controversy in a lucid and exhaustive paper, and concludes with the verdict that, "all told," the palm of merit in anæsthetic discovery rests with Simpson. The subject occupies a lengthy chapter in Dr. Duns' book but Dr. Richardson's essay might have absolved him from the unwelcome task of re-opening it. He might with still more propriety have dismissed the religious—or rather the "religiose"—cavillers from his pages. But Dr. Duns is a clergyman and cannot be expected to share Lucretius' contempt—

" Tantum Religio potuit suadere malorum."

By this time Simpson's fame was world-wide, and his society courted by *savants* and physicians, European and Transatlantic. Honours showered upon him

" Thick as leaves in Vallombrosa."

Scarcely a learned society but made him an associate or corresponding member. Controversy, however, dogged him like a sleuth-hound. Like Dr. John Brown's "Rab,"

it seemed as if he never could get "eneuch o' fechtin'." His chief encounter was with the homœopathists, notably his colleague, Professor Henderson—a man of sterling talent, of whose trenchant style Simpson had a salutary appreciation. On the whole, the victory rested with the latter, whose ingenuity and fecundity of resource came out wonderfully on the occasion. Scarcely, however, had he emerged from this struggle, when he again became involved in collegiate bickerings, and was alienated from men whom he had every reason to respect and even admire. Quite gratuitously, moreover, he intermeddled with the election to the Practice of Physic Chair, and established enmities which death itself did not close. From these it is quite refreshing to turn to his professional pursuits, and even to his dabblings in antiquarianism, for which he had a considerable aptitude and a strong liking. His device of acupressure attracted much attention, but, ingenious as it is, it seems destined to be superseded by the antiseptic ligature of Lister. His doctrine of the evils of "hospitalism," novel and striking as they are, have awakened a discussion which must end in seriously modifying the practice of congregating large numbers of the sick and hurt under the same roof. His paper on "How to stamp out the small-pox" was, perhaps, the latest contribution he made to medicine; but by that time his strong and elastic frame was showing signs of decay. Bitter disappointments, private losses, domestic and financial, above all the animosity evoked by his candidature for the post of principal of the University of Edinburgh were telling visibly on him, in spite of the gratifying honour of a baronetcy, and the recognition everywhere accorded to his genius. Angina pectoris, the agonizing symptom of fatty degeneration of the heart, had once and again betrayed itself; but still he struggled on, concealing his pain, though it must have torn him like the vulture of Prometheus. In the spring of 1870 he broke down, and before the summer set in he was confined to his room. On the 6th of May he expired, in the arms of that brother who had tended him in childhood, fostered him in youth, and stood by him through good report and bad report during his manhood. Regret at his loss was universal, and a public funeral signalized the "last scene of all."

Dr. Duns has performed his task well. As a writer he has no pretensions to style, and sometimes expresses himself with a looseness (as in the opening sentence of chapter sixth) which is surprising in a gentleman of undoubted accomplishments. There is, moreover, an unctuous religiosity of phrase running through the book which savours of "Little Bethel" rather than of the educated churchman. But with all these reservations, his biography is an interesting and instructive one, redounding much to his credit, if the extreme delicacy and difficulty of his task be held in account. An admirable photograph preserves his subject's lineaments in most characteristic form, and the external accessories are all that could be desired from the respectable firm of Messrs. Edmonston and Douglas.

A Manual of Practical Hygiene; intended especially for Medical Officers of the Army and for Civil Medical Officers of Health. By E. A. Parkes, M.D., F.R.S. Fourth edition. London: J. and A. Churchill. 1873.

To answer correctly, and at some fair length, as to wherein consists Hygiene, has become of late no light task. The necessity for providing pure air, the relation of the air to the soil, the study of its impurities (either suspended or gaseous matters), the system of properly estimating these impurities, the measurement of air necessary in certain conditions for men and animals, the study of climatology, and the instruments used by pathological men, the choice of sites for dwellings, the selection and examination of soils, the proper allotment of rooms in houses, the obviation of over-crowding, the providing against rising and drifting dampness, natural and artificial ventilation, normal heating and the degrees and kinds of warmth, the effects of exercise and training, proper lighting, the water supply, its collection and distribution, the best methods of ensuring commensurate supplies, the storage and filtration of this element, and its analysis, its impurities in transit, the construction of cisterns, the fouling of watersheds, the percolation of fæcal matters in wells, the general question of alimentation and articles of food and beverages, the quantity, quality, and digestibility of dietary matters, the detection of adulteration, the diseases consequent upon tampering with food, milk especially, the proper cooking of meat and vegetables, scientific baking, baths, their use and abuse, clothing, and the best materials for making them, the drainage of districts, and the collection and removal of excrement and dust, sewer ventilation, disconnection of drains, the proper construction of cesspools, privies, ash pits, water, earth, or ash closets, the best sanitary fittings for the house, the offices, and the stables, the utilization of sewage by filtration, precipitation and irrigation, the perfect inspection of nuisances, the disposal and burial of the dead, the disinfection and purification of the house and clothing in cases of epidemics, the duties of medical officers of health for civil, naval, or military communities, the study and classification of specific and non-specific ailments, and the prevention of diseases by precautionary measures, the arrangement of health statistics, death rates, and sanitary reports generally; these and a hundred other items of value would crowd upon the mind whilst endeavouring to reply to the apparently simple question.

After listening to the well deserved applause which followed the delivery of the address in medicine by the author of the book now under review, and the expression of thanks which it met with at the hands of the British Medical Association only the other day, it would and does appear quite supererogatory to recommend this volume to our readers in any formal way. The labours of our author in the sanitary vineyard, and the many useful things he has grafted upon the branches of the social tree, are known wherever English is understood or translations made. He is easy to understand, and temperate in all he says, simply because he is master of his multitudinous subjects, and he is precise in his deductions because he has arrived at his results after many years of elaborate observation and research. Seldom, if indeed ever, have we perused a work in which we have noticed less inflation of style, or more purity of diction, backed by such wealth of ideas.

A medical journal in reviewing a short time ago the 'Diseases of the Ovaries,' by Mr. T. Spencer Wells, observed that it was the best monograph that existed in our language, or perhaps in any other, and this is precisely what we we would say of the book before us—it is the most complete and best treatise on sanitation that has ever been issued from any press, home or foreign. The subjects which we began by enumerating, and many more, find here ample treatment; and a very complete index brings up the rear of things to commend. It must become the text book of the science in all our universities and public institutions, and it will deservedly find a place in the library of every medical man, sanitary officer, and landed proprietor.

Advice to Sanitary Authorities and to Individuals on the Threatened Approach of Asiatic Cholera. By John M. Fox, Medical Officer of Health to the Rural Sanitary Authority of the Cockermouth Union and to the Urban Authorities of Cockermouth, Wokington, and Keswick. London: Simpkin, Marshall, and Co. 1873.

Within the compass of some twenty pages, Mr. Fox presents a graphic view of how cholera is propagated, and of the means by which its propagation may be prevented, and its attack resisted. He writes intelligently,

clearly, and vigorously, and his views are not only in accordance with those of modern science, but they have borne the practical tests of experience in two former epidemics of cholera. The pamphlet is plain enough to be understood and cheap enough to be bought by every one.

Obituary.

Notice has been received of the death of the fol lowing :—

On the 25th December, 1872, Mr. John Stathers, Pharmaceutical Chemist, of Notting Hill. Mr. Stathers, joined the Pharmaceutical Society in 1858.

On the 28th June, 1873, Mr. William George Tryon, Pharmaceutical Chemist, of Landport. Mr. Tryon joined the Pharmaceutical Society in 1841.

On the 26th July, 1873, Mr. William Jabez Halliday, Pharmaceutical Chemist, of Bury New Road, Manchester. Mr. Halliday joined the Pharmaceutical Society in 1860.

On the 10th March, 1873, Mr. Richard Ellis, Chemist and Druggist, of Thornbury, Gloucester.

On the 26th June, 1873, Mr. James Collins, Chemist and Druggist, of Tewkesbury.

On the 8th July, Mr. Enos Andrews, Chemist and Druggist, of Newton-le-Willows, Lancashire.

On the 21th July, Mr. John Wray Rawling, Chemist and Druggist, of Hackney Road.

On the 30th July, Mr. Joseph Massey, Chemist and Druggist, of Oldham.

On the 11th August, Mr. Edward Sutton, Chemist and Druggist, of Sutton Bridge, Long Sutton.

Notes and Queries.

EUPHORBIA IPECACUANHA.—The properties of the root of this plant, which is officinal in the United States' Pharmacopœia, have been investigated by Mr. Christopher Petzelt, and form the subject of his inaugural essay in connection with the Philadelphia College of Pharmacy. He reports (*American Journal of Pharmacy* [4], iii., 255) that the emetic and carthartic properties of the root of *euphorbia ipecacuanha* are due solely to its resin. This resin may be prepared by exhausting a moderately fine powder of the root with alcohol, distilling off the menstruum, adding the residue to water, and washing and drying the precipitate. The resin is soft and of a yellowish colour. Exhausted with acidulated water, the solution gave no precipitate with iodohydrargyrate of potassium, but, redissolved in alcohol, a copious precipitate was formed on addition of a solution of subacetate of lead. Half a grain of the resinous matter acted as a carthartic, producing watery stools ; one-and-a-half or two grains produced nausea and vomiting. The constituents of the root were found to be resin, fixed oil, wax, starch, glucose, and inorganic salts.

COD LIVER OIL BREAD.—With a view of overcoming the repugnance of some patients to cod liver oil, M. Bouchut has sought to mask the taste of the oil by incorporating it with flour and making a kind of bread of the mixture. This bread is described (*Répertoire de Pharmacie*, N.S., i., 425) as not in any way disagreeable, and its success during several weeks is stated to have been very encouraging.

SPIRIT OF LEMON.—The following is the formula for Spiritus Limonis (Spirit of Lemon, Essence of Lemon) of the United States Pharmacopœia : —

"Take of—

Oil of Lemon, two fluid ounces,
Lemon Peel, freshly grated, a troyounce,
Stronger Alcohol [sp. gr. 0·817], two pints.

Dissolve the Oil in the Stronger Alcohol, add the Lemon Peel, macerate for twenty-four hours, and filter through paper."

[350.] ERASMUS WILSON'S HAIR WASH.—In reply to *A. C.* I send the following, which has been represented to me by one of the surgeons of St. Mary's Hospital as

Erasmus Wilson's Hair Wash.

Aqua Mellis	½ oz.
Liq. Ammoniæ	½ oz.
Spirit. Rosmarini	1 oz.
Ol. Olivæ	1 oz.

W. T.

[351] CHRISTISON'S PILLS.—In reference to a notice which appeared in the PHARMACEUTICAL JOURNAL of last Saturday I may mention that the pill so long known here as Christison's Pills, and prescribed by Sir Robert up to the present time, is really the colocynth and hyoscyamus pill mass of the *present* pharmacopœia, *but in pills of two grains each.*

At a time when Socotrine aloes was used in forming the compound colocynth pill mass, the following was the form written by Sir Robert Christison for compounding his pills :—

℞. Mass. Pil. Coloc. c. Aloes Barbad. gr. xvj.
Ext. Hyoscyam. gr. xviij.
Ft. Mass. et divide in pil. xij.

JOHN MACKAY.

[352.] ETHER BOTTLES.—Could any one suggest the best means of capping small bottles containing ether (corked bottles) ? Is there any gum, *easily melted*, that is insoluble in ether ? My present plan is to dip in melted sealing-wax and afterwards in plaster of Paris. It answers pretty well, but I would like something better.—"*Collodion.*"

[353.] LACE STIFFENING.—Will some correspondent kindly give a recipe for French stiffening for lace collars ?—*W. P. Swift.*

The following journals have been received :—The 'British Medical Journal,' August 16; the 'Medical Times and Gazette,' August 16; the 'Lancet,' August 16; the 'London Medical Record,' August 16; 'Medical Press and Circular,' August 16; 'Nature,' August 16; 'Chemical News,' August 16; 'Gardeners' Chronicle,' August 16; the 'Grocer,' August 16; 'Journal of the Society of Arts,' August 16; 'Grocery News,' August 16; 'Produce Markets Review,' August 16; 'The Practitioner,' for August; 'Liverpool Daily Post,' August; 'Journal of Applied Science,' for August; 'British Journal of Dental Science,' for August; 'Food, Water, and Air,' for August; 'Educational Times,' for August; 'Brewers' Guardian,' August; 'Scientific American,' August 16; 'Neues Jahrbuch für Pharmacie,' October 1872 to January 1873; 'Journal de Pharmacie et de Chimie,' for August; 'Moniteur Scientifique Quesneville,' for August; 'L'Union Pharmaceutique,' for August; 'Répertoire de Pharmacie,' for August; 'Boston Journal of Chemistry,' January to August; 'Pharmacist,' for August; 'American Journal of Pharmacy,' for August; 'Chemist and Druggist,' for August 15; 'Chemist and Druggists' Advocate,' for August; 'New York Medical Journal,' for July; 'Madras Medical Journal' (Index); 'Medical Notes and Queries,' August 16; 'Revista Farmaceutica,' for July; 'American Chemist,' for July; 'Zeitsch Allg. öster. Apot.-Vereines,' for August 10.

perties of this plant are not very marked. It has been used in a number of diseases.

Helianthemum.—Frostwort is considered to be a valuable remedy in scrofula, and like many other alteratives in large doses will cause vomiting. It is sometimes used externally also, in the form of a poultice made of the leaves, for scrofulous swellings, etc.

Phytolacca.—Poke root possesses powerful properties, causing vomiting and purging, together with symptoms of narcotic action. Its action in large doses is not only violent but long continued. It is generally used in small doses (one to six grains) as an alterative, and appears to produce beneficial effects by its stimulating action upon the glandular system.

Xanthoxylum.—Prickly ash bark is a stimulating alterative, and is used in rheumatism, torpor of the liver, and languid states of the system. It appears to act as an arterial stimulant, causing a determination to the skin, and an increased secretion from the various glands ; hence, it acts powerfully as a sialogogue.

Anthelmintics.

Chenopodium anthelminticum.—Wormseed is used chiefly for the expulsion of round worms in children. Its properties depend upon a volatile oil, which is the form in which it is generally administered. Its nauseous odour and taste, however, render it rather objectionable.

Asclepias incarnata, which belongs to the secondary list, possesses anthelmintic properties, but is not much used.

Astringents.

Geranium maculatum—Geranium is one of the most powerful of the indigenous astringents. In common with *Heuchera americana,* it is sometimes called alum root. On account of its freedom from unpleasant taste it is much used for children and delicate persons.

Quercus alba and *tinctoria.*—White and black oak barks are chiefly used externally for lotions and injections. The black oak yields the quercitron bark of commerce, and contains a bitter principle, which is apt to disagree with the stomach, and renders the bark unfit for internal use.

Rubus canadensis and R. villosus.—Blackberry root is astringent and tonic, and is employed as a popular remedy in infantile diarrhœa, when accompanied by atonicity of the bowels.

Statice limonium, var. Caroliniana.—Marsh rosemary is used in diarrhœa, etc., and as a gargle or wash for ulcerated mouth and throat.

In the Secondary List occur—

Diospyros virginiana.—The unripe fruit of the persimmon is a pleasant astringent and tonic used in similar cases to those in which bael is used in India.

Heuchera americana.—Alum root.—A very powerful astringent, generally used as a topical application.

Lycopus virginicus.—Bugleweed is used as an astringent in hæmoptysis and in incipient phthisis.

Rhus glabrum.—Sumach.—The berries are used as a gargle in quinsy and sore throat, and as a lotion for ringworm, etc.

Spiræa tomentosa.—Hardhack leaves are used as an astringent tonic in the diarrhœa, accompanied with indigestion, frequent among children, for which this remedy is peculiarly fitted by its freedom from unpleasant taste.

(To be continued.)

THE STASSFURT POTASH INDUSTRY.*

Stassfurt, the seat of an industry which has revolutionized the manufacture of the salts of potash, is a small town containing a few thousand inhabitants, situated about twenty kilometres from Magdeburg, and on the frontier line which divides Prussia from the principality of Anhalt. The geological bed upon which it stands is the new red sandstone. Not until 1838 was it suspected that beneath this sandstone bed there existed a layer of rock salt. Borings however were then immediately ordered by the Prussian government, and in 1851, after many difficulties, the existence of a layer of salt at least 330 metres thick was ascertained ; shafts were sunk, and in 1857 the working of the mines was commenced.

To arrive at the saline bed it was necessary to penetrate to a depth of 200 metres through the red sandstone and less important layers of gypsum and marl. The saline bed may be divided into four portions. The lower portion, about 240 metres, forms the greater part of the bed and is composed of rock salt, intersected by thin veins of *karstenite.* Next comes the region of *polyhalite,* 64 metres thick, composed still of rock salt, traversed by veins two or three centimetres thick of a salt which has been named "polyhalite." This mineral is a compound of the sulphates of lime, magnesia and potash, and answers to the formula $2(CaSO_4)+MgSO_4+K_2SO_4+2H_2O$. The mean composition of this layer is 91·20 per cent. of chloride of sodium, 0·66 per cent. of karstenite, 6·63 per cent. of polyhalite, and 1·51 per cent. of hydrated chloride of magnesium. To this layer succeeds another of different composition and characterized by the presence of a salt to which the name of "kieserite" has been given. Kieserite consists of hydrated sulphates of magnesia ($Mg\,SO_4, H_2O$) in small microscopic crystals. It gives its name to the layer in which it is found, which is 56 metres thick and contains 65 per cent. of chloride of sodium, 17 of kieserite, 13 of carnallite, 3 of chloride of magnesium, and 2 of karstenite. Finally, the upper portion is formed of a group of salts known by the name of "waste" salts, because at first they were not utilized, and were only removed in order to get at the rock salt that lay beneath. These salts have principally magnesia or potash for their base. Although this layer was unemployed at first, and was only removed to enable the miners to get at the rock salt beneath, it contains the salts which at the present day form the basis of the industry at Stassfurt. Of these the principal is carnallite, a chloride of potassium and magnesium answering to the formula $KCl+MgCl_2+6H_2O$. It is ordinarily coloured red from the presence of oxide of iron in microscopic scales. The other of these salts are "sylvine" or "howelite" (chloride of sodium containing often small quantities of sulphate of potash and sulphate and chloride of magnesia), "tachydrite" (carnallite in which chloride of potassium is replaced by chloride of calcium), and finally, "boracite," a combination of borate of magnesia and chloride of magnesium.

As before mentioned Stassfurt stands upon the frontier line which separates Prussia from the duchy of Anhalt ; the Prussian explorers were consequently unable to extend their galleries towards the south-east, although the geological indications were most favourable on that side. Hence in 1855 the government of Anhalt also undertook the exploration of the salt beds in its territory. The enterprise was completely successful. The saline layer was reached at a depth of 145 metres, and it was soon

* Abstracted from a paper in the *Moniteur Scientifique* for June.

ascertained that it was in no way inferior in richness in potash salts to that previously explored on Prussian territory. Indeed the search quickly led to the important discovery of a considerable layer of another salt, which gave a new direction to the industry of the country. This salt was the "kainite," a compound of sulphate of magnesia and chloride of potassium. Its discovery enabled the manufacturers to extend their operations beyond the preparation of chloride of potassium to that of pure sulphate of potash, which has now become an important article of export to England and the United States.

The salts obtained from the mine find after purification numerous applications. The chloride of potassium is employed in the fabrication of saltpetre: the sulphate of potash finds an important market in the alum and glass manufactories. The Stassfurt manufacturers send into commerce sulphate of magnesia, chloride of magnesium, bromine (in quantities nearly equal to the European consumption), and boric acid. Finally, the impure salts left as residue in the different processes of purification, and consisting principally of salts of soda, potash and magnesia, are skilfully combined and offered to agriculturists as a mineral manure.

To give an idea of the importance of the potash production at Stassfurt it may be mentioned that it occupies ten large manufactories, and that in 1869 the Prussian mines alone yielded 109,075,000 kilograms of potash salts, and 56,332,000 kilograms of rock salt, representing a value of 916,960 francs.

In a memoir by M. Becker some interesting details of the manufacture are given, from which the following is taken. In the preparation of the chloride of potassium the "waste" salts are received at the manufactory either in powder or in small fragments. In the first case they are dissolved in large closed vessels; in the second the solution is effected in open cylindrical boilers. These boilers are furnished at a short distance from the bottom with a plate pierced with holes, and between this plate and the bottom is a steam pipe twisted in a spiral and pierced with holes in its upper part. The boilers are from 2 to 3·5 metres in diameter, and 1·5 to 2 metres high. When the solution is made it is drawn off either by a lateral robinet placed immediately below the double bottom, or by a kind of head of a watering-pot placed in the centre of the bottom.

For each part of the "waste" salts two-fifths, in round numbers, of water is used; this is agitated constantly and concentrated until the solution marks 34·5° Baumé. It is then allowed to stand two hours to allow of the deposition of argillaceous matters. As during this time the temperature is lowered a little, there is also deposited a little marine salt, which carries down with it more argillaceous particles, and thus assists to clarify the liquid.

When the solution is sufficiently clear it is passed into the crystallization pans; the residue is then treated once or twice with boiling water, after which there remains at the bottom of the vessel a mixture of kieserite, rock salt, clay, and a very small proportion of chloride of potassium.

The clear solution naturally presents a variable composition—especially in the relative proportions of the chlorides of sodium and potassium which it contains—according to the composition of the crude salt. The following analyses, made at different times, will give an idea of its composition and the variations it presents :—

	I.	II.	III.
Chloride of Potassium .	9·65	10·24	9·96
Chloride of Sodium . .	6·89	6·22	2·48
Chloride of Magnesium .	14·62	15·73	19·67
Sulphate of Magnesia .	4·11	3·74	4·26
Total	35·27	35·93	36·37

The first crystallization of this liquor is effected in cylindrical sheet-iron vessels, 2·30 metres in diameter and 1·80 metres in height, the bottoms of which are inclined and have at the lowest part a hole which is used for running off the various portions of mother liquor, and can be closed by a wooden peg. A siphon is also used in the decantation of the liquors. In such a vessel the solution is first left to cool to 58° C. The proportion of chloride of potassium deposited varies with the temperature. It is between 50° C. and 60° C. that this salt commences to deposit. Above that temperature chloride of sodium is deposited. The following table illustrates the crystallization of the different salts from a solution having the composition of analysis III. :—

Temperature.	K Cl.	Na Cl.	Mg Cl.	Mg SO_4.	Water.	Quantity of salt per cent. of solution employed.
108-100° C.	3·15	92·78	0·51	0·69	3·95	0·78
100- 90	1·35	94·84	0·78	0·69	2·24	0·61
90- 80	1·63	95·61	0·83	0·57	2·65	0·47
80- 70	0·86	96·64	0·58	0·43	2·25	0·50
70- 60	3·70	92·70	0·76	0·63	2·68	0·40
60- 50	25·16	70·56	0·12	0·72	3·04	0·57
50- 40	72·01	23·49	0·32	0·50	3·11	1·91
40- 30	75·75	19·07	0·87	0·42	3·76	1·16
30- 20	74·51	21·05	0·80	0·89	2·15	1·03
20- 10	25·77	8·62	1·42	29·46	34·62	2·25
10- 0	11·91	7·18	3·34	36·77	40·93	4·88

It is shown by this table that it is between 60° C. and 50° C. the chloride of potassium commences to crystallize in notable quantity, and that between 20° C. and 10° C. the deposit of common salt becomes again more abundant, at the same time a large proportion of sulphate of magnesia separates.

When instead of the crude salts being dissolved in water they are dissolved in the mother liquor of a former crystallization a solution is formed that varies from the former both in composition and in the crystallizations it yields at different temperatures. It has a density of 1·273 at 100° C., and gives upon analysis the following figures :—

Chloride of Potassium . . .	12·28	per cent.
Chloride of Sodium	4·97	,,
Chloride of Magnesium . . .	17·93	,,
Sulphate of Magnesia . . .	2·28	,,
Total	37·46	,,

The following table, compared with the former one, will indicate the variation in the crystallization :—

Temperature.	K Cl.	Water.	Quantity of salt per cent. of solution.
98-90° C.	6·61	16·67	1·12
90-80	3·45	4·19	0·38
80-70	24·64	3·07	0·61
70-60	76·92	4·19	1·03
60-50	78·52	5·38	1·50
50-40	80·40	4·75	1·46
40-30	94·57	3·50	1·23
30-20	68·50	2·96	2·03
20-15	86·71	2·42	0·52
15-10	87·54	2·97	0·81

The mother liquor of this crystallization would contain 2·10 per cent. of chloride of potassium. It would appear therefore that it would be better to effect the solution with a mother liquor than with a fresh quantity of water. But when this is done so much carnallite remains in the residue as practically to nullify the advantage; in fact, only

two-fifths of the crude salts employed can then be dissolved.

In practice, the salts deposited in the crystallization vessels are richer in potash than might be supposed from the table. These salts, taken as anhydrous, contain from 15 to 22 per cent. of chloride of potassium. The proportion of water is, on the average, 30 per cent. This large proportion of water proceeds from the rapid cooling of the sides of the vessel, and especially of the surface. When the temperature approaches 60° C. the deposit of water on the sides becomes more manifest and at the same time the salts deposited are richer in potash. Below this temperature only isolated but voluminous crystals of chloride of sodium characterized besides by their whitish aspect are deposited upon the sides of the vessel. Indeed, the workmen are guided as to the time for transferring the solution to a fresh vessel less by the thermometer than by the appearance of the salts deposited upon the sides. This fractional crystallization has the advantage of yielding a purer crystal, since nearly all the earthy matters are carried down by the first crystallization of common salt. After the solution has been transferred to the second crystallization vessel it is allowed to cool to 15° C., though in summer it is frequently necessary to decant it at a temperature above that point. As it is more important to cool rapidly than to obtain large crystals the buildings where the crystallizations are effected require to be very airy; the exterior walls to the height of two metres have a great number of openings which in winter time can be closed with wooden shutters. This method of operating is gradually extending in the manufactories, but in some, when the deposit of the richer salts commences, the workmen throw into the crystallization vessels a quantity of fagots upon which the crystals are deposited. These are afterwards collected, together with those formed on the sides and the upper part of the layer formed at the bottom. The residue is either used for manure or submitted to a refining precess.

The composition of the mother liquid of this first crystallization is represented in the following two analyses :—

	a.	*b.*
Chloride of Potassium	4·89	5·41
Chloride of Sodium	4·83	5·50
Chloride of Magnesium . . .	17·58	15·55
Sulphate of Magnesia	3·66	3·78

This liquor is concentrated in a large boiler over a lignite fire; during the evaporation some crystals are deposited, and when the boiler is emptied these are thrown into boxes with perforated bottoms and left to drain. In the crystallization which follows a product is obtained containing 6 to 14 per cent. of chloride of potassium which is utilized for manure. The mother liquor of the second crystallization is, in its turn, concentrated, and again allowed to crystallize. The mother liquor now contains only from 0·5 to 1·5 per cent. of chloride of potassium, and is not again concentrated.

To return to the crystals produced in the first crystallization. These cannot be sent into commerce as they are deposited, since they contain too much chloride of sodium and too little chloride of potassium; the proportion most often required being 80 to 85, or even 95 to 97 per cent. of chloride of potassium. To remedy this inconvenience the product is digested in large wooden vessels with a small quantity of water, the process being based upon the greater solubility of common salt than of chloride of potassium. After a single digestion in water of the yield of the first crystallization, and calcining the product, it usually contains about 80 or 90 per cent. of chloride of potassium; the yield of the second crystallization, treated in a similar manner, contains about 50 or 60 per cent.

The foregoing details refer chiefly to the preparation of chloride of potassium, which is the principal product, but there are other secondary products. Thus, the residue from the first treatment by water is composed mainly of common salt and kieserite. The latter, after separation by levigation, is used in the preparation of sulphate of magnesia; the former is sold in powder, or in lumps for cattle. The salts deposited in the boilers during concentrations consist principally of a double sulphate of potash and magnesia: they are mixed with other salts deposited at different stages of the operations, calcined, ground, and sold for manure. This branch of the Stassfurt industry, originated in 1864, has become so prosperous that last spring the larger establishments were scarcely able to satisfy the demand. Lastly, the final mother liquor is used in the preparation of bromine. This operation is conducted in a large stoneware apparatus of peculiar construction, in which the mother liquors are heated, together with binoxide of manganese and sulphuric acid, by means of a steam pipe open at its extremity. The bromine which distils with the vapour of water is condensed in a leaden or earthenware worm, from whence it passes into a Woulf's bottle containing water, and then into two others containing an alkaline solution. It is afterwards distilled in large glass retorts, and then can be sent into commerce completely free from iodine. When the mother liquors are not used for the extraction of bromine they are concentrated to dryness over a fire, and the residue is gently melted and run into blocks that contain about 55 per cent. of magnesium. The greater part of this product is sent to England, where it is used in the cotton manufacture. In this manner the whole of the products of the Stassfurt mines are utilized.

THE LAVENDER-FIELDS OF HERTFORDSHIRE.

The following interesting sketch of the Lavender fields of Hertfordshire appeared in *Chambers's Journal* for August 16 :—

Comparatively few persons are aware to how large an extent the culture of lavender for commercial purposes is carried on within a radius of thirty miles from London. In the county of Surrey alone, there are nearly three hundred and fifty acres of land devoted to its growth; and the total extent of the lavender-fields in the London district cannot fall short of five hundred acres. Although it is only of recent years that the culture of the plant in England has been sufficiently extensive to raise it to the dignity of a recognized industry, the dried flowers have been used from time immemorial as a perfume; indeed, it acquired the name given to it by the Romans, *lavandula*, from the use to which it was applied in scenting the water of the bath.

The lavender plant grows wild in some part of Italy and the island of Sicily, but it is uncertain at what period it was introduced into England. Shakspeare, in the *Winter's Tale*, puts these words into the mouth of Perdita :

> "Here 's flowers for you;
> Hot lavender, mint, savory, marjoram;
> The marigold, that goes to bed with the sun,
> And with him rises weeping: these are flowers
> Of middle summer."

True, the scene is laid in Bohemia; but it is evident by the context that the plants named were such as were usually to be found in an English shepherd's garden as early as the time of Elizabeth.

Passing over the intervening three centuries, let us come at once to the subject of our sketch, the lavender-fields of Hertfordshire. An hour's journey by the Great Northern Railway, through a charming tract of country, past the historic houses of Hatfield and Knebworth, which lie hidden by trees on the traveller's right hand; over that grand engineering mistake, the Welwyn Viaduct, beneath which trickles the tiny river Mimram, through Stevenage, where Lucas the hermit, wrapped in his dirty blanket, still remains as when he served Charles Dickens as a model for his Tom Tiddler—passing all these, we at length find ourselves, as the train slackens its speed, at the bot-

tom of what seems to be an extensive chalk-pit. This is the northern outcrop of the London basin; and the station at which we alight as soon as the deep white cutting is passed, is Hitchin.

At this place, some fifty years ago the experiment was first made by a Mr. Perks of growing lavender as a source of profit. So well did it succeed, that there are now about thirty-five acres of land in Hitchin devoted to its culture, yielding sufficient essential oil to produce upwards of two thousand gallons of lavender-water annually. A visit to the fields and laboratory, during the latter part of July or the beginning of August, when the flowers are in full bloom, is in itself worth the trouble of a journey to Hitchin; to say nothing of the special attractions which the neighbourhood offers to the botanist, geologist and antiquary.

The largest field is situated at the western side of the quaint old town, near the house in which George Chapman, the friend of Shakspeare and Ben Jonson, completed his translation of Homer. The young plants are bedded out in November, at a uniform distance of one yard apart. Formerly, they were placed at only half that distance; but it is found that a heavier yield is produced from plants set a yard apart, than from double the number at only eighteen inches. When three years old, the plant is at its best; and when it reaches the age of seven years, it has made so much wood that it is more profitable to uproot it, and set a fresh plant. The harvest-time depends much on the state of the weather, but it usually commences about the first week in August. The flowers are cut with a sickle, bound up in small sheaves, and immediately carried to the distillery. There the stalks are cut off, leaving but little more than the flowers, by which the bouquet of the oil afterwards extracted is much improved, though the quantity of the oil is sensibly diminished. Much care is needed on the part of those who handle the sheaves in the distilling-house to guard against being stung by the bees which remain attached to the flowers. The temperance, industry, and providence of these insects are proverbial; yet their behaviour in lavender-fields, especially towards the end of the season, when the flowers are fully developed, cannot be too severely reprobated. So careless are they of the good reputation they have earned, that they refuse to leave their luscious feast even when it is laid on the trimming bench; and hundreds are thrown into the still, notwithstanding the efforts to dislodge them, n a state of helpless intoxication.

After the flowers are separated from the stalks, they are put in the still, which is a copper vessel holding about two hundred gallons, beneath which is a furnace. The flowers are pressed down tight, after which the still is filled with boiling water, and the head carefully fitted on and luted with clay or linseed meal, so as to prevent the escape of steam. The head somewhat resembles an enormous tobacco-pipe, the bowl being placed over the still. The stem of the pipe, called the worm, is coiled round and round in a vessel of cold water known as the worm-tube. As the steam is driven off through the head of the still, it is condensed in passing through the worm-tube, and runs into a vessel beneath. The essential oil is brought away with the condensed steam, and floats on the top. A siphon sucks out the water beneath; and as, in its passage through the worm, it has become impregnated with the oil, it is utilized by being made hot, and again put into the still, to boil the next batch. As the water in the worm-tube becomes heated by the steam-tube passing through it, cold water is injected from beneath, which forces off the upper portion of the water, which has become too hot to perform its task of condensation. In about four hours the still has given off all its steam, and the result is about a pint of essential oil, of a light yellow colour. In some seasons, it will fall far short of that quantity, while at other times it will greatly exceed it. When the condensed steam and oil have ceased to flow, the head of the still is hoisted off, the sodden mass of flowers is taken out with long forks, and the still is refilled. The refuse is taken back to the fields, and there allowed to remain, until it is used as manure for the next year's crop.

When the oil is first distilled, it has a peculiar empyreumatic odour; but by being kept in bottles for twelve months it loses much of its harshness. It is still, however, unfit to be used as a perfume in its natural state. In order to convert the essential oil into what is known as lavender-water, it is mixed with from twenty to forty times its bulk of spirit, and with just a trace of neroli, or other essential oil, according to the taste of the compounder.

Some idea of the enormous consumption of lavender-oil may be gained from the fact, that there is annually produced in England sufficient oil to produce nearly thirty thousand gallons of spirit of lavender. A large quantity is used in the production of other perfumes of more pretentious names. Soaps and toilet-washes are chiefly scented with French and Italian oil, which is worth but from eight to ten shillings a pound, while the English oil is valued at four times that price. The difference in the value is chiefly due to the fact, that in the foreign distilleries the whole of the stalks, and even the leaves, are put in the still, whereas in England, particularly at Hitchin, where even more care is taken than in the Surrey fields, nothing but the choicest blossoms is used.

THE COLLECTION OF GUM SENEGAL IN SENEGAMBIA.*

BY DR. BÉRANGER FÉRAUD.

Since the discovery of Senegambia, the gum of the country has been one of the principal objects of exchange between Europeans and the indigenous blacks, and the traffic has been so extensive and important that even the policy of the country has sometimes been subordinated to it. Senegal gum is yielded by several trees of the same genus (*Acacia arabica*, *A. Seyal*, *A. Verek*, *A. Adansonii*), and it cannot be pretended that all the species are yet known. These gum trees, which grow in the Sahara regions, are cultivated by the Moors and some black tribes, who carry the product to the various markets scattered along the banks of the Senegal. The trees also grow spontaneously in many parts of Senegambia, especially on the right bank of the Senegal; it is there that the forests of gum trees occur, if such a term can be applied to the very thinly sown agglomerations of these trees.

The forests of gum trees from which the products are sent into Senegambia are three in number:—(1) that of Alfatak, or Afatac, which is situated about fifteen leagues from the river, opposite Podor, and extends to Lake Cayar, occupying a large portion of the country of the Brakna; (2) that of Liebar, or El Ebiar ("the wells"), situated thirty or forty leagues from the river, in the country of the Darmancour Moors, and containing many small red gum trees (*A. nilotica*); (3) that of Sahel, in the territory of the Tararza Moors, the product of which is carried to Gahé. The latter forest consists exclusively of white gum trees, and it is the gum from these trees which is carried to Portendick to supply the demands of English traders.

The following details are given on the authority of M. Carrière. A gum forest is looked upon as a sacred place, where no stranger dares break off a branch or carry away the gum, under pain of celestial in addition to terrestrial punishments. Each of the members of a tribe which possesses a gum forest has the right to collect gum in it, and his share depends upon his activity, he having a right to that only which is collected by himself or by his slaves. The first collection of gum commences in

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* *L'Union Pharmaceutique (Bulletin)*, i. 67, from a memoir on the natural products of Senegambia, published in the *Moniteur Officiel de Sénégal*, Sept. 3rd, 1872.

October, at which time those of the tribe who intend collecting the gum establish themselves in huts on the outskirts of the forest, and within reach of the wells. The collection of gum is very laborious, for the forest abounds in climbing and prickly plants, so that the trees are not gained without infinite trouble and numerous punctures and excoriations; but the appetite for gain overcomes all obstacles. The master is stimulated by the wants of his family and by pride, the slave is driven by hunger and the fear of beatings; thus all labour with sustained ardour, and little by little the gum is collected.

For the removal of the gum from the branches of the acacia whence it exudes, the Moors arm themselves with long sticks crooked at the end, by the aid of which they remove the tears of gum, which collect in balls of varying size. When the work to be done lies within so small a compass that in the middle of the day the collectors can return to the wells without too much loss of time, they carry only a small bag made of skin, into which the balls of gum are placed. But if the outskirts of the forest have been explored, and it be necessary that the collectors penetrate further into the interior, another bag containing a small provision of water is also taken. But the master never allows the slave to carry any food with him, stimulating him to greater exertions by the promise, too often broken, of a good feast on his return. Should the unfortunate captive not have gathered the prescribed quantity by the evening, and, exhausted by hunger and the burning heat, dare to eat any of the gum he has collected, he is mercilessly beaten. The first collection of gum finishes in December; a second is made in March. The latter is more abundant in proportion as the winds have been stronger and more prolonged during the year; that is to say, the branches previously distended by the humidity of the rains have become more thoroughly dried, and crack more deeply and in a greater number of places. The trading in the gum is effected in the months of January and March; the tribe abandoning the forest as soon as the collection is finished, and resorting to the market. In disposing of the gum the Moor shows a considerable amount of avarice, selling it in small portions at a time, and going from ship to ship on the chance of obtaining a better price.

In the time of Adanson, about 1760, the quantity of gum exported from Senegal was nearly 30,000 quintals, or 900,000 kilograms; in 1827, a very bad year for collection, the exportation amounted only to 613,500 kilograms. But since the Moors have taken more precautions for preserving the forests from fire the production of gum has greatly augmented, and in 1868, 2,763,618 kilograms were exported from Senegal. In fact, the amount of 3,000,000 kilograms has frequently been surpassed.

Probably it would be possible, with the aid of the blacks, to create plantations of gum trees in the vast extent of country which forms the centre of the Senegambian triangle. Such a result would have a direct effect on the amount of production, and would tend to prevent the sudden and unexpected rises in the price of gum which every now and then occur.

The vereck (*A. Verek*) produces a hard, black-veined wood, which could be used for ebony work; it is especially a gum-yielding tree and abounds in Senegambia.

AIR CONTAMINATION IN RELATION TO THE PUBLIC HEALTH.

The valuable contribution to chemical climatology which, in his book entitled 'Air and Rain,' Dr. R. Angus Smith last year presented to the public, was an unofficial account of the results of prolonged investigation respecting the state of the atmosphere in various parts of the British Isles. In the Ninth Annual Report, recently presented to Parliament by Dr. Smith, as Inspector under the Alkali Act, 1863, the subject is introduced into an official document. Being rather weary of the monotony of reporting only on the escape of muriatic acid from alkali works, he commenced inquiries into the amount of other gases, so as to give an idea of the extent to which the air of our towns is injured by manufactures. He has also included researches into the amount of organic and inorganic substances existing in the atmosphere in populous towns and in country places. The intention was to establish a method by which the condition of a place as to general health could be judged of definitely from the result of chemical experiment, without waiting for the evidence in the disease or death of human beings. Dr. Smith believes that, to a certain extent, that object has been reached. The health of a town has been in accordance with the chemical results obtained. No attempt has been made to find the nature of the disease which may affect any town, but the condition has been estimated by the number of deaths in the usual way.

This is entirely a new inquiry; at least it is new to have any steady success in the matter, and Dr. Smith says it is of great importance that such experiments should be continued, and so rendered available for regulating our opinions both of the health of individual places and the effect of individual causes. For example, if we wish to know whether a certain manufacture is injurious, it may be enough, and the experiments go to show that it is enough, to examine the air. If we wish to know whether a certain mode of drainage is sufficient, the experiments go to show the same, namely, that an analysis of the atmosphere near the spot will lead us to a true conclusion.

There is, however, a great deal to be done. The results, so far as towns are concerned, are decided enough, but results are required from places which have no manufactures, and which have very few human beings. The examination of such places would decide a very important point.

Dr. Smith has thus extended his work from the inspection of alkali works to the examination of air generally for sanitary purposes, so far as chemical means are concerned; and he holds that it is of great importance that a chemical branch for such inquiry should exist, as would be in accordance with the spirit in which the Alkali Act was conceived. The medical methods of examination not being all that are required, the chemical must supplement, as far as it is in its power, taking probably out of the hands of medical men some of the work, according as experiment becomes more and more definite.

Another branch towards which Dr. Smith has devoted himself in the reports given in has been the climatological; he has brought chemical agency into that department also, a little more decidedly than has before been attempted, making a foundation for future efforts. In this not much has been done, if we speak of places quite freed from the influence of human beings; but there has been a beginning made, and it will be of great importance to continue it. It is clear from the first inquiry, that wind which blows from inhabited places differs from that which blows from uninhabited places; and it is clear from the second part or the meteorological that wind which blows from certain directions differs from that blowing from others; that air too which comes slowly over the ocean is not the same in quality as that which comes with violence, and that air which comes up rivers and from lakes is not the same in quality as that which comes from the sea. The influence of the different directions of winds has also to be considered—whether they be from an eastern or other sea; and a great deal has yet to be done in the examination of air at different heights. The word meteorological is not yet applied to these inquiries, but they may be extended so as to have it applied to them. The word climatology has been used as referring to artificial as well as to natural climates.

The examination of the rain as a means of knowing the

air has also been made to give us much more information than hitherto by the analyses of numerous specimens from various parts of Great Britain.

Considering all these things, Dr. Smith comes to the conclusion that the examination of the physical phenomena of metcorology, as hitherto carried on, has too little to tell us regarding the influence of the atmosphere on health. The force and direction of the winds are observed, and they are expected to produce every time similar results. But these expectations have an imperfect foundation. The winds may come from the same quarter, and still be different in composition. The true quality of the wind must be sought partly in the chemical examinations. By its examination we may learn the true origin of many commotions in the atmosphere. It is, therefore, important to the medical man and to the meteorologist that chemistry should be added to the other sciences which have hitherto been made to contribute to meteorological observations.

The medical man tells of disease rising from certain noxious substances. The chemist is expected to define the class of these substances, to say whether putrefying bodies exist,—bodies containing nitrogen, and capable of forming very noxious compounds,—or whether sulphuretted hydrogen or other gases are the true sources of the evil complained of. As he cannot, however, say what is the character of the disease that is in the atmosphere, that must be left to some other of the sciences, which must come in to assist the observation of the medical man. Man himself is so complicated, and the agencies which affect him are so numerous, that no one science can contain him ; and medicine, to be perfect, would seem to demand universal knowledge. Every science must come to its aid,—that is, every science which treats of any agent which affects man.

The coincidence between an improved state of the atmosphere and the lowering of the death rate is remarkably illustrated in the appendix to the report by some statistics respecting the town of Chorley, and although Dr. Smith points out that the effect is probably an exaggerated one from a large quantity of rain during the time referred to having flushed the sewers and also from many sanitary improvements having been effected, the instance given is a very striking one. The whole of the figures cannot be quoted here, but some idea of the facts may be gathered from the following comparison between the air at Chorley in January to March, 1872 and September, 1872. Taking Blackpool as a standard for hydrochloric and sulphuric acids at 100, and Inellan as a standard for free ammonia and albumenoid ammonia at the same number, we get the following comparative results :—

Locality.	Hydrochloric Acid.	Sulphuric Acid.	Free Ammonia.	Albumenoid Ammonia.
Blackpool	100	100	—	—
Inellan.....	—	—	100	100
Chorley (Jan. to March, 1872).....	1391	609	517	237
Chorley (September, 1872)	200	38	37	101
London	320	361	117	116
Underground Railway ...	974	1554	138	271
A midden	—	—	644	302

Coincident with the great improvement in the Chorley air, the death rate, which had usually been 24, fell to 18, and the manufacturing town assumed almost the health condition of a country village.

In anticipation of the inquiry, Why does not Dr. Smith proceed with his investigations if he considers them so important ? he replies that the work has not become official, and individual work must be intermittent ; but he is decidedly of opinion that the introduction of more chemical investigation into the sanitary and meteorological departments is desirable.

As to the more immediate subject matter of the report, —the escape of hydrochloric acid from alkali works—it is satisfactory to learn from Dr. Smith, with respect to a complaint often made that the manufacturers wait to be found erring instead of finding out their own mistakes, that now the better class of manufacturers look after the matter by means of their own chemists.

The smaller works are generally not so liable to escapes, because they work more quietly. Still this is not an absolute rule, and there are large works which have small escapes from close furnaces caused by their peculiarity of management. The open furnaces are usually more regular.

There have been many opinions as to the distance that gases will travel. Dr. Smith thinks we may be sure that sulphuric acid does not remain any perceptible time as a gas when it comes into the open air. It seems to travel only a short distance ; but the wind varies, and so must the distance. Muriatic acid will go several miles ; and sulphurous acid of necessity goes further, but dilutes more rapidly than the former, and will therefore be less perceived. Chlorine, it is known from a remarkably complete observation, will go four miles, and be quite distinct to the smell, so as to enable one to speak with certainty. But to obtain this the ground or space must be smooth ; if it is roughened by trees or much vegetation the air passes through as water through a stream filled with water-plants, which very readily clear the muddiest. The trees obstruct the motion of the air and gases, and the absorbable portion is removed,—not without damage, of course, to vegetation.

Chemical works generally are greatly on the increase, and the power to repress escapes of gases does not increase with them. The Alkali Act, which was excellent for a time and has done some good, is becoming less valuable daily. When alkali works accumulate in one place they make even one per cent. of escape a great evil, and it is impossible practically for all injured persons to receive compensation. It is true, or it may be true, that compensation comes to the nation, but what is that to him who loses his paternal estate or good tenants. Something more is required. All the usual gases are escaping in increasing quantities, and the actual increase of muriatic acid from alkali works is considerable, although not the percentage.

The method of measuring by percentage is becoming insufficient, unless supplemented by other methods of detection. For example, excessive escapes may take place in an irregular way that cannot be measured, and the inspector can bring no action. He may be sure that a work has done much harm, but he can only remonstrate, unless he has measured the gas.

Dr. Smith suggests that some relief would be found in having the air examined when new manufactories are proposed, and if the atmosphere is already injured to a certain extent, to allow no more of the same manufactories at the place. This would give a maximum limit of bad air.

AROMATIC TINCTURE OF ASSAFŒTIDA.

BY L. MYERS CONNOR.

Tincture of assafœtida has such an unpleasant smell and nauseous taste that it is sometimes difficult to administer. Mr. L. M. Connor, of Dallas, Texas, publishes in the *American Journal of Pharmacy* a formula based on some experiments he has made, in which he claims that the difficulty is removed. He states that the preparation keeps well.

℞.	Tinct. Assafœtida	℥viij.
	,, Orange Peel.	℥ij.
	Ess. Peppermint	℥iij.

Mix. Dose one and a half to two fluid drachms without the addition of water.

The Pharmaceutical Journal.

SATURDAY, AUGUST 30, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE UNJUST CENSURE OF A DRUGGIST.

IN the few remarks we ventured to make in reference to the case at Ramsgate, reported at page 135 of this Journal, we endeavoured as far as possible to keep within the limits of the pharmacist's functions and duties ; in fact, to mind our own business without criticizing the doings or shortcomings of others. In pursuance of that aim we expressed an opinion that the jury were wrong in appending to their verdict that Mr. DAVIDSON died from natural causes a rider throwing the onus of his death on a Ramsgate druggist who refused to supply Mr. DAVIDSON'S porter with a draught containing eight times the recognized maximum dose of tincture of digitalis, and we stated reasons for this opinion.

In taking this course, which we believed to be due to the class we represent, as well as modest in its pretension, we were supported not only by the facts of the case, but also by the remarks of the CORONER, who in his summing-up directed the jury that their whole business was to determine the cause of death. In regard to that point, he expressed his opinion that they could have but little difficulty in arriving at a conclusion. At the same time, he told them that the question whether the chemist was bound to make up the prescription was a delicate one, and he further told them he thought it was a question they ought not to go into, since, in case of necessity, any culpable error committed by the druggist could afterwards be dealt with by the proper tribunals. To our apprehension, nothing could well be more fair and reasonable, and we still think the opinion expressed by the jury was not only uncalled for by the facts of the case, but also unwarranted by the *ex-parte* evidence of the medical men.

It must always be a trying and sometimes a dangerous position for a medical man to appear at an inquest to account for the death of a patient before a jury more likely to be influenced by prejudice than to be capable of appreciating fairly the merits of a case, and it was from a sense of this fact that we abstained from criticizing the conduct of the medical man who prescribed this unusual dose of digitalis, or the evidence he gave. We hoped that this task might be left to those journals which deal more especially with medical affairs, and that the case would there be treated of fairly and equitably. But though we have heard on the part of medical men frequent approval of the course taken by Mr. FISHER, it is with no little disappointment and surprise that we find an opposite proceeding adopted by a medical journal which aspires to be a leading representative of the profession. The *Lancet* instead of realizing our anticipations in this respect, and consistently confining itself to criticism of the medical aspect of the case, has chosen to ignore this legitimate exercise of its influence and, constituting itself a censor of pharmaceutical practice, to combine a palpably disingenuous representation of the facts with abusive censure of the druggist, who is stated to have acted very wrongly, is accused of "ignorance of medical science," scornfully reproached with having no ideas beyond the range of 'Squire,' and grandiloquently told that medical practice is not to be limited by the druggist's opinion of a prescription.

At the same time we are informed that the prescriber of the half-ounce of tincture of digitalis naturally threw the onus of the man's death on the druggist, since he justified his prescription before the CORONER, and that he was "ably supported" in doing so by the ordinary medical attendant of the patient. With regard to the former point we may remark that the justification of any prescription in the eyes of a non-medical coroner would not go for much. In the present instance the justification was—apart from the example of Mr. JONES, of Jersey—merely self-justification, and the effect it produced upon the CORONER'S mind may be estimated from the fact that in his summing-up he remarked that there certainly was a startling difference between the half-ounce dose prescribed by Mr. LEAKE and the dose indicated by the British Pharmacopœia as ranging from ten to thirty minims. So much for Mr. LEAKE'S "justification" as a matter of fact, it is not our province to discuss it as a matter of medical theory or practice. But how was the extremely qualified justification so "ably supported" by the other medical man? Why, by representing the utility of administering such doses of digitalis as mere matter of opinion, and by the statement "It is not a remedy I should rely upon myself." We are here addressing ourselves to the question whether, from the facts in evidence, there was any foundation either for the statement of Mr. LEAKE that the man's death was due to his not having the medicine, or for the jury's censure, based as it was solely upon that statement and we may say instigated by it. We venture to think there was, so far, no adequate foundation for either, and if we go to medical authorities for aid we find opinions differ. Mr. CRESSWELL'S evidence moreover was distinct that the deceased had been suffering from repeated attacks of *delirium tremens* and that his habits of life were such as would tend to shorten his days. Equally explicit was his evidence that half an ounce of tincture of digitalis was not an ordinary dose.

All these facts were ignored in the *Lancet* article, and if they were not studiously ignored, at any rate the omission to mention them admits of suspicion that the writer was so prejudiced against druggists as to be incapable of taking a fair view of the case, and was consequently incompetent to write upon such matters in a leading medical journal.

Let us turn now to another aspect of the case. It is admitted by the *Lancet* that the case was a very urgent one, that there was also a corresponding responsibility attaching to the prescription—*extremi morbi extrema remedia* is the explanation given for the large dose—and then the writer goes on to say that "*in the absence of the medicine the patient speedily died.*" We italicise these words, for they are important in various ways. Without attempting to offer the opinion on medical grounds, we do not hesitate to declare this statement to be a most unwarrantable assumption. But however this may be, the *animus* we have above referred to again becomes manifest here. Why should the absence of the medicine be ascribed solely to the druggist? Is the *Lancet* writer so dull that he could not perceive the possibility—not to say the propriety—of a medical man in such a case of urgency going himself to the druggist, in the first instance, with his own prescription, and making it clear to the dispenser that the unusual and exaggerated dose of medicine prescribed was intentionally designed to meet a pressing emergency? Can he be ignorant that this is constantly done by medical men in the interest of their patients and themselves? Here was precisely a case in which such a plan should have been adopted. Mr. LEAKE, as a new comer, probably may not have been very well known in Ramsgate; his mere initials on the prescription gave no guarantee that it was written by a medical man, considering the unusually excessive amount of the dose ordered and the possibility that ℥ss. might be regarded as having been written in mistake for ʒss. These were all circumstances which might have induced Mr. LEAKE to make sure that the medicine should be supplied which he held to be of vital importance; and we venture to think that a medical journal would have rendered greater service, not only to the profession but also to the public, if it had directed its comments to this aspect of the case rather than indulged in acrimonious censure of a class with which medical men have intimate relations.

Among the letters which have appeared in reference to this case, one of the most remarkable bears the signature of J. COLLIS BROWNE. Adopting the view that the life of the patient depended on immediate treatment, the writer seems unable to perceive any cause of death but the refusal of the druggist to supply the medicine. Apart from what we have already said on this point, we may remark, that Mr. FISHER was not the only druggist in Ramsgate, and that his refusal was no absolute bar to obtaining the medicine. Undoubtedly it is the duty of the druggist in case of doubt to communicate with prescribers, but we cannot regard impertinence on the part of messengers sent for medicine, as being conducive to the performance of that duty, nor are we aware that it is any part of the druggist's business to submit to such treatment.

The writer of this letter, however, considers the druggist is merely a machine to carry out the physician's orders, and that, being properly a person ignorant of the quality and requirements of medicine, he should not have any opinion as to the limits of dose. To those who hold such views, or incline to endorse them, we will suggest for consideration the probable result of carrying out this principle in the case of a prescription now before us, in which Liq. Strychniæ ʒvj. is ordered in an ℥viij. mixture, of which two large tablespoonsful were to be taken three times a day.

Fortunately for the public and for the medical profession at large, dispensing druggists are neither so ignorant nor in so degraded a position as the writer of this letter would have them; fortunately also, as we have reason to believe, his sentiments would find but feeble echo amongst medical men.

UNIVERSAL PHARMACOPŒIA.

WE have received a circular signed by Dr. DE CRISTOFORIS MALACHIA, Chief Physician in the Milan Hospital, and LUDOVIC ZAMBELETTI, pharmacist in Milan, in which those gentlemen announce their intention to present a proposal of a Universal Pharmacopœia before the medical congress which will assemble in the course of this year at Vienna.

THE MILLER MEMORIAL.

THE friends of the late Professor JAMES MILLER, who for many years occupied the Chair of Surgery in the University of Edinburgh, have raised by private subscription the sum of £1600, to be devoted to the perpetuation of his memory. Knowing the deep interest he took in medical missions it has been determined to devote the money to the purchase of a house in George Street, Edinburgh, and its conversion into a "Home" for students while being trained by the Edinburgh Medical Missionary as medical missionaries. A sum of £1000 is still required to complete the arrangements.

AWARDS AT THE VIENNA EXHIBITION.

IN the award of prizes in connection with the Vienna Exhibition recognition is made not only of positive excellence in the articles exhibited, but also of actual progress made in the various arts. We are informed that "medals of progress" have been awarded to Messrs. T. and H. SMITH for their display of chemicals, and also to Messrs. DOWS, CLARK, and Co., of London, for their Soda Water and Ice Cream Soda Water machinery, and for their aërated mineral waters.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

At the half-yearly meeting of the above Association, held at the rooms, Halford Street, on Tuesday, August 5th, Mr. W. Thirlby, President, in the chair, the following report was read, and unanimously adopted :—

"The Committee, in presenting their usual half-yearly account of the proceedings of this Society, submit to the members what has been carried on during the past session.

"The meetings of the classes marked out by the programme have been held with nearly unbroken regularity. The attendance, which has been as good or even better than in any previous session, is a sufficient proof that the interest in this part of the Society's operations does not diminish. The average number of members attending each class has been as follows :—Chemistry, 10·1 ; Botany, 11·3 ; Materia Medica, 11·8 ; and Dispensing 7·1.

"Papers of interest have also been read by different gentlemen, including one at the opening of the session, on 'The Classification of Plants,' by F. T. Mott, Esq., F.G.S. ; and later on, J. E. Weatherhead, Esq., favoured the members with a lecture on 'The Microscope.' The Committee take this opportunity of thanking those gentlemen for their kindness.

"The preliminary class was conducted during the first part of the session by W. Walker, Esq., and the committee desire to express their high appreciation of that gentleman's long-continued and honorary services.

"In addition to the evenings devoted to the classes, the rooms have been opened every night for the purposes of study and practical work, and a good number have availed themselves of the advantages offered by this arrangement. One evening a week has been set apart for members who are specially preparing for the Minor examination.

"The committee desire to express their thanks to the Council of the Pharmaceutical Society for their donation of £10 towards erecting a case for specimens, a well-made, and in every way suitable cabinet having been put up at a cost of £12. This is being filled with specimens and articles of materia medica presented by many wholesale houses.

"The library continues to be of great use, both for the purposes of home study and reference.

"In concluding the report of the ninth session of the Society, the committee cannot but view, with considerable pleasure, the progress which has been made during the period it has been in existence. It is a matter of congratulation that one of the leading trade journals was pleased to speak of it in terms of high approbation, terming it a 'Model Association,' and the committee hope that this will be a sufficient inducement to the honorary members to continue that support which they have always so liberally afforded."

The President announced that valuable presents of drugs, chemicals, etc., had been received from the following houses,—Messrs. Hodgkinson, Stead, and Treacher ; Davy, Yates, and Routledge ; Barron, Harvey and Co. ; Langtons, Scott, and Edden ; Dunn and Co. ; and Harker and Co., of London ; Messrs. Wyllys and Co., Coventry ; Messrs. Clarke and Co., Portsmouth ; Messrs. Matthews Bros., Bristol ; Messrs. Beatson and Co., Rotherham ; Messrs. Robinson and Co., Chesterfield ; and a cordial vote of thanks was accorded to these firms for their kindness and liberality.

It was also announced that several other donations had been promised, but had not yet been received.

A vote by ballot for the election of a new committee was then taken, and the officers were chosen as follows : Mr. T. Wright, P.C., President ; Mr. S. H. Cadoux, A.P.S., Vice-President ; Mr. E. H. Butler, A.P.S., Treasurer ; Mr. C. B. Lomas, A.P.S., Hon. Secretary ; Mr. E. J. Bishop, Mr. A. Shakespeare, Mr. A. Chamberlain.

STATEMENT OF ACCOUNTS FOR THE SESSION ENDING AUG. 4, 1873

RECEIPTS.

	£	s.	d
Feb. 4th. Cash in hand	10	2	8
Cheque from Pharmaceutical Society	10	0	0
Subscription from 19 assistants at 3s. each	2	17	0
Rent from Civil Service Dramatic Club	2	0	0
Subscription from 18 apprentices at 2s. each	1	16	0
Library pence last session	0	8	6
,, ,, present do.	0	7	9
Extra cash for prizes from E. J. Bishop	0	3	10
,, ,, ,, for J. M. Butler	0	3	3
,, ,, ,, for C. B. Lomas	0	2	4
Discount...	0	2	10
	£28	4	2

DISBURSEMENTS.

	£	s.	d.
Bill for Glass Case	12	2	0
Rent and Water Rate	5	14	0
Bills for Stationery	3	7	4
Poor Rates	1	2	0
Refreshments and Incidental Expenses	1	2	0½
Bills for Chairs	1	16	0
Gas Bills	0	10	5
Coal	0	5	0
Sundries	0	7	0
Cash	1	18	4½
	£28	4	2

A programme of lectures for the tenth session (from Aug. 14, 1873, to Feb. 3, 1874) has been issued.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The following prize scheme for the session 1873-74 has been issued in connection with the Assistants' Section of the Glasgow Chemists and Druggists' Association :—

The committee have much pleasure in announcing to the assistants and apprentices connected with the trade that a sum of money has been placed at their disposal to be offered as a prize or prizes among the assistants and apprentices who are members of the Chemists and Druggists' Association, on the following conditions, viz.—

First.—Competitors shall not be in business on their own account, shall be under twenty-five years of age, and members of the Glasgow Chemists and Druggists' Association.

Second.—The names of intending competitors, together with the subject of the paper, shall be given in to the secretary (Mr. J. Murdoch), *on or before the 1st of November next.*

Third.—The subjects of the papers shall be left open to competitors ; but they must have a bearing upon the practice of pharmacy.

Fourth.—Each competitor shall read his own paper at a stated meeting of the Assistants' Section in the course of the ensuing session.

Fifth.—At the close of the competition it shall be the duty of the secretary to call a special meeting of the members of the Assistants' Section, to judge of the merits of the various papers read, and whether there shall be one prize for what may be considered the best paper, or several prizes, distributed according to the merits of the respective papers considered entitled to a prize.

Sixth.—In giving their decision, the members shall vote by ballot. The ballot papers to be examined and counted by three scrutineers, to be appointed by the members at the special meeting. The result to be final. Competitors shall not be allowed to vote.

Seventh.—The members shall decide at their special meeting when and how the prize or prizes may be presented.

The committee earnestly trust that those members of the trade eligible will *at once* prepare to enter upon the competition. Those who are not yet members of the Chemists and Druggists' Association will have an opportunity of joining during the month of October, when it is

expected the general meetings will be resumed; or at present, by applying to the secretary.

The annual subscription for apprentices is one shilling; for assistants, two shillings and sixpence. All assistants and apprentices members of the association being entitled, by virtue of that membership, to all the privileges of the Assistants' Section without further fee.

Further information may be had from Mr. J. Murdoch (Secretary, Assistants' Section, Glasgow Chemists and Druggists' Association), 47, Eglinton Street, Glasgow.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

On the Energies of the Imponderables, with especial reference to the Measurement and Utilization of them.*

BY THE REV. ARTHUR RIGG, M.A.

Lecture IV.

The Energy of Affinity, especially with reference to considerations for the Measurement and Utilization of it.

The energy of affinity assumes many protean forms, embracing facts in very opposite phases. At one time it seems to hold elemental matter in adamantine chains so firmly that no appliances, such as heat or light or electricity, can undo the bonds; at another time there seems to be a repellant power of affinity (contradictory though the expression may sound) so influencing, that though every facility for voluntary combination be presented, yet none of these inducements accomplish this combination. For example, the oxygen and nitrogen in the atmosphere, which for all general purposes may be said never to enter into combination whilst acting as atmosphere. Again, oil and water—neither shaking nor heating can cause mixture, let alone combination. This repellant power is utilized in vitality thus: The fluid which lubricates the eyeball would continually pass over the edges of the lids, and so run down the cheeks, were there not glands upon the edge of the lids that secrete a very little oil, and so by virtue of this "repellant affinity" the ordinary fluid is confined to its appointed channel. If this fluid be excessive, the oily boundary is overflown, and tears trickle down the cheeks.

The energy of affinity is manifested in mechanical action, and it is probably the source of the mechanical power utilized by men for manufacturing purposes. We find affinity operating under all circumstances in which the character of a resulting compound is different from that of the elementary bodies which constitute the compound. Affinity may be said to be kinetic when converted: and potential when in molecular relation. In other words, all the molecules of one body are somehow or other related by affinity to the molecules of another body, either directly or indirectly, when states of change are occurring. Under these circumstances, until the new molecular relations are called forth there is potential energy, as these are brought about we get kinetic energy.

The term "Affinity," as employed in this course of lectures, needs an explanation. As a term in science it is fairly derived from that sense in which it ought to be used in conversation or ordinary writing. The word, when properly applied, is in reference to those connections which a marriage may have established between the relatives of the wedded pair. Prior to that marriage there were no relationships; after it, relationships enter by *affinity*. The relatives of the husband are connected to him by consanguinity, so are the relatives of the wife to her, but after the marriage these two sets of relatives are connected each to the other by affinity. This distinction makes clear that affinities are regarded only as between different bodies. No affinity can exist between lead and lead, or between oxygen and oxygen. As in social life, the legal relationships resulting from affinity and consanguinity are very different, so in science life, the atoms which constitute the elementary parts of a simple body, and the molecules which constitute the elementary parts of a compound body, are tied together in bonds of different kinds.

Between atom and atom, or molecule and molecule of a like nature, there are no affinities. True, these are held together, but it is by what is sometimes called the force of cohesion. If atom or molecule of one nature is, thus unchanged, held to an atom or molecule of another nature, then the bond is one of adhesion. If, for example, two plates of smooth glass be slid one over the other and pressed together, they cohere. If gum be dropped on one and the other pressed upon it, they then adhere. Water adheres to many substances of very different constitution.

To cohesion we are indebted for the strength of solids. The cohesive force operates, but in marvellously different degrees, in ice, water, and steam. To adhesion we are indebted for those unions effected by cements, etc. With the intensity of these two subsidiary agents in the work of affinity this lecture is not concerned, although they perform no unimportant parts.

Between affinity, if used as a term in physics, and if used as a term in chemistry, there is this distinction:—Students in physics might classify cohesion and adhesion as branches of affinity. Students in chemistry would not admit the term (affinity) unless the composing elements after the influence of affinity have undergone such a change as to obliterate all traces of the originals. Hence the phrase "chemical" affinity, thus, by the prefix "chemical," excludes the physicist's views.

An experimental illustration may make clear the use of the term "affinity," by the respective students in physics and chemistry.

Here are two solutions, the one of gum dissolved in water, the other of camphor dissolved in spirits of wine. These two are respectively mixed, nevertheless there is in neither case any chemical affinity. If we add pure spirits of wine to the mixture of gum and water, we should destroy what the physicist might call the affinity, but which the chemist does not admit to be such. On the other hand, if we add water to the solution of camphor we destroy the mixture there; a separation takes place, and in one case the gum, and in the other the camphor, is precipitated. The term "affinity," applied to the unions thus separated, would not to a physicist seems improper; the chemist would not permit the use of this word. It is in the chemist's sense that the word is used in the phrase "energy of affinity." He distinguishes thus—the term "combination" is applied by him to the results of affinity, and to that which has just been described as a phenomenon in physics the chemist applies the term "mixture."

These preliminary distinctions prepare us for an explanation of what we are to understand by those affinities whose energies are to be considered. Used, in a chemical sense, affinity is that power which influences bodies dissimilar in composition, form, and character to combine. The consequence of this union is the formation of new compounds, which may or may not be dissimilar in colour, form, and even fashion, to any of the composing bodies, which may or may not be possessed of properties and characters that are even traceable in the originals. These compound bodies, thus, unlike their progenitors, also establish relationships of affinity, and we are soon surrounded with numerous compounds, so diverse that all traces of the originals are to ordinary apprehensions totally obliterated.

There is, however, amongst the bodies a kind of clanship or caste, similar to that amongst the people of India. Thus, simple or elementary bodies combine only with simple or elementary ones; compound bodies only with compound ones.

For example—Oxygen, which is a simple body, enters

* Cantor Lecture, delivered February 24, 1873; reprinted from the *Journal of the Society of Arts*.

into the alliance of affinity with the metals, which are also simple bodies.

Here is some pûre metal—lead—in a state of very minute subdivision. It is enclosed in an air-tight glass tube. This lump of lead is exactly the same material. The difference is that in the finely subdivided metal in the glass tube combination with oxygen will take place the moment it is exposed to the air, so that the atoms of lead which are soon to be shaken out are brought into contact with the oxygen—atom with atom.

Thus, on breaking off the end of the glass tube and shaking out the contents, you see the black particles as they fall glow with heat owing to their rapid combination with the oxygen of the atmosphere. Here is a case of affinity, consequent on a state of subdivision—a case of affinity proper. Mr. Wills, who most kindly this evening gives us the benefit of his chemical knowledge and experimental skill, will now show you how strong is the affinity of oxygen for the steel blade of a knife; when heated and placed in a stream of oxygen the ignited particles of steel in the blade rapidly burn away. The same thing happens if a stream of oxygen is directed on any of the simple metals when raised to a red heat. In a hollow on this tile are some iron nails; by directing a stream of ignited hydrogen in oxygen upon them, the affinity is so strong that they not only melt but boil, and the ebullition is so powerful that a brilliant shower of molten metal is scattered around. Similarly, a piece of zinc when exposed to oxygen is rapidly consumed.

But when we deal with acids which are compounds, they do not ally themselves by affinity with the simple metals, but only with the oxides of the metals which, like themselves, are compound bodies.

The range of the energies of affinities is very great. For example, oxygen and the metals. Oxygen can with difficulty be induced to unite with gold and platinum, hence these metals do not tarnish in the air; with sodium and potassium the affinities are so strong that the union is rapid enough to generate both light and heat. Either to facilitate or prevent such union, and so promote or retard the energy of affinity, has led to the adoption of various compounds, under the name of fluxes.

It may be well to explain that to this energy of affinity we may be said to owe the variety which the earth possesses. Reduce its compounds into their elements, and a sample of each of all of which the world is made might be arranged on this table. There are now only 63 reputed elements: from the affinity amongst these 63, whether taken by twos, or threes, or fours, or more, everything is made. Indeed, $\frac{99}{100}$ths of the earth is made of 13 elements; the mathematician's calculation is an easy one which could tell the number of articles that might be formed by combining these 13 by twos, then by threes, then by fours, and so on to 13. There would thus out of these elements be eight thousand one hundred and ninety-one different compounds. This number is very naturally increased from the operation of what may be called the law of combination in multiple and sub-multiple proportions. Allowing another 8191 for these multiples and sub-multiples, there would be in the world composed of these 13 elements 16,382 articles. Such a calculation as this is exceedingly simple, and the mathematician would say must be correct. Affinity, however, enters with a "veto." It claims the right to determine the nature of any combination or set of combinations, and in the exercise of this claim the character and constitution of the combining elements are so completely altered as to have lost all obvious trace of their original, and, therefore, when the combination by threes takes place the result does not partake of the character of any one of the components. This change of character is what the mathematician's calculation does not reckon upon, indeed such a calculation is based upon the physicist's interpretation of the word affinity, and it ignores the chemist's views.

The problem which is now before us is to define a mode of measuring the transformations in every shape introduced by affinity amongst these thirteen elements; a problem very simple, as thus stated, but wondrously complicated, in fact only capable of an approximate or inferential solution, which is, practically, no solution at all.

In a homely way this difficulty may be illustrated within the walls of many a house. Assume the residents to be a father and mother and thirteen children. Who can tell the combinations consequent upon what may be called the mutual affinities existing amongst these thirteen children? Even from day to day the stability of that family cannot be ensured. The combinations of twos and threes, which yesterday gave promise of permanency, is to-day dissolved, and these molecular children form other alliances. This microcosm of a world is under the influence of new feelings, changed tastes; indeed, it passes, with more than electrical rapidity, from a summer-like happiness to a wintry gloom—from a peaceful calm to lurid flashes—sad forebodings of domestic storms!

Well, amongst the affinities of the thirteen terrestrial elements similar changes and relations are induced. Whilst we may be able to tell with unerring exactitude how any *two* can act, if left to settle themselves under the sole influence of their dual affinities, when three or four, or more, come together certain perplexity results.

To progress from simple to compound is a most satisfactory procedure. Adopting this plan, and dealing with only two of the thirteen elements—ignoring the others—placing the two in such a relation that their mutual affinities may be fully exercised, the law as regards these two, and (as we shall see afterwards) the energy consequent upon this law, may be made fairly evident, and utilized in manufacturing industries as well as calculated with mathematical precision.

Let two be taken—any two—say, the gases oxygen and hydrogen. Place what we may call equal quantities of each apart from all other elements. Cause them to combine. It would be soon observed—*i.e.*, if the experiment were repeated frequently—that this combination is not arbitrary, it is not at the experimenter's option. Although he may put different quantities of these gases in juxtaposition, yet by some means, and for some reasons unknown to us, they unite only in definite proportions. If more than 11 oz. of hydrogen be offered to 88 oz. of oxygen, the excess of hydrogen will be left uncombined, also the reverse.

As a case of estimation by measure, the nature of the affinities, their intensity and the inexplicable results produce a comparison which is very striking; *e. g.*, 24 parts, by measure, of common salt contain 25·8 parts of sodium, and 30 parts of liquid chlorine. Such condensation, that is the condensing into (say) 24 cubic inches of solid matter so much as nearly 56 cubic inches would require the exertion of a very great mechanical force. To appreciate this, it must be remembered that the salt, the sodium, and the chlorine are all under the same atmospheric pressure, and consequently were there not certain inter-relationships among their constituent elements, of which we know nothing, such change of volume could not be accomplished.

The exercise of affinity, although definite as regards the proportions of the bodies influenced by it, is not called into action without either previous certain surroundings or the creation of influencing surroundings, such, for instance, as the presence of moisture or heat, or light or electricity. If, for example, we take these two white powders which are here mixed together, and add a little water to them, their affinities begin to operate, and a violent effervescence takes place. Again, the states of solid, liquid, and gaseous vanish under the energies of affinity. Mr. Wills will mix two gases, and they immediately form a solid. Now we will put two liquids together, and we find that they become converted into solids. In another case you see that the contact of two bodies suffices to change their state. If a little iodine is put upon this plate, and then a little phosphorus is added, the affinities are manifested by ignition, and the solids pass into the gaseous state. Nor are

changes of state and temperature the only attendant phenomena of the energy of affinity. Electrical phenomena are often, if not always present, although not always observed.

It is not improbable that if the energy of affinity is ever measured and brought within our means of calculation, it may be done inferentially, through some of these collateral manifestations which have not yet been so carefully observed, employed, and tabulated, as their importance would seem to justify. What it is that influences these affinities is as far beyond our present knowledge as to tell what it is that influences many of the affinities of social life amongst the thirteen children. The chemist not only endeavours to establish new relationships, but also to disentangle the relationships which affinities have already established. He fails to-day, he succeeds to-morrow. With bodies thus by energy of affinity compounded and interlaced—

——"In mazes intricate,
Eccentric, intervolved, yet regular
Then most, when most irregular they seem"

—we all are concerned. Although we know not their laws, we do know that they partake of the Medo-Persian character—they change not—and therefore, if once discovered, they are to be relied upon under all circumstances.

This Medo-Persian character of the laws which govern the energies of the affinities introduces into any culculation of them, when and where they are known, a precision and means of repetition which give thus far to physical chemistry the character of an exact science. With a precision equal to that of the laws of gravity, it is found that in respect to combining proportions there is a mathematical order, perfect and exact. True, articles may be mechanically mixed in any proportions; they can be chemically combined only in definite proportions, and it is only when thus combining, in the chemist's sense of the word, that the "principle of least action" is brought into operation in affinity, and its results as economically utilized by men as the results of the energies of gravity and vitality were described to be in the last two lectures.

In mixtures the particles are still separate, and in many cases may be distinguished under a microscope. Here is an instance. If this bottle is opened, the character of the whole contents is changed. The mixture of the atoms of the air with the nitrogen gas changed the appearance of the mass instantaneously. Again, you are all aware that coal gas burns in air, but we can also make the air itself appear to burn. In the presence of such experiments, it might become a question whether we burn gas in air, or whether we burn air in gas. Here is a cork through which are passed two small glass tubes. One of these tubes is connected with the gas of the room by this flexible india-rubber pipe, the other is open to the air. Now, light the gas issuing from the small tube. Here is a glass chimney, similar to those used with paraffin lamps. The cork has been fitted into the chimney. Place the chimney on the cork, the jet of gas burns as before. Let the supply of gas be increased, the consequence is that the chimney is soon filled with an atmosphere of coal gas; and observe, when a certain quantity of gas has entered, the flame quits the glass tube and now appears upon the air tube. Apparently air is now burning with a pale blue flame in an atmosphere of gas, whilst the gas issuing from the top of the chimney may also be ignited, and will burn in the air of the room. At the top, then, there is coal gas burning in air, and within, air is apparently burning in coal gas.

Again, for example, if gunpowder be taken and well washed, the nitre may be dissolved in hot water, and if the water be evaporated the nitre will be found as ordinary crystals; further, if heat be applied, the sulphur may be sublimed, and then pure charcoal will be left, or the sulphur may be dissolved out by bisulphide of carbon. Thus we can get the three elements of gunpowder, and find they are what they were at first. On another process of manufacture, if the nitre be fused in a crucible, and sulphur added, there results an entirely new substance—sulphate of potash; if to the heated mass charcoal be added, there is formed carbonic acid, and this, with the potash, forms carbonate of potash. No washing or warming will separate these latter combinations. They are for all purposes entirely new substances; they are no longer a mixture, as gunpowder is, in which the affinities may by a spark be called into play, but they are in a combination in which the affinities have already done their work, and that under the influence of continuous heat and without explosive violence, and, therefore, no further development of affinities, either with or without the energy of explosion, can take place.

The utilization of gunpowder, then, is the result of a process of mixing, such mixing being designed to facilitate the action of several affinities, by placing the elements of the composition in close approximation, ready at a signal from a controlling agent to operate. It seems reasonable to say that the closer these elements are to each other the greater will be the facility with which combinations may take place, and, therefore, the more readily can the affinities be utilized. Such *à priori* reasoning is not confirmed; no simple mixture of impalpable powder, however intimately the dusty particles may have been mingled, fulfils the condition required in gunpowder. It is possible, however, so to diffuse such impalpable powder in the air of a room as that each minute portion is surrounded with an atmosphere of oxygen. If when thus diffused explosion by detonation of any group of particles takes place, the entire mass may explode. In mills for the grinding of madder this accident has happened so frequently as to require special precautions. Herein is an example of many cases in which, whilst admitting our thorough knowledge of the premises on which our reasonings are based, we are found at fault when we apply the knowledge: consequent, apparently, upon ignorance of certain even unsuggested peculiarities in the affinities involved.

Some of you may remember that in July last there was a very serious accident in a flour mill at Glasgow. Property was destroyed to the value of £18,000 or £19,000, and nineteen lives were lost. But how it happened or why it happened no one knew. The fire insurance companies deputed two scientific gentlemen to investigate the matter thoroughly, and they came to the conclusion, rightly or wrongly, that flour diffused through the air in the mill had become so uniformly or minutely mingled with the oxygen of the air, that the atmospheric contents of the room or rooms were in a state of what may be called gaseous gunpowder. The effect of a spark from the millstones or the machinery caused explosion of the aërial gunpowder by that most violent of all means—detonation. Such a conclusion of such a probable danger being only now surmised, shows how little we know of the energy of affinity. In this mill appears to be an example of the production of explosion from hitherto unsuspected sources.

We have in this bottle a diffused substance, and it is diffused in a liquid which rapidly evaporates. A piece of paper is immersed in the liquid, and we will now allow the paper to dry. When that is nearly accomplished the combustion of the paper with flame occurs, owing to the non-vaporizable solid being so minutely subdivided that the oxygen of the air is in contact with many atoms of the same material, and so energetically unites with them as to produce flame.

To apply to the information already communicated to gunpowder, may perhaps make as clear the influences which a more detailed knowledge of affinities would give than any other instance. The action of gunpowder is simply this: in a condensed material are many gases, we will speak of these gases as one—*a gas*. The utilization of gunpowder might at first sight appear to depend upon having the largest amount of gas in the smallest solid space.

Now, without entering upon any chemical question, it may suffice to say that in this mixture of nitre, sulphur, and carbon are all the elements for (what we may name) the completion of the energies, though every other sub-

stance were excluded. We have here a jar of water, and if into that we put a mixture of gunpowder which has been ignited, you will find that water has no power to put an end to the combustion; it takes place as well under water as in air. From such reasoning and experiments as these, it might be anticipated that the cubic inch of gunpowder which on ignition produced the greatest number of cubic inches of gas would be the most valued. This, so apparently satisfactory conclusion, is very seriously in error. The amount of heat developed, and the rapidity with which the gas is formed, are important elements in guiding as to the mode of utilizing the affinities called forth amongst nitre, sulphur, and charcoal. If the affinities are so intense that the development of all the heat and gas consequent upon the exercise of the affinities through the entire heap is instantaneous, then explosion of a very violent and destructive character takes place. Such an explosion for mining, and doubtless other purposes, would entail serious loss—the rock, or the shell, would be so shivered as to be simple dust; our coals would have to be as artificial fuel, for the powder produced must, by tar, rosin, or other ingredient, be formed into lumps. To loosen and disintegrate, but not to destroy, are the general requirements for blasting or mining. If the rate at which the affinities in the mass are permitted to come into play can be regulated, and so either retarded or accelerated, then the modes of utilizing them may be planned. For example, if a ball is to be sent from a gun, that law should, if possible, be impressed upon the affinities which nature has impressed upon the energy of animal vitality. A horse accomplishes the dragging of a load by slow beginnings, a locomotive does the same, affinities must do the same. Hence the development of the greatest intensity of affinity in the case of a gun should be progressive until it attains a maximum, and the time occupied in so doing should be determined by the rate of travel of the ball and the strength and length of the gun.

Other cases, such as the blasting of rocks, demand a very different exercise of affinities. Here the object is simply to disturb, to unsettle, to break up; motion of the pieces to a distance is not required. Considerations such as these, simple as they may appear, are full of perplexity, consequent upon our ignorance of that in which these affinities consist.

Similar remarks apply to gun-cotton, dynamite, nitro-glycerine, litho-fracteur, or any of the explosives which modern science has formed.

It is from an attempt to impress upon the affinities a law of time in their exercise that the various forms and compositions of gunpowder owe their origin.

We are much obliged to Mr. Abel, who has kindly lent the Society of Arts different samples of gunpowder. There is one bottle containing powder, the grains of which are nearly half an inch cube; there are various other forms, the object of these various forms being to develop the affinities at a rate to be determined by the purpose for which the respective gunpowders are to be employed.

The pressure at the time of explosion has been estimated at more than 4000 atmospheres, *i.e.*, more than 4000 × 15lb., or 60,000lbs. per square inch. This statical pressure being converted into a kinetic or velocity estimate, is more than 216 tons lifted one foot.

There are other substances on which this same law determining the rate at which the affinities are to operate, may be impressed. Gun-cotton is one. We are again obliged to Mr. Abel for two illustrations on the wall showing the destruction of the martello tower at Dimchurch, in Sussex. It was accomplished with 186lbs. of compressed gun-cotton. And the development of the affinities was such that the tower changed at once into the form you see in the second diagram. Had gun-cotton in the same state of combination and in the same character been put into a cannon, in all probability the cannon would have burst before the ball had time to move.

Some very peculiar and inexplicable affinities are presented by this ally or rival of gunpowder, viz., gun-cotton. In the first place, the rate of combustion and the consequences of it may be previously regulated, and that with much accuracy. Its energy may be mild or great, at the will of the operator. The result of numerous experiments is that to obtain the full power of gun-cotton it must be exploded in a close chamber, in order that the gases and heat generated by the first part of the explosion may penetrate the mass. The records of experiments with gun-cotton show very plainly the absolute necessity for considering how affinities comport themselves. A bag of gunpowder nailed on the gates of a city would blow them open. A bag of gun-cotton so nailed would fail. Put the gun-cotton in a box and it will shatter the gate to atoms. A box of gun-cotton flung down close to pallisades would open a passage for troops.

Spectrum analysis reveals the fact that the spectrum from the flame of a compound body, as chloride of calcium, is not the same as that observed in the electric spark passing over pieces of chloride of calcium. The explanation suggested is that certain chemical compounds, when they are heated above a given temperature, are decomposed into their constituent elements below that temperature. These compounds are capable of existing in a permanent state. It may be thus with the energy of gun-cotton. When discharged at the temperature of flame, the gaseous constituent elements are not formed, and therefore no explosion. When at the higher temperature producing concussion, then the constituents are formed, and explosion ensues.

You will find that the rate at which gun-cotton explodes depends upon the rate at which the affinities are called into play. Here is a specimen. If we bring the affinities of this gun-cotton into play by means of a spark, and thereby do not produce sufficient heat to develop its affinities rapidly, the rate at which the gun-cotton is consumed is comparatively slow. If we bring its affinities into a flame, the rate at which affinities are developed in consequence of the heat is great. If we bring them into play by means of detonation the rate at which they are developed is greater still. You see that when a flame is applied to this strip of gun-cotton it runs along it rapidly, whereas when a spark is applied to a piece of the same material, the combustion is slow, like touch-paper. If I hold up the string of spark-ignited gun-cotton, the heat gathers, the ignition becomes more rapid, the spark being converted into a flame. Now, if instead of allowing the affinities to be exercised at that slow rate we cause them to develop immediately, we should have had a very different result. Here is some pulp gun-cotton, the very form in which it was used for the destruction of this tower. If we detonated some of that, we should none of us be here to tell the tale of how it went off. There is enough in my hand to send the walls of this room in all directions, but it must be by detonation. The effect of what is something like detonation can be shown in a different form. You are aware that in a coal-mine there are fearful explosions. It has been found that these explosions often take place after a blast in a distant part of the mine. The question therefore is, what has that blast to do with the explosion, the two not being near together? Mr. Galloway, of the Meteorological Office, has been investigating this matter for some time past, and it has been found that these Davy safety lamps, of which specimens are on the table, are not, when within the influence of a reverberation of the air from the effects of a blast in a distant part of the mine, always as safe as they are supposed to be.

The lamp consists of a flame within gauze; and when surrounded by an explosive compound, owing to the inability of the flame to penetrate the gauze, the explosive gas does not ignite. If, however, detonation takes place, even at a distance from the lamp, then we shall produce those conditions which are favourable to the development of chemical affinity. Here is a Davy safety lamp, lighted, and now placed in an atmosphere of explosive gas. The question is, what will happen in case a shot is fired in a distant part of the mine? In the case before you the lamp is

placed at one end of a long tube, the other end of which is closed by a piece of india-rubber, and in continuation of, but detached from, the long tube there is a short tube of the same diameter. There is no communication whatever between the two tubes, and as you may notice there is a space between the ends of them. My intention is to fire a pistol at the open end of the short tube; the explosion will cause the india-rubber to be compressed, and so to act on the air in the longer tube. You probably know that if there were on the table a box with an elastic back, and a candle at the other end of the room, opposite to a hole in the front of the box, then by striking the box at the back, the candle would be blown out. Now, on firing the pistol, having its end in this short tube, the india-rubber is compressed, and the gas surrounding the Davy lamp, which is supposed to be in a distant part of the mine, at once bursts into flame. This is the same phenomenon that takes place when shots are fired in one part of a mine, and an explosion occurs in another part.

This is all well and good if it would help towards a solution of the question of regulation of the energies of these affinities if only we could delay the affinities as we delay them in gunpowder, because we might then do what Galileo did when he delayed the ball down an inclined plane; or what Kater did when he caused the pendulum to repeat itself frequently, and so record the effects of gravity; or what Atwood did when he took a small weight and caused that to fall by gravity, but distributed its effect through a large mass. The consequence was that they were enabled to observe what the law of gravity is. If, now, we could rely upon such a process of delaying the affinities as has now been mentioned, we should then have a chance of ascertaining their energies; but we cannot rely upon it for two reasons. In the first place there are a number of phenomena classed under the head of nascent actions, which constantly interfere. Let me explain what that is. At the time that certain substances are being formed, certain affinities exist which do not exist afterwards. If, for example, you manufacture hydrogen and then bring nitrogen, from another process of manufacture, into contact, they do not combine. If, however, you manufacture them both in the same vessel, they combine and form ammonia, NH_3; and hence, in the case of putrefying vegetables, there arises that peculiar ammoniacal smell. Here is some permanganate of potash, which, when dropped into this tube of coloured liquid, will produce certain phenomena, which take place owing to this nascent action—the colour will be discharged.

(*To be continued.*)

Parliamentary and Law Proceedings.

The Dishonest Dipsomaniac in Trouble.

At the Marylebone Police Court, on Thursday, August 19, James Reed, 34, described as a gentleman, living at 23, Nutford Place, Marylebone, was charged with stealing a shirt, pair of sheets, and a coat and scarf. Some two months ago the prisoner was charged at the same court with obtaining chloroform under false pretences, from a chemist in the Edgware Road, and it was then stated that he was in the habit of frequenting chemists, taking chloroform, and not paying for it. It was also stated that he had been a surgeon in the army, but on his return home from India had met with an accident and injured his right arm, and at times had fits. He had a pension of 9*s.* 6*d.* per day. The prisoner had been lodging at 23, Nutford Place for ten days, and a pair of sheets were missed last Saturday, and they were found on the previous morning at the shop of a pawnbroker, near the Edgware Road. The sheets were pawned by the prisoner last Saturday for 3*s.* 6*d.* Mr. D'Eyncourt said when the prisoner was previously before him he thought he was not in his right mind, and he would not have been discharged had not his friends given an undertaking to take care of him. The prisoner would be remanded for a week.—*Marylebone Mercury.*

Alleged Poisoning by Fungi.

On Wednesday, August 18th, Dr. Diplock concluded an inquiry at Acton Bottom respecting the death of Ruth Brooks, a domestic servant at the King's Arms Tavern. The deceased, it is said, was poisoned by eating some fungi given her for mushrooms by a gardener named George Hunt, who had a few days before threatened the inmates of the house. The evidence taken at the first hearing was to the effect that Hunt was in the habit of going to the King's Arms for his beer, and he frequently made the barmaid and the deceased presents of vegetables and flowers. On Wednesday previous he brought what he said were some mushrooms. He gave them to the barmaid over the counter, telling her at the time how to cook them. The deceased, who acted as cook, fried them as recommended, and ate some for her breakfast. She died in great pain the same evening. A *post-mortem* examination showed that she had taken an irritant vegetable poison, such as is found in various fungi. Other persons who ate of the supposed mushrooms became very ill, but recovered. Hunt, upon being cautioned, said he did not know that what he gave the girls was poisonous. Upon being questioned by a juryman he admitted that he had been refused admission to the house on Sunday morning, but he denied using threats. A lad named William Lowe deposed that about three weeks ago, on a Sunday morning, Hunt applied at the house for some beer but was refused. He then made use of bad language and said, "I'll remember you." The second witness was Mr. Thomas Slattery, a builder, who, one day prior to the eating of the fungi, went to the house where Hunt was employed. He noticed some "mushrooms" growing in the meadow, and asked Hunt whether they were good ones. He at once replied, "No they are not; they are poison." These were seen upon the spot where Hunt admitted he picked those he gave to the barmaid. The Coroner, in summing up, informed the jury that if they considered Hunt gave the fungi with a malicious motive—that was to say, for the purpose, not necessarily of causing death, but of causing pain or illness—then they must return a verdict of murder against him. The jury, after a brief consultation, returned a verdict of "Wilful murder" against Hunt, who was committed upon the coroner's warrant.—*Times.*

Wholesale Poisoning by Arsenate of Soda.

Two children have died at Blackburn from the effects of eating arsenate of soda. At the inquest it was proved that a quantity of ashes had been carted from the manufactory of Messrs. Jackson Bros., George Street West, and with these ashes there had been intermingled a quantity of arsenate of soda which in 1866 had been supplied to the Messrs. Jackson for manufacturing purposes. The deceased and twenty-eight other children had picked up the salt in question under the impression, from its crystallized appearance, that it was alum, and had sucked it. The deceased had died from its effects, and the others had also been suffering from the effects. The jury returned a verdict that the deceased had been accidently poisoned. Some of the other children were not expected to recover, but the majority are out of danger.

Prosecutions under the Adulteration Act.

The Sale of Tea and Mustard.—Conflicting Evidence.

At the Court House, Epsom, on Monday, August 18, Mr. Burnett, grocer, of Sutton, was summoned for having sold tea alleged to be adulterated. Evidence was given as to the purchase of a quarter of a pound of black tea, price 6*d.* The packet was not labelled and the buyer was not informed that it was an admixture. A certificate of Dr. Stevenson, the analyst, was produced stating that the tea was adulterated with iron filings and earthy mat-

ter to the extent of about 3 per cent. by weight, but that the adulteration would not be injurious to the health of a person drinking an infusion of the contents of the packet. For the defence it was urged that the tea was in the state in which it was imported, and that Mr. Burnett ought not to be made responsible for an adulteration, if any, that had been effected across the seas. Further it was contended that the tea was not adulterated. Witnesses were called to prove that a sample of the same tea had been forwarded to Professor Campbell for analysis, and Professor Campbell deposed that in that sample he had found no trace of filings or sand, and that it appeared to be precisely similar to the packet of tea produced in Court. The Bench then ordered that a joint analysis should be made by Dr. Stevenson and Professor Campbell and the further hearing of the case was adjourned for the purpose.

Another summons, also against Mr. Burnett, was for selling mustard alleged to be adulterated. The local inspector deposed to the purchase, at the defendant's shop, of two ounces of mustard which Dr. Stevenson's certificate now stated to be adulterated with wheaten flour and turmeric, but not injurious to the health of the consumer. Mr. C. L. Price said he had been with Messrs. Colman sixteen years. He had seen the mustard, the subject of the present inquiry ; it was known as a double superfine mustard. He said it was the custom to mix the flour of black seed and the flour of white together with a portion of wheaten flour, varying from 5 to 10 per cent., and a very small portion of matter was added to give it a uniform colour. The Government, in mixing their mustard, used black and white mustard, rice, flour, ginger, and chillies. Mustard as a condiment and food was always mixed ; it was supplied pure to hospitals ; it was not acceptable to the public when pure. Dr. T. Redwood deposed that he had analysed a portion of the mustard, and found it to contain 5 per cent. flour, and a very minute portion of turmeric ; the remainder was white and black mustard seed. He should not say it was adulterated. He thought flour improved the mustard as a condiment. For medicinal purposes mustard should be pure. When he received the portion he gave part of it to Mr. Campbell. During the twenty years he had been an analyst he had known mustard to be mixed with flour as a condiment. He believed its quality to be thus improved. He considered that flour with black and white mustard seed improved the flavour, and a little turmeric improved the colour. French mustard contained many more ingredients than English mustard. The quantities used in this mustard were beneficial. He thought it a legitimate mixture. Mr. Dugdale Campbell said he received a sample of mustard from Dr. Redwood. It contained about 7 per cent. of wheaten flour. The mustard was a very good sample indeed. The quantity used was beneficial to the flavour of the mustard. The magistrates said they considered the case proved against the defendant, and fined him 3*s.* and costs 27*s.* A case was then applied for, which was granted.

Two other similar cases were heard, in which penalties of 3*s.* fine and costs were inflicted.—*Grocer.*

At the Southwark Police Court, on Monday August 25, Charles Johnson, grocer, of Kent Street, appeared to a summons taken out against him by the Vestry of St. George the Martyr for selling adulterated mustard. The officer appointed by the Vestry stated that some mustard was purchased at the shop of defendant, which, on being examined by Dr. Muter, was found to contain flour and turmeric. The defendant said he was not aware that the mustard was adulterated. Mr. Partridge informed him that if he had bought the article as the best and genuine mustard, he would have right of action against the sellers, and there was little justice to the public if such cases were lightly passed over. The defendant had rendered himself liable to a penalty of £20. He would, however, have to pay a fine of £5 and 4*s.* 6*d.* costs. The defendant urged the magistrate to reduce the penalty, but Mr. Partridge declined to do so.

At the same Court, on the following day, James Henry Herbert, milkman, of King Street Borough, was summoned for selling milk which, upon analysation by Dr. Bianchi, had been found to be adulterated with three-tenths of water, and to be deficient in fat and cream. The defendant's brother appeared to the summons and pleaded guilty. Mr. Partridge imposed a penalty of £5 and 4*s.* 6*d.* costs. Benjamin Kirkham, milkman, of Great Charlotte Street, Blackfriars Road, appeared to answer a similar complaint. Dr. Bianchi stated he examined about a pint of what was termed milk, and found in it three parts water. Such stuff was injurious to health and particularly to children. Mr. Partridge fined defendant £5 and costs. Evan Jones, milkman, of Little Guildford Street, was also summoned for a like offence. In this case the milk was half water, and very deficient in cream and fat. Mr. Partridge fined the defendant £5 and costs, and stated his intention to deal severely with all such cases. He regarded the act as a most beneficient one for the public.—*Standard.*

Reviews.

NOTES OF A COURSE OF NINETEEN LECTURES ON NATURAL PHILOSOPHY, delivered at Guy's Hospital during the Session 1872-73. By G. F. RODWELL, F.R.A.S., F.C.S. (Churchill).

These lecture-notes are very well drawn up, and are likely to do good service, both to lecturers in the arrangement of their courses, and to students as memoranda and summaries of the facts and principles of the several branches of natural philosophy to which they refer. The definitions and theorems are plainly and concisely stated, and very clear explanations and illustrations are given of many important laws. It is needless to go into details, but we would especially direct attention to the excellent advice which Mr. Rodwell gives to the student regarding experimental proof. He says : "Let him never forget to prove a thing experimentally, remembering that a law, coupled with its practical experimental proof, is infinitely more valuable as an inducer of the proper attitude of scientific thought than fifty laws which are simply remembered without demonstration. Finally, let him strive to attain that *summum bonum* of the natural philosopher's life, the enunciation of some law of nature ; commenced by steady and laborious original experimental research ; continued by generalization and the application of suitable mental processes ; ended—*finis coronat opus*—by the development of the law."

In conclusion, it will perhaps be thought worth while to direct the author's attention to a few points which may admit of modification in future editions.

Pages 74-77.—The subject of "Light" is treated, as stated in the preface, somewhat more shortly than the other subjects ; nevertheless, we think room might have been found for a short exposition of the very important phenomenon of *total reflection ;* also of *spherical aberration*, lest the student should carry away the notion that parallel or divergent rays falling on a concave mirror, are all reflected to the same point, whatever may be the aperture of the mirror.

On page 86 it is said : "The amount of heat produced by the stoppage of a moving mass is *equal* to the mass of the moving body multiplied by the square of its velocity." Instead of "equal" we would suggest "proportional."

P. 87. "Heat having been defined as a motion of the small particles, or molecules, of matter, it is obvious that the addition of this motion to a congeries of molecules must cause them to occupy a greater space than before." We cannot see the obviousness of this conclusion. On the contrary it appears to us that a collection of particles might spin round their own axes, vibrate in straight lines, revolve round one another, and perform an endless variety of gyrations, without increasing the mean distances between their centres.

P. 114. "The neutral (magnetic) fluid of a steel bar may be decomposed *either* by powerful induction, *or* by stroking the bar in one direction with one pole of another magnet." Surely this latter method is itself inductive.

P. 115. "The magnetic meridian of a place will obviously not coincide with its geographical meridian." This is not only not obvious, but it is not even universally true : for the magnetic *does* coincide with the geographical meridian on certain points of the earth's surface, viz., all those which are situated on the *line of no declination*, which was the case with London in the year 1660, as stated on the following page.

These however are minor matters, and we end as we began, by cordially recommending Mr. Radwell's book to teachers and students.

THE AIR IN RELATION TO CLOTHING, DWELLING, AND SOIL. By Dr. MAX VON PETTENKOFER. London. 1873. Trübner and Co.

The translator of the above little book of ninety-four pages, Dr. A. Hess, has conferred a positive boon, not only upon medical men, but also upon architects and engineers. The work consists of a reprint of three lectures delivered before the Albert Society at Dresden by the author, who is Professor of Hygiene at the University of Munich. The Albert Society is a ladies' association, which chiefly aims at the preparation of capable female sick nurses and other beneficences.

Were all the many useful papers upon sanitary matters which appear in the *Revue des deux Mondes*, in *Dingler's Polytechnical Journal*, and other kindred foreign publications translated regularly and in full in papers like the *Medical Record*, the *Practitioner*, and the *Journal of Public Health*, etc., the benefit would be considerable ; but we are afraid that this is not likely to come to pass, and that we must be content with the eclectic cream of these publications. Happily an education in French and German is now almost universal, and yet, despite this, there are so many drawbacks in connection with technical nomenclature, so many idioms to master, and so on, that the best of us would perhaps prefer a reliable translation ready to hand. It would be also a decided saving of time, we would then not require to convert, for ourselves, Reaumur or Centigrade into Fahrenheit, or look up our foreign tables ; above all, we should see in pride of place our own familiar ℈ ℥ ℥ and ℔. One of the wisest things which the Commissioners of Patents could do for the technical education of the country would be to employ an extra staff of competent clerks, and, not content with giving us a translation of merely the *titles* of the articles in the foreign journals, accord us a complete interpretation of their pages, good, bad, or indifferent. They could compass this with very little extra trouble, whilst private enterprize might hesitate to cross the inky flood. The *Index to Foreign Scientific Periodicals* is, as every one knows, published every fortnight at the low sum of twopence, but how many of our readers would willingly pay twenty times the amount to have their favourite sections done in full into plain English, *Non cuivis homini contingit adire Corinthum*. By all means, therefore, let us have photographs of Corinth brought to our albums.

The first lecture treats of the relations of the air to the clothes we wear, and will be found to contain some very interesting matter. In it the subject of loss of heat is also deftly handled, loss of heat by radiation, such as follows when sitting near a cold wall, or close to a window ; loss of heat by evaporation, as when our bodies are subjected to draughts, or when one side of us faces the wind ; and loss of heat by conduction, as when our warm bodies serve but to heat the constantly impinging air. This last particular cause of loss is, of course, greater in the open air than in a room, just as the loss of heat by radiation and evaporation is greater in a room than in the open air. When persons blush they give off heat, because their cheeks are dilated with warm blood, and there is more heat to be radiated, conducted away and evaporated with the watery portion of the blood. When we fan ourselves in a hot atmosphere, the benefit which accrues in the sense of coolness, is brought about by the increase of the velocity of the air, and the consequent greater abstraction of heat by conduction. We wear clothes, too, to prevent the heat of our bodies from radiating towards the colder surroundings ; in fact, our clothes absorb this heat, and also warm the air which lies between them and the skin. In the coldest day of winter, provided we are suitably clad, we feel no sensation of cold, for the heat of our live bodies is given off to the air through the medium of the dead cloth. The nerveless feathers of birds, and the insensitive fur of animals serve the very same purpose. We lose heat therefore by all three of these natural laws, and often by a conjunction of them. When we are bathed in perspiration, for instance, there is an increased assignment of heat to the enveloping air by both conduction and evaporation.

The chapter upon the influence of the air upon our dwellings, and the dangers which attend dampness, is somewhat out of the stereotyped way, and will very amply repay perusal. So will the last chapter, which treats of the ground-air, or the relations of the air to the soil. We are inclined on the whole to consider this as the most original of the series. But it would be manifestly unfair, even if our space would allow us, to condense its matter, with the risk of spoiling it, and we therefore refer our readers to the book itself.

THE MINERAL SPRINGS OF THE UNITED STATES AND CANADA, WITH ANALYSES AND NOTES ON THE PROMINENT SPAS OF EUROPE. By GEO. E. WALTON, M.D., Lecturer on Materia Medica in the Miami Medical College, Cincinnati. New York : Appleton and Co., Broadway.

"For many years," writes Dr. Walton, "he has desired to know whether there are any medicinal virtues in mineral waters. Between the incredulity of the profession, and the credulity of the public he has thought there may be a medium of truth." Hence, this work as a result of the inquiry, and the conversion of the author from being a neutral to be an advocate of the sanative power of mineral waters.

The States and Canada are rich in mineral springs, and Dr. Walton has been to much labour in gathering the particulars of the characteristics of each, together with their chemical analyses. However, we are told that whatever the chemical analysis may show as the principal constituent, the properties of the water can only be judged by clinical experience. In the words of Trousseau, "Mineral waters are not simple medicaments ; whatever may be the predominant mineralizing agent as demonstrated by analysis, it acts not alone. Nature, in combining with the more or less notable elements which chemistry may isolate other exceedingly variable ingredients and principles which have not yet been discovered, has done for this mineralized agent that which we seek to imitate each day in our prescriptions when we endeavour to reinforce or diminish the effect of a medicinal substance by associating others with it."

"Mineral waters are only applicable to the treatment of chronic diseases," and the fact seems to the author to be incontestable that they prove more beneficial than the active ingredients given in the usual way ; but why, it is not understood.

It may be interesting for our readers to recapitulate a a few of the many virtues ascribed to them by the author :—

Alkaline waters :

(Those rich in sodic carbonate.) For uric acid gravel ; catarrh of the bladder ; chronic bronchitis ; diabetes mellitus ; they afford relief to the passing of gall stones ; and to dyspepsia accompanied with acidity.

ANALYSIS OF SOME BARKS OF CINCHONA OFFICINALIS AND ITS VARIETIES CULTIVATED AT OOTACAMUND.

BY DR. J. E. DE VRIJ.

In the beginning of this year I received from Mr. McIvor twenty-five samples of bark with the request to give him my opinion about their chemical composition. Notwithstanding the great sacrifice of time and labour, I eagerly undertook their investigation as I am firmly convinced that a great number of analyses will yet be required before we become acquainted with all the conditions required by every species of cinchona to produce the largest amount of quinine. Whilst I am still occupied with the analysis of the samples of bark belonging to other species of cinchona, I now publish the results obtained from the barks of *C. officinalis* which I have recently terminated. The numbers and descriptions assigned to them are the same as given to them by Mr. McIvor.

No. 1 is a specimen of *C. officinalis*, var. *angustifolia*, grown at Dodabetta elevation. Original bark (*lancifolia* No. 2 of Mr. Broughton's Reports) :—

19·25 grammes of dry bark yielded 1·95 grammes of mixed alkaloids = 10.13 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{6·1}{0·281}$; l=200 mm.; $a° = 18°$ ↖, was $[a]j = 195°·3$ ↖.

1·669 grammes of mixed alkaloids treated with ether yielded 1·536 grammes of alkaloids soluble in ether = 9·32 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{38·14}{1·536}$; $l = 100$ mm.; $a° = 8°$ ↖, was $[a]j = 198°·6$ ↖.

1·06 grammes of alkaloids soluble in ether yielded 1·624 grammes of herapathite = 0·917 gramme of quinine = 8·06 per cent.

19·25 grammes of bark yielded 0·178 gramme of quinovic acid = 0·92 per cent.

No 2 is ditto ditto (*lancifolia* No. 3 of Mr. Broughton's reports) :—

17·85 grammes of dry bark yielded 2·135 grammes of mixed alkaloids = 11·96 per cent. The molecular rotation, through an accident, has not been determined.

1·7558 grammes of mixed alkaloids treated with ether yielded 1·5192 grammes of alkaloids soluble in ether = 10·34 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13}{0·7096}$; $l = 100$ mm.; $a° = 12°$ ↖, was $[a]j = 219°·84$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{4·9}{0·12}$; $l = 200$ mm.; $a° = 6°·5$ ↖, was $[a]j = 132°·7$ ↖

0·805 gramme of alkaloids soluble in ether yielded 1·267 grammes of herapathite = 0·71 gramme of quinine = 9·1 per cent.

17·85 grammes of bark yielded 0·136 gramme of quinovic acid = 0·761 per cent.

No. 3 is a seedling of *C. officinalis*, grown at an elevation of 6200 feet; this is a very distinct variety, with a fine habit of growth :—

48·85 grammes of dry bark yielded 2·958 grammes of mixed alkaloids = 6·05 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13·3}{0·489}$; $l = 100$ mm.; $a° = 5°·5$ ↖, was $[a]j = 150°$ ↖.

2·483 grammes of mixed alkaloids treated with ether yielded 1·565 grammes of alkaloids soluble in ether = 3·81 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13·8}{1·565}$; $l = 100$ mm.; $a° = 15°$ ↖, was $[a]j = 132°·2$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{13·6}{0·786}$; $l = 100$ mm.; $a° = 7°·5$ ↖, was $[a]j = 130°$ ↖.

1·093 grammes of alkaloids soluble in ether yielded 1·161 grammes of herapathite = 0·656 gramme of quinine = 2·286 per cent, and 0·437 gramme of amorphous alkaloid = 1·524 per cent.

As this amorphous alkaloid proved to possess a lævogyre rotation, whilst the amorphous alkaloids which I examined before were dextrogyre, it follows that the amorphous alkaloidal matter obtained in analysing cinchona barks is not always identical, and that, therefore, more than one alkaloid must be comprehended under the general name of *amorphous alkaloid*.

The alkaloids insoluble in ether after having been transformed into neutral sulphates yielded with bitartrate of sodium 0·297 gramme of bitartrate of cinchonidine = 0·2 gramme of cinchonidine. From the mother liquor of this bitartrate I obtained by caustic soda a precipitate consisting of two alkaloids, of which the one was cinchonine, whilst the other was a new alkaloid very soluble in cold alcohol and lævogyre.

48·85 grammes of bark yielded 0·092 gramme of quinovic acid = 0·188.

No. 4 is a similar variety to No. 3, but with hairy leaves while No. 3 has smooth leaves.

46 grammes of dry bark yielded 4·91 grammes of mixed alkaloids = 10·67 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13}{0·539}$; $l = 100$ mm.; $a° = 6°$ ↖, was $[a]j = 144°·7$ ↖.

4·427 grammes of mixed alkaloids treated with ether yielded 1·995 grammes of alkaloids soluble in ether = 4·808 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{20}{1·995}$; $l = 100$ mm.; $a° = 17°·5$ ↖, was $[a]j = 175°·4$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{13·2}{0·562}$; $l = 100$ mm.; $a° = 5°·5$ ↖, was $[a]j = 129°$ ↖.

1·795 grammes of alkaloids soluble in ether yielded 2·45 grammes of herapathite = 1·384 grammes of quinine = 3·707 per cent.

The mother liquor of this herapathite did not yield any amorphous alkaloid; but instead of this 0·485 gramme of a crystallizable alkaloid, together with a dark brown resinous matter.

The alkaloids insoluble in ether, transformed into neutral sulphates, yielded by bitartrate of sodium 0·945 gramme of bitartrate of cinchonidine = 0·635 gramme of cinchonidine. From the mother liquor of this bitartrate I obtained by caustic soda a precipitate consisting chiefly of a new lævogyre alkaloid very soluble in cold alcohol and containing only traces of cinchonine.

46 grammes of bark yielded 0·115 gramme of quinovic acid = 0·25 per cent.

No. 5 is renewed bark of *C. officinalis*, eighteen months old and grown at an elevation of about 7800 feet.

41·2 grammes of dry bark yielded 1·91 grammes of mixed alkaloids = 4·63 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{7·2}{0·305}$; $l = 200$ mm.; $a° = 11°$ ↖, was $[a]j = 130°$ ↖.

1·616 grammes of mixed alkaloids treated with ether yielded 1·301 grammes of alkaloids soluble in ether = 3·727 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13·6}{0·46}$; $l = 100$ mm.; $a° = 6°·55$, was $[a]j = 193°·6$ ↖.

0·841 gramme of alkaloids soluble in ether yielded 0·987 gramme of herapathite = 0·557 gramme of quinine = 2·47 per cent.

The mother liquor of the herapathite contained chiefly amorphous alkaloid with a trace of brown resinous matter.

41·2 grammes of bark yielded 0·4344 gramme of quinovic acid = 1·05 per cent.

No. 6 is the same renewed bark but only fifteen months old.

20 grammes of dry bark yielded 1·628 grammes of mixed alkaloids = 8·14 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{7·2}{0·305}$; $l = 200$ mm.; $a° = 9°$ ↖, was $[a] = 106°·2$ ↖.

1·289 grammes of mixed alkaloids, treated with ether, yielded 1·0566 grammes of alkaloids soluble in ether = 6·672 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{12·5}{0·5016}$; $l = 100$ mm.; $a° = 5°·5$ ↖, was $[a]j = 137°$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{12·6}{0·4726}$; $l = 100$ mm.; $a° = 0°$, was found to be $[a]j = 0°$.

1·522 grammes of alkaloids soluble in ether yielded 1·83 grammes of herapathite = 1·034 grammes of quinine = 4·53 per cent.

The alkaloids insoluble in ether yielded no reaction with bitartrate of sodium, but proved to consist of cinchonine and a lævogyre alkaloid, very soluble in cold alcohol.

The determination of the quinovic acid was lost by an accident.

No. 7 is renewed bark of *C. officinalis* twenty-eight months old; elevation 7800 feet.

38·7 grammes of dry bark yielded 3·875 grammes of mixed alkaloids = 10 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{20}{1·1054}$; $l = 100$ mm.; $a° = 5°$ ↖, was $[a]j = 90°·4$ ↖.

3·52 grammes of mixed alkaloids, treated with ether, yielded 1·903 grammes of alkaloids soluble in ether = 5·406 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{20}{0·853}$; $l = 300$ mm.; $a° = 19°$ ↖, was $[a]j = 148°·5$ ↖.

1·06 grammes of alkaloids soluble in ether yielded 1·012 grammes of herapathite = 0·572 gramme of quinine = 2·917 per cent.

The alkaloids insoluble in ether yielded no reaction with bitartrate of sodium on cinchonidine; but caustic soda precipitated from their solution a mixture of cinchonine, and the before mentioned lævogyre alkaloid.

38·7 grammes of bark yielded 0·624 gramme of quinovic acid = 1·612 per cent.

No. 10.—Dodabetta original *C. officinalis*. Branch bark.

58 grammes of dry bark yielded 1·807 grammes of mixed alkaloids = 3·115 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{20}{1·807}$; $l = 100$ mm.; $a° = 10°·5$ ↖, was $[a]j = 116°·2$ ↖.

1·609 grammes of mixed alkaloids treated with ether yielded 1·355 grammes of alkaloids soluble in ether = 2·617 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{20}{1·355}$; $l = 100$ mm.; $a° = 12°·5$ ↖, was $[a]j = 184°·5$ ↖.

1·287 grammes of alkaloids soluble in ether yielded 1·532 grammes of herapathite = 0·8656 gramme of quinine = 1·76 per cent.

58 grammes of bark yielded 0·232 gramme of quinovic acid = 0·4 per cent. of herapathite = 0·8656 gramme of quinine = 1·76 per cent.

Although this amount of quinine is not great, I consider it to be relatively very large, as this was branch bark, which consisted of thin quills not thicker than a goose-pen.

No. 11.—Ditto ditto, small branch bark, but the quills still thinner than the former bark.

40 grammes yielded 0·385 gramme of mixed alkaioids = 0·948 per cent. The molecular rotation calculated from the observation $\frac{V}{p} = \frac{12·5}{0·385}$; $l = 300$ mm.; $a° = 10$ ↖, was $[a]j = 108°·2$ ↖.

0·385 gramme of mixed alkaloids treated with ether yielded 0·302 gramme of alkaloids soluble in ether = 0·743 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{16·6}{0·302}$; $l = 300$ mm.; $a° = 10°·5$ ↖, was $[a]j = 192°·3$ ↖.

The amount of alkaloids at my disposal was too small to determine the quantity of quinine.

40 grammes of bark yielded 0·092 gramme of quinovic acid = 0·227 per cent.

No. 12.—Dodabetta original *C. officinalis*. Stem-bark mossed.

40 grammes of dry bark yielded 2·914 grammes of mixed alkaloids = 7·285 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{7·6}{0·319}$; $l = 200$ mm.; $a° = 13°$ ↖, was $[a]j = 154°·8$ ↖.

2·573 grammes of mixed alkaloids, treated with ether, yielded 2·162 grammes of alkaloids soluble in ether = 6·121 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{20}{2·162}$; $l = 100$ mm.; $a° = 20°·5$ ↖, was $[a]j = 189°·6$ ↖.

2·097 grammes of alkaloids soluble in ether yielded 2·9 grammes of herapathite = 1·638 grammes of quinine = 4·781 per cent.

40 grammes of bark yielded 0·329 gramme of quinovic acid = 0·822 per cent.

No. 13.—The same, but unmossed.

40 grammes of dry bark yielded 1·914 grammes of mixed alkaloids = 4·785 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13·3}{0·799}$; $l = 100$ mm.; $a° = 10°$ ↖, was $[a]j = 166°·4$ ↖.

1·893 grammes of mixed alkaloids, treated with ether, yielded 1·645 grammes of alkaloids soluble in ether = 4·16 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13·5}{0·479}$; $l = 300$ mm.; $a° = 20°$ ↖, was $[a]j = 187°·9$ ↖.

1·16 grammes of alkaloids soluble in ether yielded 1·28 grammes of herapathite = 0·723 gramme of quinine = 2·6 per cent.

40 grammes of bark yielded 0·157 gramme of quinovic acid = 0·4 per cent.

No. 14 is a large-leaved seedling of *C. officinalis*, elevation, 8200 feet; a fine strong growing variety, of which we have only a few plants.

38·6 grammes of dry bark yielded 1·1054 grammes of mixed alkaloids = 2·86 per cent.

1·1054 grammes of mixed alkaloids, treated with ether, yielded 0·728 gramme of alkaloids soluble in ether =

1·886 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13·6}{0·728}$; $l = 100$ mm.; $a° = 3°$ ↗, was $[a]j = 56°$ ↗.

By adding an alcohol solution of iodine to a solution of these alkaloids in acidulated spirit, I did not obtain a trace of quinine-herapathite. The amorphous alkaloid which I obtained from this solution, after treating with sulphurous acid gas, etc., did not contain any trace of resinous matter, as almost always happens, more or less, but was almost colourless, and yielded, with oxalic acid, a neutral oxalate, which, placed above sulphuric acid, dried like a varnish, without yielding any trace of crystallization. My opinion that this amorphous alkaloid might be quinicine was thereby proved to be unfounded, as Mr. D. Howard has demonstrated that the oxalate of quinicine can be crystallized.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{6·8}{0·273}$; $l = 200$ mm.; $a° = 15°·5$ ↗, was $[a]j = 193°$ ↗.

Their neutral solution did not give any reaction, either with iodide of sodium or with bitartrate of sodium; it contained therefore neither quinidine nor cinchonidine. I conclude from the observed facts that the mixed alkaloids of this bark consist chiefly of cinchonine and amorphous alkaloid.

38·6 grammes of bark yielded 0·1332 gramme of quinovic acid = 0·345 per cent.

The results of my analysis of this bark lead me to the conclusion that it *cannot* be produced by a variety of *C. officinalis*. My esteemed friend Mr. J. E. Howard, to whom I communicated the results obtained from this bark, replied to me—"I am interested in your analysis of the strong growing variety, which from the results shows pretty distinctly that it is not a variety of *C. officinalis* at all, but not improbably one which I set down as *C. erythranta*."

No. 15.—Dodabetta *C. officinalis*, from an exposed place, 8400 feet of elevation :—

50 grammes of dry bark yielded 4·46 grammes of mixed alkaloids = 8·92 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13·3}{0·52}$; $l = 100$ mm.; $a° = 0°$, was $[a]j = 0°$.

3·94 grammes of mixed alkaloids, treated with ether, yielded 1·669 grammes of alkaloids, soluble in ether = 3·78 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{20}{1·669}$; $l = 100$ mm.; $a° = 10°$ ↖, was $[a]j = 119°·8$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{12·8}{0·544}$; $l = 100$ mm.; $a° = 3°·5$ ↗, was $[a]j = 82°·3$ ↗.

1·44 grammes of alkaloids, soluble in ether, yielded 1·581 grammes of herapathite = 0·8932 gramme of quinine = 2·345 per cent. From the mother liquor of this herapathite I obtained 0·468 gramme of a dextrogyre amorphous alkaloid, and also a trace of orange-yellow resinous matter.

1·845 grammes of the alkaloids insoluble in ether, transformed into neutral sulphates, did not give any reaction with iodide of sodium, and proved therefore to contain no quinidine. After this negative reaction I obtained, by the addition of bitartrate of sodium, 0·519 gramme of bitartrate of cinchonidine = 0·409 gramme of cinchonidine. From the mother liquor of this bitartrate caustic soda precipitated cinchonine containing only a trace of the often mentioned lævogyre alkaloid, which was chiefly separated by washing the dry precipitate with a little cold alcohol.

The molecular rotation of the thus purified precipitate, calculated from the observation $\frac{V}{p} = \frac{13·6}{0·843}$; $l = 100$ mm.; $a° = 13°·5$ ↗, was $[a]j = 217°·9$ ↗, which, though not identical, approaches very much to that of pure cinchonine.

50 grammes of bark yielded 0·85 gramme of quinovic acid = 0·17 per cent.

No. 16 is the same, growing on a sheltered position.

50 grammes of dry bark yielded 4·212 grammes of mixed alkaloids = 8·424 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{15·1}{0·7}$; $l = 100$ mm.; $a° = 8°$ ↖, was $[a]j = 172°·5$ ↖.

3·448 grammes of the mixed alkaloids treated with ether yielded 2·684 grammes of alkaloids soluble in ether = 6·557 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{15·5}{1·133}$; $l = 100$ mm.; $a° = 14°$ ↖, was $[a]j = 193°·2$ ↖.

1·557 grammes of alkaloids soluble in ether yielded 2·242 grammes of herapathite = 1·267 grammes of quinine = 5·34 per cent.

From the mother liquor of this herapathite I obtained a mixture of an amorphous with a crystalline alkaloid, which were both lævogyre.

The molecular rotation of the last one, calculated from the observation $\frac{V}{p} = \frac{6·1}{0·255}$; $l = 200$ mm.; $a° = 3°$ ↖, was $[a]j = 35°·9$ ↖.

50 grammes of bark yielded 0·342 gramme of quinovic acid = 0·684 per cent.

No. 17. Neddiwattum *C. officinalis*, from an exposed position; elevation, 5800 feet :—

50 grammes of dry bark yielded 2·863 grammes of mixed alkaloids = 5·726 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13·7}{0·594}$; $l = 100$ mm.; $a° = 4°·5$ ↖, was $[a]j = 103°·7$ ↖.

2·734 grammes of mixed alkaloids treated with ether yielded 1·525 grammes of alkaloids soluble in ether = 3·194 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{14·5}{0·609}$; $l = 100$ mm.; $a° = 7°·5$ ↖, was $[a]j = 178°·5$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{13·5}{0·928}$; $l = 100$ mm.; $a° = 3°$ ↖, was $[a]j = 43°·6$ ↖.

0·928 gramme of alkaloids soluble in ether yielded 0·725 gramme of herapathite = 0·4096 gramme of quinine = 1·41 per cent.

From the mother liquor of this herapathite I obtained 0·467 gramme of an amorphous alkaloid, which was almost colourless.

Its molecular rotation, calculated from the observation $\frac{V}{p} = \frac{12·7}{0·467}$; $l = 100$ mm.; $a° = 3°$ ↖, was $[a]j = 81°$ ↖.

The alkaloids insoluble in ether, transformed into neutral sulphates, proved to contain no cinchonidine, as they showed a negative reaction with bitartrate of sodium. They consisted chiefly of the before mentioned lævogyre alkaloid, very soluble in cold alcohol, and a little cinchonine.

50 grammes of bark yielded 0·31 gramme of quinovic acid = 0·62 per cent.

No. 18. Dodabetta *C. officinalis*. Manured :—

50 grammes of dry bark yielded 5·83 grammes of mixed

alkaloids = 11·66 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13·3}{0·6}$; $l = 100$ mm.; $a° = 8°·5$ ↖, was $[a]j = 188°·4$ ↖.

3·589 grammes of mixed alkaloids treated with ether yielded 3·082 grammes of alkaloids soluble in ether = 10·01 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13·5}{0·969}$; $l = 100$ mm.; $a = 15°$ ↖, was $[a]\ j = 208°·9$ ↖.

1·245 grammes of alkaloids soluble in ether yielded 1·53 grammes of herapathite = 0·8644 gramme of quinine = 6·95 per cent.

From the mother liquor of this herapathite I obtained 0·344 gramme of lævogyre amorphous alkaloid.

50 grammes of bark yielded 0·475 gramme of quinovic acid = 0·95 per cent.

No. 19. The same unmanured.

50 grammes of dry bark yielded 4·183 grammes of mixed alkaloids = 8·366 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{12·7}{0·503}$; $l = 100$; $a° = 7$ ↖, was $[a]j = 176°·7$ ↖.

3·59 grammes of mixed alkaloids treated with ether yielded 2·703 grammes of alkaloids soluble in ether = 6·3 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{14·3}{1·157}$; $l = 100$ mm.; $a° = 15°$ ↖, was $[a]j = 185°·4$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{13·3}{0·806}$; $l = 100$ mm.; $a° = 6°$ ↖, was $[a]j = 99°$ ↖.

0·887 of these alkaloids yielded 0·372 gramme of bitartrate of cinchonidine = 0·25 gramme of cinchonidine. From the mother liquor of this bitartrate I obtained by caustic soda a precipitate consisting of the oft-mentioned lævogyre alkaloid, very soluble in cold alcohol, in which I could not find with certainty any trace of cinchonine.

0·962 gramme of alkaloids soluble in ether yielded 1·013 grammes of herapathite = 0·572 gramme of quinine = 3·75 per cent.

From the mother liquor of this herapathite I obtained 0·338 gramme of almost colourless amorphous alkaloid, and a trace of orange-coloured resinous matter.

The molecular rotation of the amorphous alkaloid, calculated from the observation $\frac{V}{p} = \frac{10}{0·338}$; $l = 200$; $a° = 6°·5$, was $[a]j = 96°·1$ ↖.*

I conclude this series of investigations by putting the results into a tabular form, in which, however, I have omitted the results obtained from No. 14 as that bark is considered by me not to belong to *C. officinalis*.

* I wish it to be understood that I do not and never did consider the alkaloid designed by me under the name of *amorphous alkaloid* to be a definite pure substance. As I never had more than a fraction of a gramme of it at my disposal, every one acquainted with this kind of investigation will easily comprehend that it was impossible for me to do more than to state its presence and its quantity. In the present investigation I went a step further and determined in some cases its molecular rotation. But this also I consider only of a relative and not of an absolute value. So for instance I found dextrogyre, lævogyre and inactive amorphous alkaloids in the course of my investigations, and it is very possible that a bark may contain more than one of them, which mixtures will naturally possess different rotations and sometimes none at all.

Amount of mixed alkaloids and of quinine contained in sixteen specimens of bark, from C. officinalis, *and its varieties, grown under different conditions, by Mr. W. McIvor, at Ootacamund* :—

100 Parts of Bark, dried at 100° C., contain :

No.	Mixed alkaloids.	Molecular rotation lævogyre.	Alkaloids soluble in ether.	Molecular rotation lævogyre.	Pure quinine.	Crystallized sulphate of quinine.	Quinovic acid.
1	10·130	195°	9·320	198°·6	8·600	10·199	0·920
2	11·960	not determd.	10·340	219°·8	9·100	11·609	0·761
3	6·050	150°	3·870	132°·2	2·286	2·914	0·188
4	10·670	144°·7	4·808	175°·4	3·707	4·725	0·250
5	4·630	130°	3·728	193°·6	2·470	3·136	1·050
6	8·140	106°·2	6·742	137°	4·430	5·775	not determd.
7	10·000	90°·4	5·406	148°·5	2·917	3·718	1·612
10	3·115	116°·2	2·617	184°·5	1·760	2·243	0·400
11	0·948	108°2	0·743	192°·3	not determd.		0·227
12	7·285	154°·8	6·121	154°·8	4·781	6·095	0·822
13	4·785	166°·4	4·160	187°·8	2·600	3 314	0·400
15	8 920	0°	3 780	119°·8	2·345	2·989	0·170
16	8·424	172°·5	6·557	193°·2	5·340	6·807	0·684
17	5·726	103°·7	3·194	178°·5	1·410	1·797	0·620
18	11·660	188°·4	7·940	209°	6·950	8·860	0·950
19	8·366	99°	6·300	185°·4	3·750	4·780	0 758

THE "PITURI": A NEW NARCOTIC.*

Dr. G. Bennett, writing in the *New South Wales Medical Gazette*, vol. iii. no. 8, May, 1873, some notes on Queensland, says that Mr. Hill gave him a preparation obtained from the leaves of a plant named by the aborigines of the interior "Pituri." It was obtained by Mr. James Gilmour, when in search of Dr. Leichhardt, from the natives, in the form of dried leaves, and was used by them as a stimulating narcotic, in a similar manner to the betel of the East, and forming a substitute for tobacco. It was erroneously labelled on the bottle containing the preparation "Pituri Oil," for, on examination, it was found to be spirituous, as if the leaves had fermented in the act of distillation. The botanical character of the plant could not be ascertained, from the leaves received being dried and in so pulverized a state that a perfect leaf could not be found. Mr. Hill stated that he had found that the effects of a teaspoonful of this liquid in a glass of water was to produce a burning sensation in the stomach, followed by a vomiting and giddiness.

The following is an abstract of a paper read before the Queensland Philosophical Society, March, 1872, on the Pituri, by Dr. Bancroft :—

"On February 9th of this year I obtained from Mr. Gilmour a quantity of dried leaves, and the particulars here narrated, of a plant used by the natives as a stimulating narcotic. These leaves, called "Pituri" were obtained in the neighbourhood of the waterhole Kulloo, eight miles beyond Eyre's Creek.

"The use of the pituri is confined to the men of a tribe called Mallutha, all the males of which tribe are circumcised.

"The pituri is carried in neatly made oval pointed bags, specimens of which Mr. Gilmour has brought.

"The old men, before any serious undertaking, chew these dried leaves, appearing to use about a tablespoonful. A few twigs are burnt, and the ashes mixed therewith. After a slight mastication, the bolus is placed behind the ear, to be again chewed from time to time, the whole of which is at last swallowed. The native after this is in a sufficiently courageous state of mind to fight or undertake any serious business.

* From the *London Medical Record*.

"One old man, with whom Mr. Gilmour and party fell in, refused to have anything to say or do until he had chewed the pituri; after which he rose and harangued in grand style, ordering the explorers to leave the place. The pituri caused a severe headache in persons who tried it. The dust given off in examining the leaves causes sneezing."

The above is the information supplied by Mr. Gilmour. Mr. Wills' diary from Cooper's Creek homeward (p. 283) has the following:—"May 7, 1861. In the evening various members of the tribe came down with lumps of nardoo and handfuls of fish, until we were positively unable to eat any more. They also gave us some stuff they call bedgery or pedgery; it has a highly intoxicating effect when chewed even in small quantities. It appears to be the dried stems and leaves of some shrub.

"The pituri consists of leaves broken into small particles, and mixed with acacia leaves, small dried berries containing reniform seeds, and unexpanded flower-buds of the shape of a minute caper."

After describing in detail some experiments he made with an infusion of the pituri, Dr. Bancroft thus enumerates its effects:—

"1. Period of preliminary excitement from apparent loss of inhibitory power of the cerebrum, attended with rapid respiration; in cats and dogs, with vomiting, and profuse secretion of saliva.

"2. Irregular muscular action followed by general convulsion.

"3. Paralysis of respiratory function of medulla.

"4. Death, or

"5. Sighing inspirations at long intervals.

"6. Rapid respiration and returning consciousness.

"7. Normal respiration and general torpidity, not unattended with danger to life."

The poison given by the mouth acts with less vigour; when it is injected into the intestines the results are more certain. The animal has a longer stage of excitement, the convulsive fit is not so severe, and recovery is more certain. Torpidity remains for some hours.

A quarter of a drop injected under the skin of a rat causes excitement; the animal starts with slight noises, may fall over a few times from very strong muscular irregularities, remains excitable for some time, then gradually becomes torpid.

In small medical doses we may expect to find the period of the excitement and the torpidity to be the only marked symptoms. In cats and dogs the excitement is not marked, but vomiting of a violent kind occurs.

Some leaves of a tree of the natural order *Lauraceæ*, and of the genus *Tetranthera*, used medicinally by the aborigines of New South Wales, were given to Dr. Bennett, which had been brought from the Bogan and Darling, where they are smoked by the aborigines for pains in the head and other ailments. It is called by them Yarran. The leaves have also been smoked by Europeans, and found beneficial in cases of asthma. The tree grows from twelve to fifteen feet high; the wood is hard, and used by the aborigines for clubs.

The editor of the *New South Wales Medical Gazette* adds that at the Cape of Good Hope there is a Composite plant, the *Parchonanthus camphoratus*, Linn., the leaves of which, when dried, are smoked by the Hottentots and bushmen instead of tobacco, exhibiting slight narcotic effects. In the form of infusion they promote perspiration, and are said to be useful in spasmodic asthma. The wild dagga (*Leonotus leonurus*, R. Brown), which bears very beautiful flowers and belongs to the order *Labiatæ*, is abundant at the Cape, and is also smoked by the Hottentots instead of tobacco, with similar narcotic symptoms to the preceding.

OIL OF CHAMOMILE.*

BY E. DEMARÇAY.

Having had occasion to prepare angelic acid by means of the essential oil of chamomile, the author collected a quantity of the liquid which Gerhardt considered to be a carbide of hydrogen, and to which he gave the name of camomillene. Having noticed that it presented characters differing from those attributed to it by Gerhardt, M. Demarçay made a closer investigation of the substance, the results of which he has recently communicated to the French Academy.

According to Gerhardt, the oil would be a mixture of a small quantity of resinous matter, of hydride of angelyl, and a carbide of hydrogen, boiling at 175°C., isomerous with oil of turpentine. He supposed that the hydride of angelyl would possess a boiling point approaching closely to 175° C., and that that circumstance, added to the presence of the resinous matter, would explain, on the one hand, the impossibility of separating the different principles of the oil, and on the other the gradual elevation of its boiling point. He based his conclusions on the disengagement of hydrogen when the oil was heated with potash and the production of angelic acid.

This conclusion M. Demarçay holds to be incorrect, the disengagement of hydrogen being a pure illusion. In fact, the oil can be decomposed without the least trace of gas being observed, while the same products of decomposition are obtained.

The oil yielded the following relative results at the boiling points of its different portions:—

At 150° C. ebullition commenced, but up to about 173° C. only a few drops passed over.

From 173° to 185° C. there passed over 32 per cent. of the oil.

From 185° to 200° C. there passed over 40 per cent. of the oil.

From 200° to 250° C. there passed over 17 per cent. of the oil.

The distillation was then stopped, the brown oily residue, which formed about one-tenth of the oil, appearing to decompose.

In re-distilling the fractional portions, a slight lowering of the boiling points was observed, and also points of stoppage between 177° and 184° C., about 194° C. and 200° C.; above 230° C. a very few drops passed, the retort then containing a small proportion of a thick liquid. Operating upon small quantities of the oil, the author was able to collect the peculiar products at the above temperatures, but found it difficult to isolate them in a state of purity.

The action of alcoholic potash and fused potash upon the oil produced identical results, provided the latter was shaken with the oil several times, or until it had no further action. This latter process, however, occasioned considerable loss of the volatile products, leading the author to prefer the former. To the oil dissolved in its volume of alcohol, its weight of potash was added in small fragments, and the whole was shaken together in a well-stoppered bottle until the potash was dissolved. After thirty-six hours the liquid had formed a mass, to which was added its volume of water. It was then distilled, first in a water bath and next over a flame, until nothing but water passed over, and the products of the two distillations were mixed. The residue was covered with a thin layer of liquid that solidified upon cooling.

The distilled portion, after the addition of carbonate of potash, separated into two layers, the upper of which, containing all the products of distillation, was dried over solid carbonate of potash, then over anhydrous baryta, and finally submitted to distillation. Ebullition commenced at 80° C. By fractional distillation a first liquid was obtained passing over at below 100° C., this was alco-

* *Comptes Rendus*, vol. lxxvii., p. 360.

hol; the remainder passed over between 105° and 160° C., and by repeated rectification was separated into two products, one boiling between 107° and 109° C., and the other between 129° and 132° C.

The first of these products gave an iodide boiling between 119° and 121° C. Examined comparatively with butylic iodide it presented exactly the same reactions. Analysis of the product showed that it possessed exactly the composition of butylic alcohol.

The second body formed an iodide boiling between 144° and 146° C. It proved by its reactions and by analysis to be amylic alcohol.

The oil when treated with fused potash gave exactly similar products, and the author was in this way able to ascertain the complete absence of ethylic and propylic alcohols.

A small quantity of distillate which passed over at above 135° C. had the odour of the residues of distillation of amylic alcohol, and presented the appearance of a mixture of alcohols, and a mixture of the iodides and acetates of those alcohols was obtained from it. These products had the odour of corresponding amylic compounds, but boiled at a higher temperature, the iodides rising to 170° C., which seemed to indicate the presence of a higher alcohol. In explanation of the difference of his results from those of Gerhardt, the author suggests that the presence of the alcohols escaped the notice of that chemist through the drying of his product over chloride of calcium, which combines with alcohols.

The mixture of potash salts remaining in solution after the distillation of the alcohols gave with sulphuric acid an oily layer equal in weight to nearly half the essential oil operated upon. This layer was composed of angelic and valerianic acids, very difficult to separate either by cooling or by distillation. The method that succeeded best was to etherify the mixture, and then to separate the two ethers. The valerianic acid which was present in smaller proportion than the angelic acid appeared to differ somewhat from the ordinary acid.

From the foregoing facts the author concludes that oil of chamomile is a mixture of several ethers among which the angelates and valerianates of butyl and amyl predominate. To control this hypothesis he prepared the angelates of butyl and amyl and also analysed portions of the essential oil. The angelate of butyl boils at 177° to 179° C.; its odour recalls that of the oil, but is not identical. The angelate of amyl boils at 198° to 200° C.; its odour much resembles that of the preceding compound. The analysis also confirmed the supposition, camomillene giving the figures of valerianate of butyl. Like the ethers also the oil combines with metallic chlorides.

Thus composition, boiling point, and manner of decomposition all agree in indicating that oil of chamomile should be looked upon as a mixture of ethers and not as an aldehyd.

PRELIMINARY NOTICE OF A NEW KIND OF PLASTER.*

BY L. E. SHAEL.

It is no uncommon practice among physicians to order an aqueous compound and an oily substance together in the form of a plaster. Commonly this case could be managed without producing serious complications, but when the mixture is to be applied upon another plaster, previously spread, then the skill of the dispenser is unduly taxed. Sometimes such directions could not be carried out by common means, and, therefore, it becomes optional with the compounder to change the character of the ingredients, or their proportion and quantity, as prescribed, or make additions which will afford the necessary consistency; or in the event of non-compliance with the indications, fail in the attempt, and without really good cause sacrifice his reputation.

When the prescription is impossible, according to its letter, a conscientious pharmacist will always reserve to himself the necessary license to construe and execute it according to the spirit, as prompted by the occasion, an action justified by common reason, and conceded by the interests of both professions, and hence an operator deficient in this amount of judgment and application is unqualified to serve at the dispensing counter.

The physician desiring a certain combination, writes for a number of ingredients, in the proportion desired; but being himself no pharmacist, and therefore utterly unskilled in the art, consequently expects that the operator, with the proper capacity, will elaborate the prescription, according to the art of pharmacy, and the spirit of the order.

This, however, does not imply uncalled for substitutions or mercenary interference with the quantities of expensive ingredients, neither does it confer the privilege of dispensing pills for powders, or liquid mixtures in the place of these, nor does it justify the dispensing of a greater quantity of medicine than the physician directs.

Utterly impossible combinations, or dangerous mixtures or doses, are, of course, from *primâ facie* evidence, referred to their author for correction or revision. A thoroughly competent pharmacist will never constitute himself the umpire in regard to the pathological merits of any case as appears from a prescription; a doubt in this regard does not find elucidation within the confines of the pharmacal art.

Now, however, if it is ordered to apply to the square inch of surface of a plaster of some particular kind, previously spread, an additional quantity of five to ten grains each of some solid extract and some fixed or volatile oil, then it requires the intervention of another agency which will harmonize these extremely heterogeneous elements. The solid extract must necessarily first be softened with a small proportion of water; it will even then adhere only with difficulty to the plaster, but much more so after the addition of the oily substance, which produces a mixture that in most cases instantly separates when in a state of rest, and possesses no adhesiveness whatever. More oil or more extract would avail nothing, neither would a more solid fatty ingredient be of much consequence, but the incorporation of a moderate quantity of powdered tragacanth affords the desired medium by which the mixture can be made to assume an adhesive, compact, and uniform character, and thus be easily applied upon the plaster, which by aid of its exposed margin will stick firmly and securely to the position in which it is placed on the skin.

Other plasters can be produced by the aid of powdered tragacanth, whereby large quantities of oil or extract can be employed, when spread upon sheets with an adhesive margin. In every case the extract is first liquefied with water and a small proportion of glycerin, the oily substance added, then thickened with powdered tragacanth, and finally spread upon any desirable base with an adhesive margin.

* From the *Pharmacist* for August, 1873.

NEW ZEALAND NATIVE DRUGS.

In an article upon the 'Useful Plants of New Zealand,' quoted in the *Gardeners' Chronicle*, from the *Auckland Almanac*, it is stated that many species of native plants furnish drugs which might be made serviceable articles of export. The "Supplejack" gives a good substitute for sarsaparilla; the gum of Phormium is invaluable for severe burns, scalds, and wounds; the gum of the Ponga (*Cyathea medullaris*) is a vermifuge; *Pelargonium clandestinum* (the Kopata) and *Geranium microphyllum*, both of which are common in the province, afford good substitutes for arnica; the inner bark of the Pohutukaua and Rata, and the root bark of the Bramble (*Rubus australis*), are of great value in diarrhœa and dysentery; but the want of space forbids mention of many interesting objects in this section.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 6, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BRADFORD MEETINGS.

AFTER fifteen years of wandering through Great Britain and Ireland, the British Association for the Advancement of Science will, in a few days, again visit the shire in which it first saw the light. When the Association held its inaugural meeting at York, in 1831, under the presidency of the late EARL FITZWILLIAM, few would have predicted for it such a development of vigorous scientific life. At each successive visit to the county,—again to York in 1844; to Hull in 1853; and to Leeds in 1858,—it has shown increased strength and vitality, fresh sections and subsections have indicated the widening of its grasp and the extension of its influence; and it will meet at Bradford with the prestige of a meeting last year at Brighton perhaps on the whole unparalleled in the history of science. The single source of regret is, that through the illness of the President-Designate, Dr. JAMES PRESCOTT JOULE, the Association will lose the inestimable services of a man whose work is appreciated far more widely than his name is known.

The British Pharmaceutical Conference, however, will now visit Yorkshire for the first time, and, under the presidency of its first treasurer, will gather within a few miles of the home of one of the gentlemen to whose early services, as general secretaries, the Conference owes so much of its prosperity. Bradford, *per se*, has perhaps little that would tempt the fagged pharmacist to spend a portion of his dearly-won holiday there. The seat of the worsted manufacture, with its "palatial warehouses," would fail to charm those who are weary of looking at similar sights, and who remember the last year's visit to London-surmer; but it stands within easy reach of much that is worth seeing in a county second to none in antiquarian, historic, botanic, geologic, or scenic interest.

But before proceeding further it is worthy of note that Yorkshire still carries off the palm for the number of its pharmaceutical organizations. Of the twenty-seven societies, more or less engaged in pharmaceutical education, reported on by the Provincial Education Committee of 1870, seven, or more than one-fourth, were situated in that county, namely, those at Bradford, Halifax, Hull, Leeds, Scarborough, Sheffield, and York. The societies at Scarborough and York have scarcely shown any further sign of their existence, but enough remain still to give to Yorkshire pharmacists the pre-eminence in this respect, although even here the provincial societies are in a somewhat drooping condition. At the last annual meeting of the Bradford Chemists' Association, the President regretted the slight evidence of progress, and that the only class formed—a botanical class—had been poorly attended. From a resolution passed, this Association appears to put a low estimate upon its innate educational powers, and favours the suggestion of teachers being employed by the Pharmaceutical Society to travel from town to town. It is to be hoped, however, that the Conference meeting will give a stimulus similar to that which it has hitherto given at every place of meeting, and leave the Bradford pharmacists with a better knowledge of each other, and a less desponding view of their qualifications. Ten miles off, at Leeds, the Association is in the eleventh year of its existence. The last report spoke of a decrease in the number of members; but the position taken by the Associates of this Society in the examination of the Science and Art Department has been very favourable. This seems to be worthy the notice of the Sheffield Pharmaceutical and Chemical Association, which expressed disapproval of Mr. SCHACHT'S scheme on the ground that the mere payment of £1 or £2 to students passing the local examinations would, in that locality, prove comparatively insignificant and totally inadequate. Here again the annual report speaks of indifference, shown by decrease in attendance at the meetings; but a redeeming feature is the establishment of a Pharmaceutical Students' Association, which it is pleasant to hear is in a prosperous condition. Seven miles from Bradford is Halifax, where the Chemists and Druggists' Association being recently in possession of a small financial surplus resolved to spend it in forming the nucleus of a library of reference. Stretching across the county eastward, Hull is reached with its Chemists' Association, whose late president, Mr. ATKINSON PICKERING, has more than once vigorously expressed his opinion upon the duty of the Council of the Pharmaceutical Society respecting provincial pharmaceutical education, and the manner in which it has been performed. Official *laches*, if any, have not prevented the Hull people from doing their duty; a system of education for pharmaceutical students has been provided by them, which is described as second to none in the kingdom, and, what is quite as much to the purpose, the students have availed themselves of it in numbers exceeding expectation. Should the Hull Association ever cease to run alone, may it still be able to make as satisfactory a report!

At present no intimation of the number or nature of the papers to be read at the Conference meeting has been given, though doubtless they will be well up to the mark, and will be heralded by an address from the PRESIDENT worthy of his established

reputation. In the absence of business, therefore, the thoughts may well be excused for foretasting the holiday which many have resolved shall follow this year's scientific meetings in the North.

Bolton Abbey is the spot to which the local committee of the Conference invite the members to accompany them on Friday, the 19th inst.; a place famous for natural beauty and traditional interest, the name of which, being linked with some of WORDSWORTH'S most beautiful poetry, will be remembered as long as the English language shall last. In his 'History of the Deanery of Craven,' Dr. WHITAKER thus paints it, in language which it would be a pity to curtail :—

"Bolton Priory stands upon a beautiful curvature of the Wharfe, on a level sufficiently elevated to protect it from inundation, and low enough for every purpose of picturesque effect. Opposite to the east window of the priory church the river washes the foot of a rock nearly perpendicular and of the richest purple, where several of the mineral beds which break out, instead of maintaining their usual inclination to the horizon, are twisted by some inconceivable process into undulating and spiral lines. To the south all is soft and delicious : the eye reposes upon a few rich pastures, a moderate reach of the river, sufficiently tranquil to form a mirror to the sun, and the bounding hills beyond, neither too near nor too lofty to exclude, even in winter, any portion of his rays. But, after all, the glories of Bolton are on the north. Whatever the most fastidious taste could require to constitute a perfect landscape is not only found here, but in its proper place. In front, and immediately under the eye, is a smooth expanse of park-like enclosure, spotted with native elm, ash, etc., of the finest growth : on the right a skirting oak wood, with jutting points of grey rock ; on the left a rising copse. Still forward, are seen the aged groves of Bolton Park, the growth of centuries ; and further, yet, the barren and rocky distances of Simon Seat and Bardon Fell, contrasted with the warmth, fertility, and luxuriant foliage of the valley below."

Is the visitor imaginative ? He may fancy he can hear still ringing through the air the puzzling question—

"What is good for a bootless bene ?"

which the LADY ALICE—bereaved mother !—answered by rearing the stately priory. He may wander up the river to the "Strid," where the "lordly Wharfe" is "pent in with rocks on either side," and see the tragedy enacted o'er again in which young ROMILLY lost his life :—

"He sprang in glee,—for what cared he
That the river was strong, and the rocks were steep ?
But the greyhound in the leash hung back,
And checked him in his leap.

"The boy is in the arms of Wharfe,
And strangled by a merciless force ;
For never more was young Romilly seen
Till he rose a lifeless corse."

Past the chantry door, looking through the "chink in the fractured floor," he may conjure up the CLAPHAMS and MAULEVERERS—

"Buried upright;
There, face by face, and hand by hand;"

or go out into the churchyard and see the white doe of Rylstone loitering there. To Bolton Priory, too, came the good HENRY CLIFFORD the "Shepherd-lord," who—to save his life from the Yorkists, after the bloody field of Towton, upon which his father fell—was put to lead the lowly life of a shepherd. When King HENRY VII. came to the throne the estates were restored, and although CLIFFORD was then thirty-one, and could neither read nor write, he worked with such good purpose as to win a reputation for learning in astronomy and alchemy.

"Choice of studious friends had he
Of Bolton's dear fraternity ;
Who, standing on this old church tower,
In many a calm propitious hour,
Perused, with him, the starry sky;
Or, in their cells, with him did pry
For other lore—through strong desire
Searching the earth with chemic fire."

But Bolton Abbey is not the only place in the county associated with letters that the world will not willingly let die. Haworth, the home of the BRONTE family, is not far from Bradford. EUGENE ARAM'S crime, the theme of BULWER'S tale and HOOD'S poem, was committed near Knaresborough, and he himself was tried and executed at York. And away in the north, near the borders of Durham, are Rokeby, and Bowes, where it is said the original Dotheboys Hall stood. Yorkshire is also the scene of many of ROBIN HOOD'S exploits. JAMES MONTGOMERY was educated at Fulneck and imprisoned in York Castle for libel. EBENEZER ELLIOTT was born at Masborough.

One more name may be mentioned, for the sake of its associations, though not so well-known as several that are omitted. It is that of a friend of DRYDEN, POPE, and ADDISON ; of a man who was glad to die at forty-one to get rid of the trouble of taking off his shoes—Sir SAMUEL GARTH, the author of the *Dispensary*. At the end of the seventeenth century there existed a very pretty quarrel between the College of Physicians and the apothecaries. The latter had ventured to prescribe as well as to compound medicines, and the physicians to outbid them in popularity advertised that they would give advice gratis to the poor and establish a dispensary of their own for the sale of cheap medicines. Sir SAMUEL rushed into the fight with his satire, in which, not satisfied with speaking for his friends the physicians, he constructed speeches for his opponents. This is the strain in which he made COLOCYNTHUS, an apothecary, talk :—

"Couldst thou propose that we, the friends of fates
Who fill churchyards, and who unpeople states,
Who baffle nature and dispose of lives, . . .
Should e'er submit to their despotic will,
Who out of consultation scarce can skill ?
The towering Alps shall sooner sink to vales,
And leeches in our glasses swell to whales. . .
Our properties must on our arms depend,
'Tis next to conquer bravely to defend."

Had Sir SAMUEL GARTH lived in the present day he might have ranked as first pharmakophobist on the *Lancet* staff. Dr. PRIESTLEY—of whom it was said that "no one ever entered on the study of chemistry with more disadvantages and yet few have occupied a more dignified station in it"—was a native

of Yorkshire ; so also were Professor PHILLIPS and Professor SEDGWICK, both past Presidents of the British Association.

The numerous mineral springs constitute another feature in the county, not without interest to the pharmacist. The principal of these are—Aldfield (slightly sulphureous) ; Askerne (weak saline aperient, and slightly sulphureous) ; Boston Spa (saline) ; Bridlington Quay (chalybeate) ; Croft (strongly sulphureous) ; Filey (saline aperient) ; Guisborough, the first place in England where alum works were erected (sulphureous) ; Harrogate (sulphureous and chalybeate)* ; Horley Green (aluminous and strongly chalybeate) ; Hovingham (stimulating and aperient) ; Knaresborough (carbonated alkaline) ; Malton (strong saline chalybeate) ; Scarborough (saline chalybeate). Near Ilkley are two hydropathic establishments, one at Ilkley Wells, the other at Ben Rhydding, where there is also a compressed air bath. Those who enjoy the luxuriously appointed baths of the present day may contrast them with HUMPHREY CLINKER'S experience of those at Harrogate in his time :—

"At night I was conducted into a dark hole on the ground floor, where the tub smoked and stunk like the pit of Acheron in one corner, and in another stood a dirty bed, provided with thick blankets, in which I was to sweat after coming out of the bath. My heart seemed to die within me when I entered this dismal bagnio, and found my brain assaulted by such insufferable effluvia. After having endured all but real suffocation for above a quarter of an hour in the tub, I was moved to bed and wrapped in blankets. There I lay a full hour, panting with intolerable heat."

As to the many other objects of interest in the county : the battle-fields—such as Stamford Brig, where HAROLD fought and conquered before marching for Hastings ; Wakefield, Towton, and others associated with the white and red roses ; Marston Moor, fatal to royalists—do they not form part of the national history ? The dales and vales, the moors and fells, the abbeys and castles, the churches and towers ; Scarborough, "the queen of English watering-places," with her sisters from Redcar on the north to Withernsea on the south, are they not described in the Guide Books ? This "gossip" has lasted long enough. *Vale !*

ALEPPO DRUGS.

ONE of the points of interest in the recent report of Mr. SKENE, her Majesty's Consul at Aleppo, is that the seeds of the Palma Christi (*Ricinus communis*) have for the first time been brought forward as an article of exportation from that province. The plant has been cultivated there for many years, and is always sown in alternate rows with sesame, prospering equally well. In 1872 the produce was of such excellent quality and so abundant that with a hope of extending its cultivation should the consignment be as successful as similar ones from Egypt, 230 sacks of seed, weighing nine tons, were exported to France, Italy, and Germany, at a cost of 55,000 piastres.

Six-sevenths of the scammony exported from Aleppo in 1872 was consigned to England and the remainder to France, the whole amounting to 737 cases, weighing 1456 cwt., and costing at the shipping port 210,000 piastres. This was a low price and resulted from the dishonest cupidity of the collectors, who have adulterated the product more than ever. The *Convolvulus Scammonia* grows plentifully upon the slopes of Mount Amanus ; the scammony collected is of good quality and if it were not adulterated would command a much higher price.

As an illustration of the important modification which a branch of commerce may undergo through the influence of scientific discovery, the fact may be instanced that gall nuts, an article of local produce, no longer occupy the place in British trade with North Syria that they did before other chemical appliances had displaced them in the arts of tanning and dyeing in England. Only a quarter of the yield of 1872 was sent to this country. The quantity gathered from the dwarf oaks on the mountains of the province during the year, although more than double that of 1871, did not amount to one-half the product of former years, when the demand was greater than now.

The opening of European apothecaries' shops, in the place of those of the Asiatic drug-selling grocers in the bazaars of Aleppo has created a trade which is becoming prosperous. A large quantity of drugs was imported in 1872 ; but it is impossible to determine what proportion of them was sold, or at what prices, because they form a branch of the gains of the medical profession, each practitioner having his own dispensary, while the *ad valorem* import duty, registered at the custom-house, is entirely fictitious, representing, perhaps, only a small fraction of the real value.

It is also interesting to note that the use of henna is on the decline, that appearing in the markets of North Syria being inferior in quantity and quality, and the import of 1872 not having found a ready or remunerative sale. The use of it is thoroughly an oriental custom, and although women are still seen with their hands and horses with their tails dyed with henna, its use is rapidly going out like other Eastern fashions, which are receding as those of Europe advance.

MR. W. W. STODDART, Pharmaceutical Chemist, of Bristol, has been appointed, under the Adulteration Act, Public Analyst to the City and County of Bristol, at a salary of £100 per annum, and £50 per annum for laboratory expenses.

WE regret to learn that Mrs. HANNAH GREAVES, who was in 1870 elected as an annuitant on the Benevolent Fund, died on the 30th August, aged 80 years.

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* A very interesting series of specimens, showing the saline residues of one pint (20 oz.) of each of the Harrogate waters, prepared by Mr. Davis, Pharmaceutical Chemist, of Harrogate, is exhibited in the Museum of the Pharmaceutical Society.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

September 3rd, 1873.

MR. JOHN WILLIAMS, TREASURER, IN THE CHAIR.

Present—Messrs. Betty, Greenish, Hampson, Owen, Robbins, Savage, Stoddart, Sutton, and Urwick.

The minutes of the previous meeting were read and confirmed.

The New Bye-Laws.

The Chairman reported on what had taken place between Mr. Simon and the deputation recently appointed to wait upon him. It appeared to be the opinion of the Privy Council that as they could not accept the Bye-Laws in their present form, on account of the alteration in the Bye-Law referring to the election of a President or Vice-President of the Society to the Board of Examiners within six months of leaving office, the whole of the Bye-Laws should be formally reconsidered and approved. This, however, would be a troublesome process, and the deputation suggested that the Privy Council should accept the new Bye Laws, with the exception of the one they objected to, which would simply leave the law as it stood at present in that respect. This, he believed, would be agreed to.

Mr. Savage thought the Council should now pass a resolution accepting the suggestion of the Privy Council, and then ask for the confirmation of the Bye-Laws.

Mr. Betty did not see how the difficulty of submitting the amended Bye-Laws to three meetings of the Council, and to a special meeting of the members could be avoided.

The Chairman said it was very desirable to get the Bye-Laws confirmed as early as possible, in order that the Council might be empowered to elect two additional examiners.

Some discussion ensued as to the necessity for again going through the form of submitting the Bye-Laws, when amended, to three meetings of the Council and a special meeting. Mr. Urwick thought the new Bye-Laws, which were accepted by the Privy Council, might be confirmed and come into force, without being re-approved in consequence of the omission of one amendment.

Mr. Betty, on the other hand, was convinced this would not be sufficient; *admissio unius exclusio alterius* was a well-known maxim of law, and clearly applicable to the present case. He suggested that the Bye-Laws, as amended by the Privy Council, be at once read a first time, and approved by the Council, in order not to lose time, and that the opinion of the solicitor be obtained as to the necessity of going through the whole process.

After some further conversation this suggestion was accepted, and a resolution passed, in the following form, on the motion of Mr. Betty, seconded by Mr. Sutton.

> "That in lieu of the amended Bye-Law, sec. 10, clause 6, as passed by the last special meeting, the following be now read a first time:—'*No person shall be appointed an examiner who, at the time of appointment, is, or who, during one year prior to the time of appointment, has been a member of the Council, and the election of any examiner to be a member of the Council shall vacate his appointment as an Examiner.*'"

Certain Members and Associates were restored to their status in the Society on payment of the subscription for the current year, and a fine of one shilling.

Elections.

MEMBERS.

Pharmaceutical Chemists.

Grimsdale, James .....Uxbridge.
Mumby, Charles John Everitt...Gosport.
Saunders, Thomas Bealby .....Darlington.

Chemist and Druggist.

Wilkinson, William .....Colne.

ASSOCIATES.

The following having passed their respective examinations, and being in business, were elected "Associates in Business" of the Society:—

Minor.

Fairburn, Robert Waller.....Guisborough.

Modified.

Epps, Franklin .....London.
Evans, Roderick .....Lampeter.
Hurst, James.....Oldham.
Tily, Charles Alfred..... .....London.
Welton, Henry .....Coventry.

The following having passed the Minor examination were elected "Associates" of the Society:—

Brown, William Braithwaite ...Preston.
Lord, John Edward .....Rawtenstall.
Smithies, William Edward .....Elland.
Turner, William Spencer.....Hingham.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination were elected "Apprentices or Students" of the Society:—

Bell, Frederick Leonard .....Southampton.
Clayton, Thomas .....Malton.
Dowdeswell, Jonathan.....Tiverton.
Fisher, Sidney .....Wolverhampton.
Griffith, John .....Penycaeran.
Grimshaw, Thomas .....Preston.
Heading, Herbert Henry.....Ely.
Hooper, David .....Southwark.
Hugill, John Howden .....Edmonton.
Procter, Robert.....Kidderminster.
Sharp, John .....Sunderland.
Wood, James.....Devonport.

Election of an Examiner.

The Council next proceeded to elect an Examiner to fill the place vacated by Mr. Haselden, the late President, in consequence of his election not being approved by the Privy Council. Two or three names were mentioned, but on a ballot being taken Mr. Octavius Corder, of Norwich, was declared unanimously elected.

Finance Committee.

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

Benevolent Fund.

This Committee had met as usual, but made no recommendations with regard to grants, the cases brought before them being still under investigation.

Unusual Doses in Prescriptions.

The Chairman said all the members were doubtless aware of the circumstances which had recently taken place at Ramsgate with reference to the refusal of a chemist to dispense a prescription containing an unusual dose of digitalis. He did not know whether the Council would take any steps to correct the erroneous impression which seemed to be entertained by the coroner and jury. He had no doubt in his own mind that Mr. Fisher of Ramsgate was perfectly justified in declining to dispense the prescription.

Mr. Savage hoped the Council would not move in the matter, being convinced if they once began to interfere in local matters there would be no end to it.

Mr. Hampson said he had thought a good deal upon this matter, and it was his intention to bring it before the Pharmaceutical Conference, so that, if possible, they might agree upon some sign to be recommended for the adoption of medical men when excessive or unusual doses

were ordered. When this was done, as he had no doubt it would be, by a unanimous resolution of the Conference, it would probably be well if the Council also recommended its adoption. He did not think it wise to enter into personal matters, but the general question was of great importance.

Mr. Owen said there were hundreds, if not thousands, of chemists throughout the kingdom who never saw the Journal, or any periodical of the kind, and therefore it would be useless to take any action of this kind unless they were prepared to send out a circular to every one in the trade. Two years ago, when in the West of England, he was astonished to find a chemist, doing a large business in a large town, who was totally ignorant that there had been any agitation with regard to the Poison Regulations.

Mr. Stoddart mentioned a case which had recently happened in his own experience where a young lady desired to have a prescription made up containing a large dose of strychnine, to be taken every four hours. She stated that her father was a physician, and desired the prescription to be made up as written, but as she would give no further details, he declined to dispense it, and never heard anything more of it.

Mr. Greenish was glad to hear that this matter was to be brought forward at the Conference by Mr. Hampson, and thought that any action taken by the Council should come afterwards. He thought dispensing chemists had a right to call upon medical men, for their own protection, to attach some sign to unusual doses. It was not the province of the chemist and druggist to determine whether any given dose was proper in any particular case, but where it was an unusually large dose it was the bounden duty of the medical man to attach some sign to it. That sign he thought should be his own initials, and then the chemist would be justified in dispensing it.

Mr. Betty had no doubt the matter would be fully discussed at Bradford.

Mr. Greenish added that in the New Pharmacopœia for Germany there is a table containing 86 articles, and in the Austrian Pharmacopœia there is a similar table containing 60 articles, to each of which the maximum dose is attached, and any prescription containing a dose beyond the maximum in those tables cannot be dispensed without the prescriber's sign, thus (!) opposite to it, nor is the chemist permitted to dispense the same prescription a second time without an additional guarantee of a similar character.

Mr. Robbins agreed that this was a very important subject, and one which ought to be taken up by the Council if they could do so effectively. It appeared to him, however, that the best course of action would be for the Council to communicate with the College of Physicians, and ask them to recommend some regular course of action in the matter to their brethren.

Mr. Savage thought this suggestion a very valuable one.

Mr. Betty agreed with Mr. Robbins that a communication should be sent to the College of Physicians. Confined to pharmacists, their labours would be futile, but as the Pharmacopœia was issued by authority of the Medical Council, on which the College of Physicians was represented, and as this Pharmacopœia contained the doses in which chemists were examined, they might fairly call upon the College of Physicians for support and assistance in this matter.

Mr. Hampson said it was his intention, if the Conference came to any decision upon this subject, to bring it before the Council, and afterwards it would be very advisable to send copies of the resolution—if it should be carried—to the Medical Council and the medical colleges, and ask them to move in the matter themselves. Strictly speaking it was the duty of medical men to take the initiative, but he hoped the ventilation of the subject at the Conference and a resolution of the Council would produce the desired effect.

The Chairman said he was sure even the present discussion would be serviceable, particularly after the remarkable letter of Dr. Collis Browne, which they had no doubt seen, stating in effect that chemists ought to be mere automatons, having no right to think for themselves, or do anything but blindly follow the prescriptions which were brought them. Such a notion could not be too strongly repudiated.

Mr. Betty felt sure there was not a man at the table who would not have poisoned two or three persons in the course of his life if he had followed the principle laid down in this remarkable letter. He himself could recall two or three instances in which he should have killed the patient as dead as a nail if he had followed literally the prescription sent him.

House Committee.

The report of this Committee was read. It stated that a special meeting had been called in consequence of a letter from the contractors whose tender for the alterations had been accepted, saying that they had discovered an important error in their figures and begged to withdraw the tender. Application was then made to the next lowest on the list, but he also declined to abide by his original tender, and the Committee therefore, acting under the advice of the Surveyor, had obtained and accepted a tender from Mr. Stanley Bird, and had given him directions to proceed with the work, although the total cost would be £96 above the amount sanctioned by the Council at the previous meeting.

After some conversation as to the details of the business, the report was unanimously adopted.

The Registrar was instructed to erase from the register the name of Annie Aspinall, of Over Darwen, Lancashire.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

On the Energies of the Imponderables, with especial reference to the Measurement and Utilization of them.*

BY THE REV. ARTHUR RIGG, M.A.

Lecture IV.

The Energy of Affinity, especially with reference to considerations for the Measurement and Utilization of it.

(*Continued from page* 176.)

Then there are another set of actions which are more peculiar still, which manifest great energy, but which actions interfere with our measuring the energy of affinity as utilized by men. We have here a piece of platinum, and here is an argand burner, connected by a flexible tube with the gas-pipes of the room. Over the argand burner is placed this copper cylinder on three legs, having a wire-gauze top. The sheet platinum is now coiled, and placed on its edge on the gauze. The tap is opened, and the gas now burns with a lambent blue flame. Observe, the platinum is now being heated; now it glows. Let the gas be turned off. The flame is now extinguished; the once glowing platinum has become black. Thus far is nothing peculiar. Again, the gas is turned on. The black platinum is passing to a dull red; now it glows again, but the gas is not ignited, and the platinum remains at this red-white heat without any apparent cause. If a glass cylinder, to protect it from currents of air, be placed round it, this apparent burning without being consumed will continue during the remainder of the lecture, and, were conjuring tricks an object, it might be said that light and heat were here produced without the destruction of any materials. This is a case of what is called catalytic action. Phenomena like these perplex very much in estimating the energy of affinities.

Here is another case, of a like peculiar character. This is a coil of platinum wire, and you will find that if made

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* Cantor Lecture, delivered February 24, 1873; reprinted from the *Journal of the Society of Arts*.

red hot, and then placed in a vessel of ammonia, although there is no gas in it, the platinum continues red hot. There is no reason, apparently, why it should continue in that red-hot state.

Gunpowder has been introduced solely for the purpose of illustrating the questions that might arise in reference to the physicist's and the chemist's views of affinity, and not for any purpose in reference to its use in mining or war.

If its introduction has made clear that the affinities amongst the atoms of which it is composed may be controlled, that the intensity and rate of its explosion (which is but another name for chemical combination) may be regulated—that it and its related explosive agents may exercise their affinities without danger—harmlessly and slowly, then the inquiry is at once suggested, on what elements do chemical combinations depend? Why are these combinations accompanied with devastation and ruin? Why are those peaceful and unperceived?

Those who were present at the first lecture will be prepared for the suggestion that these differences arise (in part, at least) from some of those results which in that lecture were said to be deducible from a consideration of the units of time, mass, and space. Those fundamental units form a combination on which all our knowledge of work and production of energy depends. It will probably be remembered, too, that in the lectures on gravity and vitality these units of measurement formed the object of research by the men who have given to society the mode of estimating these energies.

It may have been noticed that whereas in the other lectures of this series the titles have in them the words, "especially with reference to the measurement of it," these words are changed in the title of the present lecture, and there are substituted for them the phrase, "especially with reference to considerations for measuring, etc." It will now be not inappropriate if one or two of the causes which lead to this difficulty in estimating the energies of affinity be made as clear as the competency of your lecturer will permit.

Before entering upon this, it may be well to consider whether the actual putting forth of the energy of affinity is a phenomenon belonging to physics or chemistry. The answer, open to contradiction by many, is that the study of the energies of affinity is a purely physical question and not a chemical one. For this reason a chemist deals with those combinations in which the constituent elements have passed through such changes that their identity is lost. The chemist is ever dwelling upon changes, and his equations are not the equations of the physicist and the mathematician; they are, by the use of mathematical symbols, the representatives of change, of what affinity has done and completed, and not of that energy with which it has been done, and which is to be measured. The energy of affinity either causes or induces these changes, and until that energy has operated chemistry has no standing-ground. The energy of affinity opens the gate which separates the domains of the chemist from those of the physicist, and as the physicist is in possession of the matter the chemist must look there before he can take note of those changes he so loves to contemplate.

It is quite true that when the physicist and mathematician attempt to apply those principles which serve so well in investigating the measurement and utilization of the other imponderables, they are baffled. By the application and study of these principles it is moderately well known how to call forth that which we wish to call forth. The summons being issued, we can rely upon the same result, whatever may be the surroundings. Not so with the energy of affinity; it is now slow, now sudden, now destructive, now restorative, now brought out by heat, now by light, now by moisture, now by sound, now by time, now by the simple presence of another molecule.

It is similar to the other energies with which we are dealing, in that it seems to consist in a species of attraction or its opposite repulsion. Gravity has a power of attraction at all distances; electricity has both attractive and repellant powers, and we may say at all distances; but affinity is limited to molecules so near that we must say that the matters of which they consist are in absolute and perfect contact.

That there is what we call matter—that it is of such a character or nature as that no two particles of it can at one and the same time occupy the same space; that however much a lump of this matter be divided it may still by finer instruments be subdivided; that by neither mechanical nor chemical means has anyone ever yet obtained one such ultimate and indivisible particle of matter. These are assumptions generally received without controversy.

It is, however, in and amongst these ultimate and indivisible particles of matter, that the laws of affinity operate. If we could handle them as we handle the bulks, which the aggregation of these particles form, then, probably, all difficulties respecting the laws of affinity would vanish. We cannot handle them. The physicist gives it up in despair; the chemist, however, more venturesome, deals with them. In dealing with them he puts forth a proposition which the physicist knows not how to accept.

Such unions and interlacings as these seem to set at nought the postulate that no two particles of matter can occupy the same space. For the chemist recognizes two, three, four, or five particles of matter, seemingly rushing together, and, as far as we know, occupying the very space which a fundamental physical proposition states they cannot occupy. It may, however, be quite true, for telegraphic messages now-a-days run along the same wire in opposite directions at the same time.

If we could but reconcile these views (and they will be reconciled some day), what a change will come over the dreams of scientific theorists, and what a magnificent and splendid territory for scientific research will then be brought into possession!

To return to the difficulties which interfere with an enunciation of the laws of affinity.

It is plain that explosives, as they are called, vary in their manifestations to our senses in respect of intensity (the assumption that the energy of affinity always produces a species of explosion is not a very violent one). But it is not so plain that within themselves the intensity is a constant quantity, and admits of no variation—that whether gun-cotton causes a cliff to crumble as powder into the sea, or flashes harmlessly without even igniting the gunpowder laid on the palm of the operator's hand, the energy of the affinity in the two cases is exactly the same. In fact, affinity can neither be created nor destroyed—it may be resisted, and if the resistance could be measured at the moment affinity may be said to put forth its energy, and overcome the resistance; then this is the measure of the energy. Illustrations of this are numerous and convincing. Let a few minutes be given to one.

If a person raises 100 separate 1lb. weights off the floor on to a table three feet high, then, as a measure of the energy expended, we take the work that is done, viz., 100 separate lbs. raised three feet, and call the product 100×3, viz., 300, as the measure of the energy of vitality which thus raised the weights. Suppose now the man had been ten minutes in doing this work, then the energy per minute would be measured by the figures 30. Suppose that instead of working at this rate he had lifted all the weights in one minute, the energy per minute would be still measured by the figures 300, and if the rate of work were continued there would have been expended in ten minutes an energy represented by the figures 3000. Thus we may reason until the work originally done in ten minutes is done in one second. The measure of the energy in that one second is 300, and in one minute 18,000, and in ten minutes 180,000. The intensity of the energy in this last experiment is 6000 times as great as in the first experiment. Let this illustration suffice to show that to measure the itensity of an energy time must be taken into account if we wish to utilize that energy, or to bring it into calculations.

It will be within the memory of those present at a former lecture, that, in the case of the energy of gravity, Atwood brought time in by staying the sudden action of gravity, and distributing the fall of a weight through a large mass. Kater brought time in by causing a pendulum to record the number of its vibrations. They dealt with gravity alone, but we are dealing not only with the energy of affinity alone, but with such concealed and unknown energies as those which are taking place whilst the phenomena we are observing are going on. If we could put two substances together, and could guarantee that neither nascent nor catalytic action should be taking place, then we should have an energy responding as a unit to the energy of gravity. So, if we could prolong the time, we might, somehow or other, get a record of the energy. But that we cannot do, and with all our modern appliances it seems almost impossible to notice the time when affinity begins and ends its work. Under any circumstances it is difficult to notice time, but when the interval is short, what is called the personal error is as great as though the time were long.

A digression may make this clear. Suppose the eye sees an event, a nerve of sensation conveys the impression to the brain, and then a nerve of motion directs the muscles of the fingers to record it. Now, in the case of affinity, before the nerve of sensation has telegraphed to the brain the commencement of the event whose duration we wish to record, the end of the event is there, and the retina has impression super-imposed upon impression, and the fingers fail to enter the records. This leads to another difficulty—the nerves of different persons transmit impressions at different rates, hence observations and records of the duration of things seen and heard by two people do not agree, and certain corrections have to be introduced consequent upon these personal differences in the speed of these nerve-conveying telegrams.

As regards mass. Assuming that our investigations are carried on in the same locality, then, speaking generally, mass is fairly measured by weight in vacuo. If the bodies we see and handle were units, then we might recognize mass as the weight of the visible body. These bodies are composed of elemental units, the masses of which we cannot see, and affinity deals with these elemental unit masses and not with the bodies themselves. Certain considerations, based upon numerous observations, led Dalton and others to conclusions in regard to the weights of these ultimate unit masses. Admitting all to be correct, they are not sufficient for the purpose of estimating the energy of affinity through the fundamental units of time, space, and mass.

The failure is thus—Dalton finding hydrogen the lightest substance compared all others with it. But what is the actual weight of a hydrogen atom? That we do not know, therefore we cannot know the weights of the other substances which are recorded in this.

If the absolute weight of one elemental unit of any simple body could be had, then thanks to Dalton and others, the absolute weight of the unit elements of all other bodies is known.

For the purpose of making clear the value of these atomic or molecular elements in reference to their mass and the space between them, let me, at the risk of some repetition remind you that knowing the weight of one atom or molecule of each of the bodies, the energy of whose affinities is to be measured, and knowing the space between them and through which space these atoms or molecules pass before they coalesce, then the product of these two elements gives the value of the energy in the form of work done. If with this product the time is combined, then not only the energy but the intensity of the energy is also known.

Now, if we cannot get at the unit *masses*, how can we possibly get at the distance between them; yet this distance is the *space* through which these little masses must be carried by the influence of that affinity whose energy is to be measured by the work it does.

When, however, we consider that the waves of light have been measured, the number of them per inch stated, their velocity ascertained, we have good grounds for assuming that the masses and distances of the ultimate elements of matter will also be ascertained; then the laws which regulate the energies of such affinities will, most probably, be also ascertained.

Such are some of the preliminary difficulties which present themselves to those who look in hope to establish the laws which govern the energies of affinity from first principles.

If, however, these laws be enunciated—if they be even approximately attained—it will, most probably, be through some indirect means, through some other energies from which these energies of affinity may be deduced. In this indirect way the mechanical energy of heat has been measured, and its value is as generally received and acted upon as that twelve pence make one shilling and twenty shillings make one pound.

The source of mechanical power, so far as men utilize it, is in the energies of affinities. To these energies, as formed by the Creator (inherent and primordial), we owe the means by which work is done. Indeed, it is no very bold suggestion to make, that to the exercise, even now, of these inherent affinities, we owe much—it may be all—of terrestrial magnetism and internal terrestrial change and heat; the progress, in the depths of the earth, of these affinities, may be the cause of the variation of the compass; nay, we cannot tell where speculations such as these lead. How the atoms disport themselves we know not; this we do know, that when some atoms meet some other atoms they are as Greek joined to Greek, for "then comes the tug of war."

Parliamentary and Law Proceedings.

Alleged Poisoning by a Lotion.—Committal of a Chemist and Druggist for Manslaughter.

A lengthened inquiry has been held at Barnstaple by Mr. R. J. Bencraft, borough coroner, touching the circumstances attending the death of Mrs. Yeo, the wife of an innkeeper of that town. Mr. L. Bencraft watched the proceedings on behalf of Mr. Goss, chemist and druggist.

At the first meeting of the jury in consequence of a statement made by Mr. Fernie, the surgeon who had attended the deceased, it was thought desirable not to proceed further until a *post mortem* examination of the body had taken place. At the next meeting Mr. Fernie deposed that he had made such *post mortem* examination, assisted by Mr. Bosson, a duly qualified medical practitioner. He first examined the umbilical hernia, from which the deceased had suffered for several years; it was about as large as his two fists, and consisted of a quantity of omentum, softened by inflammation. He then proceeded to examine the stomach, between which and the hernia there were 16 feet of other intestine, which seemed to be perfectly healthy. He found that one-third of the inner surface of the stomach exhibited signs of inflammation, and fully one-third showed signs of intense inflammation, the colour being a deep crimson interspersed with streaks of a very dark colour. This part of the stomach was near the gullet or swallow. Upon examination of the rectum he found the lower part of its inner surface inflamed. The whole of the intestines were perfectly empty as regarded food. The liver was very large, and of a fatty texture; the heart and lungs were healthy, and so was the brain. Having made the *post mortem* examination, he imagined, in the first place, that the inflamed state of the intestines and partial strangulation of the hernia were such as would have caused death. In the second place, the state of the stomach was such as would also have caused death; yet, the two conditions seemed to be perfectly separate, because there was no continuation of the inflammation between the stomach and the hernia.

On thinking the matter over, it seemed to him not improbable that, supposing the deceased had vomited, as was stated she had done for two or three weeks, the repeated acts of vomiting would squeeze more and more of the intestines into the hernia, and so produce strangulation.

The Coroner: Can you give the jury any opinion as to how the inflammation of the stomach arose?—Witness: I can only surmise, knowing that there was arsenic in the lotion, that arsenic might have caused the inflammation.

Mr. L. Bencraft: You have expressed an opinion that the lotion contained arsenic.—Witness: Yes.

Did you receive one bottle or two?—Two.

Will you tell the jury whether you have submitted the contents of these two bottles to a chemical test?—Both have been tested, and I have no doubt that the lotion does contain arsenic. At the same time, if conviction is required, you must go further than me, and engage a professional analyst.

Having made these experiments, are you prepared to pledge your professional experience and reputation that the lotion contained arsenic?—I have no reputation as an analyst.

But you have stated that the lotion does contain arsenic?—And I firmly believe it does.

Of course you have the remains of it carefully preserved?—Yes; and I can show you the arsenic now, if you choose. I may add that I found evidence of sulphuric acid in the lotion.

I apprehend the theory is, that if this did cause death, it would have got into the stomach by absorption?—Yes; and would have produced the inflamed appearance of which I have spoken.

You think the condition of the stomach sufficient to have caused death?—Yes.

You spoke of a very large liver: I apprehend that betokens an intemperate person?—I am unable to form an opinion.

Might not the appearance be due to intense diarrhœa?—No; it is impossible. Inflammation of the stomach is a very rare complaint, unless it is the result of poison.

Notwithstanding all this, you hesitate to express a decided opinion as to the cause of death.—Yes; considering the condition of the hernia, I must. I can only say that the state of the hernia was such as would cause death, but at the same time I do not think the inflammation had been more than three days in existence.

Having regard to the mixture, do you think it could have been composed simply of sulphate of zinc and water?—My opinion is strongly against it. I still have the ingredients, and they can be tested.

The Coroner said he took it that at this inquiry the jury would not go immediately into what the mixture contained. It would be more for them to consider whether they thought any further examination of the lotion and the parts of the body referred to, was or was not necessary. They had had a general statement from Mr. Fernie as to the state of the stomach and intestines, and they had heard that gentlemen say what it was that led him to make the statement he did at the first inquiry, which statement he had reiterated on that occasion.

A juryman asked whether, at the previous inquiry, Mr. Fernie stated he had no doubt the deceased died from the application of arsenic?

Mr. Fernie said he did not go so far as that, and was not responsible for what had appeared in the newspapers. He did not go so far even as to say that the inflammation of the stomach was caused by arsenic.

Mr. Bencraft said he proposed calling the person who made the mixture.

The Coroner: I should not feel disposed to accept the responsiblity of taking his statement on oath even were he prepared to give it. The simple question for the jury was whether, having heard Mr. Fernie's statement, they thought it their duty to send the lotion to a professional analyst, in order that they might be perfectly satisfied as to what it did contain.

The court was cleared whilst the jury held a consultation upon the course to be pursued, and on the reporters being re-admitted the Coroner stated that they had come to the unanimous conclusion that they could not satisfactorily go further into the matter until an analysis of the lotion and certain parts of the body had been made by a competent person. He had undertaken to see that this should be done. The lotion and the parts of the body mentioned would be sent to Mr. Stoddart, of Bristol, who would report the result of his examination to the jury, and if upon that report he (the Coroner) thought it necessary to subpœna him he should do so.

Mr. Bencraft suggested that if Mr. Stoddart discovered arsenic he should be asked in what quantity, because he was told that sulphate of zinc did contain a quantity of arsenic. It was then decided to adjourn the inquiry for a fortnight.

On Saturday afternoon, August 30th, the adjourned inquest was held at the Guildhall. Mr. John A. Thorne was present to watch the case on behalf of Mr. Goss, of Braunton.

The Coroner opened the proceedings by stating that a fortnight ago an adjournment had been made to allow of parts of the stomach, etc., and the lotions used by the deceased, being examined by an analytical chemist. He had taken the subjects to be analysed, carefully sealed, to Mr. Stoddart, who had furnished him with a report, upon which he had subpœnaed him there that day. Mr. Stoddart was present to give any further evidence or answer any questions which the jury might wish to put to him.

The first witness called was Mr. William Walter Stoddart, analytical chemist, of Bristol, who, on being sworn, read the following report:—

"Western Counties Laboratory, 90, North Street,
"Bristol, August 22nd, 1873.

"I. Bencraft, Esq., Coroner for Barnstaple.

"Dear Sir,—I have completed the analysis of the contents of the hamper left by you on the 18th instant, viz.—jar containing part of mamma and ulcer; 2 ditto, stomach; 3 ditto, rectum; 4 ditto, liver and spleen; 5 ditto, kidney; 6, bottle of lotion, marked No. 1; 7, ditto, marked No. 2, bottle of mixture. All the above except mixture, contain zinc in large quantities. The several portions of the body are highly charged with that metal in the state of oxide combined with animal principles. The lotions are strong solutions of sulphate of zinc, commonly called white vitrol. They also contain oxide of iron and traces of lead. Both these are probably derived from the above-named salt. I have carefully and repeatedly tested each for the presence of arsenic by the processes of Reinsch and Marsh, without success. I am quite sure arsenic is not present in any of the tissues received, or in either of the lotions. I think the absorption of so much zinc would be likely to cause excessive sickness and diarrhœa, especially when accompanied with so much general derangement of the body."

Mr. Stoddart then proceeded to make some observations, and remarked that the inside of the stomach was in such a state of decomposition that, besides being very disagreeable, it was very difficult to tell what the appearances were like. It was the first instance he had experienced in which he had found zinc in such remarkably large quantity. He had tried fully five times to detect the presence of arsenic, but had failed. He showed the jury the porcelains upon which he had experimented; their surfaces were quite clean, while on another, on which he had placed a solution containing three grains of arsenic, there were three large-sized spots. He also exhibited the zinc which he had extracted from the ulcer, the liver, and the lotion. It appeared to him that the zinc had been absorbed into the system. He had tried two methods of testing the tissues; one, by boiling them in acid, and treating the solution with the usual

precipitant; the other by burning them. The zinc was separated in a pure state.

Dr. Thompson, of Bideford, was then examined. He stated that he was the coroner of Bideford, and a duly qualified medical practitioner. He had been in practice thirty years. He gave it as his opinion that the absorption into the system of a lotion containing zinc, in such large quantities as had been described, was likely to be attended with very serious results. On being asked what would be the symptoms resulting from absorption, he replied that he could not say, neither did he know of any recorded instance of poisoning by absorption of zinc, but he knew what the effects would be when taken into the stomach. It would produce irritation of the stomach and diarrhœa, but the effect it would have on the constitution would depend very much upon the time it was in the body. Zinc did not class amongst the most irritant of poisons, and therefore it would require a long time to effect a very strong impression on the system; the length of time would be the essence of its operation. If he were to keep a person under the influence of any medicine that would cause nausea and vomiting for a very long time, he should very likely kill him, whereas the use of the same medicine for a short time only would probably do no harm.

The Coroner: Having heard what Mr. Stoddart has stated that the lotion contained, do you consider that a large or small dose?—It might be used for a short period without harm, but I should not like to use it for many weeks together.

A juryman asked whether, the effect it would produce being so gradual, sudden death would be likely to ensue?

Dr. Thompson: If a person were gradually reduced by an irritant substance, such as sulphate of zinc, that person would be very likely to collapse, but at the same time, there was a case recorded by Dr. Barrington, in which sulphate of zinc was administered in doses of two scruples three times a day for a week, without an injurious effect upon the constitution. In his own practice he had frequently known persons suffering from cancer die suddenly.

The Coroner: Would it be a judicious thing to use zinc to the amount contained in the lotion, in the case of a person suffering from a disease of that sort?

Dr. Thompson: Certainly not; it would be highly dangerous.

By Mr. Thorne: Habits of intemperance would reduce a person and necessitate more caution as to what was administered. The fact of a person being fat, taken by itself, would not render sudden death more probable. Absorption of zinc, or any other soluble substance, was very likely to take place through a cancerous wound.

Supposing the lotion to contain the proportions of zinc mentioned by Mr. Stoddart, would that be likely to cause death?—I should think not. If, however, I were applying such a lotion, and found that diarrhœa ensued after three or four days, I should think that the zinc was causing it, and discontinue its use at once.

Just so; but you do not think it would cause sudden death, as in this case?—I should not think so. I have applied substances containing sulphate of zinc in large quantities to a woman's leg without any injurious effect upon her constitution.

Mr. Andrew Fernie, surgeon, was again called, and asked by the foreman why he had spoken so positively as to the presence of arsenic in the lotion. He replied that when he stated to the jury there was arsenic in the lotion he was expressing the result of an analysis made by Dr. Kemp, who he thought was a competent person for making such an analysis, and who wrote to him stating that he had discovered a considerable quantity of arsenic in the lotion. Dr. Kemp did produce arsenic, and Mr. Stoddart was of opinion that the spot on the porcelain was arsenic, but he was of opinion now that the chemicals used were not pure, and must have contained arsenic. He spoke strongly on this point, because the appearance of the stomach induced him to believe that some irritant had been applied.

The Coroner said they must have all seen the importance of the inquiry, and that the case demanded careful and rigid investigation. He commented on the evidence at great length, and said it was for the jury to determine whether death was caused by the ailments from which the deceased was suffering, or from a complication of them; or whether it resulted from the unskilful treatment of the person who attended her. He noticed that Mr. Goss, of Braunton, was a registered chemist. Well-known remedies were sometimes used by unskilful persons, sometimes with good effect, but of course greater responsibility rested on unqualified persons. Any fair and reasonable doubts should be given in favour of the person implicated. If, however, they thought death was accelerated by unskilful treatment, that would amount to a verdict of manslaughter, a rather high-sounding word, but one which sometimes implied but very little culpability.

The jury retired, and, after an hour-and-a-half's absence, gave it as their opinion that there was no positive evidence as to the immediate cause of death, but they believed it to have been accelerated by the unskilful treatment of Mr. Goss, of Braunton. The Coroner said this would entail upon him the necessity of recording a verdict which, in effect, would be that of manslaughter.—One of the jurymen remarked that a censure was all that they had intended their verdict to convey.

Mr. Goss at once came forward and voluntarily surrendered, and the Coroner intimated his willingness to accept bail, Mr. Goss in £50, and two sureties in £50 each. Messrs. John and J. P. Seldon immediately offered themselves as securities for Mr. Goss's appearance at the assizes.—*From the North Devon Herald.*

Sending Dangerous Acids by Railway.

William Warden, sen., and William Warden, jun., of Gordon Terrace, Gordon Road, Peckham, were summoned before Mr. Cooke, sitting at the Clerkenwell Police Court, by Mr. Richard Williams, superintendent of police of the Great Northern Railway Company, for sending by rail a box containing three bottles of sulphuric and nitric acid, without distinctly indicating their dangerous nature. It was stated that on the 31st of July, the younger defendant took to the King's Cross Station a large box, labelled for Scarborough. As it was being put into the train a liquid was observed running from the box, smelling very strongly and giving off vapour. The defendants, who were in the employ of Messrs. Brock, the firework makers, denied having any knowledge as to the contents of the box.

Mr. Hopkinson, chemist, of Swinton Street, Gray's Inn Road, examined the bottles and found they contained nitric and sulphuric acids.

For the defence it was submitted that there was no evidence against the elder defendant, and that no offence within the statute had been proved against the younger defendant, inasmuch as it had been proved that he did not send the goods at all, but intended to take them with him as luggage. As to notice not being given, there was time to declare the nature of the goods before the train by which the defendant was going started.

Mr. Cooke said that he should dismiss the summons, against the elder defendant. With regard to the other defendant, he was of opinion that the delivery of the vitriol to the company's servants to be sent by train was a sending within the meaning of the Act of Parliament. If he was wrong in that view the defendant could appeal. He fined the defendant £5 or, in default, imprisonment in the House of Correction for two calendar months. He might say that the offence was a very bad one; and had it not been for the youth of the defendant he should have inflicted a penalty in the fullest amount.—*Standard.*

Review.

LECTURES ON PRACTICAL PHARMACY. By B. S. PROCTOR, Lecturer in Pharmacy at the College of Medicine, Newcastle-upon-Tyne.

We are very glad to be able to welcome the appearance of Proctor's 'Practical Pharmacy,' not only because it supplies a volume for which there is and has been for some time past an undoubted demand, but also because the work is from the pen of one of ourselves—a pharmacist *pur et simple*.

It is remarkable that, although during the past ten years we have had many manuals and text-books upon chemistry proper, and chemistry as applied to pharmacy, and, in addition, books which are little better than paraphrases of the pharmacopœia, still we have not, as far as our memory serves us, had a single work devoted to the "art and mystery" of pharmacy from a British pharmaceutist.

First let us be just to the provinces, and not only congratulate but compliment them in having thus taken the initiative.

Zealous men and teachers are on all sides to be found, but it is to be feared that in pharmacy such men are almost as numerous as the younger ones who are desirous of obtaining a complete knowledge of their profession, for even in Newcastle-upon-Tyne, the stronghold of enthusiastic and scientific pharmacists, we are told that a lecturer—the author—found himself discoursing upon sulphur to *one only*—the last student left to him.

It does not transpire what followed after sulphur, amorphous, octohedral, and prismatic, had been dilated upon, but we imagine that the solitary student could hardly have been treated as was once described by Tom Hood in his poem of "The Last Man," and sent to breathe sulphur in its gaseous form.

Since the passing of the Pharmacy Act, 1868, there seems to have been more organization than in former years, and, through the good offices of the author, assisted by his brethren of Newcastle, the wants of the pharmaceutical student have been provided for at the College of Medicine, where lectures are now delivered upon pharmacy.

In the "prefatory letter," our author lays claim to being "by nature a student;" we, in our turn, will make out his claim as a teacher, a position to which he is fairly entitled after the exposition of practical pharmacy he has placed before us.

We are aware as the author intimates that occasionally "professed teachers" ride their hobbies of nomenclature, notation, etc., most unmercifully, but we overlook their infirmities when we see that by system, and sometimes by system only, pupils can be taught. Even upon weights, measures, and thermometers, we must confess we are wedded to a system, and we are not quite sure that our ideas upon almost anything and everything that bears upon instruction to youth are not also based upon system.

Of course it may happen that in some so-called systems there will be no true system at all.

Who, for instance, does not remember the tortures of committing to memory weights and measures, and the attempt to understand divisions in the scale of thermometers, which were evidently compiled in days when the metric system was not the prevailing notion. Upon this point therefore our views are, we regret, diametrically opposed to those of the author.

Do not let us be misunderstood in this matter, but point to an illustration from the details of an experiment made with a view of determining moisture in squills and senna (page 11), in which the weight of the substance taken is first described in grams and the loss in drying in grains. We hold that much more would have been conveyed to and impressed upon the mind of the student if the weight taken had been described as one, ten, or one hundred grams, and the loss as so many decigrams, centigrams, or milligrams; or, if we must have our subdivision of the avoirdupois pound, then as one hundred or one thousand grains, and the loss in grains.

In one case the percentage loss is instantly apparent, whether reading or listening to a lecturer, while in the other, to make the matter intelligible, calculation is required, and if listening, the ordinary mental calculator is in a maze as the figures pass in at one ear and out of the other.

The work before us is first of all subdivided into three parts—viz., abstract or general pharmacy, official pharmacy, and extempore pharmacy, these subjects being severally treated in a series of lectures numbering in all twenty-nine.

Under the head of drying medicinal plants, by no means an unimportant topic to the pharmacist, some very excellent suggestions are given for the drying of leaves, and these directions have not been inserted without the *rationale* of the process accompanying them; they also are followed by a woodcut of a very excellent and simple drying stove, which we consider well worth the attention of the pharmacist.

The comminution of drugs is not confined to a description of the simple machines used for incising and contusing, but the more complicated and ponderous mills used for producing powders of extreme fineness on the large scale are fully described. We should have been glad to have seen appended to the very excellent cut and description of sifting apparatus a table of the various degrees of fineness of sieves through which powders must pass before they can be termed coarse, moderately fine, fine, superfine—indeed, if the description of powders given in the U.S. Pharmacopœia had been copied here, it would have been a valuable guide, although perhaps not identical with the degrees of fineness commonly accepted in this country.

In the lecture apportioned to "Solutions" we have tables of density of liquids in constant use, such as caustic soda, acetic acid, details of experiments to determine the solubility of salts and gases, under ordinary circumstances and under pressure, and in addition, some interesting remarks on supersaturated solutions, with Mr. Tomlinson's theory of the phenomenon of supersaturation appended.

Crystalline and amorphous salts, groups of isomorphous salts, the separation of crystals from liquors both amorphous and crystallizable, notes upon certain salts which appear in crystalline forms with variable amounts of water of crystallization, with a table of the amount of water in certain common pharmaceutical salts, occupy the lecture devoted to crystallization.

It is to be regretted that the notation used to describe the composition of these crystals is almost wholly upon the old system; occasionally it happens the two are side by side. Not only do we regret it because it makes the work appear (what it really is not) ten years behind the times, but because to students who know little or nothing of chemistry, the composition of the salts may seem obscure when reading this work alternately with a modern manual of chemistry. We are therefore tempted to question the policy of the arrangement, for we well remember our own confusion and embarassment during the transition period from the old to the present system of notation.

The evaporation of liquids either with a view to concentration or of finally producing extract is well described, as is also the use of steam heat applied under ordinary atmospheric pressure and by means of vacuum pans, the temperature of the former being wisely stated as such as would be produced by a heat of four or five pounds pressure to the square inch, a point too often lost sight of by manufacturers who work frequently with pressures ranging from one to two atmospheres, thereby partially charring many vegetable substances. Illustrative of this lecture is also a cut of Reynolds' mechanical stirring apparatus.

Under the lecture upon distillation we have descriptions and cuts of stills and condensers, as well as very practical remarks upon the processes usually resorted to for the production of essential oils, followed by tables giving the boiling points of many such oils, and also another very valuable table illustrative of the amount of essential oils yielded by materials commonly distilled. In passing we would just remark that some of the oils there enumerated, for instance almond and caraway, are certainly yielded in larger proportions than the maximum there stated.

Under filtration and percolation, embracing among other arrangements Schacht's filter, described some few years since in the PHARMACEUTICAL JOURNAL, of which a cut is given, is one of the author's filters for oil, which although tolerably well adapted for filtering oil on a miniature scale, would require to be materially altered before it could be made to filter anything but small quantities.

Of the several varieties of percolators illustrated and described, we must confess that we prefer Deane's, and agree with the author that the great secrets of percolation are undoubtedly to be found in the comminution of the drug and the proper packing in the percolator. Upon this subject we think our transatlantic brethren can, and do give us some practical hints; we are sure also that they would support the author in denouncing the attempt to economize spirit by using water to displace the last portions of that menstruum, and more especially the idea that spirit so displaced is of full strength. With this lecture (the tenth) the section of the work devoted to Abstract or General Pharmacy is concluded.

Official Pharmacy opens the second part, upon which, we think, little can, or indeed is necessary to be said, for if the pharmacopœia processes from which these are abstracted are faithfully followed, in the majority of cases good and reliable preparations will result. The directions for the manufacture of all preparations seem, as far as they go, to accord with the officinal processes, even to the errors which have from time to time been pointed out as existing in the Pharmacopœia. In many cases the author has, for the sake of brevity, omitted most important details, such for instance as the temperature at which the operator is to work.

We must not pass by the very excellent paragraphs upon Spirits of Wine, fully explaining (without errors so common under this head) its relation to the excise and pharmacy.

The directions for making the scale preparations of iron well describe the various stages of manufacture, and as much may be said for the resinoids. Upon resin of podophyllin, however, the author describes the U.S. process as being different to our own, inasmuch as hydrochloric acid is not used to precipitate the bebeerine. This certainly was the case formerly, but in the recent U. S. Pharmacopœia the process is identical with our own.

With the lecture upon dispensing commences an all important section of the work, one perhaps more than any other, upon which the knowledge of the many special subjects with which a pharmacist has to become acquainted is brought to bear. The author evidently holds the same views, for he has devoted no less than about one-sixth of the whole work to dispensing and comments upon doubtful prescriptions, upwards of thirty excellent lithographed facsimiles of which are inserted as illustrative of his subject.

He commences with excellent hints, and to those about to be initiated into pharmacy we cannot over-estimate the value of his advice—"There is no department of business in which the formation of good habits is so important as in dispensing. Let it be your habit—a habit so strongly formed as to be your second nature—to be orderly, neat and quick, attentive to little things, observant of everything," and last, and not least, "the dispenser should be an accomplished man and a gentleman, up to every duty and above none."

After first noting the various mixtures, salts, etc., in daily and almost hourly use, that may be kept in a concentrated form or in solution, in order to expedite work at the dispensing counter, and after giving a few simple, but none the less all sufficient directions for labelling, weighing, and measuring, the author passes to doubtful doses in prescriptions, a subject at the present time most interesting to dispensers, as the medical journals are expressing somewhat strong opinions upon it.

Emulsions, the terror of juvenile pharmacists, are here explained, and formulæ given upon which students may experiment. We cannot comment upon the dissection of, and rendering clear, the doubtful points in the autograph prescriptions to which we have before alluded, being unable to reproduce them here, for it would be but a repetition of playing a tragedy with its chief character omitted. In order, therefore, that our readers may form a just appreciation of their style and value, we must refer them to the work itself, and its accompanying notes and explanations. The making of pills with various excipients, not only from ordinary ingredients, but from those bodies which it is generally acknowledged are most difficult to turn into elegant masses, forms the subject of a whole lecture. The student would do well to try many of the formulæ, as well also as the various powders for covering, and the process for coating pills there given.

One topic more, in connection with the dispensing counter, one that cannot, all will agree, be learned by "cramming," viz., plaster-spreading. Here, if knowledge is to be imparted and acquired, it must be by practical demonstration on the part of the teacher, and practical experience on the part of the learner.

Lectures twenty-four and twenty-five are solely devoted to the chemical examination of officinal salts; such a subject we think should have been omitted from a manual like the present. Its legitimate place would be in a treatise upon pharmaceutical chemistry, where, in order to make every point intelligible to the student, each reaction would be explained and the decomposition illustrated according to the notation used among modern chemists.

The pharmacy of special drugs to which the latter pages of the volume are devoted is certainly a novel and praiseworthy idea; the effect evidently intended to be brought about by the author, is to induce students to take a drug and work at it and its preparations step by step, until a thorough knowledge of its character be acquired.

Although the author's experiments upon Cinchona Bark and other special drugs are not such as we ourselves or other pharmacists might have chosen to have carried out, still they are valuable as an indication of the manner and style of work necessary to decide the queries of pharmacy.

The calculation given for determining worth of quinine as based upon the value of Cinchona Bark is not by any means clear. We question the accuracy of the starting point, for according to our own ideas a bark yielding two per cent. of quinine would for the purposes of quinine manufacture be commercially worth about three shillings per pound, provided that the whole or greater part of that quinine was crystallizable as sulphate; if not, it would be worth even a less sum.

We quite agree with the author that our Cinchona preparations are eminently unsatisfactory. The fluid extract although much approved by the medical profession is one that cannot upon the completion of its manufacture be viewed with satisfaction by the operator; for in the first place he finds he has at the least 25 per cent. less fluid extract than the Pharmacopœia says he should have, that the amount of water (and consequently the evaporation required) has been something enormous, unless indeed he has resorted to the special device recommended by Giles and others (overlooked by the author), and, finally although the bark to all appearance is exhausted, upon making a chemical examination of it he finds at least half the quinia is left untouched.

To devise a good and economical process for the production of fluid extract of Cinchona is a field in which a student might work with advantage.

We would not for one moment advise any one to try to make a concentrated decoction, either with or without

acid, as Mr. Proctor did, to attempt to accurately represent and at the same time be eight times the strength of the officinal decoction, for time is valuable and it has long since been decided that concentrated decoctions and infusions do not represent with accuracy when diluted the officinal preparations.

The chapters specially devoted to opium and aloes contain much information, both for students and those of maturer years, such, indeed, as is not to be found in any one published work. The author has taken advantage of recent investigations by Deane and Brady upon the former drug, and the researches of Tilden and Flückiger upon aloes and its crystalline principles.

The final lecture, devoted to iron preparations, is replete with that sound judgment and plain speaking so characteristic of the entire work.

We quite agree with the author, and most heartily endorse his opinions by quoting from this section :—"There is no article of materia medica which has been administered in so many different forms as iron, and none which threatens to go on multiplying and replenishing our shelves with such frightful fecundity.

"To stay this plague, to increase the death rate and diminish the birth rate of iron remedies, is the one thing most highly to be desired."

"The granular effervescing preparations known as citrate of iron, citrate of iron and quinine, carbonate of iron, and iodide of iron, form a little family. It were better they had never been born. Their birth showed but the folly of their parents, and their decay shows that they did not possess the stamina for a useful existence."

Notwithstanding the different opinions we have held upon some points, we feel that we should not be doing justice to ourselves and to the author if we did not record the great pleasure the perusal of his manual has afforded us.

We have no hesitation in recommending Proctor's 'Practical Pharmacy' as a text-book for those who during their apprenticeship have not only to acquire business habits, but also to obtain such information as will enable them to understand the *rationale* of the various pharmaceutical processes they are daily called upon to perform. To more advanced students, who are preparing for examination, we think this volume will supply a want that has often been felt, when such information is required as can only be obtained from practical men.

We shall not be surprised to find this work taking its place side by side with the manuals now recognized as being specially adapted for pharmaceutical students.

BOOKS RECEIVED.

QUANTITATIVE CHEMICAL ANALYSIS. By T. E. THORPE, Ph.D., F.R.S.E., etc. London : Longmans, Green and Co. 1873. From the Publishers.

SKIN DISEASES : an Inquiry into their Parasitic Origin and Connection with Eye Affections ; also the Fungoid or Germ Theory of Cholera. By JABEZ HOGG. London : Baillière, Tindall and Cox. 1873. From the Author.

Obituary.

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

On the 26th July, 1873, Mr. William George Jones, Pharmaceutical Chemist, of Staines. Mr. Jones had been a member of the Pharmaceutical Society since 1852.

On the 11th August, 1873, Mr. Edward Earl, Chemist and Druggist, of Sutton Bridge, Long Sutton.

On the 21th August, 1873, Mr. Alexander Forbes Allan, Chemist and Druggist, of Fyvie, Aberdeenshire.

On the 31th August, 1873, Mr. William Chellew, Chemist and Druggist, of Breck Road, Liverpool.

Correspondence.

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

UNJUST CENSURE OF A CHEMIST.

Sir,—If you think it worth while you can add this contribution to the discussion raised by Mr. Fisher's case.

In the matter of etiquette the fact seems to be lost sight of that the dispensing chemist, if he attends to his business, is nearly always to be found "at home," while the medical man, if he attend properly to his practice, will spend nearly as much time perhaps "abroad."

Some twenty years ago I made up a series of boxes of pills to which, each time the prescription was presented, successive additions and subtractions were made, *something like this* (I have now no copy to refer to) :—

℞ Quinæ Bisulph. . . gr. 6, 12, 18, 24, 30, 36, 6
Ferri Sulph. . . . gr. 36, 30, 24, 18, 12, 6, 48

These figures represent the successive alterations that had been made, and had all been marked through except the last in each line.

Thinking it quite possible that the prescriber might have committed the error of mistaking the line to which he added the figures, I called upon him at once, a mile and a-half off. He was not in, and I was briefly told to "come again at 6 in the morning." I did so, and found the gentleman in full career with a hall full of patients. Mr. —— was very courteous, but asked me if I thought the dose poisonous. I said, "No." "Well," said he, "I meant it ; but"—looking at the paper—"I might as well have written a fresh prescription." So I thought ; since it caused a delay of more than twenty-four hours, the patient residing in the country.

Now, it is continually urged even among ourselves that it is the chemist's duty in each case of doubt to call upon the doctor, and ask an explanation. I used to do this, but so often found the gentleman out on his rounds (as on the face of the thing is extremely likely) that repeated disappointment and delays tired me out. I now but rarely give myself this trouble, not unlikely to be worse than useless, but instead, confining myself to no rule however, say perhaps,—"I suppose the doctor said he particularly wished to know the effect of the first dose or two of the medicine ?" "No. He did not." "Well, tell him the chemist made the remark : he will be all the more satisfied of the medicine being carefully prepared." I have then made the correction in pencil which I thought was obviously needed, and dispensed the medicine. The doctor discovers the correction, and thanks me next day. At least, I have been so far so fortunate.

The alternative is—wait upon, send or write to the prescriber, and hours may pass ere communication is effected. Meanwhile the patient grows *im*patient and suspicious. And every chemist must have experienced how very difficult it often is to satisfy a party who *intends to wait*—and to whom the doctor may himself have said, "This is a simple thing, and won't detain your messenger more than a few minutes"—with excuses for delay, without in some degree compromising himself or the medical man.

Once I received "℞ Liq. Plumbi Acet. ℥j" which by mere accident I learned was not intended for outward use, but to be taken. The paper was duly signed, but without either directions for use or name of patient. The doctor had actually written "Tinct. Ferri Mur.," but had taken up in mistake from off his desk or table another slip of paper. In this case I saw and asked the gentleman : but it suggests a dilemma.

Suppose such a prescription were brought from a distance by rail, as concentrated formulæ often are. What then would be the wisest course to pursue ? It is clearly the chemist's duty not merely to refuse to dispense the medicine himself but to prevent its being dispensed at all as written, and it is only "doing as one would be done by" to screen the practitioner. I have had also good reason to know that patients will sometimes rely implicitly on the word of mouth instructions perhaps of a friend and regard the chemist as over, if not absurdly, cautious for putting upon it a poison label.

THOMAS LOWE.

Liverpool, Aug. 30th.

Sir,—It being an open question among the medical profession as to whether the dose of digitalis was a safe or

proper one, for convenience sake I will assume that it was both.

The question then arises how for the future a prescription ought to be written that the chemist may have the confidence to dispense doses when ordered eight times the maximum strength of the B. P.

When shall he know that the time has arrived to cast aside his knowledge of doses and the action of medicines—a knowledge that has cost him much time and money to acquire; a knowledge that by Act of Parliament he is now bound to possess before he is permitted to carry on a business as a chemist and druggist; and a knowledge that he is supposed to exercise for the safety of the patient in any instance of glaring error?

It is proposed by some of your correspondents to append (*sic*) to unusual doses, but this would not ensure the detection of error where ℥ is written for ℥, or ℥ for ℈, or ℈ for gr. or guttæ.

If the suggestions in my letter at p. 520, vol. iii. had been followed they would have met this case.

If the prescribing had been correct a life might have been saved, if wrong, the chemist could not have been to blame.

I now append another note to the same plan, which will obviate any mistake: it is (where possible) to write the first line of the active ingredient in its highest terms, and the next in a lower one, thus—

Tinct. Digitalis . . . . . ℥j.
2 (℥ ss. + ℥ iiiss.)

It is surprising that the jury should go out of its way to censure the chemist for his carefulness and yet could not discover much serious neglect in other quarters.

As to whether the surgeon has been guilty of culpable supineness we need not discuss.

It is our duty to carry out the physician's intentions, when clearly defined, and it is also our duty to endeavour to have laid down such rules as will for the future prevent any dispenser from becoming the victim of a vindictive persecution.

H. Simpson.

Regent's Park, September 3rd, 1873.

Sir,—In Dr. Farre's 'Abridgment of Dr. Pereira's Elements of Materia Medica' (1865), under the head of "Tincture of Digitalis," is the following note by the editor:—

"It would remove all doubts about the real intention of the prescriber, and would relieve any scruples of the dispenser, if the prescriber when ordering *unusually* large doses of this or any other medicine would *write his initials* above the dose, or above the quantity of the active ingredient."

Had Mr. Leake adopted this reasonable precaution Mr. Fisher would have *at once* dispensed the prescription, but he did nothing of the kind. Surely the *Lancet* will not deny that Dr. Farre's opinion ought to have weight with members of the profession.

As a pharmacist of forty years' experience in business, I have frequently had to submit to the prescriber what *appeared* to me to be an overdose or a wrong quantity, and *in almost all cases they proved to be so*, and I have been repeatedly thanked for doing it. In some cases most certainly death would have resulted had the prescription been made up as written. When the prescriber could not be communicated with, I have positively refused to dispense the medicine, and would do so again, and I hope the improper finding of the jury will not deter any pharmacist from doing the same.

An Original Member of the Pharmaceutical Society of Great Britain.

Edinburgh, 30th August, 1873.

Sir,—Allow me to call the attention of the readers of the Pharmaceutical Journal to a leading article in the *Lancet* of August 30th, on the duty of druggists in general, when any unusual dose of a powerful drug is prescribed, and on the conduct of Mr. Fisher, of Ramsgate, in particular, in not dispensing a prescription containing half-an-ounce of tincture of digitalis for a dose.

We readily grant that the usual mode of procedure in the first dispensing establishments in London, when such cases occur, is to consult the physician or surgeon, *if known* and *if possible*, but be it understood that such a course is always considered as a *courtesy* rather than a *duty*.

Again, the article in question has the following sentence—"We think it would have been more creditable to the druggist in question *if he had known that the administration of large doses of tincture of digitalis has been a recognized practice* since the discovery, twelve years ago, of its usefulness by Mr. Jones, of Jersey, who treated sixty-seven cases in this way."

Now, I have no hesitation in saying that no house of business, in London or country, would have dispensed a prescription ordering half-an-ounce of tincture of digitalis for a dose (unless acquainted with the physician's intention) even if they had known of all the large and unusual doses administered during the last two centuries.

It is very evident that the writer is ignorant of the rules of a strictly conducted dispensing establishment, and of the care requisite to ensure what he terms "the wonderful accuracy with which medicines are dispensed," and, whatever may be the "notoriety of prescription," I venture to assert that, however well acquainted the writer of the article in the *Lancet* may be with instances of half-ounce doses of tincture of digitalis, not one chemist in five hundred has ever seen such a prescription, although they may have lived in houses where a hundred or a hundred and fifty prescriptions were dispensed daily.

And, sir, I think "things will come to a fine pass" if medical men allow their patients to die for the want of proper instructions to the dispensers of medicine.

Proctor Jones.

August 30th, 1873.

Chemists' Responsibilities.

Sir,—In reference to the case of Mr. Fisher, of Ramsgate, permit me to say that as a chemist of more than thirty years' experience, I should neither accept the dictum of Mr. Leake nor the preposterous assumption of the *Lancet*, that a dispensing chemist is to be allowed no freedom of action, but is bound to dispense (without questioning) any prescription containing even the most unusual doses of the most powerful or even deadly remedies, and, as it often happens (as well as in the case of Mr. Fisher) without knowing anything of the qualifications of the writer of it.

It would be a waste of time to attempt to convince either Mr. Leake or the writer in the *Lancet* as to what is to be expected from one educated man of another, and as every disinterested person must consider that Mr. Fisher was entirely free from blame, I will allow the Ramsgate case to pass without further notice.

Now, after asking two or three questions springing out of the point at issue, I shall endeavour to answer the same from my own experience, and as briefly as the importance of the subject will admit of.

Well, then,—Is a dispenser always able to know whether an unusually large dose of a medicine be really intended by the prescriber or whether it be an oversight?

To this I most decidedly answer, He is not able.

For several years the superintendence was in my hands of a dispensing department where considerably more than a thousand prescriptions per week were made up, from some of the principal physicians and surgeons in London. Whenever an extreme dose was ordered my attention was directed to it, and it generally turned out to be an error of the prescriber's, proving the force of the old saying to hold good with doctors as well as with others, "Nemo mortalium omnibus horis sapit." Can the writer of a prescription always be communicated with when doubts do arise? In very many instances he cannot, as I well know at the cost of considerable trouble and anxiety.

Now, without being tedious, perhaps it will be allowed me to give a few results of comparatively recent experience which will demonstrate, I hope, the truth for which I contend, that the dispenser is called upon not only to have an opinion as to doses, but to act upon it.

℞. Hydrarg. Chlorid.
Pulv. Opii āā . . . . . gr. ij.
Ft. pil., 4tis. horis sumend. Mitte vj.

In this case the prescriber, a physician of considerable practice, was found, and at once altered the Pulv. Opii to gr. ¼.

℞. Hydrarg. Bichlor.
Ammon. Hydrochlor. āā . . gr. iss.
Pil. Ferri Comp. . . . . gr. v,
Ft. pil., ter die sumend. Mitte xxiv.

This was also the prescription of a medical man of great practice, and most precise in everything. The first time the pills were made the Pil. Ferri alone was ordered, the mistake had occurred through writing the doses of the Hydrarg. Bichlor. (when the prescription was altered) for twenty-four pills instead of one. The prescription was brought to us in the middle of a busy market, the doctor was not found, and the patient was going a long distance into the country. So without a word to the patient (which always causes alarm), I took the liberty to erase the the gr. iss. and put gr. $\frac{1}{16}$.

A prescription containing Liq. Strychniæ ♏ xv. for a dose was brought me by a lady from a medical man of celebrity thirty miles from this; she was to take the medicine for ten days or a fortnight, and see him again. Now I feel pretty sure that many, not being so conversant with the effects of strychnia as myself, would have made it up as ordered, but I ventured to reduce the dose to half that quantity, until I could communicate with the prescriber, who at once wrote to say the dose was intended to be ♏ v., not xv.

Only a very short time since, during my absence for a short period, a prescription was made up by my young man, and on my entering the shop about a quarter of an hour after, he at once asked me if ♏ xv. of the Acid. Hydrocyanic. P.B. was not a large dose; my reply was that it was, and on looking at the copy of the prescription in our book, felt certain that Acid. Hydrocyanic. was not intended.

I sent off at once with the best excuse I could for the medicine, and found on looking at the prescription that it was decidedly written Acid. Hydrocyan. dil., although it appears, as I at first knew, Acid. Hydrochlor. dil. was intended.

But I will go further than this, and state most unhesitatingly that doses are ordered which are dangerous (and sometimes even would be fatal) through the *sheer ignorance* of the prescriber, and this is why I affirm that in the case of a large dose being ordered it is not only necessary to be assured that such dose is intended, *but on public grounds*, to satisfy oneself as to the qualification of the prescriber, or, as Mr. Fisher did, refuse to dispense it; in such a case full name and address being requisite.

It is most essential at all events that in the case of unusually large doses being ordered, some distinct mark should be given to show that such is intended. And I should much prefer to *(sic.)* it being written thus:—

℞

Tinct. Digitalis . . ℥ iv. (4 drachms.)

Statim sumend.

℞

Tinct. Opii. . . . ♏ lx. (60 minims.)

Statim et post horas duas si opus sit.

℞

Ext. Belladon. . . grs. 80 (80 grains.)
Aqua. . . . . ad ℥ iv. (4 ounces.)

One tablespoonful three times a day.

I hope my desire to occupy as little space as possible will not prevent my letter from being intelligible, and sincerely hoping the Council of the Pharmaceutical Society will take action in the matter, leave it in their hands and in that of the trade at large,

ONE WHO HAS KNOWN THE DRUG TRADE MORE THAN THIRTY YEARS.

Sir,—A delicate question arises out of the Ramsgate case—How is the pharmacist to know whether prescriptions, in the manner they are now written, come from legally qualified practitioners or not, when they are merely signed with initials, as physicians' prescriptions usually are? Of course many are known to be genuine by their handwriting, but, as regards nearly half the prescriptions dispensed in London, the dispenser cannot be certain about their genuineness, and if a prescription written by an unqualified practitioner, say for *Acetum Cantharidis* or *Extractum Ergotæ Liquidum*, were dispensed by a pharmacist, and the medicine were used feloniously, would the pharmacist be actionable for supplying it? There ought to be a remedy for this, and I would suggest that each qualified practitioner should write his prescriptions on paper bearing his address, or some reference to the medical register, so that their authenticity could be ascertained and reference to the writer rendered comparatively easy, which is not the case at present.

WM. MARTINDALE.

10, *New Cavendish Street, W.*,
Sept. 1st, 1873.

"PRICE LISTS."

Sir,—Will you allow me a small space in your valuable columns to draw attention to a contemptibly low and mean practice carried on here through the medium of the price list?

A few days ago a woman called at our establishment with a prescription to get dispensed, and in handing it to me remarked that the doctor had recommended her to patronize Mr. ——, and had had it there three or four times, but supposed she could get it from me all the same. On examining the prescription I found it could have been dispensed by any chemist and druggist, as it merely contained bromide and iodide of potass. After dispensing it I stated that the charge would be 2*s.*, which was the price marked on the margin in the authorized characters of the price list, when, to my astonishment, she remarked that she had only paid 1*s.* 10*d.* for it before, at the same time adding that she had been told, on complaining of it being so expensive, that she would pay two shillings at any other shop. Now, sir, this is a very deplorable state of principles in our ranks, and more especially as the case in point emanates from a Pharmaceutical Chemist.

AN ASSISTANT.

Edinburgh, August 27, 1873.

Inquirens.—(1) Yes. (2) The new regulations of the Board of Examiners are to come into force after October 1, 1874.

"*A Registered Student.*"—Only Registered Students and Apprentices of the Society are eligible to compete for the Jacob Bell Memorial Scholarship.

"*Fidelio.*"—Several recipes for sauces were given in vol. i. of the present series, p. 1043.

J. Attenburrow.—Hypericum androsæmum.

S. H.—The expressed oil is meant, and the quantity printed—half a drachm—is correct.

"*Student.*"—See a note to Mr. Greenish's paper on Mustard (vol. iii., p. 783) respecting a pure article supplied by Messrs. Dewar, of Newcastle. We believe that unadulterated mustard is supplied also by Messrs. Sadler, Frith, and Ross, of London.

"*Inquirer.*"—We do not know of any published book upon the subject.

Errata.—In consequence of two misprints that occur in the letter from "One of Twenty Years' Experience," on p. 180, the following corrections become necessary:—col. i, line 19 from bottom, *for* "Acid. Sulph. ℥ ss." *read* "Acid. Sulph. ℥ jss."; line 5 from bottom, *for* "℥ j. tr. digital." *read* "℥ ss. tr. digital."

A. E. P.—(1) We cannot name this plant from the specimen sent, send another specimen, and mention locality where gathered. (2) *Aster Tripolium.* (3) *Suæda maritima.* (4) *Hydrocotyle vulgaris.* (5) *Cochlearia officinalis.*

"*Carte.*"—No such photograph has been advertised, but one might perhaps be obtained from Messrs. Maull and Polyblank, Piccadilly, or from the Royal Exchange Photograph Company, Cornhill.

R. H. C.—The 'Elements of Materia Medica,' edited by Bentley and Redwood, is an abstract of the original work by Dr. Pereira. We know of no other that has been published recently.

J. W. Ellis.—Stachys sylvatica.

T. M. D.—It is probably a misnomer for "oleic."

The following journals have been received:—The 'British Medical Journal,' August 30; the 'Medical Times and Gazette,' August 30; the 'Lancet,' August 30; the 'London Medical Record,' August 30; 'Medical Press and Circular,' August 30; 'Nature,' August 30; 'Chemical News,' August 30; 'Gardener's Chronicle,' August 30; the 'Grocer,' August 30; 'Journal of the Society of Arts,' August 30; 'Grocery News,' August 30; 'Produce Markets Review,' August 30.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. J. N. Moore, Mr. H. W. Howse, Mr. E. B. Storm, "Assistant," "Kilburn," E. W., W. E. G.

MATERIA MEDICA OF THE UNITED STATES' PHARMACOPŒIA.

BY E. M. HOLMES.

Curator of the Museum of the Pharmaceutical Society of Great Britain.

(*Concluded from page* 163.)

Demulcents.

Sassafras pith.—Two drachms of the pith to a pint of water forms a pleasant mucilaginous liquid which is used as a drink in catarrh and in irritation of the bladder, and as a lotion in ophthalmia.

Ulmus fulva. Slippery elm.—The inner bark is a favourite remedy in the United States, and is used for several purposes. It is a valuable demulcent and emollient. In a coarse powder it is used as a poultice to allay inflammation. In fine powder it is used to form a kind of gruel, or boiled with milk to form a nourishing food for infants. In mucous inflammations a drink formed by infusing the bark in water is found to be very useful. The taste of the bark resembles that of fenugreek seed, but is without the bitterness of the latter.

Viola pedata belongs to the secondary list. It possesses similar properties to the *Viola odorata.*

Emetics.

Euphorbia corollata. Large flowering spurge. The root bark possesses emetic properties in doses of 15 to 20 grains, but in large doses produces cathartic effects and sometimes inflammation of the mucous membrane of the alimentary canal.

Euphorbia ipecacuanha, or American ipecacuanha, resembles the last in its effects, but in a lesser degree, and is used for the same purposes as ipecacuanha.

In the Secondary List occur—

Apocynum androsæmifolium, or dogsbane, and *gillenia*, both of which resemble ipecacuanha in their action. The former is generally used in chronic liver complaints.

Diaphoretics.

Eupatorium perfoliatum. Thoroughwort, or boneset, as it is more commonly called. It is much used in colds, influenza and febrile diseases, to produce profuse perspiration. This is frequently accompanied by vomiting and relaxation of the bowels. Its action does not appear, however, to be attended with any injurious effects.

Sambucus canadensis is used in America for the same purposes as elder is used in England.

In the Secondary List are found—

Asclepias tuberosa. Butterfly weed, or as it is more frequently called, pleurisy root. It is a popular remedy for colds, etc., and possesses somewhat similar properties to boneset, but is of a much milder nature. It is said to have proved very useful in the treatment of prolapsus uteri, when mixed with half its weight of the root of *Aletris farinosa*, and given in drachm doses of the powder three times a day.*

Nervines.

Cimicifuga racemosa. Black cohosh. The special action of this drug appears to be to allay nervous irritability, and it has hence been used in a variety of diseases, more particularly in rheumatism. It should not be used when acidity of stomach is present.

In the Secondary List occur—

Cypripedium, commonly called American valerian, is used for the same purposes that *Valeriana officinalis* is in England. In conjunction with catnep and scullcap it is a popular remedy for neuralgia and nervous headache.

Scutellaria lateriflora.—Scullcap is by some authorities considered to be inert, and hence finds a place in the secondary list. By others it is highly esteemed as a nervine tonic and antispasmodic. In delirium tremens and in nervous excitability the infusion drunk freely is said to produce a calm sleep.

Rhus toxicodendron.—The leaves of the poison oak have been recommended as a nervous excitant in paralysis, but on account of the variable action and volatility of the active principle the plant is but little used.

Stimulant Carminatives, etc.

Gaultheria. — Gaultheria or winter-green. The leaves used to restrain chronic mucous discharges, and the essential oil as a stimulant and flavouring agent.

Hedeoma.—American pennyroyal is used for the same purposes as *Mentha Pulegium* or English pennyroyal. The oil of pennyroyal of American commerce is obtained from the hedeoma.

Monarda.—Horsemint is used in flatulence, vomiting, and urinary disorders, and as an emmenagogue.

In the Secondary List occur—

Asarum canadense.—Wild ginger.—It is used as a stimulant and carminative and as an adjunct to other medicines.

Solidago odora.—Sweet-scented golden rod is used as a stimulant and a diaphoretic, and the essential oil to remove nausea, and as a flavouring agent.

Tonics.

Coptis trifolia.—Gold thread is a pure bitter tonic of a similar nature to calumba and hydrastis. *Xanthorrhiza apiifolia*, which occurs in the secondary list, has similar properties, and like coptis owes its usefulness to the presence of berberine. It is singular that this principle, the occurrence of which in so many plants seems to point out its usefulness, should not have been brought into use in an isolated state.

Cornus florida.—Dogwood bark is an astringent tonic, useful in those cases in which quinine cannot be administered without causing unpleasant symptoms. It also acts as a stimulant and antiperiodic. When fresh the bark will sometimes cause griping.

Sanguinaria canadensis, or bloodroot, is a stimulant tonic. When administered in small doses it increases arterial action and stimulates the liver and digestive organs, but in large doses it manifests acrid and narcotic properties. It is chiefly used in torpid conditions of the liver. Externally it is sometimes used as an escharotic for fungous growths, in which it seems to restore a healthy action.

In the Secondary List occur—

Cornus circinata, or round-leaved dogwood, and *Cornus sericea*, a swamp dogwood. The former possesses similar properties to *C. florida*, while the latter is more astringent and less bitter. The infusion of *C. sericea* is stated to be very valuable in the sickness of pregnancy and uterine diseases.

Frasera Walteri or American calumba, and *Gentiana Catesbœi*, or blue gentian, are used in the same cases as the *Gentiana lutea* *Sabbatia angularis*, another gentianaceous plant, resembles our English

* King's 'American Dispensatory,' p. 143.

centaury in appearance and properties, and is hence known as the American centaury.

Liriodendron.—Tulip tree bark is possessed of stimulant and aromatic as well as tonic properties.

Magnolia glauca possesses antiperiodic and diaphoretic as well as tonic properties. It is sometimes used as a substitute for Peruvian bark in cases where the latter causes unpleasant symptoms.

Polygala rubella is simply a bitter tonic without possessing the acrid properties occurring in other species of this genus.

Prinos verticillatus.—The bark of the black alder, a shrub belonging to the holly family, is used as an astringent and alterative tonic in cases in which there is considerable want of vital power, as in gangrene, dropsy, etc. The decoction is also used as a lotion for gangrene and skin diseases.

For fuller information concerning the above remedies, the reader is referred to the American Dispensatory, to which work I am indebted for some of the information here given, more particularly that relating to the articles of the secondary list, many of which are not much used by the medical profession, although they are largely used in domestic medicine.

In conclusion it may be remarked that there are comparatively few remedies in the U. S. P. of a nature altogether different to those which are to be found in the B. P. Among those which may be said to have no representatives in the B. P. are gelsemium, sanguinaria, stillingia, helianthemum, castanea, and *Iris versicolor*. Hydrastis is perhaps peculiar in its tonic action upon the mucous membranes, although it otherwise much resembles calumba. Sassafras pith affords a readier means than is presented by any article of the B. P. of making elegant mucilage; and slippery elm has an advantage over linseed meal in not being liable to cause irritation.

The reduction in the number of processes given for preparations which have a definite chemical composition, and which cannot be advantageously prepared by the retail pharmaceutist, and the increase in the number of processes for essential oils, and articles which cannot be readily tested and purified and which are very liable to adulteration, is a feature to which attention might be called in this country. Obviously, the processes given are not very likely to be followed by wholesale manufacturers who have processes of their own which are better, or, at all events, more convenient. For the articles of which the purity and strength can be readily ascertained by the retail pharmaceutist, it cannot be considered absolutely necessary that this should be the case, and all other preparations are best prepared by the pharmaceutist himself.

TARTRATES AND CITRATES OF IRON AND THEIR AMMONIACAL COMBINATIONS.*

BY C. MÉHU.

The use of ferrous salts, so justly lauded in the present day, has induced me to publish the following experiments, which had for their special object the preparation of one of the most stable ferrous salts, the tartrate, and of two double salts of peroxide of iron and ammonia, the tartrate and citrate, in such a way as that they should have a constant composition.

* *Journal de Pharmacie et de Chimie* [4], vol. xviii. p. 85.

Ferrous tartrate ($C_8H_4O_{10}$, 2(FeO).*—To obtain this salt perfectly white, permanent in the air, and of a constant composition, I place in a flask nearly equal weights of small iron tacks or iron wire cut small, tartaric acid and boiling water, and boil the mixture regularly over a gentle fire. Hydrogen is abundantly disengaged, and little by little, a perfectly white gritty deposit appears, which at length gives to the liquid the consistence of soup. By repeated additions of distilled water the liquid is maintained at the same level. When a sufficient quantity of ferrous tartrate is formed, it is collected on a filter of white paper or calico and washed with boiling distilled water. The acid liquid which passes through is again poured upon the iron and heated, it being still very acid and far from exhausted. The last washings may be used in a succeeding operation to replace the water which evaporates from the flask. The ferrous tartrate, well washed, forms a white gritty mass, which is divided into tablets upon filtering paper and dried quickly in a moderately heated stove.

The precaution most necessary to observe is that the washing should be sufficient, for if the salt retain a little tartaric acid it acquires after a time a green or even yellow tint, in proportion to the acid remaining. It is necessary, therefore, to thoroughly wash it with boiling water. This washing might be effected also with alcohol, which disappears more quickly in the drying, and easily dissolves the tartaric acid, but its use would be costly and unnecessary.

The iron not being chemically pure, there occurs, especially at the commencement of the action of the tartaric acid, a separation of usually a very thin layer of black carbonaceous impurities, which is easily removed by filtration just at the point when the deposit of ferrous tartrate commences to manifest itself.

It would be incovenient to employ only the exact quantity necessary of metallic iron, even though well divided; a large excess of iron renders the operation more rapid. The product separates very well from the metallic mass, as it remains suspended in the liquid upon the flask being shaken, provided that the liquid be in sufficient quantity and the iron not in too small fragments.

When the acid liquid, in the midst of which the deposit of ferrous tartrate is formed, is exposed to the air, it turns yellow through absorption of oxygen, and ferric tartrate is formed. Upon boiling this solution upon metallic iron in great excess it is rapidly decolorized under the influence of the hydrogen disengaged by the reaction. If the acid liquor and the iron be left in contact without boiling, the ferrous tartrate and the metallic iron after a time form a solid mass, upon which the acid liquor gradually ceases to act. It is therefore important not to interrupt the boiling of the liquid.

The composition of ferrous tartrate, perfectly dry and white, corresponds to the formula $C_8H_4O_{10}$, 2(FeO), which gives 39·2 per cent. of anhydrous peroxide of iron. Direct analysis of the product dried in a stove at 100° C. gave 38·99, 38·90, and 38·95 per cent. of anhydrous peroxide of iron, amounts very near to that indicated by theory.

Ferrous tartrate is a well defined white salt, in very clear microscopic crystals; it may be preserved in

* Throughout this paper the old notation (C=6; O=8; Fe=28), which is that adopted by the author, has been retained.

closed vessels indefinitely, even in the light, without any necessity for special precautions. The salt has no tendency to oxidize if it contains no free acid ; I have kept it thirteen years without undergoing any sensible alteration. One of the least perfect specimens, exposed to the sun in an unclosed bottle became at length slightly reddened ; but imperfect washing and the influence of ammonia in the air were probably the determining causes of this slight oxidation. Water strongly acidulated with tartaric, citric, or acetic acid, or saturated with chloride of ammonium, does not exercise any perceptible solvent action upon ferrous tartrate, even with heat. Water acidulated with hydrochloric or sulphuric acid dissolves it rapidly, the solutions being nearly colourless at first, afterwards gradually becoming yellow. Nitric acid reacts in a similar manner, but its oxidizing action is more rapid.

Hydrochloric solution of ferrous tartrate turns to the right the plane of polarized light ; it acts similarly to a solution of ferrous chloride with tartaric acid added. Ammonia separates from this solution a white precipitate, which in the air immediately turns green.

Tartrate of Peroxide of Iron and Ammonia.—$C_8H_4O_{10}$, Fe_2O_3, NH_3, 2HO, dried at 100° C. Brought into contact with an excess of ammonia solution, the ferrous tartrate is dissolved with a very perceptible evolution of heat, the liquor taking a greenish colour, and gradually acquiring a thicker consistence. The mixture absorbs oxygen from the air to form the tartrate of peroxide of iron with fixation of water. With the citrate the absorption of oxygen takes place more slowly ; the liquid, at first green, appearing nearly black in the mass, turning yellow slowly. The compound can then be dried in the open air, it not being deliquescent. At first the ferrous tartrate dissolved in the ammonia forms a fluid solution ; this in proportion as it absorbs oxygen thickens and finally solidifies if it be not diluted with water, even in presence of great excess of ammonia. As soon as the oxidation is complete the liquid again becomes more and more fluid, until, when it has acquired the colour of caramel, it has nearly the fluidity of water. This is due to the formation of an intermediate tartrate only slightly soluble in ammonia, which may easily be obtained upon evaporation in green crystals ; it is not, however, a stable or a well defined product. The tartrate of peroxide of iron and ammonia obtained without heat from the ferrous tartrate is not deliquescent ; it occurs in transparent plates, very soluble in distilled water, insoluble in alcohol. Alcohol is not even coloured by contact with it, and precipitates it from a concentrated aqueous solution. It is also insoluble in ether.

Simply dried in the open air tartrate of peroxide of iron and ammonia so obtained yielded upon incineration 27·09 and 28·2 per cent. of anhydrous ferric oxide, the figures varying with the hygrometric state of the air. Dried under a glass over sulphuric acid the salt gave 29·58, 29·19, and 29·4 per cent. of anhydrous ferric oxide ; these figures corresponding to the formula, $C_8H_4O_{10}$, Fe_2O_3, $NH_3 + 5\,HO =$ 29·19 per cent. of ferric oxide. Dried at 100° C., until it ceased to lose weight, and then incinerated, it gave 32·68, 32·53, and 32·59 per cent. of anhydrous ferric oxide, corresponding to the formula $C_8H_4O_{10}$, Fe_2O_3, $NH_3 + 2\,HO = 32{\cdot}38$ per cent. of ferric oxide. The oxide of iron was calcined several times, with the addition of a few drops of nitric acid, to destroy all trace of carbon, until the complete cessation of loss of weight during a fresh calcination.

Tartrate of peroxide of iron and ammonia is usually prepared with bitartrate of ammonia and hydrated peroxide of iron. In the reaction of these two compounds in the presence of water the oxide of iron is gradually but very slowly dissolved. Beside the difficulty of preparing *pure* hydrated peroxide of iron, the process has the inconvenience that the length of time required with the bitartrate, or even with the saturated tartrate of ammonia, tends to drive off all the ammonia and eventually to give a tartrate of peroxide of iron.

Ferrous Citrate.—$C_{12}H_5O_{11}$, 2FeO + 3HO.—"Metallic iron," says Gerhardt,* "dissolves in citric acid with disengagement of hydrogen. The saturated solution, precipitated with alcohol, gives white flocks of triferrous citrate." When the action of an aqueous solution of citric acid upon reduced iron is exhausted, the filtered liquor added to two or three times its weight of alcohol presents scarcely any turbidity. If, on the contrary, the liquor is still very acid, the precipitate is more voluminous, flocculent, and white. This soft mass may easily be washed with lukewarm water ; exposed to the air it becomes green, then dark-green, and finally a blackish-green when dried at 100° C. By this method only a very small quantity of more or less oxidized triferrous citrate, mixed with varying proportions of biferrous citrate, is obtained. The product gives 37 to 39 per cent. of anhydrous ferric oxide, after being dried at 100° C. It dissolves freely in ammonia, and the solution appears to have a greater avidity for oxygen than that of the biferrous citrate.

By proceeding as for the preparation of ferrous tartrate, that is to say, submitting to prolonged ebullition in a glass vessel a mixture of equal weights of small tacks or iron wire, citric acid, and water, hydrogen is given off, and a ferrous citrate is obtained perfectly white, gritty, crystalline, dense, and particularly easy to separate from excess of iron. This salt can be collected upon a calico filter, and washed rapidly with boiling water ; but when divided into squares on filtering paper and placed in the stove it is more unstable than the ferrous tartrate. It is only by taking great precaution that this salt can be obtained dry and white.

Citric acid appears to attack iron more readily than tartaric acid. The crystals of ferrous citrate are larger than those of ferrous tartrate, which allows of their being more rapidly washed. They are also more soluble in water than those of the tartrate, but a hot saturated solution does not deposit crystals upon cooling. Alcohol scarcely precipitates a saturated solution of this citrate unless there be excess of acid. Direct sunlight colours the crystals red upon the surface, but the oxidation penetrates only a little way below the surface, and is also very slow.

This ferrous citrate is a citrate with two equivalents of metallic base ; its composition corresponds to the formula $C_{12}H_5O_{11}$, 2(FeO) + 3HO, which gives theoretically 30·3 per cent. of anhydrous ferric oxide. Incineration of four specimens of good white ferrous citrate, dried at 100° C., left 29·97, 30·0, 30·4, and 30·3 per cent. of anhydrous ferric oxide. It may be noted that in using the citrates too finely divided it is difficult to avoid during calcination a projection of some portions of the iron beyond the platinum cap-

* 'Chimie Organique,' vol ii., p. 99.

sule even when it is covered. The tartrates do not present this inconvenience, and it may be avoided by using the ferrous citrate and the citrate of peroxide of iron and ammonia in large fragments. The citrate also was washed with nitric acid and dried before each calcination.

The ferrous tartrate is a salt in which the acid is completely saturated by the ferrous oxide. The citrate just described is not completely saturated, since the citric acid is trivalent; hence the heat produced by the action of solution of ammonia upon ferrous citrate is much greater than that which results from the action of ammonia upon ferrous tartrate.

Citrate of Peroxide of Iron and Ammonia.—$C_{12}H_5O_{11}$, Fe_2O_3, $NH_3 + 3HO$.—Ferrous citrate dissolves immediately in solution of ammonia, with great evolution of heat. The liquid which is at first dark green, nearly black in the mass, rapidly becomes yellow at the edges. The liquid state favours oxidation; it is only necessary to spread the ammoniacal solution upon a flat surface and in two days its oxidation will be complete. Dried in the open air or in a stove it then gives fine scales of citrate of peroxide of iron and ammonia, of constant composition, perfectly soluble, and easily preserved. If the oxidation be incomplete the scales will have a green colour; this intermediate citrate preserves well but is ill-defined.

The citrate of peroxide of iron and ammonia absorbs atmospheric moisture rather freely; hence it gives variable proportions of anhydrous ferric oxide, unless the precaution be taken of carefully drying it. Perfectly dried in a stove at 100° C. it gave 27·80, 27·78, and 27·70 per cent. of anhydrous ferric oxide. The formula given corresponds to 27·681 per cent. of ferric oxide.

This method of preparation presents no difficulty, and avoids the long and troublesome process of preparing pure peroxide of iron, so difficult when operating upon large quantities; it also gives a product of constant composition, and easily preserved. The solution of the citrate of peroxide of iron and ammonia resists ebullition well. It may be concentrated at will, for the salt is soluble in water in all proportions: one part of water and two parts of citrate give a solution that has not even a syrupy consistence.

Rectified spirit dissolves only traces of citrate of peroxide of iron and ammonia; more concentrated alcohol is not even coloured by contact, and the salt remains pulverulent at the bottom of the tube. Employed in sufficient quantity alcohol precipitates it from its aqueous solution.

OLIVE OIL FROM TUNIS.

An important division of the regency of Tunis, called the Sahil, is very largely devoted to the production of olive oil, and therefore, as little information with regard to this part of the country has been presented to English readers, we may shortly describe it, in so far as the oil trade is concerned. The sandy, calcareous soil of the Sahil is very suitable for the growth of the olive tree; it is soft, loose, and easily turned, and if stones are met with in some places, they are merely upon the surface. A little wheat and barley is occasionally sown, but it is exclusively the olive tree which forms the true riches of the country. The number of olive trees, as given for the entire Sahil, is about 5,000,000, which should, taking the average production (although there is great variation in this respect), produce an annual average of 2,000,000 metals of oil, or in other words, upwards of 44,000 tons. It is stated, however, that with a little enterprise on the part of the inhabitants, the production might be very materially increased, as there are large spaces of good land remaining unemployed, and from which consequently no benefit is derived. In point of fact, as mentioned before, the real wealth of the Sahil consists in the oil trade. Its development took place some twenty years ago, when the duty of 10 per cent. upon the produce, so universal in Mahommedan countries, was changed to a fixed duty upon the tree. Before this wise change was effected, the native labourer, having to pay away a tenth of his crop, was comparatively indifferent as to the amount yielded by his trees.

Under the present system, however, not only have the old and profitless trees been replaced by young fruit-bearing ones, and the sites more judiciously chosen, but a more equal distribution of property has ensued, by inducing land-holders to part with their lands. Indeed, the salutary consequences arising from this measure were rendered manifest by the results of the years immediately following its introduction. The duty, or kanoon, as it is called, varies, according to the tree, from 1½*d.* to 3*d.* From an official report for the year ending July, 1872, we learn that the revenue from this duty amounted to over £11,000, while another advantage of the new system is, that it yields the State a fixed, instead of an unknown and variable revenue, resulting from the uncertainty of the crops. In regard to the culture of the olive tree, the worst enemy against which it has to contend is the drought, and this unfortunately occurs with great frequency, inasmuch as the absence of natural springs renders the province entirely dependent upon the rains. The first of these are the winter rains, which predispose the trees to an abundant florescence; the spring rains force the fruit, while any subsequent falls assist in filling it out. Occasionally it happens that some of these periodical rains are wanting; at others, that they are all withheld, the latter having been unfortunately the case during the last three or four years, when the crops were reduced to a fourth, and even sixth, of an average yield. Considering how greatly dependant the native of the Sahil is upon these rains for the fruit of his trees, it is very unsatisfactory to find the great disregard he manifests in the way of guarding against the evils caused by a want of rain. He rarely loosens the earth around the base of the roots, to enable them to imbibe the atmospheric moisture of the nights, nor does he train them, as he might do, horizontally, to screen the roots, by means of the foliage, from the parching effects of the summer sun.

It may be interesting to shortly describe the *modus operandi* adopted in Sahil in the manipulation of the oil. The olives are gathered in the months of December and January, those who gather them having leather or horn casings on the fingers, and the fruit is collected on mats or on cloths spread around the trunk of the tree for that purpose. There are two kinds of oil—the masri, which is strong in flavour and smell, and the drub-el-ma, which is deprived of both by being passed through water. The mills, however, are rudely constructed, and very imperfect in their operation, the result of which is, that a great deal of the oil is not pressed, and consequently passes off with the refuse. In addition, the process is attended with a great deal of waste, and the presses certainly require improvement. They are composed of round blocks of stone, from three to four feet long, revolving on an axis fixed horizontally to a vertical stake, and put in motion by a mule or camel. By this roller the olives are crushed into a sort of paste, which for the drub-el-ma is precipitated into water, whereon the oil floats from the difference of its specific gravity, and is skimmed off. If the masri oil be required, this paste is submitted to pressure. After the extraction of the oil, the residue, which is called fittura, is given to camels. The purchases of the oil from the producers are effected by means of semsars or brokers, with whom the oil merchants contract for future delivery, and at prices mutually agreed upon. As the payments are always made in cash, the merchants are frequently

obliged to make heavy advances. In these transactions the system of advances in anticipation of a non-existent article cannot fail to be attended by considerable risk, to cover which the parties who make the advances can only afford to offer the lowest prices, and find it necessary to charge heavy interest. These transactions, in fact, are merely loans of money for a return with interest, in produce, when instalments become due. If the crops fail, the contract is renewed for the following year, after altering the conditions, to the advantage, in most cases, of the creditor rather than the debtor. For brokerage, 1 per cent. is charged, and the vendor pays the governmental duty of ½*d.* per metal of oil. Forty-five metals are equal to one ton.

According to official statistics published on the subject, it is calculated that during the past five years £300,000 worth of olive oil left the shores of Tunis, of which Great Britain took one-fifth, the rest being divided between France and Italy. Freights direct to the United Kingdom now range from 40*s.* to 50*s.* per ton, but for the latter rate vessels call at Italian ports for casks to contain the oil. It is only within the last few years that shipments have been made direct to ports in the United Kingdom, up to which period British trade was limited to the Island of Malta, and results show that it amounted, on an average, only to an annual value of about £20,000 for exports, and considerably less for imports. France and Italy, it is said, can always compete successfully with Great Britain in the oil trade of Tunis, as the demand for the article in the former countries is permanent, and the cost of transport much lower. It appears that the cost of the oil free on board is about £33 per ton, to which must be added the cost of casks, £2; freight, say £2; landing expenses, insurance, etc., 35*s.*, bringing up the total cost in London per ton to nearly £40.

THE ACTION AND RELATIVE VALUE OF DISINFECTANTS.*

BY J. A. WANKLYN.

If we heat the infectious material of, for instance, scarlet fever to a red heat, we destroy it. There can be as little doubt that, if we bring chlorine gas thoroughly into contact with infectious material, we destroy it likewise. If we boil it with oil of vitriol, or with permanganate of potash, we destroy it. Probably, too, if we soak it in concentrated carbolic acid, or treat it with excess of corrosive sublimate or arsenious acid, we render it inert. It is, indeed, highly probable that every kind of infectious material is capable of being rendered inert by thorough contact with any powerful chemical reagent.

But if the heat be only gentle, and if the chemical reagent be dilute, there is absolutely no reason for believing that, by the employment either of the one or of the other, we are so much as contributing towards the destruction of infection. There is a difference not only in degree, but even in kind, between the action of the same chemical when concentrated and when dilute. Concentrated sulphuric acid will convert cane-sugar into a lump of charcoal, but dilute sulphuric acid transforms it into dextrine and glucose, and, curiously enough, fits it for undergoing septic changes. So, again, very dilute bleaching powder has actually been found to favour the development of certain low forms of life; and Pettenkofer, as is well known, has found that germs whose development had been arrested by carbolic acid, start into life when the carbolic acid is still further diluted.

In the practical employment of disinfectants, the fact that dilution frustrates the action of a disinfectant has been very generally lost sight of. Attempts have often been made to disinfect the atmosphere. It is even said that, during the panic occasioned by the cattle-plague, the commissioners endeavoured to disinfect the general atmosphere of the agricultural districts by turning cattle adrift with towels soaked in carbolic acid attached to their horns. I need not insist on the futility of such a proceeding; or, indeed, on the necessary futility of any effort to eliminate anything by chemical means from the general atmosphere covering our fields or occupying our streets. But it will probably not be quite needless to insist upon the impracticability of attacking the very limited atmosphere of a dwelling-house by chemical means. Certain very simple considerations will, however, suffice to throw the utmost doubt on the utility of endeavouring to purify air which has suffered contamination.

In a well-known official memorandum, drawn up, I believe, by Professor Rolleston of Oxford, directions are given for the disinfection of a room with sulphurous acid. So much sulphur (the quantity proportionate to the size of the room) is to be burnt, and doors and windows are to be shut; and the memorandum winds up with the statement that, if a man be able to abide in the room for one instant whilst the disinfection is being carried on, then the disinfection is not to be depended upon. In other words, it is admitted that, not until you have put so much sulphurous acid into the air as to make it totally unfit to breathe, have you disinfected that air. The same certainly holds generally in regard to other agents; and, in short, we cannot hope to purify the air of a room by any chemical means without spoiling the air. It is therefore useless to try to disinfect the air. This is strikingly illustrated in reference to printed directions relative to the practice of disinfection. See, for instance, Dr. Wilson's little card, 'Disinfectants and how to use them.'

"Chlorine gas, poisonous and irritating to the lungs when in excess. For an occupied room, close fire-place windows, etc., as directed under F. Pour over a quarter of a pound of black oxide of manganese in a dish placed high half a pint of muriatic acid (spirit of salt), and leave for six hours. It bleaches, and is apt to make white-limed walls sweat—useful for cabs."

Now if we take a room, say 13 feet by 13 feet and 13 feet high, or of a capacity of about 39 cubic metres (and that is not a very large room), and if we calculate what proportion by weight the chlorine liberated by the quarter of a pound of oxide of manganese will amount to, we get about 3 parts of chlorine in 1000 parts of air. In point of fact, however, the proportion of chlorine in the atmosphere of such a room would never reach anything like 3 per 1000, inasmuch as walls are not impervious, and during the six hours the air would have changed, and 3 parts per 10,000 would probably be nearer the true proportion. But this is the room not fit to inhabit by reason of the presence of chlorine. The minuteness of the dose of chlorine which the inhabited room receives may be left to your imaginations. To me it seems that the wisdom of the physician who places his little saucer with bleaching powder and muriatic acid in the chamber of his patient, is comparable with that of the cattle-plague commissioners who tied the carbolized cloths to the horns of the cattle.

Experience confirms that which an appeal to first principles suggests; and we are informed that, during the Franco-German war, although the hospitals stank of carbolic acid, yet wounds were not healthy. Although I believe that the purification of air which has once been defiled is a hopeless task, yet it by no means follows that disinfectants have nothing to do with purity of atmosphere. It is open to us to abstain, in a very large degree, from rendering the air impure.

By the efficient application of disinfectants to foul surfaces, we may hinder defilement of the atmosphere of our dwellings. One of the main functions of a serviceable disinfectant is that it shall be antiseptic; that it shall postpone decomposition and putrefaction until a convenient season. A good disinfectant should not itself defile

* Read before the Public Medicine Section at the Annual Meeting of the British Medical Association in London, August, 1873, and printed in the *British Medical Journal*. The discussion upon this and the following paper will be found at p. 213.

air, neither should it be dangerously poisonous or corrosive. There is a very common substance which has long been used to hinder putrefaction. It does so only in a concentrated form. It has no smell; it is not poisonous. It can hardly be said to be corrosive. Its name is common salt. I hold that this substance and its analogues—the chloride of calcium and the chloride of magnesium—are the most available general disinfectants.

THE MODE OF DISINFECTING BY HEAT.*

BY W. H. RANSOM, M.D., F.R.S , F.R.C.P.,
Physician to the General Hospital, Nottingham.

As it is my desire to treat this question as a practical one only, I assume assent to the proposition that heat is a disinfecting agent of so much value as to justify public authorities in spending money to secure the necessary mechanical appliances. To this I venture to add, as an opinion which will, I think, receive general assent, that heat is, for a certain group of things, the best and almost the only known trustworthy disinfecting agent. Nor can I here, without violence to the memory of an able man who has passed away—I mean Dr. Henry of Manchester—omit to point out that almost all our knowledge of the facts upon which we rest the proposition to which I have assumed your assent is due to that gentleman. He alone, so far as I know, has had the courage to make the experiments so much needed ; and he has apparently proved that a temperature of 200° F., continued for not less than one hour, destroys the activity of the virus of scarlet fever.

My attention was first drawn to this matter about eight years since, when, being asked by a public body to advise them as to the best form of hot closet for disinfecting purposes, I was unable to find any one in use which I could recommend. I therefore commenced some experiments with the view of suggesting a pattern to be tried ; but the engineer who then kindly assisted me died, and the matter was put aside until 1870, when the occurrence of scarlet fever in my own family recalled my attention to this urgent public want.

Experiments made at home in 1870 with a hot closet, having a capacity of about twenty-five cubic feet, constructed upon the oven principle, heated by gas outside, and having its surfaces partly covered by a hot-air flue and partly backed with non-conducting material, led me to the conclusion that this form of hot closet could not be recommended. I was, however, enabled from these observations to form provisional opinions as to the temperature which might be safely used, the time that goods should be exposed, the need for ventilation in such a chamber, etc. I will not take up your time by stating in detail the results of these experiments, because, from the imperfection of principle in the closet, very few of the results were sufficiently exact. However, I found that clothes and bedding might be exposed to a heat of 250° to 260° F. for an hour and a half in such a chamber without much injury. As chambers made on this principle are much used, I will here briefly state the imperfections which were found out in working.

a. The chamber cannot be long maintained at a steady heat, however carefully you attend to the adjustment of the gas-tap ; and, were it heated by coal, I cannot think it could be so well regulated as by gas.

b. The temperature varies enormously in different parts of the chamber at the same time.

c. Being imperfectly ventilated, its drying power is insufficient, and the heat therefore penetrates slowly into the interior of beds, etc.

I decided, therefore, to endeavour to construct a new one, which should fulfil the following conditions.

1. The temperature should at all times and in all parts of the chamber be within certain known limits ; and it should be plain at a glance that they are not exceeded ; the maximum being determined by the singeing-point of the materials of clothes and bedding, and the minimum lying as close as possible to the maximum, but always ten or twelve degrees above 212° F. Thus one might feel assured that clothing put into such a chamber really was exposed to a sufficient heat, and yet not injured by too much, which would seriously deter the public from using it.
2. The temperature should be easily maintained within the required limits, for periods of time sufficient to ensure adequate penetration of heat into the interior of bad conductors, such as beds, etc.
3. The chamber should have a current of heated air passing through it, so as to favour penetration of heat by drying.
4. It should be so moderate in cost and so simple in use, that small institutions might avail themselves of it, and a fairly instructed nurse manage it.
5. It should be self-regulating.

Accordingly, in the winter of 1871-2, a hot closet was erected, under my directions, at the General Hospital, Nottingham, which to a great extent did what was desired to be done. In this contrivance, the heat is obtained by burning gas with smokeless flames, and conducting the products of combustion, mixed with the heated air, by means of a short horizontal flue, into a cubical chamber through an aperture in its floor, and out of it by a smaller aperture in its roof. Fixed thermometers show the temperature of the entering and outgoing currents, which represent the maximum and minimum temperatures of the chamber. A self-acting mercurial regulator, adapted to this stove from Kemp's regulator, maintains the temperature of the entering current at any required degree. A thick jacket of felt and wood economises the heat, and makes it steadier. A valve at the outlet of the chamber, together with another at the inlet of the furnace, enables the maker to regulate once for all the speed of the current passing through the chamber—an item of great importance in the endeavour to keep the temperature of the outgoing current as high as possible. To this, if it be desired, may be added a conical short chimney at the outlet, in which three or four small fish-tail burners may be lighted. By this method any active particles of poison which might, in the earlier moments of the operation, be carried up in the current, would be burned. Dr. Henry anticipated objections of this kind, and used in his apparatus a similar contrivance to that which is now employed in Fraser's disinfecting closet.

For about a year and a half this closet has been in use with but few interruptions, and, I think I may venture to say, has rendered important services to the hospital, especially during the recent prevalence of small-pox, when a number of cases were admitted to our fever-house. Whenever the fever-house is occupied, the hot closet is at work night and day, and ready at any moment for use. The sister in charge managed it without difficulty after a little instruction which I gave her. Although it has a cubic capacity of twenty-five feet only, and is chiefly used for the clothes of patients, it has sufficed to disinfect blankets and the contents of beds and pillows. Its average consumption of gas is nine cubic feet an hour, at a cost, assuming gas to be 4*s.* per 1000 feet, of 6*s.* a week, counting seven days a week, and twenty-four hours a day.

Records of its work have been kept, showing the maximum and minimum temperature, the consumption of gas, and the pressure of gas at various hours. From these I am able to say that the heat can be maintained for weeks at a stretch without any greater diurnal variation than 5° F., which is usually due to the increase of pressure at the gas-works in the evening.

The average reading of the maximum thermometer is 250-5° F. ; that of the minimum is 232° F., which I should like to see 10° F. higher. Nor do I doubt the possibility of making it so in any future closet which may be erected upon this plan.

* Read before the Public Medicine Section at the annual meeting of the British Medical Association in London, August, 1873, and printed in the *British Medical Journal*. The discussion upon this and the preceding paper will be found at p. 213.

Thus, it may be said the five conditions stated as desirable have been fairly well fulfilled by this stove. When a large experience shall have taught us more, I do not doubt that much better results may be achieved by improvements in the details of the construction of hot closets on the principle now described.

The chief advantages of this closet are, its moderate cost, its efficiency, cleanliness, constant readiness for use; its capability of being managed without the cost of an engineer or stoker by an intelligent nurse; and the facility which it offers for maintaining a steady known heat for the length of time necessary to ensure deep penetration into bad conductors.

The only disadvantages which I have noted are: (*a*) The necessity of having occasionally (perhaps four times a year) the services of an intelligent workman to look at and adjust the heat-regulator if necessary; (*b*) The action, which I think is occasionally though rarely seen, of the acid products of combustion upon some of the most delicate colours. This I will show you, and you will see how trivial it is. It would not be difficult to overcome this objection.

Before proceeding to draw up a card of instruction for the guidance of the sister in charge, I thought it prudent to repeat observations by the acid of this chamber on the singeing point of various textile fabrics, and on the time required for penetration of heat into beds, etc. First, as to the singeing point; here are tables recording these observations, not yet complete. I will sum up the results, so far as I have gone.

White wool, cotton, linen, silk, and paper, may be heated to 250° F. for three hours without apparent injury, although the wool will show a faint change in colour, especially when it is new. Perhaps this change is not more than the change which new white flannel undergoes when it is washed. The same may be said of dyed wools and printed cottons, and of most dyed silks; but there is one kind of white silk which easily turns brown by this heat, and pink silks of some kinds are also faded by it. The same or even slightly lowered temperature will, if continued for a longer period—seven or eight hours—slightly change the colour of, but not injure, white wool, cotton, silk, paper, and grey linen. A heat of 295° F., continued for about three hours, more decidedly singes white wool, and less so grey and white cotton and white silk, white paper, and linen, both grey and white; but does not, I think, injure their appearance materially. The same heat continued for about five hours, singes and injures the appearance of white wool, and cotton, grey linen, white silk and paper, some coloured fabrics of wool, or mixed wool and cotton, or mixed wool and silk.

These observations confirm the conclusion drawn from the previous one—that 250° F. was the best and most safe maximum heat to use. It is interesting to observe here that Dr. Henry (see foot-note in *Phil. Mag.*, vol. xi., p. 22) had ascertained that cotton would resist this temperature. I was not aware, however, of this until the spring of this year.

It is noteworthy that the singeing of any fabric depends not alone upon the heat used, but also on the time during which it is exposed; and is influenced by the presence of other articles in the stove capable of giving up moisture. The maximum temperature, which I find best for general purposes,—viz., 250° Fahr.—does not weaken the strength of cotton, silk, wool, or linen threads, even when continued for about eight hours; neither does it, so far as my experiments go, lessen the strength of textile fabrics composed of these yarns. This statement, however, refers only to articles which have been left aside long enough to have reabsorbed their normal hygrometric moisture. A temperature of from 293° to 300° F., continued from three to five hours, weakens the strength of cotton-thread; probably also that of linen to a less degree—not silk, and not wool. But the fabrics composed of woollen yarn become dusty, and, I should think, would be weaker after washing. Neither they, nor yet linen fabrics, as in bed-ticking, are demonstrably weakened by this heat.

Turning now to the difficult question of securing the penetration of heat into the inside of beds, etc., I must again notice that Dr. Henry states that this is only a question of time; and so, in the main, I find it to be by observation. The accompanying table, abstracted from my notes, will show this. But the penetration of heat depends not only upon the time of exposure, but also upon the thickness of the bed, the amount of hygrometric moisture it contains, the nature of the materials of which it is composed, and perhaps also their degree of compression, as well as on the temperature used. These conditions have to be borne in mind in working any disinfecting chamber.

No	Name, thickness, and condition of sample.	Heat used. deg. F.	Time heated.	Results. Heat of inside deg. F.	Loss of weight.	Singed or not.
1	Horse hair pillow, 5 in. thick; normal moisture	251-262 2 operations	8 hours	247	1-10th	Not.
2	The same, nearly dry	247	2⅔ ,,	221	1-40th	Not.
3	White blanket folded in 24 layers, 4½ in. thick; moist	248	6⅔ ,,	214	1-12th	A little; not injured.
4	Feather pillow, 5 in. thick; moist	241	7⅔ ,,	232	1-10th	Not.
5	Flock pillow, 5 in. thick; moist	237-245 2 operations	23 ,,	252*	1-10th	Not.
6	Horse-hair pillow, very moist, 5½ in. thick.....	293	3⅛ ,,	178	1-8th	Singed; injured
7	The same, much dryer	296	4¾ ,,	296	1-17th	Ditto
8	Flock pillow, 5½ in. thick; moist	293-300 2 operations	10½ ,,	280	1-10th	Ditto

A SUMMER DAY'S DISCOURSE.†

BY THE REV. W. C. GANNETT.

What would the spring be without the flowers! And yet a spring with flowers is a modern improvement. For ages and ages, through far the greater part of its life thus far, a flowerless earth turned its sombre face up to the sun. It had not learned to smile. All winter we warm ourselves with the ancient sunshine of springs and summers in the far-off past that made the trees that make our coal-beds. But the spring-times of those carboniferous ages had no flowers, no fruit-blossoms, no grass, and of course no bees, and no song-birds, in them! All the plants, the wise men say, were like our ferns or our club mosses, or our meadow horse-tails, only they "were giants in those days," or else, like our cone-bearing trees, all reproducing in the secret way the ferns still know, or the quiet way the pine cones have. Not till long, long ages afterwards did the earth bear blossoms.

Thinking of that, we cannot say "The good old times!" We thank Heaven that the birds and flowers came before us. Indeed, the earth had to be ripe for them before it

* Perhaps an error in instrument. The inner and outer thermometers in this case may be taken as equal.

† Abstracted from a sermon preached at Boston, Massachusetts, and quoted in the *Gardeners' Chronicle*.

could be ripe for us. So here we are to-day, and the whole land is laughing for us—laughing in grass and flowers. Great tribes of beings have been already born, and others are on their way into existence, to people the planet again with colour and beauty.

What place on it shall have the fairest? Where will the Great Gardener walk and work most fondly? On the broad stretches of prairie-floor paved with gay mosaic? Or in the secret places of the woods? Or on the tiny farms that hardly seem to dot the New England landscape, although Massachusetts is the crowded corner of America? No, none of these; for Dr. Hayes says he never saw such beautiful wild flowers as he found in the Arctic zone, where the summer is almost counted by hours! And Ruskin, with his mountain-love, claims the noblest for the uplands. The grass grows nowhere softer and greener than on the alpine pastures; and set out of the glaciers, nestled by eternal snows, rise rocks whose bright tops are gardens of anemones and gentians; while the lovers of the ocean tell us that nowhere do the colours glow and deepen as they do where the sea winds feed them. The reddest wild roses I ever saw grew out of the graves of the old Puritan ministers of Marblehead—who lie ranged in a row among the rocks of the seaward burying-ground. Or what think you of the great central plain of California in flower time? For six months of the year it is a scorched and dust-swept desert. In April it becomes one flower-bed nearly 400 miles long and 30 wide, set there under the snow mountains. A traveller writes of it: "Go where I would, east, west, north, south, I still plashed and rippled in flower-gems. More than a hundred flowers touched my feet at every step, closing above them as if I were wading in water." To count the riches he gathered the harvest of one square yard of plain, taken at random like a cupful of water from a lake, and it gave more than 7000 distinct flower-heads, besides 1000 stems of silky grasses, these rising from an inch-deep velvet floor containing by estimate a million of the tiny cups and hoods that we call mosses. What barns God has!

Where, then, is the place of the fairest, seeing that all eyes claim it for their own? Nay, which one of all these children of the sun is fairest? Thoughts about beauty turn into poetry of themselves. And one can hardly think about flowers without twining his words with verse. Let me quote, at least, this one delicate answer to our question—Which one is the fairest?

"The Daffodil sang, 'Darling of the sun
Am I, am I that wear
His colour everywhere!'

'The Violet pleaded soft in undertone:
'Am I less perfect made,
Though hidden in the shade
So close and deep that heaven may not see
Its own fair hue in me?'

"The Rose stood up full-blown,
Right royal as a queen upon her throne:
'Nay, but I reign alone,'
She said, 'with all hearts for my own.'

"One whispered with faint flush not far away,
'I am the eye of day,
And all men love me;' and with drowsy sighs
A Lotus from the still pond where she lay
Breathed—'I am precious balm for weary eyes.'

"Only the fair field Lily, slim and tall,
Spake not for all—
Spake not, and did not stir,
Lapsed in some far and tender memory.
Softly I questioned her,
'And what of thee?'

"And winds were lulled about the bended head,
And the warm sunlight swathed her as in flame,
While the awed answer came—
'Hath He not said?'"

The flowers are children of the sun, I said. Literally so. The sun makes these as actually as it makes the clouds. It is sun-stir, that motion in the earth-atoms which continually unbuilds and builds them up anew. All things take part in the great circulations of the system. It is heat and light that organize the minerals into root and stem and leaf, and then green leaf still higher into flower organs. Emerson's verse holds simple fact:—

"Heat gives the reed and lily length,
Adds to oak and oxen strength."

Earth and sun—it takes them both to make a clover head! And the flowers show their kinship with the sun by waiting on it punctually. As he takes his station in the heavens above, they take theirs in the fields below. Spring is spring for each flower separately, and the gay procession of life marches on in order. We can predict the coming banners. We can date the passing weeks by flower arrivals and departures—can count the quick hours by flower-wakings and flower-closings.

But without thinking of these upper sympathies that possess the little souls of our dumb spring angels, what a marvel is each one in itself, in its own make and stature! Think what the mathematics of the leaf-arrangement imply—that every leaf on every budding tree in Massachusetts, in this whole spring, is set in place by law! that not one has stumbled to its twig, or to its station on the twig, by any accident! and that this same ordered stationing can be traced all through the close phalanx of the pine cone's scales, and determines where the limbs shall start on every tree, and the very spot within the blossom where each stamen shall droop or nod.

That last word touches the greatest flower secret that has thus far been discovered. The high-school boys all know it now, but the wisest men were just high enough a century ago to guess it; and its outcome, the thought involved in it, has rechristened all our modern science. It is the secret that the botanists call metamorphosis, but, in its grander name, transfiguration, evolution—the secret that every organ of the flower is but a transformed leaf; that bud-scale, bract, and sepal and petal and stamen and pistil, back to the new bud-scale, in spite of all the differences of their forms and all their various tintings, are but successive leaf-transfigurations. Economic Nature gets her new effects, not by selecting new themes, but by playing variations on the old themes; and when she makes a blossom on an apple tree or on a pasture weed she only shortens and alters what would else have been a common leafy branch. How do we know it? By tracing the cousinship of each pair of neighbour organs through graded series of transitional forms; by watching the conversion and the reconversion of these organs into each other in domesticated double flowers; by studying the cases of monstrosity that so often blab Nature's riddles, and reveal the latent tendencies of beings. On such full evidence as this we know it. But, not content with such transfiguration, the mother of all beauty takes up the separate organs and tenderly carries out her variations on each one. She bears fixed laws in mind, and never really forgets her arithmetic—the rules of twos and threes and fours and fives; but by multiplying parts, by dividing parts, by joining them at this place on their edges and then at that, by enlarging some and making others smaller, by their complete abortion sometimes, by moulding horns and cups, by unfurling wings, by hanging bells and ravelling fringes out, by all sorts of dainty devices of sculpture, she makes the myriad distinct species of miracles that men stare at untiringly as the flowers of spring. It is rare luck, in some old classic land, to turn up from the soil the fragment of a marble statue of old beauty. But Nature, she flings her carvings everywhere above the ground—each one complete and fresh and perfect in its niche, and such a joy that were it the lone one of its race it would draw the nations into pilgrimage for its worship.

(To be continued.)

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 13, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

MEDICAL DRAGOONING.

THE victorious vote which the *pharmaciens militaires* have recently secured in the French Academy of Medicine has an interest for every pharmacist whose professional sympathies extend beyond the threshold of his own pharmacy. Not only is it gratifying to the *esprit de corps*, but it shows that—at least in France—below the superficial literary fussiness which in some medical quarters seems to find its highest gratification in expatiating on the duties of pharmacists, there is a much larger—though quieter—substratum of medical gentlemen who think that pharmacists are not in need of this *quasi*-paternal government.

The circumstances of the dispute, which are referred to in greater detail at p. 212, are briefly as follows. The corps of *pharmaciens militaires* has existed in France for the last eighty years, and during that time has constituted a parallel but independent section of the health service of the French army. Its officers, from aides-majors of the second class up to inspectors, exactly correspond with the officers similarly named in the medical service, and like them they rank in the army from sub-lieutenants to generals of brigades. All fresh privileges accorded to one section have been equally given to the other. Until the year 1852 another section of the health service had also existed, namely, the surgeons, similarly constituted and equally independent. But in that year the medical and surgical sections were incorporated, their members without distinction being entrusted with the practice of medicine and surgery.

It will not be matter of surprise to hear that more than once during these eighty years members of the medical section of the health service have been dissatisfied with the independent position of the military pharmacists and have attempted to relegate pharmacy to a subordinate position in the service. The latest attempt was made in 1870, when the general impulse to retrieve the position of the country by a general reconstruction of existing organizations reached the health service of the army in such a form. The question was first sent to a mixed commission, and upon its failure to come to a decision the Minister of War, GENERAL DE CISSEY, applied for advice to the Academy of Medicine. The questions which he submitted for consideration were the following:—(1) Should the pharmaceutical service be incorporated with the medical? (2) Ought the pharmaceutical service to be subordinated to the medical? At first the conclusion appeared to be a foregone one, and such was the temper of the medical majority of the committee to which the Academy referred the matter, that the minority of pharmaceutical members thought its dignity would be best consulted by retiring before a report was made and appealing to the entire body. The reporters recommended that the two sections should not be fused together; that the health service should be placed under the direction of a chief chosen from its members; and that as the *logical consequence (!)* of the autonomy of the health service pharmacy should be subordinated to medicine.

Fortunately, the cause of the pharmacists fell into the able hands of Messrs. POGGIALE, BUSSY, DUMAS, and BOUDET; and equally fortunate was that it these were able to point to the past history of the service, so rich in names famous in pharmaceutical and other applications of science. Taking their stand upon the broad fact that medicine and pharmacy require different qualifications in their followers, they asserted that there was nothing in a medical education that would ensure qualification to practise pharmacy, except in a most perfunctory way, and certainly nought to enable a medical man to act as a superior pharmaceutical officer. The appeals were eloquent and forcible—we regret that we shall only be able to give an outline of them—and the Academy acknowledged their justice in rejecting the proposition for the subordination of pharmacy by a large majority.

So much for the position accorded to pharmacists by medical men in France! We enjoy the conviction that in this country the bulk of medical men look upon them in quite as favourable a light. But the fact cannot be disguised that too often there is an offensive assumption of superiority. Only recently a gentleman whose name is not unknown to pharmacists, asserted that "the chemist is bound by every rule of law and right to strictly obey the physician's orders," and that "it is not optional for him to say he is not bound by law to put up a prescription." And this in the face of every day experience, and the fact that the pharmacist is specially examined as to his capability for recognizing unusual doses. Surely such assertions may be classed with his widely advertised indignation that any one should presume to speculate concerning the composition of a certain proprietary medicine. Too frequently also, when it is intended to prescribe a dose that *ought* to raise the pharmacist's scruples, no intimation is given that it is not an oversight, and it is then held to be the pharmacist's duty, at any inconvenience, to discover the name of the—possibly obscure—prescriber, and communicate with him. Surely common courtesy would dictate some better arrangement than this, for it cannot be supposed that these doses are prescribed without some consideration. As to the spurious indignation that has been vented respecting the alleged censorship of pharmacists, M. POGGIALE refers to a very suggestive incident, where a patient

was poisoned *in spite of* the pharmacist's remonstrances.

The dignified assertion in France of the right of the pharmacist to be considered a scientific man, and one qualified to render independent service to his country by his special scientific training, has our heartiest sympathy. In this country, the circumstances attending the initiation of the Adulteration Act developed a similar spirit, and, so far, the result has amply justified the position taken. Then, as recently, there was a display of medico-literary assumption quite disproportionate to the real feeling of the profession upon the matters discussed; and it is our opinion that if the propositions so dogmatically propounded could have been submitted to the vote of a really representative body, they would, as in France, have been rejected by a large majority!

THE BRADFORD MEETING.

BRADFORD will hardly have recovered from the excitement attending the opening of the new town hall, before her scientific visitors will commence to arrive, in anticipation of the Annual Meetings of the British Association and the British Pharmaceutical Conference, which are to be held there next week.

The Conference meetings are first in order of date, and will commence on Tuesday morning, at 10 a.m., in the Lecture Hall of the Church of England Literary Institute. On Tuesday evening the members and their friends will dine at the Victoria Hotel. On Wednesday morning, the Conference will reassemble at 10 a.m., and the proceedings will terminate on Wednesday afternoon. After the reading of the Report, and other preliminary business, the President, Mr. H. B. BRADY, F.C.S., F.L.S., will deliver an address. This will be followed by the reading and discussion of papers, and among those promised are the following :—

1. Unusually Large Doses in Prescriptions : should they be distinguished by Signs, and by what Signs. Mr. R. HAMPSON, Mr. H. WHITFIELD.
2. Urinary Examinations in General, and the Tests for Albumen and Sugar in Particular. Mr. L. SIEBOLD.
3. Amount of Calcic Oxalate Excreted in Oxaluria. Professor ATTFIELD.
4. Composition of the Air of Sewers and Drains. J. J. NICHOLSON, F.C.S.
5. Commercial Sulphate of Copper. W. W. STODDART, F.C.S.
6. Ammoniacal Salts, and their Usual Impurities. ALFRED PAYNE, F.C.S.
7. Pharmaceutical Notes : The Preliminary Examinations.—The Medical Profession.—Pharmaceutical Titles. Mr. R. S. ATKINS.
8. Absence of Morphia in the Petals of *Papaver Rheas*. Professor ATTFIELD.
9. Further Experiments on Nepaul Aconite, and on the Characteristics of the Aconitines. THOMAS B. GROVES, F.C.S.
10. A New Test for Morphia. Mr. L. SIEBOLD.
11. New Derivatives from Morphine and Codeine. Professor C. R. A. WRIGHT, D.Sc.
12. On the Essential Oil of Orange. Professor C. R. A. WRIGHT, D.Sc.
13. On the Essential Oil of Nutmegs. Professor C. R. A. WRIGHT, D.Sc.
14. Report on the Purity of Commercial Specimens of Official Acids. Mr. L. SIEBOLD.
15. The Bearings of Alchemy on Pharmacy. Mr. W. D. SAVAGE.
16. Note on the Presence of Bromine, Iodine, and Silver, in Sea Water. Mr. G. A. KEYWORTH.
17. Detection of the Adulteration of Tea. ALFRED H. ALLEN, F.C.S.
18. Some Starches Microscopically and Polariscopically Considered. Mr. H. POCKLINGTON.

As probably the precedent will be followed of inviting the attendance of the local medical practitioners, and these might be expected to attend in the greatest number to hear the presidential address, it would perhaps be advisable to give precedence to subjects having special medical interest, such as the verification of unusually large doses, in order that the Conference might be assisted in their discussion by an expression of medical opinion.

A reception-room, a meeting-room, and a news-room will be open for members of the Conference, at the Institute, on Monday, September 15th, Tuesday, September 16th, and Wednesday, September 17th. We need only allude to the proposed excursion to Bolton Abbey and Woods, on Friday, the 19th.

The first general meeting of the British Association will be held on Wednesday, September 17th, at 8 p.m. precisely, when Dr. CARPENTER, LL.D., F.R.S., etc., will resign the chair, and the President-elect, Professor A. W. WILLIAMSON, Ph.D., F.R.S., F.C.S., will assume the presidency, and deliver an address. On Thursday evening, September 18th, at 8 p.m., there will be a *soirée*; on Friday evening, September 19th, at 8.30 p.m., a discourse by Professor WILLIAMSON, F.R.S., on "Coal and Coal Plants;" on Monday evening, September 22nd, at 8.30 p.m., a discourse by Professor CLERK MAXWELL, F.R.S., on "Molecules;" on Tuesday evening, September 23rd, at 8 p.m., a *soirée*; and on Wednesday, September 24th, the concluding general meeting will be held at 2.30 p.m.

The different sections will assemble in the rooms appointed for them, for the reading and discussion of reports and other communications, on Thursday, September 18th; Friday, September 19th; Saturday, September 20th; Monday, September 22nd; and Tuesday, September 23rd, at 11 a.m. precisely.

Excursions to places of interest in the neighbourhood of Bradford will be made on Thursday, September 25th.

IN consequence of considerable difference of opinion having been manifested respecting the comparative value of the various methods of estimating cinchona barks, a Commission consisting of MM. BAUDRIMONT, MARAIS, JUNGFLEISCH, P. WURTZ, STANISLAS-MARTIN, and P. BLONDEAU, has been appointed to report upon the subject. The methods proposed by M. GUILLIERMOND, Dr. DE VRIJ, and M. CARLES, are to be specially considered

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

The first annual meeting of the Association was held at 150, North Street, on the evening of Tuesday, the 2nd September, Mr. W. D. Savage (President) in the chair.

The minutes of the previous meeting having been read and adopted, the Secretary read the following report, after which the Treasurer presented his financial statement.

Report.

"In presenting this, the first annual report of the proceedings of the Association, your Committee have much pleasure in congratulating its members on the very cordial support given by so large a proportion of the chemists and druggists and their assistants at its commencement, 35 principals and 24 assistants having enrolled themselves. They naturally expected from a beginning so satisfactory a corresponding interest in the monthly meetings, which it was thought might prove a bond of union, and conduce to the general interests and improvement of the members at large. In this they have been greatly disappointed, for the number of members attending the meetings has been comparatively small, and it is therefore hoped that for the future greater efforts will be made to be present, otherwise the meetings of the Association will effect but little benefit.

"Some excellent papers have been read on subjects of interest to pharmaceutists, and your Committee feel that their best thanks are due to those members who have, in this way, so kindly assisted them in furthering the objects of the Association. The Lectures on Chemistry, arranged by your Committee, and delivered by Mr. Pankhurst, were well attended, considering the whole of the junior members were unable to absent themselves from business at the time of their delivery.

"Your Committee take this opportunity of acknowledging the kindness of Mr. W. H. Smith in undertaking to deliver a course of six or more lectures introductory to botany, should the attendance be satisfactory; but at the end of the seventh lecture, from various causes, the attendance was so small that it was thought advisable to discontinue them. This is to be regretted, as it is felt much good might have been obtained by those attending.

"One of the chief objects yuor Committee have had in view since the establishment of the Association has been the formation of a library of reference for the use of the members, and they have now much pleasure in announcing that, in addition to the books received from the old Association and those presented to the Association from the "Bell and Hills Fund," they have recently added ten volumes of valuable works on chemistry and pharmacy. The Committee are anxious that these standard works may not remain on the shelves idle, but that the members will make use of them freely.

"Your Committee congratulate the members on the very satisfactory state of the finances, for after expending the sum of £27 11*s.* 8*d.* in conducting the affairs of the Association for the past year, there still remains £4 0*s.* 10*d.* to the credit of the Association."

The Treasurer's statement showed the receipts during the year to have amounted to £31 12*s.* 6*d.* and the expenditure to £27 11*s.* 8*d.*, leaving a balance in hand of £4 0*s.* 10*d.* An extra sum of £9 17*s.* 2*d.* received by Secretary of Mr. Glaisyer, part sum of the Conference Fund, had been expended by Secretary in books for additions to library.

The Secretary's and Treasurer's reports having been adopted, and ordered to be printed and circulated amongst the members of the Association, some proposed alterations in the rules were discussed and agreed to, after which it was unanimously resolved: "That the best thanks of the Association be given to the President, Vice-President, and Secretary for their services during the past year." The following were elected to constitute the Committee for the ensuing year:—Messrs. Barton, Brew, Cornish, Ettles, Glaisyer, Gwatkin, jun., Haffenden, Higham, Mathews, Padwick, Savage, and Smith.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION.—SCHOOL OF PHARMACY.

The Council of the Manchester Chemists and Druggists' Association announce that they have made arrangements with Mr. Louis Siebold for the delivery of the following lectures during the winter session, at the Manchester School of Pharmacy, 37, Blackfriars Street, and they trust that the advantages presented to apprentices and assistants in this extended and comprehensive scheme of pharmaceutical education may be widely appreciated. The fees have been fixed on a moderate scale in contemplation of large classes for each subject.

The lectures will be fully illustrated by experiments and specimens, and whilst they will afford the best possible aid to students preparing for examinations of the Pharmaceutical Society, the higher object in view will be to impart that thoroughly sound and practical acquaintance with the various subjects which can alone be of lasting service to the pharmacist or chemist and druggist.

Examinations will be held and prizes awarded in each of the classes at the end of the session.

The Council appeal earnestly to members of the trade to aid their efforts by giving time to apprentices and assistants to attend one or more of the lecture courses, and also to join the Association, which, by its monthly and other meetings, affords valuable opportunities for friendly intercourse and co-operation.

The lecture arrangements are as follows:—

Chemistry.—Twenty-five lectures on Tuesdays, from 8 to 9.30 p.m. Commencing October 7th, 1873. Fee, 25*s.*

Materia Medica and Pharmacy.—Twenty-five lectures on Fridays, from 8 to 9 p.m. Commencing October 10th, 1873. Fee, 21*s.*

Botany.—Fifteen lectures on Fridays, from 9 to 10 p.m. Commencing October 10th, 1873. Fee, 12*s.* 6*d.*

Students willing to attend all three courses may do so on payment of a reduced composition fee of £2 10*s.* Tickets and further information may be obtained of Mr. F. Baden Benger, 1, Market Place; or Mr. Louis Siebold, Oxford street, Manchester.

Proceedings of Scientific Societies.

PARIS SOCIÉTÉ DE PHARMACIE.

This Society met on Wednesday, August 6th, under the presidency of M. Grassi.

Estimation of Cinchona Barks.

It was reported that a note had been received from Dr. De Vrij upon the estimation of cinchonas. It was accompanied by a specimen of *Cinchona officinalis* and a sealed packet, in which its composition was indicated. Dr. De Vrij also made a reclamation for M. Delondre as the discoverer of quinium.

M. Boudet said that he had received from M. Guilliermond, jun., a memoir relative to the analysis of cinchonas, in which he recalled the labours of his father upon the subject.

It was therefore unanimously resolved to appoint a commission—consisting of MM. Baudrimont, Marais, Jungfleisch, P. Wurtz, Stanislas-Martin, and P. Blondeau—to examine and report upon the comparative value of the different methods of analysis, especially those of MM. Guilliermond, De Vrij, and Carles.

M. Buignet presented a paper by M. Yvon upon crystallized protoiodide of mercury.* A specimen of the product was also exhibited to the Society.

M. Marais exhibited a well-preserved specimen of *Amomum racemosum*, received from Cochin China.

Relations of the Medical and Pharmaceutical Services in the French Army.

Upon the invitation of the President, M. Boudet gave

* See *ante*, p. 43.

a summary of the discussions at the Academy of Medicine upon the questions submitted to it by the Minister of War,—Should the military medical and pharmaceutical services be fused? Ought the pharmaceutical service to be subordinated to the medical? or, Is it necessary to preserve the *statu quo*? He explained that the commission appointed by the Academy to report upon the subject consisted originally of nine members, but these were reduced to six by the resignation of Messrs. Bussy. Poggiale, and Gobley, who were the only representatives of pharmacy upon the commission. In the name of the commission so reduced, M. Broca had reported to the Academy for its adoption the following conclusions :—

(1) That the proposal to fuse medicine and pharmacy ought to be rejected as prejudicial to the interests of the army.

(2) That the actual organization of the military health service does not respond to the wants and true interests of the army. It is necessary that the service should be placed under the direction of a competent chief, taken from its members.

(3) That the subordination of pharmacy to medicine in the army is the logical consequence of the autonomy of the service of health.

M. Boudet said that upon the consideration of the report by the Academy, the first and second conclusions had been adopted without difficulty, but that the third, recommending the subordination of pharmacy to medicine, had been *rejected by a large majority*.

In referring to this vote as a fortunate result for pharmacy, M. Boudet proposed that the thanks of the Society should be tendered to M. Poggiale, for the remarkable talent with which he had defended the cause of the military pharmaciens.

This proposition was carried with acclamation, and M. Poggiale, who was present, in returning thanks, said that they were no less due to MM. Bussy, Dumas, Boudet, and Gobley, who had joined in resisting this unfair attack upon pharmacy.

It being the general feeling that it was desirable the speeches delivered at the Academy upon the subject should have the greatest possible publicity, it was resolved to make a grant of 300 francs towards the expense of printing them.

[It will be seen that under the head of the Academy of Medicine we have availed ourselves of these reports as far as published.]

ACADÉMIE DE MÉDECINE.

A discussion took place at the Academy of Medicine, on the 15th July, upon the report of a commission recommending the subordination of pharmacy to medicine in the French military health service. (See above.)

M. Bussy, in opposing the adoption of the report, first detailed the considerations which led him and two other of his colleagues to retire from the commission. He said the commission originally comprised nine members, of whom three were physicians, three surgeons, and three pharmacists. It was to a commission thus composed that the question whether pharmacy should be subordinated to medicine had been submitted. Without any reflection upon any of the members of the commission it might have been expected that the conclusions would not be favourable to pharmacy. When these probabilities appeared to increase in the progress of the discussion, he and his colleagues had thought it due to themselves to retire, so that their signatures might not appear at the foot of a document that would deprive pharmacy of the rank it occupied in the military service and thus inflict upon it an unmerited degradation. Leaving to M. Poggiale to deal with the proposition to abolish the organization of the service of health that had existed since 1793, in order to replace it by one borrowed from the Prussians, the speaker passed on to consider what must be understood as meant by this subordination of pharmacy to medicine. The letter of the Minister of War threw some light upon this question. In it he said—"In fact, the *corps* of military officers of health is divided in two sections, medical men and pharmacists, each with a separate recruitment and set of officials; two professions independent of each other whose incompatibility is consecrated by law, since no one can practise medicine without the doctor's diploma or pharmacy without that of the pharmacist. Although up to the present time this independence has not been any hindrance to the hospital service of our army, I have observed that in certain quarters, and especially with military medical men, it has been the subject of numerous criticisms. Indeed the military doctors called upon to treat our sick soldiers have manifested a tendency increasingly marked to act the part of superior to subordinate towards the pharmaciens charged with the execution of their prescriptions. Besides this the doctors see with reluctance that the pharmaciens of our military hospitals possess an official organization peculiar to themselves and enabling them to acquire a rank identical with theirs; and in order to do away with what they call a regrettable anomaly they demand either the suppression of the pharmacists, under the name of fusion, or their complet subordination to the medical department, a subordination which should lead, according to them, to a diminution of one degree in the official ranks at present attributed to military pharmacists." Here, said M. Bussy, is the true origin of the demand for change, an origin to be regretted, but indispensable to be known. The subordination proposed has nothing in common with the subordination that exists in the general military ranks, where a man may pass step by step to the highest grades. There there exists no subordination of one service to another; there the word applies to the superiority of one grade to another, but it can have no application as between scientific men of different professions. Chemistry cannot be subordinated to medicine, at least in the sense laid down in the letter of the Minister of War, that the pharmacist should remain in all its grades inferior to the medical man and that he should never attain the rank of inspector-general, that grade being exclusively reserved to a functionary belonging to the collateral service. Under such a system, neither Bayen, or Parmentier, or Serullas, or Millon would have been able to aspire to the rank of inspector-general. After alluding to the advantages resulting from a division of labour and pointing out that it was desirable that the sick should have the undivided attention of the medical man, he referred to the effect the proposed subordination would have in destroying the spirit of emulation and reducing the service to a dead level of mediocrity. In the past the military pharmacists had not confined themselves to the proper preparation of medicaments and their distribution according to prescribed rules, but from the nature of their studies they had naturally been called in to enlighten the ministry of war upon many important questions, and particularly upon those which require the application of chemistry and of the natural sciences. The splendid researches of one of their colleagues, a *pharmacien militaire*, upon the nutritive value of the principal alimentary substances that enter into the rations of the soldier, and also his memoirs upon potable waters, were well known to all chemists and a long list might be made of services rendered to science by members of the body. In conclusion, M. Bussy expressed his opinion that the two services should not be fused into one, that pharmacy in the army should not be subordinated to medicine, but that the system which for eighty years had undergone so gloriously the test of good as well as bad fortune in the field should remain unaltered.

M. Poggiale commenced his address by referring to the circumstances that led him and his colleagues to withdraw from the commission. Notwithstanding the importance of the question, and the fact that the control of the whole army was in a transitory state of reorganization, the commission, after hearing the evidence of two *médecins militaires*, had precipitately decided upon this vital question

before even the bases of the special law upon the administration of the army were known. He expressed his regret at the polemic ardour shown by some military medical men in the dispute. In that corps he counted many friends; he had often vaunted their knowledge, services, and devotion. It appeared to him that the interests and aspirations of both bodies were in some senses identical, and he had never ceased to recommend the respect and esteem of one for the other. It was therefore extremely painful for him to take part in such a debate, where both medical men and pharmacists had something to lose. But he felt it to be his duty to defend the services of a body unjustly attacked, of which he had been a member forty-four years and the chief for fourteen years. He rapidly traced the history of the laws, ordinances, and decrees of 1792, 1793, 1794, 1795, 1824, 1831, 1836, 1865, and 1870 which established the distinction, independence and absolute equality of the medical, surgical and pharmaceutical professions in the army. Arago, who was minister of war in 1848, in reconstituting the corps of officers of health in the army, decreed that each of these three branches of the service should comprise equally the ranks of *élève sous-aide*, *sous-aide*, *aide-major*, (two classes), *principal*, *principal inspecteur* and *inspecteur-général*, and that these should be assimilated to the grades of the officers of other corps in the army, from that of sub-lieutenant to general of brigade. This decree was discussed in the legislative assembly by whom it was remitted to a commission under the presidency of Marshal Vaillant. Here amongst other objections it was met with the proposition to incorporate the two branches; but the commission unanimously reported that the two sections of the new service of health, medicine and pharmacy, as well as being distinct, should receive the same hierarchic constitution and participate in the same advantages of every kind. In accordance with this report the President of the Republic, in 1852, issued a decree instituting a corps of military officers of health, comprising medical men and pharmacists, the first charged without distinction of profession with the practice of medicine and surgery, the latter with the practice of pharmacy. These were to form two sections parallel to and independent of each other, but under the authority of the military administration. In 1859 an augmentation of pay and rank was applied in strictly the same manner to both sections. The following represents the effective force of each according to this decree :—

	Médecins.	Pharmaciens.
Inspectors.	7	1
Principals (1st class) . . .	40	5
,, (2nd class) . . .	40	5
Majors (1st class)	260	36
,, (2nd class)	300	42
Aides-majors (1st class) . .	400	55
,, (2nd class) . .	100	15
	1147	159

The revolution of 1870 again brought the subject up, and it was entrusted by General Cissey to a mixed commission, which, after much disputing, and the consideration of many projects, in all of which the medical section demanded fusion or subordination, failed to come to a decision, and now the question had been sent to the Academy of Medicine. In dealing with the first question asked by the Minister of War, whether military pharmacy should be fused with military medicine, he maintained that it was not practicable; it would suppress the sole representatives in the army of the physical and natural sciences, and would replace competent and tried men with medical incapables. The medical man who was unable to devote himself to the study of chemistry, natural history, and pharmacy, would be unable to bring to the preparation of medicines and chemical analyses the scrupulous care and knowledge required. How many mishaps there would be to deplore if pharmacists did not supervise scientifically the medical prescriptions of the junior ranks of the medical service! He did not want to excite an angry debate by citing examples, but he could not forget that, in an important hospital, a man had died, poisoned by hydrochlorate of morphia, in spite of the remonstrances of the pharmacist. A demand had been made for a gram of that poisonous substance to dress a blister. The pharmacist refused it; but the demand had been insisted upon with so much energy, that he was compelled to deliver three decigrams of the poison, and the patient died the same day. He himself believed that it was necessary that the army should have tried physicians, skilful surgeons, and educated and practised pharmacists, and he regretted the fusion of medicine and surgery that had already taken place. If the proposed fusion of pharmacy with medicine were accomplished, it was easy to foresee that the preparation of medicines would be left to the nurses. It was unreasonable to suppose that the young medical man, after consecrating several years to the study of medical science, should undertake new studies to fit him for a position that would always be subordinate. Only mediocre men, idle and without character, the dry fruits of medicine, would accept such a position, and the results would be disastrous to the welfare of the army. In fact, it would enable the Minister of War to confer the right to practise pharmacy in the army without the safeguards,—represented by years of study certified by a diploma,—which have hitherto been demanded by the state in the interests of civilians. To the proposition that pharmacy should be subordinated to medicine, M. Poggiale gave a decided negative. For eighty years the military pharmacists had enjoyed the same rank as military doctors, and during that time they had never ceased to deserve it by their services. And yet at the moment it was proposed to suppress the rank of pharmaceutical inspector it was also proposed to largely increase the staff of army medical inspectors. The seats on the council of health that had been occupied by Bayen and Parmentier would be given up to men without any prestige, and not even having the authority of rank. No argument could justify this suppression, and the true motive for it was the unavowed spirit of domination. Medical inspectors would be quite unfitted for the inspection of the central and military pharmacies, and to perform many other important duties. Indignantly resenting the proposition to abolish the highest grade in the military pharmaceutical service, by which means the supremacy of the medical service would be secured, M. Poggiale mentioned several recent instances in which *pharmaciens militaires* had rendered valuable services to the state. He also quoted several instances where the value of their services had been acknowledged by medical men of high authority, amongst others the testimony of Larrey, after the battle of Moscow, that he owed to the *pharmacien-en-chef* of that day, and to many of his junior pharmaciens, praises and thanks for the zeal with which they had seconded him under the trying ordeal. "Larrey," said M. Poggiale, "never formulated a complaint against the *pharmaciens militaires*, and I am certain that if he were still living he would not agree with the sentiments, so wanting in friendliness, of a great number of *médecins militaires*."

(*To be continued.*)

BRITISH MEDICAL ASSOCIATION.

Disinfectants and Disinfection.

The reading of a paper by Mr. J. A. Wanklyn on the "Action and Relative Value of Disinfectants" (printed at p. 205), and another by Dr. Ransom on the "Mode of Disinfection by Heat" (printed at p. 206), before the Public Medicine Section of the British Medical Association during its recent meeting in London, gave rise to a very interesting discussion upon the subject, which is epitomized as follows in the *British Medical Journal* :—

Dr. Tripe (Hackney) said that he entirely agreed with Mr. Wanklyn that it was not necessary to use the host of disinfectants that had been lately introduced to the

public. There was one point with which the officers of health would have to deal, viz. the sewers. In order to use disinfectants properly, such as chlorine, they must not be used so strong as to be rendered dangerous. The first time that he used some chlorine he almost poisoned one or two persons. In using carbolic acid of the strength recommended, if something were got which was not carbolic acid, it would produce injury of the lungs. Care must be taken to get true carbolic acid. As to chloride of lime, so far from removing the smell from sewers, it very frequently aggravated it. Disinfection by heat was most important; but special regard must be paid to the amount of moisture. To disinfect clothes, beddings, etc., the heated air must be made to pass entirely through them. If they were put in in a mass, the inside was often found not to be dried. Flock he found to be very difficult to disinfect; it was often burnt, and new was given in the place of it. In his district, a brick building lined with iron was used, in which also disinfectants were used; for he never trusted to heat alone, but always used sulphur. In using sulphur in rooms, the bed should be taken down and put upon chairs, and the blankets and mattresses placed upon end, so that the whole might be as fully as possible exposed to the disinfectants. Care must be taken in setting fire to the sulphur that it did not burn the things. The sulphur to be burnt should be put into a pan, and this in a vessel of water, so that if the sulphur did happen to overturn it went into the water. He agreed with Mr. Wanklyn that if they used common salt and sulphate of iron they would not have to go further for disinfectants.

Dr. Bond (Gloucester) said he had considered how to provide an apparatus for disinfection. Being anxious not to put the authorities to much expense, he had made an apparatus which very closely resembled Dr. Ransom's. He was glad to see that Dr. Ransom had had his in operation for some time. It struck him that wherever gas was available it provided all that was necessary; and he should be glad to know whether there was any objection to make a disinfecting apparatus portable, because it was exceedingly desirable that it should be taken to the house where the clothes were to be disinfected. He had roughly designed a form of portable apparatus, which would answer certain other purposes. It was very important, in order to save expense, to combine several objects. It struck him whether it was not necessary to have an ambulance for removing the sick, a means of disinfecting clothes, and carrying disinfectants. He did not understand how common salt was to be used for the disinfection of clothes.

Mr. Wanklyn said that the only way of disinfecting clothes effectually was by burning them. Something might be done by exposing them to the weather, and to water and heat. He did not believe that liquids could be disinfected.

Dr. Ransom said that the cost of his apparatus, of which only one had been erected, and the drawings of another were prepared, was £50. If it came into general use, it would cost about half this sum. He thought that heat was the best disinfectant for clothes; but still he was inclined to think, with Mr. Wanklyn, that they could hardly be disinfected. As to the sulphurous acid, it destroyed the paper and bed-hangings.

Dr. Tripe said that he did not use the word disinfectant in its strictly chemical sense. He used it to mean the prevention of the reciprocal action between the virus and the body upon which it might have acted.

Dr. Syson said that his opinion was, that the best thing to do was to destroy the article. By disinfecting with water money and time would be wasted, and certainly the disease would be driven elsewhere; it was merely pickling the germs to be unpickled for the use of some one else. Sulphate of iron could only exercise a certain influence. His practice had always been to do a thing well, or not do it at all, rather than get into a feeling of false security by only half doing it. He should be happy to hear of Dr. Ransom's apparatus being thoroughly effective. As to the cost, it should not be reckoned against human life.

Mr. Grieve (Hampstead) had had practical experience of disinfection at Hampstead. They had received 12,000 cases of small-pox, and they disinfected the patients, and gave them on leaving the same clothing they had on when they entered the hospital. These patients had been traced, and there were no signs of their having carried the infection with them. The mode was to use heat combined with sulphur and sulphurous acid. It was found that they could be used in a chamber at a temperature of 230° F., without damaging the clothes. The buildings, which were of iron, were now occupied by pauper imbeciles. The plan recommended by Dr. Tripe was followed. Sulphur was burnt in the buildings; and, to make assurance doubly sure, every inch of the surface was washed with carbolic acid and well watered with the fire hose. The buildings were thus prepared, and there were now between 300 and 400 inmates, and not a single case of small-pox had arisen. Disinfection could not have been put to a more crucial test.

Dr. Farr (London) said that what was wanted to be known was whether disinfection was effectual against other diseases as well as small-pox.

Dr. Tripe said that he never knew of an infectious disease spreading after the application of sulphur at a temperature of 230°.

Mr. Hastings said that at the meeting of the Social Science Association, to be held at Norwich in the beginning of October, there was to be an exhibition of sanitary appliances; and he would suggest to Dr. Ransom to exhibit there the actual model, so that it might be seen, if necessary, in operation. Thus a more accurate idea would be arrived at as to how far it would be desirable to erect it in other places.

Dr. Ransom said that he was obliged to dissent from the sweeping proposition of Mr. Wanklyn. He had the evidence of Dr. Henry, of Manchester, who proved the easy destruction of the activity of vaccine by exposure to a temperature of 140° F., for an hour. The close analogy between that and small-pox made it exceedingly probable that the virus was destroyed by heat at a moderate temperature. With regard to scarlet fever, the object had been attained; for the clothes worn by those suffering from the disease had been subjected to the treatment, and were afterwards worn by others, and no harm had arisen from it. That was recorded in the *Philosophical Magazine*, volumes x. to xi. With regard to the destruction of clothes, that was practically impossible. Nothing would persuade people of a certain class to destroy their bedding and furniture (which, relatively to their income, were very valuable), and nothing would induce the ratepayers to pay for them. If it could be shown that clothing could be disinfected tolerably safely for a small sum, many people would take advantage of it. His object had been to remove the difficulty in the way of applying heat; and he trusted that in the course of time his suggestion would remove some of these evils.

Mr. Wanklyn said there were two ways of getting rid of infectious material. All organic matter was destroyed by a red heat, or by powerful chemicals. Many infectious materials were comparatively easily destroyed; he believed that the matter of small-pox perished as infectious material below even the boiling point of water. There was another way, and that was by extreme dilution. The material was a chemical substance, and at a certain point it ceased to be poisonous. By extreme dilution germ-poison could be destroyed. A certain quantity of water destroyed these germs, as far as development was concerned. With regard to the disinfection of clothes by heat, he thought that Dr. Ransom had furnished the answer. Flock must be heated twenty-four hours before the whole mass got the temperature. He did not think that it would be practical to disinfect the ditches, but he believed that something might be done to the drains and

sewers. If there were an abundant supply of water, he did not believe that any disinfectant was needed. It was only when the surface was getting dry that he believed that sulphate of iron and other things were necessary. He utterly disbelieved in the use of carbolic acid for this purpose.

Mr. Huntley (Jarrow) said that he came from a town where the atmosphere was pervaded with chlorine. They could not walk through the streets without having their noses tickled with it, and their eyes filled with it. If this chlorine were disinfectant, epidemic diseases ought to be altogether absent; but he was sorry to say this was not so. Jarrow had suffered from small-pox as severely as most places, and from time to time it was visited by various diseases.

SOCIETY OF ARTS.

On the Energies of the Imponderables, with especial reference to the Measurement and Utilization of them.*

BY THE REV. ARTHUR RIGG, M.A.

Lecture V.

On the Energy of Electricity, with especial reference to the Measurement and Utilization of it.

The energy of electricity is being manifested in phases new to men day by day. That which in the early part of the present century was unknown, is now so well known as to win neither surprise nor notice. The telegraph which girdles the earth—the electro-deposition of metals—the light which pales our brightest—the power which melts the most refractory metals (for I have seen a square bar of iron a foot in length, and about three-eighths of an inch on the side, fused into drops by a current of electricity in less time than this narrative has occupied)—these have been handed down by science to promote the commercial and social welfare of mankind.

What remains to be done by this energy, so recently harnessed, and as yet only partially trained, is beyond our present ken; but that it will—or, at least, that it can—be developed in a sufficiency to supply our coal-fields when exhausted, and take upon itself all that coal, and wind, and water now give of kinetic energy, no one who has watched the progress of the past need doubt; this, too, quite irrespective of the view that owing to the quantity of zinc consumed, electricity can never compete with coal in producing the same results. There is every reason to expect that long ere the coal-fields are exhausted, the tidal waves on our coasts will be supplying light enough and heat enough, and, therefore, power enough, for the requirements of Great Britain and Ireland.

Propositions better established than that which asserts electricity to be non-producible from sufficiently economical sources have faded into oblivion.

The energies of electricity are manifested whenever there is a molecular disturbance within or amongst bodies. Whenever any change takes place in anything whatever, and amongst any molecules whatever, an electric current is produced, and if not necessarily manifested to us, still it always is present. Probably there is not a single act of our lives, and it may be not even a thought in our heads, which is not associated with an electric current.

Kindly understand that the lecture is on the energy of electricity, and, therefore, time must not be occupied in describing instruments. Galvanometers are now-a-days made so delicate that if you lay one fingure in one trough of salt water, and another in another, and simply tighten the muscles of one arm, a current of electricity passes through the galvanometer and deflects the needle. We cannot raise our hands to our head without setting free a current of electricity, and in that current is energy. Its energy is manifested in the moving of the galvanometer needle. How much of that energy is merely the balance between two energies of large amount—how much is not manifested, owing to the sluggishness of the instrument and from other defects, we know not, but that some is thus interfered with there is very little doubt. We usually speak of a galvanic battery as being formed of zinc and copper, or of metals in chemically different relations to a liquid; if, however, you take a piece of ordinary copper bell wire, and connect the two ends of it with the galvanometer, then cut it in two with a pair of scissors, and dip each cut end into salt and water, or put them into your mouth, an electric current passes, and the galvanometer shows that there has been some species or other of molecular disturbance which has caused a manifestation of electrical energy.

This energy of electricity becomes kinetic when it is allowed to pass freely. For example, in any bodies which are quiescent, it is kinetic, but it is potential when resisted. If, for instance, a current of electricity passes along a wire and the action is resisted, the wire becomes hot. If it passes through any compound body, as, for instance, water, then it is resisted, and the water is immediately decomposed. Consequently we are dealing to-night with an energy manifested in molecular disturbance, and having both a potential or stored-up power, and a kinetic power in motion. The question now is, how is this energy to be measured, for the subject of the lecture this evening is a mode of measuring the energy of electricity.

Towards the middle of the last century (1746) the first electrical machine was made. In 1650, Otto Guericke, to whom we are indebted for the air-pump, suggested the scheme, but Hawksbee was the first to make one. His machine consisted of a ball of sulphur, afterwards altered to a ball of glass. The hands were employed to rub it, and a large fly-wheel, about six feet high, was employed to turn it. Silk threads from the ceiling held what we now call the conductor; and by the exercise of a very large amount of mechanical power they were enabled to get a small spark, to the surprise of all, to the curiosity of many, and the dread of not a few. After that we come to the plate machine, which is arranged, as you are aware, with cushions; still we have those sparks which were supposed to have much energy in them. We then pass on from the glass plate machine to the vulcanite plate machine. Here is a vulcanite-plate, and, as you are aware, by rotating it between cushions, the electricity is gathered upon this conductor. You see this large wooden ring—that was suggested by Winter; the object of it was, somehow or other, we do not know how, to condense the electricity, and to convert what might be a fine line spark, into a solid whitish spark. How this ring acts, and the whole history of this machine, would be quite sufficient matter for one lecture; but that with which we are now concerned is not how to produce such phenomena, but how to attempt to measure the energy of the electricity which these machines, and other means, can develop. I scarcely need tell you that it is not, in any sense of the word, an electrical lecture in which we are to be engaged this evening, and these apparatus are only here as illustrations of the operations. Sparks pass from the conductor, and are usually charged into a jar of this kind—a Leyden jar. That was first done in the year 1746. The jars were charged and discharged, and although great shocks were felt, yet no measure was taken, and it was supposed that in the shock consisted the energy of electricity.

Now, the mode in which electricity thus presenting itself was ultimately measured was by a small jar of this kind, called a unit jar. This unit jar is in all respects the counterpart of the Leyden jar, only made smaller, and one is here mounted on glass and brass rods. There are two brass balls, one connected with the inside of the jar and one with the outside, which balls can be set at any distance apart. The inside of the jar is charged from the electrical machine, and as soon as it is sufficiently charged, according to the distance of the balls from one another, a spark passes. So passing, spark after spark enters the

* Cantor Lecture, delivered February 21, 1873; reprinted from the *Journal of the Society of Arts*.

larger jar, and if we count the number of such entering, we have settled what was supposed to be the measure of energy contained in the large jar. We may put in 10, 20, 30, or 40 charges. It will be very obvious to you, however, that these unit jars vary. The same jar is always alike, but you cannot make two exactly alike. Even if this could be done, the state of the atmosphere and other surroundings would so influence the passing electricity that accurate comparisons and conclusions could not be made. Moreover, these jars vary on the surface, and in the character of the glass, and in other ways ; consequently, this mode of measuring energy must necessarly be a failure. The unit jar, therefore, has fallen into a complete disuse.

Hitherto the mode of producing the electricity to be measured has been by friction. Now, here is a machine, consisting of a thin circular vulcanite disc, capable of being put in rapid rotation, but there are no rubbers or other articles in contact with the plate. It is called a Bertsch machine. Here are three segments of thin vulcanite; one of these is rubbed with a piece of dry silk or fur, and, being slid in prepared grooves, the faces of the segment and rotating vulcanite are about one quarter of an inch apart. These two other segmental pieces can be slid behind the first one ; if the room and the atmosphere were not so damp we should probably get a four-inch spark from this machine. One segment is rubbed, and placed about a quarter of an inch from the disc, and by a process of induction, when it is rotated, there is a noise as of much electricity being brought forward and gathered by the conductor. Again, we have it here no quantity of electricity—we have no kinetic energy. The difference between energy as it is used, speaking electrically, and intensity, as it is also used, speaking electrically, is this, there may be great intensity and little or no quantity—no power, in the proper sense of the word. For example, if a piece of iron were taken and formed into needles, and if those needles were placed points downward upon the hand, and a small weight upon them, we should find that piece of iron possessed of great intensity ; but if this iron in rough block form, with any weight upon it, be placed upon the hand, although there be a very much larger quantity of iron, yet there is little intensity. In such a sense the distinction is drawn in electricity between quantity and intensity. There is great penetrative power in electricity obtained from this machine, but there is no quantity of electricity moving, and upon the quantity in motion depends our ability to get energy. If all our iron appeared in the form of needle-points we should do very little with it.

There is another matter, also peculiar to electricity of this character, compared with the uses to which iron is now applied. Here is a small glass flask with crumpled pieces of tinfoil in it. If this flask were coated on the outside, as a jar is, the amount of intensity and the shock that would be given by it, would be equal to what might be obtained from that large jar, for this reason, the electrical balances between the inner superficial metal surface and the outer coating of the jar depends upon the intensity of these two. Electricity of this character rests upon surfaces only ; electricity of that other character, with which we are more concerned, enters below the surface, and may be said to reside and travel within the body. Whatever, therefore, may be the number of, say, square inches of surface within the jar, the electricity upon the whole of them would be balanced by electricity of equal intensity upon an outer surface covering the jar only. This may be illustrated by reference to the large quantity of water contained in a dock for ships. It is supported or kept at its level by a gate which in no respect is stronger than would be required for a dock of the same depth containing not one-tenth of the quantity of water. So what is called the hydrostatic paradox, also so with Bramah's hydraulic press, and so with this little jar. There may be a large quantity of electricity within this jar if it have a large surface on which to distribute itself, and then it will be balanced or kept in equilibrium by a smaller surface on the outside charged to the same intensity.

The electricity here has been produced through physical exertion. We found, however, the other night that there is no physical exertion so great as that which takes place between the molecules of different bodies when chemical affinity is allowed to operate. If therefore, instead of getting molecular disturbance in the muscles of our arms by turning these handles, we produce molecular disturbance between the ultimate atoms, or molecules of matter, forces are called into play as far beyond the power of our arms as those of the most colossal steam-engine are beyond the power of a mouse. By chemical arrangements we are enabled to obtain electricity of a totally different character from that hitherto noticed—so different that there is little similarity between them, excepting a common name. In fact, the earlier attempts at telegraphy failed in consequence of the promoters using electricity produced by machinery such as this—an electricity which is possessed only of intensity and not of that energy consequent upon quantity.

Let us now pass on to the mode of obtaining electricity from chemical action. Before doing so a phenomenon should be noticed, which disturbs results very seriously, and which is, at present, not understood. Here is some copper wire, covered with cotton, coiled from end to end, say five or six times along this large bobbin of wood. Within the bobbin is a larger hole than usual. The two ends of this wire so coiled are connected with the reflecting galvanometer. The reflected light from this lamp is now visible and stationary upon the screen. You are aware that motion of that reflected speck of light will be the consequence of electricity passing through the coils of the galvanometer. Now, observe that, without either chemical or physical agency acting upon or in contact with the wire, we shall obtain a manifestation of electrical disturbance within the copper wire. Let the end of this steel magnet be introduced within the bobbin, you see that the speck of light immediately moves. Except in this manner, copper does not manifest electrical properties. Again, if the other end of the steel magnet be brought within the bobbin, you see the speck of the galvanometer moves in an opposite direction. Thus may be shown one form of electrical induction.

Now, with that phenomenon we are perplexed. This property of induction manifests itself at times and in ways of which we know nothing. For example, if a copper wire were laid upon this floor, and another copper wire were laid parallel to it on the floor below ; and if any current of electricity passed through the wire on this floor, the one below would answer to it, although there was not any apparent contact or communication between them.

The laws which govern such electrical manifestations as these are very partially understood, and therefore the measurements of the results of these laws are for general use almost valueless. We must, however, for the present assume that the nature of the phenomena of electrical induction is clear.

The next stage in obtaining electricity is by means of what is called agalvanic cell. Such a cell usually consists of two different metals, and one or two liquids. Whatever may be the arrangement, the electricity developed may be estimated by the intensity of chemical affinity during the process, and at the time of the measurement. But the whole of this question of chemical affinity must now be assumed, and some of the affinities explained in the last lecture are probably the chemical affinities operating in this cell. A chemical action takes place upon a square inch of one plate, and it is met by an action upon a square inch of the other, therefore on every square inch an action is produced. Between the two plates there is something (say the liquid) which causes the action. It is in fact the presence of this liquid which calls the chemical affinities into play.

A word must now be introduced which will often occur during the evening, and it is one which performs an important part in the measurement of electricity of the character which men utilise, *i.e.*, resistance. Indeed, this resistance to the free passage of an electric current is our

during the evening, and it is one which performs an important part in the measurement of electricity of the character which men utilise, *i.e.*, resistance. Indeed, this resistance to the free passage of an electric current is our chief business to-night. Whilst the size of the plates in these cells is increased, the resistance to the free course of the manifested electricity is not decreased. Thus, for instance, from a square inch of one plate there is a current of electricity meeting or co-operating with that developed from a square inch of the opposite plate. Whatever may be the energy of the chemical affinity upon one square inch, it is met by the energy of the chemical affinity upon the opposite square inch of the other, and that energy has to overcome the resistance of the liquid between them. Now, then, assume that each of these plates is enlarged by the addition of another square inch. This introduces an additional quantity of liquid, and we have to overcome the resistance of this liquid. The difficulty of overcoming the resistance of the intervening liquid is such that, however much we multiply the number of square inches, we also introduce more liquid, and by so doing add further electrical resistance. Hence, however large may be the plates, we do not overcome the resistance more easily. That led to the contrivance of thus coupling up in what is called "a series" in the form you see here, that which is familiar under the name of a cell-battery.

It may perhaps make clear what is a difficulty to many minds if an attempt be made to explain how it is that an electrical current which passes when cells are coupled up "in series," that is, one after the other, is more intense than when they are combined as one large single cell.

Supposing these two plates, each one square inch in area, were the only two concerned, therefore there would be a certain resistance to be overcome. The chemical affinity of one such combination not only overcomes that resistance but leaves a surplus of electricity, which surplus is said to run along the outside wire, and may produce what we call a telegraphic despatch. Now, suppose that in addition to those two plates, there are two others of the same size and material in a cell behind them. Between these second plates there is also a resistance similar to that between the first two. Those two second plates, however, also produce a surplus. Now as that surplus passes over it continues its way through the previous plates and wire, and the consequence is that when once the resistance of its own cell has been overcome, the surplus electricity can pass through the other cells without any resistance, and, therefore, we are enabled to add the surplus of one cell to the surplus of the next, and so on. Hence, when combined in the form in which they are combined in this battery, we are manifestly enabled to pass along the connecting wire successive equal amounts of electricities, and these flowing so very closely behind each other, produce an effect upon any resistance similar to that produced upon a slab of marble or of glass by the forcible driving against it of small grains of sand in a continuous stream. These grains penetrate, and, as it were, bore holes even in hardened steel; so these successive electricities are, as it were, continuous, and thereby overcome great resistance, It may, in connection with this, be remarked that, perhaps, in some such way as now described, the mighty energies of affinity may be accomplished by this clashing of millions upon millions of atoms and molecules. This may explain how and why it is that these cells thus arranged "in series" are under certain circumstances more effective than when the same amount of liquid and metallic elements operate as one cell only.

Electricity thus, or by other means at our disposal, is now to be measured. Two things are especially before us to-night. One to make clear how this measurement is made; the other to endeavour to make clear how the resistance of various bodies, be they wires or liquids, is also measured.

This electricity is measured in a very simple way. All the apparatus is here, but as it would take too long to show experiments in detail, perhaps you will kindly accept a statement of facts instead of a visible reproduction of them. In these cells is being produced a quantity of electricity which is to be measured, much as sugar is measured by the pound or liquids by the quart. The way it is measured is either by the chemical decompositions that it can produce, or by the amount of heat it can develop, or by other means, as for instance its effect upon the magnet in a given time.

This seems a convenient opportunity for directing attention to a galvanometer, which is arranged upon a plan by which is shown the amount of decomposition effected by the current indicated by the place of a needle on the dial. The gentleman who designed it had in view only a manufacturer's requirements. The measurement effected by such a galvanometer is not of that character with which this lecture is to be concerned, and therefore further reference to this particular one is not requisite.

To consider a mode of measurement we must recur to those elements—mass, space, and time. The apparatus on which my hand now rests consists of a wooden ring, about ten inches in diameter, having coils of copper wire around it. Within this circular box with a glass top is a small magnetized steel needle. Now, the small steel needle assumes a certain position in consequence of the influence of terrestrial magnetism. Such an influence as this is not unlike a stream of water in a brook upon a short stick, one end of which is tied to a stake by a string. So long as the stream flows steadily past the stick it is retained in the same position. Let a disturbance take place in the evenly flowing water, and the stick will no longer retain either steadiness or direction. Suppose, now, that this needle is retained in a certain direction by the influence of what we may call the stream of terrestrial electricity flowing through the atmosphere of this room. (That such a stream is so flowing through the atmosphere shall be made apparent presently.) From these four cells of a galvanic battery a current of electricity may be caused to pass along the wire which surrounds this wooden ring. The arrangements are made, and such a current is now passing. What is the consequence? The even flow of that which retained the needle is disturbed, and the needle answers as the stick in the water would have done to the disturbing causes. Clearly the nature and extent of the invisible disturbance may be estimated—indeed measured—by the motions of the visible needle, just as a new position assumed by the stick would measure the disturbing influence on the stream.

(*To be continued.*)

Parliamentary and Law Proceedings.

Attempted Murder and Suicide by Poisoning.

At the Lambeth Police Court on Saturday, September 6, Ann Dickson, 20, boot closer, was charged before Mr. Ellison with attempting to cause the death of Rose Alice Catheron, aged six years, by giving her a quantity of precipitate powder. She was also charged with attempting to commit suicide by taking a quantity of oxalic acid. A police constable said that at about a quarter past eleven o'clock on Friday night he was called to a house in Wood Street, Lambeth Walk. He found the prisoner lying on a bed in the back parlour. She was evidently suffering great pain. In the room there was also the child, Rose Alice Catheron, who was vomiting very much. He took them at once to Lambeth workhouse, and they were attended by the doctor, who found them suffering from the effects of poison. The prisoner, upon recovering, said, "I have done this through revenge. I have left my apartments this morning. What things I had I have sold, and I intended to do this when I left home this morning. I bought precipitate powder for the child, and oxalic acid for myself. The child's father has ruined me, and this was my revenge." Witness afterwards found some pieces of paper, one marked oxalic acid and the other precipitate powder. The child was still under medical care. The prisoner, who declined to say anything at present, was remanded.—*Standard.*

Suicide of an Apothecary by Aconite.

An inquest was held at Cork on Friday, September 5, upon the body of Mr. H. Haines, an apothecary. From the evidence of a brother of the deceased it appeared that he had been labouring under various delusions, and in a very desponding state of mind, which witness attributed to the recent loss of his wife and two daughters. His assistant also gave similar evidence, and deposed that he had at deceased's request prepared a sedative draught on two occasions just before his death. On the Thursday deceased left the shop and went into the laboratory, and witness feeling uneasy at his long stay went after him. Upon entering witness saw deceased finish drinking out of a tumbler something which at first he thought was wine, but upon asking him where he had taken it from, deceased pointed to the "aconite" bottle. Witness immediately called for assistance and administered sulphate of zinc and hot water, and similar treatment was continued by the medical man who attended, but deceased gradually sank and died in about half-an-hour. The bottle from which deceased took the "aconite" was a fresh one, and he drank more than an ounce from it. A verdict was returned that deceased committed suicide while in an unsound state of mind.—*From the Cork Advertiser.*

Prosecutions under the Adulteration Act.

THE SALE OF MILK.

At Worship Street Police Court on Thursday, Sept. 4, William Walker and Samuel Quint, of Heneage Street, Mile End, were summoned under the Adulteration of Food Act, 35 and 36 Vict., cap. 74, sec. 2, for selling milk and water as genuine milk. The sanitary inspector proved that on the 9th of July he purchased at the premises of the defendants a pint of milk, placed it in a bottle, and sent it to Dr. Meymott Tidy for analysis. Dr. Tidy, Professor of Chemistry at the London Hospital, then deposed that at least one-half of the "milk" was water. Mr. Hannay said the evidence was conclusive. The milk, however, had not been mixed with any deleterious matter, otherwise he would have imposed the full penalty. He now ordered the defendants to pay £5 and costs. The money was paid. Henry Foster, of Pelham Street, Mile End, was summoned for a similar offence, and was ordered to pay a like penalty and costs.—*Times.*

THE SALE OF TEA.

At the Birmingham Police Court, on the 3rd inst., Mr. Bakers, was summoned for having sold a quarter of a pound of black tea, and a quarter of a pound of green tea, both of which were alleged to be adulterated. Evidence was given as to the purchase, and two certificates from Dr. Alfred Hill, the borough analyst, stating that the black tea was adulterated with sandy matter, talc, and iron filings, to the extent of 4·7 per cent., and the green tea with similar foreign substances to the extent of 6·9 per cent. For the defence it was urged that the defendant had said that he could not guarantee the quality of the tea sold at the price paid for the samples, and that it was not necessary to state what the mixture was composed of; he had sold the tea as he received it. The Bench considered the offence proved, and inflicted a fine of 20*s.* and 8*s.* 6*d.* costs.—*Grocer.*

Action against a Wholesale House for Alleged Supply of Adulterated Jam.

An action has been brought in the Bath County Court, in which the plaintiff, Mr. Cox, a grocer, sued the defendants who are large wholesale confectioners, carrying on business in Botolph Lane, London, and having a factory at Ratcliff, to recover damages for the loss occasioned by a purchase of jam, which was made on the faith of the representations of the defendants' traveller. The plaintiff said that in August, 1872, the defendants' traveller came to him and urged him to purchase some of their jams. He ordered three gross of the best jams, at 7*s.* 3*d.* per dozen, to be delivered to him when he demanded them. The traveller guaranteed that the jams should consist only of the finest fruit and the best sugar, and that the fruit should be so labelled—strawberry should contain strawberry, and raspberry raspberry. The jams were delivered about April 15, and immediately plaintiff began to receive complaints about them. At length he had them analysed by Mr. Ekin, and, in consequence of his report, wrote to the defendants on June 6, and said he found their jams "highly adulterated," and requested them to take them back. Repelling the assertion that they were adulterated, the defendants declined to do so, and said their contract to make the jam only of the finest fruit and best sugar had been strictly fulfilled. Some further correspondence passed, and Mr. Cox sold the remainder by auction: what cost him £12 17*s.* 10*d.* realized net £6 3*s.* 10*d.*, and he therefore claimed the difference, £6 14*s.*

Mr. Ekin, F.C.S., described the analysis he had made of the sample jam; he considered it was not genuine jam, because when filtered and reduced to an extract it was deficient in flavour; there was a remarkable absence of pips, and artificial colouring matter was present. This he had proved by the application of caustic alkali, which discharged the colouring, while it would not natural colour. The colour, too, was too much of a pinkish tinge. He counted the pips in a quarter of a pound of the jam and found there were forty-five, or about enough for two strawberries. He was sharply cross-examined by the defendants' counsel. He said the number of pips in a strawberry varied, but not to the extent of 1000 per cent.

It was submitted, that the traveller collected accounts and received orders, but had no authority to give guarantee or to make a contract. He merely received Mr. Cox's order and presumably communicated to the firm, who, it was admitted, sent down a contract note. On that, it was stated, the house guaranteed to make their jams of the finest fruit and the best sugar. In the second place it was contended that that contract had been fulfilled. In the course of manufacture it was found necessary to add a little juicy fruit to the dry fruit, and *vice versâ*, to prevent deterioration, but that was all. The fact was that Mr. Cox found himself at the beginning of a cheap season with jams deficient in flavour and high in price, and he desired to get rid of them. But on account of the imputation made in his first letter the house declined to receive them. The traveller could not be called, as he was in California for the benefit of his health. If he had guaranteed the jams he did it in the teeth of his instructions. Evidence was then given as to the purity of the jams.

Judgment reserved.—*Grocer.*

Reviews.

Chemistry: General, Medical, and Pharmaceutical, including the Chemistry of the U. S. Pharmacopœia. A Manual on the General Principles of the Science and their Applications to Medicine and Pharmacy. By John Attfield, Ph.D., F.C.S., etc. Fifth Edition. Philadelphia: Henry C. Lea. 1873.

The difficulty of writing a good manual is generally acknowledged, but students, as a rule, are shrewd enough to avail themselves of one when it is produced. The fact that in a few years Professor Attfield's manual has reached its fifth edition—three in England and two in the United States—bears more eloquent testimony to its merits than any that we can express. The simple manner in which the student is led on step by step to comprehend the general principles of chemical philosophy, the analytical and synthetical reactions of the metallic and acidulous radicals, and to become initiated into the more recondite subjects of pharmaceutical chemistry, together with the inexpensive experiments by which each subject is illustrated, have combined to make his book a favourite both in this country and the United States.

The present edition is based upon the fourth (English)

edition, and is adapted to the chemistry of the new edition of the United States' Pharmacopœia. Amongst the fresh matter introduced, however, there is one statement to which exception may be taken. The formula for cantharidin is given on p. 409 as $C_5H_6O_2$ (?), and it is stated that Massing and Dragendorf consider it "to be an anhydride ($C_5H_6O_2$), and that with the elements of water it forms cantharidic acid ($H_2C_5H_6O_2$). These formulæ evidently contain a mistake. The fact is, that Dragendorf represents the metallic derivatives of cantharidin by $C_5H_7O_3M$ or $(C_5H_7O_3)_2M_{11}$. But this is a small matter, and we hope that the author will have many opportunities of setting it right.

WORKSHOP APPLIANCES. By C. P. B. SHELLEY. Longmans, Green, and Co. 1873.

It might possibly amuse a person "unaccustomed to private thinking" if he were told that a work such as the above would be really valuable to the students of surgery and medicine. He might possibly imagine that the light cast by the star of mechanics would be out of place in a chemical or pharmaceutical laboratory, and smile at the idea of a professor surrounded by a lathe, a press, a drilling machine, a circular shears and a grinding stone, and the possessor of a tool chest, where chisels, gouges, and files lay in ready contiguity. But any one who considered even for a moment the countless contrivances necessary in a hospital, and the endless inventions used in the workshop of a chemist, would at once perceive that unless the operators in either place were at least cognizant of the elements of machine designing and tool constructing, it might frequently happen that wise opportunities of improving their familiar appliances would be utterly lost; and it might even be at once conceded that had mechanics in past times intruded more into the curriculum of the school, college, or university, we should have seen a greater progress in surgical instruments and in the appliances for the relief of deformity, than a stroll through Class X., Div. II. of the International Exhibition of 1873 will afford us. It frequently happens that a something is wanted to perform a certain function, and no other, and unless it is handed over to the professional tool or instrument maker, at very often a prohibitive tariff, the idea of using that suitable article is dispensed with and a makeshift adopted. The dentist is almost entirely dependent upon his workshop, and if we could only know the thousands of instruments outside of odontology which have been originally invented by our physicians and surgeons, and could estimate rightly the advantage which would follow even the partial training of our students in applied and practical mechanics, so as to enable them to model and work in metal for themselves during their leisure hours, we should hail text-books like these with even superlative pleasure.

Professor Shelley's book is one of the series of 'Text-Books of Science' adapted for the use of all kinds of students, and of which series some excellent works upon mathematics, metals, mechanism, materials, manufactures, mensuration, magnetism, and other subjects boasting a greater variation of initial letters, have already appeared. We can safely say that if the *remaining* text-books are equally practical—and, as far as we can see from our experience, reliable—very forward strides will continue to be made in the right direction. The chief intention of this particular work is to stereotype a concise description of the varied tools used in the conversion of wood and iron, etc., into useful articles in the engineer's or amateur's workshop, and to enable even the youthful inhabitant of a remote village to compete as bravely for the Whitworth Scholarships as the junior or even senior residents of London, Leeds, or Birmingham.

In the preface, the author says—and it chimes in exactly with the views which we have heard expressed by some of our leading men—"the student, in making himself familiar with the appliances described, will but be following in the steps of many of our most eminent civil engineers, some of whom have made improvements in mechanism, upon which, however trivial they may appear in themselves, has depended the success of the most brilliant of their achievements." One might say the same of some of the wonderful instruments described in the reports of the Medical Officer of the Privy Council, or which are to be seen in the studios of our chief pathological men.

One might also almost admit that the students of to-day—whose patron in the olden times would have been the *healing* god—Æsculapius of Cos—have quite enough to do to master all the essentials of their own immediate profession without learning the mysteries of the drill-chuck or the machine for measuring to the 10,000th part of an inch. Even the *pharmaceutist* has sufficient to do. Botany must be his handmaiden, and he must be well acquainted with every flower and shrub pictured upon her ample robe; philology must be his, to lay bare the printed treasures of other lands; mineralogy must be his slave, and prompt him as to the properties of countless things obtained even far below in the Plutonic kingdom; chemistry must also be at his beck and call, with all her hieroglyphical-looking formulæ; and as for the classics, these must perforce be added to his repertory of powers, or he can never hope to weigh in the mental balances, properly, the strange things (he will perhaps never see) represented by the long-winded syllables of Greece and Rome, or venture to name for the future any discovery of his own. What use, therefore, of adding to his *répertoire*, or to that the student of medicine or surgery, any more of the 'onomies, 'ographies, 'ologies, or 'ognomies?

We cannot expect every one, or indeed *any one*, now-a-days to be an "Admirable Crichton." Nevertheless, the reviewer will have the last word, and humbly promulgate the idea that if our young men are wise they will, to the before-mentioned *extras*, add artistic and mechanical knowledge, and at least accord an hebdomadal hour or two to the ever-so-humble private workshop. Better a studio, dilapidated with earnest work, than a sumptuous billiard room, and yet nevertheless, of course, both in their place.

Notes and Queries.

[354.] SHEEP DIPPING COMPOSITION.—Will any reader favour me with a recipe for a Sheep Dipping Composition, free from arsenic, which could be put up in cans similar to the Dougall's or the "Glycerine Dip?"—E.W.

[355.] LIME JUICE AND GLYCERINE.—*X. Y. Z.* wishes for directions for making "Lime Juice and Glycerine" that will not separate upon standing.

[356.] MARKING INK.—We should be much obliged if some reader would favour us with a really good recipe for Marking Ink.—YOUNG and POSTANS.

[357.] FLUID EXTRACT OF MILLEFOLIUM.—I should esteem it a favour if you would inform me of a method of preparing Ext Millefol. Fluid.—J. A. MAXWELL.

[*** We do not know the Fluid Extract of Millefolium, but should imagine that a process similar to that given in the B. P. for the preparation of Ext. Pareiræ Liquid. would answer very well: strength—fℨj = ℨj of the dried plant. Perhaps some of our readers can give a formula.—ED. PH. J.]

[358.] RED HAIR.—Will some correspondent give me a recipe for making red hair lighter in colour?

[359.] STEEL OF ANTIMONY.—"*Nescius*" having been asked for "Steel of Antimony," would thank any student of abstruse pharmaceutical nomenclature to explain what it is.

[360.] DELECTABLE LOZENGES.—Can any one give me a good formula for delectable lozenges?—H. WONFOR, *Wincanton.*

Correspondence.

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

Prescribers and Dispensers.

Sir,—I am very pleased to see that Mr. Hampson intends to bring forward the subject of doses in prescriptions at the Conference, and think some rule is necessary for alterations and additions in old prescriptions as well.

Alterations in quantities are frequently made in prescriptions that have been previously copied and numbered, and sometimes there is another ingredient added. When there is no erasure, there is nothing to attract the dispenser's attention to it, or to enable him to make the alteration in the prescription book, in order that future supplies may be dispensed accurately without the prescription. It is of no use leaving it to the patient to tell the chemist of the alteration made, for we all know how uncertain a method that is, and one throws the blame on the other if there is any mistake.

If by the side of any alteration or addition the medical man were to put his initials and the date, it would make everything quite clear, and facilitate business very much. If medical men only knew how many patients take their medicine without even unwrapping the bottle (just tearing the top of the paper off to get the cork out), they would be more particular in noting any alterations in medicines or doses, or times of taking them.

I have known several prescriptions lost through being cast away with the empty bottles (tied on to the wrapper); also bottles sent to be refilled with the old wrapper on, only just torn off at the neck.

It is very desirable that prescribers and dispensers should come to a good understanding on such matters, and have some recognized rules to guide them.

George Brown.

Sandown, I.W., Sept. 8th, 1873.

The Unjust Censure of a Chemist.

Sir,—It appears to me to be the duty of one and all the members of our Society to endeavour to remove the effect of the unjust stigma passed upon our professional brother, Mr. Fisher, of Ramsgate, in the late fatal case of *delirium tremens*. Allow me, therefore, to give experience of miswritten prescriptions.

Twenty years back I was living senior assistant at a well-to-do City pharmacy: among our customers was one of the operating surgeons of an East End hospital: his coachman called with a prescription written for himself by his employer, adding that his master wished us to book it to his own private account.

℞ Quinæ Sulph. . . . ℥ ss
Inf. Rosæ Co. ad . . ℥ vj
M. ft. mist. sumend. ¼ part. 6tis horis.

I told the coachman it would be ready in an hour. Meanwhile I called upon the surgeon in Broad Street: his footman stated that his master was at dinner and that I could not then have an interview. I said that it was matter of importance to the surgeon himself; so most unwillingly the latter left his meal, stood at the top of the first-floor staircase,—myself remaining in the hall—and then called out in the roughest manner,

"Well, what is it?"

"Sir, you have written a prescription for your coachman in which I fear there is some error,"

"I have made no error."

"Very well, Sir; I will return and dispense it, at your absolute order, thus relieving myself of all responsibility."

"Here, let me see it."

I then hand in prescription.

"Dear me; dear me;" laughingly, and casting aside his brusqueness. "I meant *magnes.* sulph. ℥ ss. I am glad you called."

I then withdrew, suggesting that he should not be so curt, as Pius IX. was the only man that had the reputation of being infallible.

Another prescription, No. 2662 in my journal, is this:—

℞ Liq. Morph. Acet. . . . ℥ j
Antimon. Sulph. . . . . gr. x.
Sacch. . . . . ℥ j
Divide in Pulv. viij.
One powder at bed time.
7/3/72. A. R.

In this case I knew what was meant and put in place:—
Morph. Acet. . . . . gr. ss.

If Dr. Collis Browne's dictum is correct I ought to have used "Liq. Morph. Acet.," made an electuary, and sent it to the patient in eight pieces of tin foil.

Robert Owen Fitch.

200, *Well Street, South Hackney.*

The Remuneration of Assistants.

Sir,—Permit me to insert a few remarks respecting the pay of chemists' assistants, contrasted with their qualification.

We are every week seeing the amount offered to a qualified man, viz., £40 per annum; this is the average for which he is expected to work from eight a.m. until ten p.m., in the majority of cases, and be in attendance a portion of Sunday, for which he is allowed perhaps one aiternoon a week. Now I maintain there is not a parallel case to be found in any other trade. There is no class of men equally educated whose labours are so badly remunerated.

A deal has been said about the poor agricultural labourer, and to some purpose. Might not more be said about the poor chemists' assistants, when it is a fact farm labourers are getting £6 per month (four weeks), and all found them in many districts for harvest work? Of course, I need hardly contrast the qualifications of the two, or the responsibility of dispensing poisonous medicines.

Another great point is the labourer does not work so many hours, and has the Sundays to himself.

This latter being a great consideration, and I cannot help feeling the majority of chemists who are in favour of Sunday work have not the interests of the public at heart, but their own pockets, and scruple not at selling many things which could well be done without. I speak from experience.

Such Sunday trading, I should have thought, would be looked upon as decidedly wrong by the most respectable amongst us, but I was sorry to see in the Journal, a few weeks back, it was thought a great convenience to the public.

I am inclined to think apprentices will be rather shy in entering the trade with its present prospects, and I am at a loss to know what inducements masters can hold out.

Richard Cattell.

Queens Street, Exeter.

"*Theta.*"—Apply to the Secretary for a copy of the pamphlet entitled 'Hints for Sudents.'

"*Alpha.*"—(1) The fees are payable in advance. (2) Notice is not necessary, but advisable. (3) Yes.

J. Scrutton.—Chemists and druggists are not exempted from serving on juries, unless they be also pharmaceutical chemists.

G. Kemp.—We have received your communication, and thank you for the newspaper forwarded.

H. W House.—We have received your letter, and think it would be better that you should communicate direct to the Board of Examiners any suggestions that you may desire to make.

J. T. C. Williams.—*Jasione montana.*

"*Tyro.*"—(1) *Medicago lupulina.* (2) *Filago germanica.* (3) *Chenopodium album.* (4) *Stachys palustris.* (5) *Inula dysenterica.*

"*Scutellaria.*"—(1) *Lycopus europæus.* (2) *Crepis virens.* (3) *Aparyia hispida.* (4) *Mentha arvensis.* (5) *Bidens cernua.* (6) *Scutellaria galericulata.*

J. Bradshaw.—No.

E. B. Storm.—Violet ink having been used, we know of nothing that would restore the writing. If written with a steel pen, it might perhaps be deciphered with the aid of a magnifying glass.

Communications, Letters, etc., have been received from Mr. J. E. Howard, Mr. Mumbray, Mr. Harper, Messrs. Sadler, Firth, and Ross, G. L. N.

PHARMACEUTICAL RESULTS OF THE CALCUTTA BOTANIC GARDENS.

Acclimatization of Jalap and Ipecacuanha.

Dr. Henderson, the superintendent in charge of the Calcutta Botanic Gardens during Dr. King's absence in England on sick leave, has produced a very interesting annual report on the work done and the requirements still needed in the garden, to which is added an elaborate appendix on the cultivation of the ipecacuanha.

First, with regard to an economic garden, Dr. Henderson says an Indian botanic garden ought to have some space devoted to plants of economic importance, which are grown in the country, as well as such plants from other countries as can be got to grow there. A commencement has been made to form such a garden, but the difficulty is, with native agency, to keep it up, for most of the plants have to be renewed every year, just as in the case of the herbaceous garden. A great variety of seed of fibre-yielding plants has lately been received from the commission appointed to inquire into the jute trade. This seed has all germinated, and when the plants flower, and can be identified, they may yield some interesting information. Dr. Henderson took with him to Calcutta in December last some jalap plants (*Exogonium purga*), which, he says, have, as yet, hardly had a fair trial, but the plant does not appear to thrive in Calcutta, and it will be tried in Sikkim. With regard to this hill garden in Sikkim Dr. Henderson says, "The climate and soil of the Calcutta gardens are unsuitable for so many plants which it is desirable to introduce into the Himalayas that for some years a small branch nursery garden has been kept up in Sikkim, at the cinchona plantations. I should like to see these nurseries very much extended, as there is now a large European population of tea-planters in Sikkim, and, as a rule, all are anxious to try new plants. A number of plants (250) of the European sweet-chesnut have been raised, and it is expected before the end of this year a very large number of plants will be got up for distribution, Dr. Oldham, on his way home on leave, having kindly undertaken to get seed for me in Italy. Coffee is also being tried, and succeeds very well. Many tea-planters now grow coffee for home use, but it will not pay so well as tea, I fear."

To the report, which concludes by drawing attention to the necessity of a building for a museum, and the propriety of making the gardens the head-quarters of a botanical survey of India, is added a lengthy appendix on ipecacuanha, which contains so much of interest that we give it entire :—

"As the experiments being made to introduce this plant into India are perhaps the most interesting attempts at acclimatization now being made, I think it as well to give a concise history of what has been already done, and the latest results of our experience regarding the plant. The history is a very instructive one, and shows how difficult it is to carry out such an experiment rapidly, nearly eight years having now been occupied in getting up a lot of stock plants, and as yet we have only about 7000 altogether, half of them minute cuttings. If ipecacuanha is ever to succeed in India, I think another year will see a small plantation fairly started.

"There are evidently several varieties, if not species, of ipecacuanha amongst the plants now in the Rungbee nurseries, and I think this gives us additional encouragement to persevere, for it is possible that these varieties may require just as different treatment as the different species of cinchona do, and that although one variety may not answer here, some of the others may. Besides this, plants grown from minute cuttings and reared under glass are much more delicate than those grown from larger cuttings and kept in the open air ; and I do not consider that the experiments hitherto made are of much value as showing whether or not the plant will thrive in the Bengal Presidency. It is one of the slowest growing plants I know, and one of the most difficult to propagate by cuttings. I have seen some cuttings of the stem remain quite fresh for over two months without an attempt at making roots. Root cuttings strike much more readily, but even they sometimes become quite stagnant, and will not put out shoots unless they are of pretty large size and get a brisk bottom heat. From all I hear of the soil and climate of the Andaman Islands, I believe the plant will thrive there, and I have offered to send General Stewart some plants for trial.

"But to return to the history of its introduction. In 1866 Dr. King brought a plant from Kew which had been originally got from Brazil ; two years later, namely, in 1868, this plant had been increased by cuttings to nine.

"1869.—Only nine plants, but Dr. Anderson, who had gone to England, was endeavouring to get more, and succeeded in obtaining a number in Edinburgh.

"1870.—Mr. Clarke reported that the plants were as at last report ; everything had been done for them, but they continued unhealthy and would not grow. Some sent to Sikkim were doing better.

"1871.—The plants in Calcutta are reported just as before.

"1872.—At the beginning of the official year there were five plants in Sikkim and seven in Calcutta, and those in Sikkim were multiplied by root cuttings to about 300 by the end of August."

"In a memorandum by Mr. Gammie, on the introduction of ipecacuanha to the Sikkim Himalayas, he says :—

"'Three plants of ipecacuanha were received at Rungbee from the Calcutta Botanical Gardens in 1868. These formed part of the produce of the single plant brought out by Dr. King from the Royal Gardens, Kew, in the early part of 1866. One of the three died soon after arrival at Rungbee, and on the 31st of March, 1869, the remaining two had been increased to five rooted plants and one cutting. The cutting afterwards died. On the same date in 1870 there were five rooted plants and seven cuttings, and again the cuttings were unfortunate, for a drunken washerman (dhobie) fell through the glass frame in which they were placed and completely destroyed them. We then determined not to cut the tops of the plants again, as we found that after cutting the plants were a very long time in throwing out fresh shoots, and even then most sparingly. We waited patiently to allow the plants to form a good supply of roots, and in consequence of this determination, and the dhobie accident, we had five plants only on the 31st March, 1871. In the summer of that year we partially stripped the plants of their roots, which we cut into very small pieces and treated as ordinary cuttings. By this method our stock of plants and cuttings was increased to about 300 by the end of August, 1871. Since then the following four consignments of plants

have been received at Rungbee from the Edinburgh Botanical Gardens and Messrs. Lawson and Sons, the Edinburgh nurserymen :—

September, 1871	11
March, 1872	247
December, 1872	112
January, 1873	10
Total	380

—the number that reached Rungee alive. On the 1st January, 1873, the total number of plants and cuttings was 3066.

"On 31st March last they mounted to no less than 6719 in Sikkim, and about 500 in Calcutta. In December last I brought out 128 plants from Kew and Edinburgh, and as the weather was then too cold to send them to Sikkim, I decided to see if they could be multiplied in Calcutta, notwithstanding that all former attempts made there had failed, as stated in the Annual Report for 1871-72.

"Mr. Lister, the second gardener, just arrived from the Edinburgh gardens, where he had seen the plant propagated, set to work and made cuttings both of the root and stem, and by the end of March about 500 new plants had been produced ; and most of the 128 original ones were sent by post to Sikkim, where they arrived as fresh and healthy as the day they left Calcutta. The roots, when packed in slightly moist earth, stand carriage remarkably well. I brought out some root plants from England packed in this way, and most of them arrived in good order. I do not like Mr. McNab's method of packing in sphagnum moss ; I think moist earth preferable.

"Besides trying to multiply them, I planted out a number in Calcutta under every variety of conditions—some in the open, some under moderate shade, and others under dense shade. Two plants fully exposed were killed by the sun ; all those under shade appear to thrive, but have met with many accidents. Single plants have been placed out at five different points along the bottom of the Rungbee valley, but with the exception of one plant under shade of cinchona, near Mr. Biermann's house, none seem to thrive, and even the successful one is no better than those planted under shade in Calcutta. At Bamunpokree, in the Terai, they are no better, with one exception. An experiment in planting out is now, at my suggestion, being tried on a much larger scale at Rungbee with several hundred plants, in beds of leaf mould very carefully prepared. Until the rains, these are being shaded with grass matting ; but as soon as the rains set the shades will be gradually removed. Mr. Jaffrey has not only succeeded in getting leaves planted as cuttings to make roots, but in ten months he has got these rooted leaves to produce as many as four shoots from half an inch to an inch-and-a-half long."

(To be continued.)

ANNUAL DINNER OF THE PHARMACEUTICAL CONFERENCE.

The annual dinner of the British Pharmaceutical Conference took place at the Victoria Hotel, on Tuesday, September 16th, at eight o'clock, Mr. F. M. Rimmington, of Bradford, one of the Vice-Presidents of the Conference, in the chair. About seventy sat down to dinner.

The cloth having been drawn,

The CHAIRMAN, in proposing "The Health of Her Majesty the Queen," said: Gentlemen, I believe that as a body we are essentially a Conservative confraternity, and therefore I have the greatest pleasure in proposing "The Health of the Queen."

The toast was drunk amid loud cheers, and was followed by "God Save the Queen."

The CHAIRMAN, in proposing "The Health of the Prince and Princess of Wales and the rest of the Royal Family," said : I have great pleasure in proposing "The Health of the Prince and Princess of Wales and the rest of the Royal Family." It is quite certain that every person here must feel the greatest interest in the succession to the Crown in this country. We see with pleasure that the spirit of republicanism and of anarchy which at one time did threaten the constitution of this country is fast falling into decay. I have the greatest pleasure in asking you to drink the toast which I have proposed.

The toast was warmly received, and was followed by "God Bless the Prince of Wales."

The CHAIRMAN, in proposing the toast of "The President and Officers of the Pharmaceutical Conference," said : Gentlemen, I really feel a great satisfaction—something, in fact, akin to pride—in presiding over this meeting, when I consider that, ten years ago, I was one of the twenty apostles who went to Newcastle with the view of establishing this now important Society. We assembled there in a small upper chamber, and from thence we promulgated the principle which has been perpetuated by this now highly respectable and influential Society. I have always felt an interest in the progress of this Association, and I have supported it as far as my abilities, time, and opportunities would allow me. I cannot pretend to have been a very active supporter of the Society, but I have done the best I could for it, and that is as much as most people can do. I can only say that I am glad to see that it is progressing, and that I am quite satisfied that the influence of the Pharmaceutical Conference both upon the ethics and the *esprit de corps* of the pharmaceutical world has been most beneficial, and that if the Society survives another decade, we shall see pharmacy occupying a very different position to that which it held before this Association was established. Of course, this Association may be said to have sprung out of the Pharmaceutical Society, because it was started, in the first instance, by eminent pharmacists who were members of that Society, who, actuated by high principles, and strong motives for raising the *status*, both socially and materially, of the profession, with no little labour and self-sacrifice, founded this Association. This Conference, however, is an itinerant society, which, by changing its locality, transfers its influence from place to place. It has hitherto been associated, as a rule, with the British Association, because it derives some advantage from connecting itself with that body ; but at the same time, the British Association may sometimes take flights in which this Society does not feel itself competent to take part. The Conference has hitherto confined its visits to England and Scotland, and if Ireland does not appear to wish for its interference,—and indeed somewhat repudiates such interference,—however much we may regret that determination, I think that the pharmacists of Ireland will have more reason to regret it eventually. I am sure that, at all events, we should have done no harm if we had gone there, and I think that it is very likely that we should have done them a great deal of good. We can, at all events, enjoy ourselves at home quite as much as we could in Ireland. In conclusion, I have great pleasure in proposing "The Health of the President and Officers of the Pharmaceutical Conference," coupled with the names of the President, Mr. Brady, and the Secretaries, Professor Attfield and Mr. Benger.

The toast was drunk with loud cheers.

Mr. BRADY (the President) in responding said : Mr. Chairman and gentlemen,—One of the most remarkable speeches I ever had the pleasure of listening to began with the words, "I had hoped that I might have been spared," and I confess that when the Chairman was concluding his speech that I too had begun to hope that on

the present occasion I might have been spared. It seems to me that the President of the Conference has a very wide duty to discharge, something after the nature of that of those farms in New England whose energetic owners set them up on end in order to grow corn on both sides of them. It seems to me that the President of the Conference has to deliver addresses all the morning and to make speeches all the evening. The duty of the President of the British Pharmaceutical Conference has become a very weighty and a very onerous one. In relinquishing that position however I feel that I ought to say a very few words not merely of congratulation to the Conference as to the position it now enjoys, but in reference to my own personal indebtedness to its members for the very kindly feeling they have always shown to me in whatever relation I have been placed towards them. The British Pharmaceutical Conference was born, as one may say, in Newcastle-upon-Tyne, my native town. The mere locality however was a matter of accident. The circumstance was brought about by but little real action on the part of the pharmacists of that town. It happened that I was the local secretary of the Pharmaceutical Society at the time, and as such I was called upon to make provision for those who assembled on that occasion. When the first staff of officers was discussed there was some difficulty in obtaining officers for the new and untried body, and I was asked to undertake the office of Treasurer. I had but little to do in that capacity; it was Professor Attfield and Mr. Reynolds who had the labour,—they kept the show and did all the work within, whilst I merely held the hat and took the money at the door. It was a very easy post, and to the mere moneytaker pertains very little of the credit of raising up an association of this kind. There is, however, a matter in connection with the present meeting to which I should wish to allude. I have felt that in coming to this part of Yorkshire I was returning to old familiar ground, because although my early life was spent in Newcastle my pharmaceutical education was obtained in Leeds, where I first formed a friendship with Mr. Reynolds, and where I first became acquainted with our chairman, Mr. Rimmington. Anything that I may have done in pharmaceutical science since then is due to the training which I received in your neighbouring town. I don't know that I can say anything more—I ought perhaps to have said less; but I feel that there is a debt of gratitude due from me to the Conference for the kindness which I have always experienced at the hands of its members, for the friendships I have made by attendance at its meetings, and for the very delightful evenings such as the present which I have spent in past years. In conclusion I can only express hearty thanks to you, gentlemen, officially on behalf of the Conference, and personally on my own account, for the kind manner in which you accepted the toast.

Professor ATTFIELD: I had hoped that after having heard the toast so ably acknowledged by your President, the chief of the officers and the Conference, you would have allowed me at once to have resumed my seat, but since you have been so kind as to call me forward I feel bound to express my acknowledgments for the kindness with which you have recognized my labours as one of your officers. When my friend, Mr. Reynolds, ten years ago, first drew my attention to the subject which had been suggested some time before by Mr. Schacht, respecting the importance of organizing such a body as this has become; and when Mr. Reynolds added that in his opinion the time had arrived for starting such a Society, I could but give in my adhesion to the proposal, and consented to devote what ability and energy I possessed to carry out successfully the idea originated by Mr. Schacht, and matured by Mr. Reynolds and Mr. Brady. If my efforts have apparently been successful, I therefore feel abundantly rewarded for my labours, and I can assure you that I shall continue to do my best to serve the Conference. I laboured heartily for it, because I saw from the commencement that it would promote pharmaceutical research, and tend to produce that unity amongst the whole body of pharmacists which was so much wanted. That it has produced an increase of pharmaceutical research nobody can deny. We may not have in this country a sufficient number of high class pharmacists to produce severe original researches every week, but you have at least more research than you had before this Conference was started. Any one who will take the trouble to count up the number of English pharmaceutical researches published before and since the establishment of this Association will find that what I say is correct. If I were to allude to the promotion of unity amongst us, I should only be reiterating what was so well said this morning by your President. With regard to the recent alterations in our financial arrangements, I must confess that I at first felt some misgiving that in attempting to raise the amount of our subscriptions, which it was imperative to do, we should probably frighten away a considerable number of our members, and I expected some six weeks ago when the annual circular to members was issued, that the post would bring me numerous resignations. Well, on the first day of receiving answers to the circular, forty letters came to hand. How many of them do you think contained post-office orders, and how many resignations? There were thirty-nine orders, and only one resignation. The next day I had sixty letters handed to me, and they all contained post-office orders for 7*s.* 6*d.* each. The following day I had 108 letters, and only two out of the 108 contained the remark by their writers that because the Year-book had only cost 5*s.* the year before, they did not see why it should cost 7*s.* 6*d.* for the following year. You will doubtless be glad to hear that from the 1st of August until yesterday, the number of subscriptions sent in to me has been three times as large as I have ever had at the corresponding period of the year, and that I have had during that time 800 subscriptions handed to me, while only three gentlemen have withdrawn from the Conference. In such a state of things as this, I need scarcely say that I feel that my labours in behalf of the Conference have been abundantly rewarded.

Mr. BENGER: I feel it a very great honour to have my name associated with such distinguished ones as those of Mr. Brady and Professor Attfield, although I cannot affect to regard my labours on behalf of the Conference as in any way equalling theirs in importance. Professor Attfield takes the greatest pleasure in discharging the duties of Secretary, and performs them so well that it would be a thousand pities to relieve him from them. The success that has attended the Conference hitherto makes me look forward with equal confidence to the future as pleasure to the past. I feel certain that an Association of two thousand English pharmaceutists must possess great intellectual energy, and that we shall not look in vain for great results from this Conference. It is to the local committees of the towns we visit that we owe much of our success in a social point of view, but it is to the general body of members that we must look to promote the other important object we have in view—that of increasing the common stock of pharmaceutical knowledge. I hope that in the future we shall produce some successful results by the formation of committees, or, if the word be preferred, of commissions, to examine into and report upon some special subject.

Mr. BELL: I have been requested to propose the toast of "The Pharmaceutical Press," and with it I beg to couple the names of Dr. Paul, of the PHARMACEUTICAL JOURNAL, and Mr. A. C. Wootton, of the *Chemist and Druggist*, to whom as representative of the local committee I offer a hearty welcome.

Dr. PAUL having expressed his thanks for the honour conferred upon him,

Mr. WOOTTON said: I should scarcely like to allow this opportunity, when the Conference is visiting for the first time a town in Yorkshire, to pass without my offering you, in the name of the *Chemist and Druggist* and of the

pharmaceutical press, my sincere thanks for the continued and very effective support which that press has received in this county. We always look upon Yorkshire as being our favourite county—as being, in fact, one of our best preserves for obtaining subscribers and the other advantages by which the pharmaceutical press lives. During this visit I have met with the utmost kindness from the pharmaceutists of Yorkshire, for which I beg to return my most sincere thanks. I adopt in full the words of Dr. Paul in responding to this toast, as I merely rose in order to avail myself of the opportunity to acknowledge my sense of the generous support the pharmaceutical press receives from this county.

The VICE-CHAIRMAN (Mr. Rogerson): The toast I have to propose is "The Health of the Visitors." We are all enlisted under the banners of the Pharmaceutical Society, in which we are all interested, and of which I had the privilege of being one of the founders. I am exceedingly happy to see so large a body of pharmaceutists gathered together in this room. Many have distinguished themselves in chemistry and pharmacy, but I believe that we were never so well represented in an intellectual point of view on any previous occasion as we are to-night sitting round this table. We look upon it as a great honour to have so many of the most distinguished chemists and pharmaceutists of this kingdom gathered together in Bradford. As, however, our time is short, I shall confine my remarks to one distinguished individual, Dr. Edwards, who I believe was one of the first who passed in the School of Pharmacy of Great Britain. Having been engaged in business for many years in Oxford Street, he has since been for some time in Canada, where he has greatly distinguished himself. I am sure that you will heartily join with me in offering him our congratulations, and in wishing him a safe return to Canada.

Dr. EDWARDS: Mr. Vice-President, your kindness, which reaches from one end of the room to the other, may perhaps be rather exhausting to yourself, but is by no means depressing to those who have listened to you. I do not feel like a stranger or a guest, but rather like a child at home. I was one of the original members of the Pharmaceutical Conference, and I have always regarded it as being one of those excellent institutions which is bound to go a-head. It is not an association that is calculated to interfere in any way with the Pharmaceutical Society, which may very properly be considered as the parent institution, and I trust that we shall always look upon that society with affection and friendship. I have made an effort to be present on this occasion, and in a short time I hope to be again at home in Canada, for although my native shore, this country is not now my home. I have spent many pleasant evenings, such as that I am now enjoying, with the members of the American Pharmaceutical Association, at their meetings at Chicago, Philadelphia, Boston, and other places, and I hope some day again to be present at such friendly gatherings on the other side of the Atlantic. Regretting that there were not present some more distinguished visitors than myself to respond to the toast, I beg to thank you for the honour you have done me in coupling my name with the toast you have so warmly received. I wish the Conference ten times more success in the future than it has had in the past.

Mr. SAVAGE: The toast I have been requested to propose is one which I feel sure you will receive most cordially. It is that of "The Health of our Chairman." It affords me the greatest possible satisfaction to meet him here on this occasion. Twelve months ago I had much pleasure in meeting him at Brighton, and I now come here relieved from all the cares which are undergone by those who are on local committees. Although for forty-one years I have lived in one of the most southern towns of England, yet I am a native of Yorkshire. We derive much advantage from our itinerant habits as a Conference, because, by mingling with those who live in different parts of the country, we rub off the angles that are the fruits of living in towns, and with them get rid of many prejudices which are engendered by constantly associating with the same persons. I have much pleasure in proposing the health of our Chairman, Mr. Rimmington, and thank him for the very efficient way in which he has performed the duties of the evening.

The CHAIRMAN: Your hearty cheers and expressions in my favour would quite overwhelm a stronger man than myself. I feel exceedingly glad—a sort of high satisfaction—in seeing you here enjoying yourselves this evening, and I cannot help expressing considerable regret that it may be a long time before we shall meet in Bradford again round such a table as this. One of the benefits of this Association is that it brings together heterogeneous elements into one body, and I heartily hope that we shall often meet again elsewhere if not here. I, again, beg to thank you for the honour you have done me in drinking my health.

Mr. BRADY: Gentlemen, for once we have beaten the Americans. When we telegraphed on a former occasion from Liverpool to the American Pharmaceutical Society, then sitting at Baltimore, we found that the Americans had been beforehand with us. But to-day we have forestalled them. We despatched a greeting to them at Richmond by telegraph at eleven o'clock this morning, and I have received a telegram in reply dated half-past five o'clock this afternoon, which is as follows:—

From the President of the American Pharmaceutical Association,
To the President of the British Pharmaceutical Conference at Bradford, England.

We return your hearty fraternal greetings.

(Loud cheers.)

Mr. WILLIAMS: I beg to propose the health of our Vice-Chairman, Mr. Rogerson. The Conference has received on this occasion such a reception as it never has had before, but we hope to do our best when we see the members in London, where I believe the next meeting of the Conference will be held.

The VICE-CHAIRMAN (Mr. M. Rogerson) said: We may congratulate ourselves that the Pharmaceutical Conference is not now, as it might have been some years ago, a thing to be hoped for, but hardly to be expected. It has become in a great degree, and it is becoming in a still greater degree, an accomplished fact. The Society has passed through troubles and undergone difficulties, as most of us do in the course of our days, but we now see that it is a success. I feel it to be a great honour to have the meeting of the Pharmaceutical Conference in our smoky town, where we are all busily engaged in trade and manufacturing pursuits, with a dense population surrounding us. The local committee have done their best for the accommodation and comfort of their distinguished visitors, but have fallen far short of what they would have wished to accomplish. It was quite new to us, and if we had to do it again, I am certain we could do it much better. We are under a great amount of indebtedness to those gentlemen who take an active part in the Conference, not only for scientific purposes, but to raise the standard of our avocation, which is so much needed. In this marvellously prosperous town, which I have known and lived in for forty-five years, we see a many who are engaged in the staple trade of the town amass large fortunes. In our avocation we cannot do this, but we ought not to feel discouraged when, if blest with good health, we can at least earn a comfortable and respectable livelihood.

Mr. COTTERELL proposed "The Health of the Local Secretary of the Conference (Dr. Parkinson) and of the Committee," coupling with the toast the name of Mr. Alderman Hicks.

Mr. Alderman HICKS, in responding, reminded those present that the usual hour for closing the hotel had arrived, and contented himself with heartily thanking them for drinking his health. He concluded by asking them to drink "To our next merry meeting."

The company then separated.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 20, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

BRADFORD.

THE attendance at this year's meeting of the British Pharmaceutical Conference has hardly been so numerous as on some former occasions, and it would seem that this has been in a great measure due to the circumstance that the ordinary charges for hotel accommodation have been very largely increased for the period of the British Association Meeting. We think this system an eminently vicious one, and that whatever arguments may be advanced in support of it, the legitimate interests of the hotel keepers could be at least quite as effectually guarded by other means less objectionable in their character. Surely it would be desirable if the representatives of a town inviting a visit from the British Association were to exercise their influence in regard to this point, by endeavouring to prevent a state of things not unfrequently denounced as extortion, and at least inappropriate under the circumstances.

However, in spite of such difficulties the meeting just terminated has been decidedly successful generally, and in some respects above the average. The Presidential address dealt with a variety of subjects important to the pharmacist, and a perusal of the report of this address, which we publish at p. 229, will convince our readers that it was justly listened to with attentive interest by the meeting. We may here refer to the admirable *résumé* given of cinchona cultivation in India and elsewhere as furnishing the best accessible account of the progress in that enterprise. Equally interesting was the narrative of the several steps recently taken towards the realization of the "dream of the dispenser," a cosmopolitan pharmacopœia. But it was when the speaker entered upon the subject of pharmaceutical education, and the influence exercised by the standard of the Society's examinations, that the chief effect was produced. Mr. BRADY'S remarks on this subject are deserving of thoughtful consideration, and their reception by the audience showed how desirable it is that there should not be any relaxation of the influence hitherto exercised by the Pharmaceutical Society towards the establishment of such a general high standard of technical qualification among the pharmacists of this country as shall place them collectively on a level with the same bodies in Germany and France. It is not fitting to enter on a discussion of this subject here at present, even if there were time to do so, for the opinions of the PRESIDENT of the Pharmaceutical Conference claim consideration first of all. We therefore limit ourselves to directing attention to them and to the expression of our earnest hopes that the action of the Pharmaceutical Society as regards education will still continue in its main results satisfactorily conducive to the attainment of that object which is desired by all, though it may be sought under the influence of different views.

In the proceedings immediately following the address of the PRESIDENT, attention was first directed to the very important subject of unusual doses in prescriptions, and the thanks of the pharmaceutical body at large are due to Mr. HAMPSON for having brought it forward in a manner calculated to enlist the co-operation of the medical profession in the endeavour to establish some recognized system by which the due fulfilment of the prescriber's intentions may be ensured in such cases, while, at the same time, security is afforded to dispensers that the responsibility falling upon them shall not be too onerous. The discussion that took place on this subject was in the best possible spirit, and the unanimous feeling of the meeting was in favour of some means to secure joint action on the part of medical men and pharmacists. Several suggestions were offered as the result of varied experiences, and a committee was appointed to take such steps as were advisable for arriving at the desired result. A report was afterwards presented and adopted, which the general secretaries were empowered to communicate to the medical profession in such a way as may be most suitable. We look forward to the issue of these deliberations with confidence that it will afford an illustration of the practical utility of such an association as the Pharmaceutical Conference.

Among other points of interest characterizing the meeting, it is pleasant to record the interchange of expressions of friendly greeting and sympathy between the British Pharmaceutical Conference and the American Pharmaceutical Association, now holding its meeting at Richmond, Virginia.

The papers read at the Conference were decidedly in advance of previous meetings, and showed evidence of increased scientific activity on the part of its members, which we trust will still continue to grow in extent and usefulness. One of the most important contributions was that on Nepaul aconite and aconitines by Mr. GROVES. Another on sewer gases by Mr. NICHOLSON, of Sunderland, and one on the detection of adulteration in tea by Mr. ALLEN, of Sheffield, may be mentioned as useful contributions to our knowledge of subjects apart from pharmacy, though of a nature to admit of the pharmacist's practical acquaintance with chemistry being applied to them with advantage. Among the more purely pharmaceutical papers we may also refer to those on the purity of commercial specimens of official acids, and on a new test for morphia by Mr. SIEBOLD, of Manchester, whose growing popularity as a teacher was evidenced by the hearty applause

with which he was welcomed. While speaking of the papers read, however, we must express our opinion that in some few instances they were overloaded with minute technical details in such a way as to detract from the interest they might be entitled to excite. It seems worthy of consideration whether in such cases much tedium might not be avoided and the ends of the authors and of the Conference equally well served by the preparation of abstracts giving the chief results obtained, afterwards publishing the papers *in extenso*, as at present, especially since the whole time at the disposal of the Conference is so short.

Of the cordial hospitality manifested towards the members of the Conference at Bradford and in the neighbourhood it would be impossible to speak too highly. Suffice it to say that it in no respect fell short of the reputation which Yorkshire enjoys in this respect ; that it was even more than could have been expected, so ample, hearty, and unostentatious in every way that we feel sure those who had the pleasure of participating in it will long retain a warm remembrance of their Yorkshire *confrères*.

The dinner organized by the Local Committee (a report of which appears on a preceding page) was a success certainly not inferior to that of any previous year. The same gentlemen also invited the members to accompany them on Friday in an excursion to Bolton Abbey and Woods.

The decision of the British Pharmaceutical Conference at its closing session, to take advantage of the opportunity afforded by the visit of the British Association to Belfast for holding a meeting in London in 1874 will undoubtedly meet with general approval. The offer of assistance made by the Council in the name of the Pharmaceutical Society, and the good fortune of the Conference in securing the services of so energetic a Local Secretary for the occasion as Mr. M. CARTEIGHE, may fairly raise the hope that next year's meeting will inaugurate the second decade of the history of the Conference with a fresh advance in its prosperity. In the President-Elect, Mr. T. B. GROVES, of Weymouth, a worthy successor to Mr. BRADY, has been chosen. Mr. GROVES' researches on the aconite alkaloid have now become part of the history of the plant, and his fresh memoir upon the subject will be read with interest by scientific pharmacists throughout Europe and America.

Another instance of the community of thought and feeling which, chiefly owing to the spread of pharmaceutical literature, now exists between pharmacists of different nations was afforded in the beautiful album presented to the Conference on behalf of the American Pharmaceutical Association. Among the portraits of leading American pharmacists which it contains, are those of many whose names are familiar to the readers of this Journal.

Thus another meeting of the Conference has been conducted to a successful termination. But busy, prosperous, money-making Bradford is still full of visitors. Up and down her crooked streets, where splendid new buildings tread on each other in curiously irregular succession, the members of the British Association will yet wander for some days. And we venture to say that when all is over, more pleasant memories will remain than would have been thought possible of a locality where man by the aid of smoke and stone and bricks has done so much to deface the beauties of nature as in the district of Bradford

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

The tenth annual meeting of the British Pharmaceutical Conference was commenced on Tuesday, September 16, 1873, at the Church Institute, Bradford, under the presidency of Mr. H. B. Brady, F.L.S., F.C.S., of Newcastle-on-Tyne.

The Secretary (Professor ATTFIELD) read letters of apology from several members who were unable, from various reasons, to attend the Conference.

RECEPTION OF DELEGATES.

It was announced that the following gentleman were present as Delegates from the respective societies of which they were members :—

Brighton Association of Pharmacy.—Mr. W. D. Savage (President).

Bristol Pharmaceutical Association.—Messrs. G. F. Schacht, F.C.S. (President).

Edinburgh—North British Branch of the Pharmaceutical Society.– Dr. S. Macadam.

Glasgow Chemists and Druggists' Association.—Messrs. Thomas Davison Black and E. C. C. Stanford.

Halifax Chemists' Association.—Messrs. W. Dyer and W. Stott.

Hull Chemists' Association.—Mr. James Baynes.

Leeds Chemists' Association.—Messrs. Edward Brown, John Day, J. W. Longley, and Wm. Smeeton.

Liverpool Chemists' Association.—Messrs. Joseph Hallawell (Hon. Sec.), A. H. Mason, F.C.S., John Shaw, and Robert Sumner.

Northampton Chemists' Assistants and Apprentices' Association.—Mr. J. Berry.

Nottingham and Notts. Chemists' Association.—Messrs. J. H. Atherton and J. Rayner.

Manchester Chemists' and Druggists' Association.—Mr. F. Baden Benger (Hon. Sec.) and Mr. Louis Siebold.

Sunderland Chemists' Association.—Messrs. J. Harrison, J. J. Nicholson (Hon. Sec.), R. Robinson (Treasurer), and D. B. Sharp.

The Secretary stated that the number of Delegates present on this occasion was larger than had attended any former Conference.

PHARMACEUTICAL PHOTOGRAPHIC ALBUM.

The following letter from the representatives of the American Pharmaceutical Association was read by the Secretary :—

To the British Pharmaceutical Conference.

HENRY B. BRADY, Esq., President.

The undersigned, on behalf of the American Pharmaceutical Association, take great pleasure in presenting to the British Pharmaceutical Conference an album containing the "shadows" of some of the officers and members of our Association. May the fraternal feeling which has heretofore existed between these Associations ever continue, and the good work which has been accomplished for the advancement of the true interests of Pharmacy and its collateral sciences be an earnest of what the future shall show.

With great respect,

Committee on Photographic Album.
H. W. LINCOLN,
P. W. BEDFORD,
JAMES T. SHINN,
LOUIS STREHL,
MAURICE W. ALEXANDER.

By P. W. BEDFORD.

Professor ATTFIELD said: You are aware that our President (Mr. Brady) visited America a short time since. After his return he collected a large number of photographs of the leading members of the Pharmaceutical Society of Great Britain, and of this Conference, which

he sent in an album to the American Pharmaceutical Association. Since then, the gentlemen connected with the American Pharmaceutical Association have returned the compliment by sending us an album containing the photographs of the most eminent American Pharmaceutists. The album, which is now being brought over by a gentleman who is crosssing the Atlantic, has, however, not reached us at present.

Mr. J. WILLIAMS moved the following resolution :—

"That the thanks of the British Pharmaceutical Conference be presented to the President and members of the American Pharmaceutical Association for the album which has been sent to the British Pharmaceutical Conference containing the portraits of the leading members of the American Pharmaceutical Association."

The resolution having been seconded by Mr. GREENISH, was carried unanimously.

MESSAGE OF GREETING TO THE MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION AT RICHMOND, VA.

The PRESIDENT : It may be known to some present that at this moment the American Pharmaceutical Association is holding its meeting in Richmond, Virginia. On a former occasion, when we were holding our meeting at Liverpool and the American Association were holding theirs at the same time at Baltimore, we forwarded per telegram a greeting to our fellow pharmaceutists across the Atlantic. Is it your pleasure therefore that a similar message should be forwarded to-day to Richmond? It happened oddly enough on the last occasion that the same idea had occurred to the American Association, and that thus our messages of mutual greeting crossed each other on the way.

Mr. RIMMINGTON moved, and Mr. HAMPSON seconded a resolution to the effect that a message of greeting should be forwarded from the Conference to the meeting of American pharmaceutists at Richmond, and the following telegram was subsequently drawn up by the Secretary and approved by the meeting :—

From the President of the British Pharmaceutical Conference, Bradford, England,

To the President of the American Pharmaceutical Association, Richmond, Virginia.

Our members send to your members hearty fraternal greetings.

THE ELECTION OF NEW MEMBERS.

The following gentlemen were duly elected members of the Conference :—Mr. James L. Alexander, of Bathurst, N.S.W. ; Mr. Richard Appleyard, of Bradford ; Mr. John Townsend Bailey, of Bradford ; Mr. J. L. Benson, Ph.D., of Leeds ; Mr. Montague Browne, of Melbourne, Australia ; Mr. Henry Butterworth, of Bathurst, N.S.W., Mr. Alexander Courtenay, of London ; Mr. A. H. Crundall, of Bath ; Mr. S. H. Darwin, of Liverpool ; Mr. Joseph Farnell, of Bradford ; Mr. H. E. Firman, of Alton ; Mr. A. W. Gerrard, of London ; Mr. F. Grason, of Milan ; Mr. Robert Hitchin, of Burnley ; Mr. William Holloway, of Bradford ; Mr. W. Howie, of Edinburgh ; Mr. J. T. James, of London ; Mr. J. W. Longley, of Leeds ; Mr. Frank Midgeley, of Padiham : Mr. Freshfield Reynolds, of Leeds ; Mr. W. H. Rhodes, of Leeds ; Mr. Samuel Lloyd Stacey, of London ; Mr. Sutcliffe, L.D.S., of Bradford ; Mr. H. Swingbourne, of South Molton ; Mr. Richard Thomas, of Burnley ; Mr. Hezekiah Thornton, of Bradford ; Mr. W. F. Tomlinson, of Leeds ; Mr. William Veitch, of London ; Mr. Joseph Henry Watson, of Leeds ; Mr. E. T. Webster, of Newcastle-on-Tyne.

THE REPORT OF THE EXECUTIVE COMMITTEE.

Mr. F. BADEN BENGER then read the following report:—

Your Committee have met three times during the past year.

On May, 7th 1873, the Senior Secretary, Professor Attfield, reported that in the previous September, on endeavouring to renew the arrangements for the issue of the annual volume, he found that the printers required an advance on former prices of $7\frac{1}{2}$ per cent. for the greater part of the printing, paper, etc., and 8 per cent. on the binding. He had convinced himself that this demand was a reasonable one and had granted it ; and the Year-book had been published in December. It contained besides the 400 pages of abstracts of papers on pharmaceutical subjects collected by the editor, the names and addresses of the 2000 members of the Conference, an alphabetical list of towns with the resident members, and a complete report of the transactions of the Conference at the ninth annual meeting at Brighton. He further reported that, in December, circulars had been issued requesting members to forward their subscriptions ; a second and third application had in some cases been made in vain, and at the suggestion of the Secretary it was resolved that the fifty-seven members whose subscriptions were three years in arrear should have a final application addressed to them, directing attention to the rule respecting defaulters and stating that if no answer were received within ten days, the name of the member applied to would be struck off the roll by the Executive Committee.

The Junior Secretary (Mr. Benger) reported the steps he had taken to ascertain the opinions of leading members of the Conference respecting the most desirable method of appropriating the money placed at the disposal of the Executive Committee by Thomas Hyde Hills, Esq. Many valuable suggestions had been received, a summary of which he laid before the Committee, with a draft of a circular including rules relating to the application of the fund. The plan proposed was similar to that adopted by the British Association which has for many years granted money in aid of original research. After some slight alteration, it was resolved "That the statement and rules now read be printed and circulated in the manner suggested." The following is a copy of the circular referred to :—

"At the annual meeting held at Exeter in 1869, Mr. T. H. Hills presented the Conference with the sum of 50 guineas, half in his own name and half in memory of Jacob Bell, suggesting that 10 guineas should be applied for the purchase of books for the Chemists' library in that town. In subsequent years the Executive Committee gave further effect to Mr. Hills' desire to promote pharmaceutical education, by presenting the same value of books to the Chemists' library in the town visited. These books have been appropriately bound, and stamped with the device shown above.

"Shortly before the meeting at Brighton last year, when the fund was nearly exhausted, Mr. Hills, with characteristic generosity, added to his original gift the munificent sum of £200 (4 Russian bonds of £50 each). The Executive Committee, after consultation with Mr. Hills, drew up a resolution to the effect that the discretionary power of granting a sum of £10 for books to any local association in towns where the Conference had met be continued ; that the principal sum of £200 be retained until the Executive Committee decide that one Bond of £50 be sold out, such sale not to be repeated oftener than once in three years ; the Executive Committee for the current year to decide upon the appropriation of such income from principal and interest, by granting sums in aid of original research, or for the cultivation of pharmaceutical science. This resolution was carried unanimously at the Brighton meeting.

"The British Association for the Advancement of Science has for many years expended considerable sums in grants to individuals or committees willing to undertake special work, and this plan has resulted in the accomplishment of much valuable investigation. The Executive Committee of the Conference believe that they will do well to follow such a successful example in the appropriation of the fund placed at their disposal. The sum available during the next three years will be about £80 ; they are therefore prepared to receive applications for grants in aid of any

original research members may desire to initiate or elaborate on subjects of permanent interest and value in connection with pharmaceutical science. It is also thought that many published statements in reference to pharmacy and meteria medica need verification, and that some part of the fund may be applied to cover the expense of repeating experimental work, where corroboration may seem desirable.

"The Executive Committee will meet on the 20th of the present month, and again, if necessary, in June, to consider any applications, for grants which may in the meantime have been addressed to the Secretaries of the Conference (at 17, Bloomsbury Square, London). The Committee will also be glad to receive suggestions which may assist them in selecting either appropriate subjects for research, or a member, or two or more associated members, or sub-committee, to whom such investigations might be entrusted.

"*Rules.*

"Applications for grants in aid of original research, or to defray the cost of repeating or corroborating important experiments must be addressed to the Executive Committee of the Pharmaceutical Conference through the general Secretaries, such applications will then be considered, and grants made as far as the fund will allow.

"Applicants must give full particulars of the investigation they are willing to undertake, and state their estimate of the cost.

"Members or Secretaries of Committees to whom grants of money have been entrusted are required to present to the next annual meeting of the Conference a report of the progress which has been made, and before such annual meeting to forward to the general Secretaries or Treasurer a statement of the sums which have been expended, and the balance which remains disposable on each grant.

"In grants of money to members the Conference does not contemplate the payment of personal expenses. Grants of money sanctioned by the Executive Committee expire one week before the Annual General Meeting, and the Treasurer is not authorized after that date to allow any claims on account of such grants, unless they be renewed in the original or a modified form by the Executive Committee.

"In all cases where additional grants of money are made for the continuation of researches, the sum named is deemed to include, as a part of the amount, whatever balance may remain unpaid on the former grant for the same object.

"When Committees are appointed, the first member named is regarded as the Secretary, except there is a specific nomination, and he is the only person entitled to call on the Treasurer for such portion of the sums granted as may from time to time be required.

"Professor ATTFIELD, 17, Bloomsbury Square, W.C.
"Mr. F. BADEN BENGER, 1, Market Place, Manchester.
"*Hon. Gen. Secs.*"

Ten guineas from the Bell and Hills Fund had been devoted to the purchase of books for the Brighton Chemists' Association; the volumes, suitably bound, had been forwarded in the name of the Committee.

On May 21st, 1873, the Senior Secretary reported that the Bell and Hills Fund circular had been sent, accompanied by a private letter on the subject, to each member of the Executive Committee, to every member who had contributed an original paper to the Conference, and to the respective editors of the PHARMACEUTICAL JOURNAL and the *Chemist and Druggist*, who had kindly given considerable prominence to the matter. In answer, no actual applications for grants had been made, but many suggestions of subjects for investigation had been offered; amongst others, Mr. Martindale suggested a thorough investigation of the plasters of the Pharmacopœia; Dr. Wright, that sums might be offered to members who would aid in clearing up questions about doubtful alkaloids; Mr. A. H. Allen, for improved methods of detecting adulterations or admixtures of fixed oils; Mr. Tichborne, for researches having for their object the improvement of many of the official formulæ and the exclusion of others; contributions to the natural history of drugs; modes of economising alcohol in making spirituous preparations; investigations on disinfectants; and papers on the application of physical instruments in pharmacy; Mr. Savage for an improved pill-machine for dispensing purposes, and for machines for rapidly and perfectly commingling ingredients for large and small pill masses; and Mr. Greenish, for a model compact pharmaceutical laboratory. These, with the 200 subjects for research, given in the "blue list," a copy of which had recently been sent to every member of the Conference, afforded ample variety, and if the cost of working out researches deterred members from undertaking them, such members should at once apply to the Committee for grants.

The question of increasing the annual subscription to the Conference was discussed at this meeting. Professor Attfield pointed out that when the Conference was established, the founders did not entertain any idea of publishing that large and important volume 'The Year-book of Pharmacy.' After its publication, finding that their small annual subscription left them, year after year, with an increasing balance in hand, a decision was arrived at to use up the accumulated funds before making any charge whatever for the book. These funds had now been expended, the cost of producing the Year-book had recently increased, and the expenditure of the Conference was, in consequence, somewhat in excess of its income. It had become necessary for the Committee to devise and recommend a scheme which would place the Conference on a sound financial basis.

The Committee were of opinion that the money value of the book was double that paid for it by members, and that an increase in the subscription would not alienate any important number of their supporters. It was recommended that the annual meeting should pass the following resolution:—"That the annual subscription to the Conference be in future 7*s.* 6*d.* per annum."

It was announced that in consequence of the appointment of Mr. C. H. Wood, as Quinologist to the Indian Government, that gentleman had intimated the necessity of shortly placing his resignation in the hands of the Committee, and the Secretary was instructed to issue an advertisement, stating that the editorship of the "Year-book" for 1874 would be vacant, and inviting applications from candidates for the appointment.

A discussion took place on the question whether or not it was desirable, in accordance with the custom hitherto adopted, of assembling at the time and place of meeting of the British Association, to go to Belfast in the autumn of 1874. Letters addressed to the Secretary, from prominent members of the Conference resident in Ireland were read, adducing reasons against the visit. Further consideration of the subject was adjourned.

At this meeting sixty-one gentlemen were elected to membership.

On May, 29th 1873, a deputation, consisting of Dr. Whittaker and Mr. Pring, from the Protective Association of Licentiate Apothecaries of Ireland met the Committee. These gentlemen explained at length the relative position of apothecaries and druggists in Ireland, the latter class only dealt in drugs among other things, and did not dispense precriptions; and the apothecaries, whose position was identical with that of English pharmacists (and not with the English "apothecary") would object to meet men who knew little or nothing of the subjects likely to be discussed at a meeting of the British Pharmaceutical Conference. The deputation having retired, it was unanimously resolved—"That the Committee having heard the statement of Dr. Whittaker and Mr. Pring, apothecaries, of Belfast, regarding the present unsettled condition of pharmacy in Ireland, are of opinion that it would not be expedient for the Conference to meet in Belfast in 1874."

Some discussion ensued respecting the class of town in

which to meet in 1874, and a very general opinion was expressed in favour of London.

Little need be added as to the prospects and capabilities of our Association. Its continued success and usefulness depend no less on the activity of individual members than on the energy of its officers. A very wide field of research is suggested, and your Committee earnestly hope that during the present year the progress of pharmacy in England may receive a renewed impetus by the exertions of some of the 2000 members of the Conference.

The TREASURER (Mr. J. F. Schacht) read the financial statement of the Association as follows :—

The Treasurer in account with the British Pharmaceutical Conference, 1872-3.

Dr.	£	*s.*	*d.*
To cash in hand, June 30, 1872	38	14	1
„ Sale of 58 "Year-books" by Publisher	14	10	0
„ „ 54 „ „ Secretary	15	16	8
„ Advertisements in "Year-book," 1871	16	9	0
„ „ „ 1872	78	6	0
„ Subscriptions from Members	470	19	9
„ Balance due to Treasurer	4	5	4
	£639	0	10

Cr.						
By expenses connected with "Year-book"—						
Butler and Tanner for printing, binding, and banding	£358	5	3			
Salary to Editor	100	0	0			
J. and A. Churchill, 25 per cent. commission on advertisements	23	13	9			
Advertising Year-book	2	8	0			
Foreign Journals (Nutt)	5	13	0			
„ „ (Skeet)	1	4	0			
				491	4	0
By General Printing—						
Butler and Tanner	5	17	6			
„ „	4	6	6			
Taylor and Co.	11	19	0			
Programme and Circulars at Brighton	2	16	0			
Stevens and Richardson	0	7	6			
				25	6	6
By Directing Circulars and Envelopes				3	18	3
„ Assistant-Secretary's Salary and expenses at Brighton				30	0	0
„ Postage				82	11	7½
„ Commission on Stamps at Post-office				0	15	9
„ Sundries				5	4	8½
				£639	0	10
1873. June 30. Postage Stamps in hand				3	8	1½

Bell and Hills Library Fund.

Dr.			
To cash in hand, June 30, 1872	21	0	0
„ Dividends on Russian Bonds, September and March	9	15	8
	30	15	8

Cr.			
By Grant of Books to Brighton	10	10	0
„ Balance	20	5	8
	£30	15	8

Examined and found correct—
THOMAS A. BREW, JOSEPH HICK, } Auditors.

Having read the report, Mr. SCHACHT said : The result of the report shows that the expenses of the Association are in excess of its income, and in order to meet the deficiency I beg to move that the resolution recommended in the report to the effect that the subscription to the Conference in future be 7*s.* 6*d.* be adopted.

Mr. HAMPSON seconded the resolution, which was carried unanimously.

Mr. M. ROGERSON, in moving that the report of the Treasurer be received and adopted, said : The report seems generally to be very satisfactory, but I am sorry to hear that the financial position of the Association is not so good as it deserves to be. I have no doubt, however, that as the Association advances in usefulness any deficiency in its income will be soon made good.

Mr. BELL having seconded the resolution, it was carried unanimously.

THE PRESIDENT'S INAUGURAL ADDRESS.

The PRESIDENT then proceeded to deliver his inaugural address, as follows :—

Gentlemen,—The duty which devolves upon your President to open the proceedings of the Conference by a few introductory remarks, an "address" as your Secretaries are accustomed to say, need not, on the present occasion, detain you long from the more important business which you are assembled to transact. At the same time, we may remember that our present meeting in Bradford completes the first decade in the history of the Conference, and this fact suggests retrospective thoughts which may well for a moment occupy our consideration, and important questions which may rightly claim some preliminary attention — thoughts as to the progress of pharmacy during the ten years' interval, questions as to the objects sought by the founders of the Conference and the success or failure which has attended its labours. It is fortunate that we can look back with few regrets and that the record of our past is one which has no dark chapter.

It is now many years since our worthy Treasurer urged the desirability of a periodical gathering of pharmaceutists out of London, and though the precise course he proposed for effecting the object failed to evoke a practical response, it was founded on that principle of decentralization which is the almost essential basis of any scheme for the spread and advancement of knowledge and for the encouragement of united action amongst the members of a scattered body. His idea was allowed to slumber, but was too good to perish, and ere long it reappeared in a new form, recast and rehabilitated, at the hands of your late Secretary. Early in 1863 a suggestion appeared, bearing Mr. Reynolds' name, that the pharmaceutists who were accustomed to attend the meetings of the British Association should assemble at the then forthcoming meeting in Newcastle-upon-Tyne, with all others who inclined to join them, to consider the desirability of an annual conference to discuss subjects connected with pharmacy.

The energetic co-operation of Dr. Attfield from the very first and the hearty concurrence of a number of our present members, notably of Mr. Deane and Professor Bentley, ensured even at the commencement a modicum of success. It never occurred to the one-and-twenty gentlemen who met as proposed on the 2nd of September in that year that the number who had responded to the invitation was a small one, if taken to represent British pharmacy, nor did it prevent them from adopting a constitution founded on the very widest basis. When, a year later, the new society held its first meeting in Bath, and the twenty had become two hundred, a success unthought of was reached. Already political differences were dividing pharmacists into two sections, and the value of a common meeting-ground, undisturbed by party strife, was apparent to all, and in the years that followed, the association and friendly intercourse of men of every shade of opinion at our annual gatherings was one of the most potent agencies in removing the jealousies which ob-

structed pharmaceutical legislation ; nor is it too much to say that to the good offices of the Conference in this respect we owe the conditions under which alone the passing of the Pharmacy Act of 1868 was possible.

In 1865 Birmingham welcomed us, a still advancing body, and our meeting in the following summer at Nottingham is still fresh in remembrance, partly on account of the exhibition of objects of pharmaceutical and general scientific interest held in connection with it, the organization of which was due to the energy of Mr. Atherton and his colleagues, but not less from the admirable exposition of pharmaceutical ethics which was presented on that occasion by our able colleague Mr. Ince—the first recognition that to pharmaceutists, in their relation to each other or to society at large, pertained any specialized system of morality that could be appealed to as a standard of right.

In 1867 Dundee asserted that Scotland shared with England a zeal for scientific advancement which only needed an opportunity to display itself, and the subsequent success of the meetings at Norwich in the east and Exeter in the west, brought fresh proof that distance from populous centres scarcely affected the spirit of the meetings or the fulness of their attendance. These gatherings, indeed, were remarkable for nothing so much as their uniformly satisfactory character. Liverpool followed with a yet larger assemblage of members, and the proceedings of 1870 were chronicled in our first 'Year-book of Pharmacy.' Edinburgh then confirmed all the favourable opinions of Scottish interest and welcome, the foundation of which had been laid at Dundee.

Our meeting at Brighton last year is still fresh in your minds. Science for once scarcely had its fair share of attention, but gave way, perforce, to the pressing and at the time irrepressible question of "provincial education." Though it cannot be said that any definite solution of the much-vexed problem was the result, it is hardly possible to regret the time spent over a discussion that did such good service in ripening opinion on a new and many-sided subject.

Such, then, has been the course of our Association, and if you ask me what there is to show of results, I may point to the organization which renders possible such a meeting as we have here to-day as of itself no unworthy object to have worked for—to the scientific and ethical value of the papers which have been presented in past years, and the discussions which have taken place upon them—or to the 'Year-book of Pharmacy,' of which the fourth volume will ere long be in your possession, and I say that any of these would by itself be reason enough for the past, and promise for the future, of the Conference.

The ten years of its lifetime have been fruitful in external changes, modifying in many respects the relation of the Conference to general pharmacy. By far the most important of these have arisen out of the Pharmacy Act of 1868, the gathering thereby into one compact body of all who had any claim to be called pharmacists, and their separation by the hard line of registration from that large class of general dealers who, to the detriment of pharmacy and to the danger of the public, added a trade in medicines to their more miscellaneous calling. That the full effect of so radical a change is not yet apparent we all know, but every year gives fresh evidence of its salutary working.

There are few topics that have claimed so large a share of attention, or that have been discussed with the same earnestness, as the possibility of a general fusion of pharmacopœias, and there can hardly be one of greater importance to those who are liable at all times to be called upon to prepare the compounds of any of the very numerous existing codes. The spread of commercial enterprize and the yearly increasing disposition to travel in foreign countries for pleasure or gain are rapidly softening national boundaries, and some recognized system in medical formulæ must become more and more an international question of the same sort as the simplification of coinage or the adoption of common standards of weight and measurement. It is not to be expected that the dream of the dispenser—a universal pharmacopœia—can be brought about *per saltum*, the matter is too complicated to be settled in such a way, but it is no small thing to be able to record that in the short lifetime of the Conference two great steps have been taken towards the desired end.

In 1864, the three pharmacopœias of the United Kingdom, namely, those of London, Edinburgh, and Dublin, were merged into one volume under the authority vested in the General Medical Council. The representatives of each of the colleges had to surrender a good deal, but concessions which looked serious at first have caused comparatively little inconvenience in practice ; so little, that it seems wonderful in looking back that the same work was not accomplished many years earlier. The resulting volume was in many ways faulty, as indeed, it could hardly fail to be, but the principle was adopted, and the issue of a new edition three years later was a matter of routine not one of debate. The co-operation of two gentlemen distinguished in pharmacy, Professor Redwood and the late Mr. Warington, in the compilation of the edition of 1867, led to the production of a volume which might be compared without disadvantage with any pharmacopœia then existing.

Another step, at least as great, in the same direction has been more recently taken in the issue of the Pharmacopœa Germanica. Until a comparatively recent period not less than nine pharmacopœias were in force in the area comprised in the present German Empire, namely, those of Prussia, Hanover, Saxony, Hesse, Hamburg, Sleswick-Holstein, Baden, Würtemburg, and Bavaria. In the year 1861, a joint voluntary commission was appointed, at the instance of the pharmaceutical associations of Northern Germany, Southern Germany, and Austria, to consider the questions arising out of this complicated state of things, and if possible to compile a general pharmacopœia for German-speaking nations. The commission was composed of men of highest standing in the pharmaceutical sciences, and it succeeded in producing in 1865 the first "Pharmacopœa Germaniæ." In its original form this was not accepted by any of the German States, but in 1867 an amended edition was published, which was eventually adopted by the kingdom of Saxony, and, what is much more important, served as a basis for the "Pharmacopœa Germanica" of 1872, which is now the authorized codex for the whole German Empire. The only regret is that Austria was not concerned in the latter work, and is thereby shut out for the present from the benefit of uniformity.

Differences in climate, in national habits, in natural productions, and many other external circumstances, make it almost hopeless to look for one code of universal application, but that the British and German Pharmacopœias now cover the ground that nine years ago was occupied by at least a dozen dissimilar works, is a fair subject for congratulation. What the next advance may be it is not easy to guess. There are a large number of substances in general use as medicines in almost every civilized country, and officinal in almost every pharmacopœia ; and if the strengths of the preparations of such as are common to all were rendered uniform, one of the greatest causes of discrepancy in dispensing would be provided against. There would probably be no insuperable difficulty even now in unifying the recognized medicinal formulæ of Great Britain and the United States, and it would be worth a strong effort and some mutual concession to reduce to one standard the pharmacopœias of two great nations speaking the same language and otherwise closely connected.

The same period of about ten years—we will not draw the line very strictly—has been fruitful in the introduction of new remedial agents. Some of them experience has shown to be valuable additions to the materia medica, a

larger number have been found to have a limited application and to present no general superiority to older and well-known medicines, whilst others again have proved to be altogether valueless, their recommendation having been based on supposed properties to which they had no claim.

Of the first series, hydrate of chloral is a prominent example, a substance first introduced to us by Mr. Hanbury, who presented to the Exeter meeting of the Conference an abstract of the original paper read by Dr. Liebreich before the Berlin Chemical Society. The specimen of chloral hydrate exhibited on that occasion was regarded as a chemical curiosity, and there could be little idea that within so short a time it was to become an article of commerce on so enormous a scale. To dwell upon a substance now so familiar to all would be waste of time.

The modern germ theory and the views of advanced biologists as to the invariable presence in the air and in water of bodies, capable under favourable conditions of infinite reproduction, becoming thereby a fertile source of disease, has in the hands of Professor Lister caused a revolution in surgery, and carbolic acid, which a little time ago was scarcely thought of except perhaps as a substitute for creasote, has in consequence become one of the most important bodies with which the pharmaceutist has to do. Solutions of other substances such as chloride of zinc and boracic acid have been employed with more or less success for the same purposes, but it is with carbolic acid, or the mixed carbolic and cresylic products of the distillation of coal-tar, that antiseptic treatment in medicine and surgery is more especially connected. It may possibly still be deemed an open question how far the preference for the crystalline carbolic acid over the fluid product containing the cresyl derivative has any solid basis. We, as pharmaceutists, are too apt to forget that the term "acid," as applied to this substance, is to some extent a misnomer, that, chemically speaking, carbolic acid is the alcohol of the phenyl series,—its solvent, or as we say its corrosive properties, rather than its strict chemical relation, having given rise to its name. On this fact, the somewhat uncertain nature and instability of many of its so-called salts in great measure depend.

In the same category, in point of importance, may be placed the extended employment of phosphates in medicine in place of salts containing vegetable or mineral acids. This has given rise to the introduction of a long series of syrups prepared from various phosphates dissolved in excess of phosphoric acid. In most of them, iron is a prominent ingredient, but we have also calcium, sodium, potassium, nickel, and manganese amongst metallic bases, and in addition certain alkaloids, notably quinia and strychnia, presenting altogether an almost endless diversity of combination. Other phosphorus oxides, such as pyrophosphoric and hypophosphorous acid, have shared with phosphoric the favour of the medical profession, and recently, the direct combinations of phosphorus with metals, *e.g.*, phosphides of zinc or iron, have been called into vogue, and the dispenser has had his wits further perplexed with fancy modes of administration of phosphorus itself in pills, capsules, oil, or ethereal tincture.

Whilst the introduction of chloral, the employment of carbolic acid in the antiseptic treatment of disease, and the development of the use of salts with one or other of the phosphorus oxides as an acid, mark the most salient changes in medical practice as affecting the duties of the pharmaceutist, during the past decade, many other new remedies have established themselves more or less securely in public favour. A considerable proportion of them we owe to America, for example, Podophyllin, Leptandrin, Prunus Virginiana, Actæa racemosa, and Veratrum viride.

But we are possibly too apt to search at a distance for medicaments, to the neglect of many within easy reach of our own doors. I suppose it was always so, for did not Gerarde write thus of the virtues of golden rod two or three centuries ago :—

"It hath in times past been had in greater estimation and regard than in these dayes: for in my remembrance I have knowne the dry herbe which came from beyond the sea sold in Bucklers Bury, in London, for halfe a crowne an ounce. But since it was found in Hampstead wood, euen as it were at our townes end, no man will give halfe a crowne for an hundredweight of it: which plainly setteth forth our inconstancie and sudden mutabilitie, esteeming no longer of anything, how pretious soeuer it be, than whilst it is strange and rare. This verifieth our English prouerbe, Far fetcht and deare bought is best for ladies."*

Professor Christison corrected this tendency in one remarkable instance by the re-introduction of our common male fern (*Aspidium Filix-mas*), in place of the foreign remedies for tape-worm which were so popular a few years ago, and it would be easy to point to many other indigenous plants that have more recently received the testimony of medical authority in their favour. For example, the rhizome of the bog-bean (*Menyanthes trifoliata*) has been stated to be in many respects superior to the root of its ally, the officinal gentian, and the dried leaves of the common raspberry (*Rubus Idæus*), used in some parts of the country in domestic practice in place of ergot, yield by no means the inert infusion that might be expected. The use of the expressed juice of the common periwinkle (*Vinca minor*) in uterine hæmorrhage, of the rhizome of the couch-grass (*Triticum repens*) in irritable bladder, of the red clover (*Trifolium pratense*) in hay fever, of one of our brown seaweeds (*Fucus vesiculosus*) in obesity, of a species of bedstraw (*Galium aparine*) in some cutaneous affections, of the rhizome of the burdock (*Lappa minor*) in syphilitic eruptions, have all given results that, if not sufficient to establish the claims made for them, at least show a *primâ facie* case in their favour. The last-named is but one instance out of several in which an indigenous British plant is officinal in the United States' Pharmacopœia and not in our own. A Russian physiologist recently observed that the alcoholic extract of our common hound's-tongue (*Cynoglossum officinale*) had all the properties of curarè, and though a series of experiments made a year or two ago, in conjunction with my friend Professor M. Foster, by no means confirmed the statement, they showed that the plant had nevertheless certain very peculiar effects on the nervous system, which further research might utilize. I name these but as examples of a large number that might be selected from our native flora.

Few subjects have been so frequently before pharmaceutical readers during the past ten or fifteen years as the efforts of the governments of Holland and Great Britain to introduce the various species of Cinchona into their respective colonies. It would be hardly possible to overrate the importance of the enterprise and it is one that interests alike the pharmaceutist, the botanist, and the votary of economic science. The records of progress which have been made public are so scattered and unconnected, the opinions and reports so conflicting, that it has been difficult for the general reader to retain the thread of the story or to arrive at any very clear estimate of the present position and prospects of the undertaking. The earliest steps in this great experiment in acclimatization date back to a period before that which we have had under review, but so far as results are concerned, the subject is one which pertains essentially to the past few years, and I propose to place before you, in as few words as may be, and unincumbered by the controversial matter with which its literature abounds, an outline of the beginning of the enterprise and of its present practical aspect.

The initiative in Cinchona cultivation was taken, as you well know, by the Dutch government, whose efforts were directed to its introduction into the Island of Java

* Gerarde, 1633 ed., p. 430.

The first Cinchona trees which were sent out to that colony were a few specimens of *C. Calisaya** raised from seeds collected by M. Weddell in Bolivia, and forwarded by a firm of nurserymen in Paris in exchange for rare Javan plants. In the same year, 1852, the Dutch government were induced to send M. Hasskarl, a gentleman previously attached to the Botanic Gardens at Buitzenorg, on a mission to South America, for the purpose of collecting plants and seeds. During the two years following M. Hasskarl pursued his labours and succeeded in forwarding consignments from some parts of Peru, the Cinchona districts of Bolivia being for the most part closed against him; and his efforts were supplemented as to the New Granada species by the assistance of Dr. Karsten. The resulting collections were sent in part direct to Java, and the remainder to Amsterdam for re-shipment. I need not dwell on the mishaps and disappointments inevitable in so new and difficult an enterprise,—it is sufficient to note that within three or four years, that is by the middle of 1856, upwards of 250 plants almost exclusively of two species, *C. Pahudiana* and *C. Calisaya*, were flourishing in the Java plantation as the outcome of the expedition. In the same year, with wise forethought, an accomplished chemist, Dr. De Vrij, was sent out to conduct chemical observations on the growing barks.

We may pass over the long series of troubles that attended the early efforts of those in charge of the trees —the ravages of insects, the destruction of young plants by rats, the devastation committed by wild cattle and rhinoceroses, and, above all, the difficulties dependant on climate, which eventually necessitated the transplantation of nearly the whole of the trees from the locality first chosen, on the north side of the mountain range, to one with a southern aspect. We will pass on, I say, to the year 1863, and we shall find that the total number of Cinchona trees in Java was then 1,151,810. Of these about 99 per cent. were of the species known as *C. Pahudiana*, the remainder comprising about 12,000 of *C. Calisaya* and trifling numbers of four other species. This proportion was unfortunate, for the bark of *C. Pahudiana* was found to be deficient in alkaloids, and therefore supposed to be valueless, and by decrees dated 1862 and 1864 its further culture was ordered to be forthwith stopped.

We may now turn to the steps taken by the British Government in the same direction.

Dr. Ainsley, in his work on Materia Medica, was perhaps the first to suggest the idea of the acclimatization of the Cinchona in India, and, as early as 1839, Dr. Forbes Royle especially indicated the Neilgherry and Silhet mountains as eligible for the experiment. Appeals were subsequently made to the East India Company by Mr. Grant and Dr. Falconar, with the object of inducing them to take up the matter, and in 1852 instructions were sent to the British consular agents in South America to endeavour to procure seeds of the various species, but without much real effect. Dr. Royle, as Reporter on the Products of India, continued to urge the subject on the attention of Government up to the time of his death, and eventually, in 1859, at the instance of his successor in office, Dr. Forbes Watson, the services of Mr. Clements R. Markham were called into request by the home authorities.

Mr. Markham proposed a four-fold expedition to South America, and his scheme was at last sanctioned by the Secretary of State for India, and ordered to be carried out. The first portion of the expedition was directed to Bolivia and Caravaya, the region of *Cinchona Calisaya* and *C. micrantha* (var. *Boliviana*). Secondly, Huanuco and Huamalies were to be searched for *C. nitida* and *C. glandulifera*. Thirdly, Cuenca and Loxa in the Republic of Ecuador for *C. Chahuarguera*, *C. Uritusinga*, and *C. Condaminea*; and lastly, New Granada as the habitat of *C. Pitayo* and *C. lancifolia*. Mr. Pritchett and Mr. Spruce were appointed coadjutors to Mr. Markham, and the expeditions set out in 1859, the latter gentleman proceeding to the northern part of Bolivia, the district of the yellow barks; Mr. Spruce to the mountain region of Chimborazo, in quest of red cinchonas; Mr. Pritchett taking the grey bark forests of Huanuco, in the north of Peru. The perils encountered by these travellers, the hardships they endured, the disappointments they suffered, form a chapter in the history of travel. But illness and privation, bad roads, and even native jealousies, left unaffected the general success of the expedition, and though, unfortunately, the plants collected at great risk by Mr. Markham, including many of the best species of Bolivia, perished in the Red Sea in their transit to India, leaving no survivors, it is to the work accomplished by these three enthusiastic labourers that we owe the basis of our present Cinchona plantations. In 1860, the Ootacamund station was established, and the following year the number of young Cinchona trees was reported to be 1128. Under the excellent care of Mr. McIvor these had been increased in 1863, the date to which I have brought my account of the Java plantations, to 248,166.

It is no part of my purpose to enter into minutiæ of history, nor to do more than associate with the first steps in Cinchona culture the names of Messrs. Hasskarl and Markham, Spruce, and Pritchett as travellers, those of Dr. De Vrij and Mr. John Eliot Howard as advisers in technical details, and more recently, Messrs. McIvor and Broughton, who have been conspicuous, so far as India is concerned, in the rapid development of the enterprise.

The efforts of our own Government have not been confined to India, but localities have been sought in other parts of the world where natural conditions seemed to favour the chance of success in the introduction of quinine-yielding trees, and at the time I speak of (1863), there were under the care of Mr. Thwaites in Ceylon upwards of 20,000 young Cinchona plants. Jamaica also had made a successful beginning, and the authorities of several European countries were considering how far their respective colonies might be utilized to the same end, though but little decided action beyond what I have stated had been taken.

The ten years that have intervened need not detain us, but having noticed the origin we will turn at once to the practical aspect of the subject at the present time.

The latest official return places the number of Cinchona trees in cultivation in the Island of Java at two millions.

I can find no published account of the exact extent of the British plantations at the present time. My latest information I owe to the kindness of C. R. Markham, F.R.S., of the India Office. It is contained in the Parliamentary Blue-book of August, 1870, and refers only to the Madras and Bengal Presidencies. This gives the total number of Cinchona plants growing on the Neilgherries in January of that year at 2,595,176, of which nearly one-half (1,143,844) were permanently planted out.* The number at Darjeeling in the Bengal

* My friend, J. E. Howard, F.L.S., to whose kind revision subsequent paragraphs owe any scientific value they possess, tells me that, accurately speaking, these were *C. Calisaya*, var. *Josephiana*.

* Since this was written I have received a copy of a return which is believed to represent the actual number of Cinchona trees in the Government plantations in the Neilgherries at the present time. It shows an increase of 12,330 "planted out," and is as follows:—

Crown barks (*C. officinalis*)	508,878
Red barks	579,938
Yellow barks	33,859
Grey barks	28,759
Other species	4,749
	1,156,174

In addition to these, i must be recollected that the Government had up to 1870 distributed upwards of 178,000 trees from the Neilgherry nurseries, as well as nearly three

Presidency in March, 1870, is stated at 2;262,210, of which a million and a half were in permanent plantations.

Of the extent of the plantations in Ceylon and Jamaica I know nothing, but reports from time to time state that they are prospering. It is needless to refer to the experiments in cultivation in the South of Europe, the Caucasus, Brazil, the Philippines, or Australia, as these are not yet sufficient in extent to have any practical significance.

The relative value of the bark produced by the various species and varieties of Cinchona is a question that has received close attention and perhaps cannot be considered settled until something more like uniformity in the subdivision and nomenclature of the genus prevails. Plants regarded as merely varieties of the same species yield widely differing proportions of alkaloids, and the subject is further complicated by considerations as to the possible effects of cultivation and of different climatal conditions.

The result of last year's sale of Java barks at Amsterdam, and the statement of Dr. De Vrij upon the alkaloids they contained did not favour the hope that a permanent source of quinine supply had been secured. The highest price given on that occasion (about four shillings per pound) was for a parcel of *C. officinalis*, whilst one lot of *C. succirubra* (?) brought only 9*d.* per lb. Happily, the report for the present year has been reassuring. In the words of Mr. Howard (PHARM. JOURNAL, July 12, 1873), the Dutch "plantations have just been distinguished by a great success, in having sent into the market bark which has been sold at prices equal to from 8*s.* to 9*s.* 5*d.* per lb., and this not simply from such accidental circumstances as will sometimes occur, but from the intrinsic goodness of the bark." One of these Javan samples of *C. Calisaya* yielded 7·25 per cent. of alkaloids, of which 5·53 was quinine. The different alkaloid value of the so-called varieties of *C. Calisaya* was strikingly shown in this consignment—the bark from three of them yielding 1·23 per cent., 2·32 per cent., and 5·53 per cent. of quinine (alkaloid) respectively. The rich and valuable bark was all from trees the seed of which had been collected in Bolivia by Mr. Ledger, and it is to be regretted that at present so small a proportion of the whole is the product of that importation.

The barks now being produced in the Dutch and British colonies are referrible to five species, viz.:—

C. Calisaya, of which, as I have said, only a small proportion realizes expectation in its yield of quinine;

C. Hasskarliana (called a hybrid), which appears to be of little value in respect of alkaloids;

C. Pahudiana, deficient in the same particulars, but producing a bark which finds a ready market for pharmaceutical purposes;

C. officinalis, which, in British India,* appears to be the most generally satisfactory; and

C. succirubra, which, notwithstanding certain exceptional samples, has not turned out altogether well.

I have already stated the high price that Calisaya bark from Ledger's seed will fetch. Mr. Howard informs me that for the bark of *C. officinalis* grown in the Neilgherries or Ceylon, the firm of which he is a member, is ready to give the same price as for ordinary Bolivian Calisaya. The produce of *C. succirubra* appears very variable, but I have before me, through the kindness of the same gentleman, the commercial analysis of a sample from Ceylon which gives 5·51 per cent. as the total of pure alkaloids.

The pet idea of the Indian government, to manufacture on the spot a preparation supposed to consist of the crude mixed cinchona alkaloids, to sell at a very low price, is one that cannot be regarded with much favour. Any such product, however carefully made, must be of very uncertain composition, and, as is well known, samples which have reached this country have even contained poisonous metallic impurities. If cheap alkaloids are required, red bark will yield cinchonidine, the value of which as an antiperiodic is now well ascertained, and many species give cinchonine cheaply enough. But surely it were better that government should confine its attention to providing the material, and leave it to makers who have larger technical knowledge and practical experience to supply the low-priced alkaloids they desire.

Time is an important element in commercial matters, and the question as to the age at which it will pay best to collect the barks must remain at present in abeyance, and it probably will be found to differ in the different kinds—but already the sales of bark from acclimatized trees are considerable, and of course a yearly increase may be expected. Last year at the sale alluded to 5800 kilos (12,787 lbs.) were offered at Amsterdam, and it has been recently stated that our Neilgherry plantations alone will this year furnish 75,000 lbs. of bark for the English market.

I can say little about the West Indian plantations as to extent, but the quality of the bark they produce is encouraging. Mr. Howard reports that the chemical examination of barks from Jamaica is "highly satisfactory as regards the prospects of Cinchona culture in that island."

Various questions are still pending:—the influence of manures on the chemical constituents of the trees, the various methods of removing the bark from the tree, and the encouragement of renewal by the processes of stripping and mossing, and many others of like importance, the solution of which must be left to time and need not occupy our consideration here. My allusions to the subject have already been somewhat lengthy, but the scale of the experiment is gigantic and its issues momentous. I could not in a retrospect have omitted to notice it, and to have courted brevity beyond what I have done would have been at the risk of intelligibility.

Turning from our wider general retrospect to circumstances of more recent date affecting pharmacy, I may allude to two or three substances whose employment in medicine possesses more than common scientific interest, primarily to the Hydrate of Croton-Chloral and Propylamine or Trimethylamine.

The name of Dr. Oscar Liebreich is so favourably known in connection with chloral hydrate that any remedy introduced under his recommendation necessarily commands attention. In his further researches on bodies more or less related to chloral he discovered that croton-chloral, that is the substance represented by the same term in the allyl (C_3H_5) series that chloral has in the Ethyl (C_2H_5) group, in other words, dichlorcrotonic aldehyd, possessed very singular physiological properties. We gather that it is a powerful sedative, but that its action instead of affecting the entire nervous system, and to some extent the circulation also (like chloral hydrate), is confined to the fifth pair of cerebral nerves. Experiment in this country has at any rate in part confirmed Dr. Liebreich's views, and it is needless to say how important an acquisition to the medical practitioner would be any agent with well ascertained specialized action such as that described. Hydrate of croton-chloral very much resembles in appearance the ordinary chloral. I do not know what process is followed for its preparation on a commercial scale, but chemical text-books tells us that it may be

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hundred ounces of the seeds of various species, to private individuals disposed to plant on their estates. After all, when the experimental stage of such an undertaking is over, private enterprise would seem to be its safest basis. A Parliamentary paper on the progress of India in 1872, just issued, gives the total number of plants in the Neilgherry plantations as 2,639,285, but this probably includes the very young trees still in nurseries. I have no particulars beyond what appear in a paragraph in the *Times*.

* This limitation is at present necessary. Dr. De Vrij's late paper on Jamaica barks (PHARM JOURNAL, August 16th, 1873) shows the produce of *C. officinalis* in that island to be very deficient in quinine, inferior indeed to *C. Pahudiana*, whilst a still later communication confirms Mr. Howard's opinion as to the richness of Indian-grown specimens.

prepared by passing chlorine gas into allylene, or by acting upon dichlorallyl and formic acid with alkalies.

The use of propylamine in medicine originated in Russia, but until quite lately the reports of Professor Awenarius and others on the success which had attended its employment in acute and chronic articular rheumatism passed almost unnoticed. During the present year however its medicinal properties have been closely investigated in the Paris hospitals by M. Dujardin-Beaumetz and the results published from time to time. An elaborate memoir, summarizing the whole, has just appeared, entitled 'Nouvelles Recherches sur la Triméthylamine.' It may be necessary to advert to the isomerism which gives rise to three different names for substances with the same ultimate composition (C_3H_9N), namely, propylamine, ethylomethylamine, and trimethylamine, inasmuch as the last name is employed with some emphasis by the French author, who also dwells upon the different physical characters of the three isomers and notes especially their widely different boiling points.

Propylamine is produced in minute quantities in plants of several genera, *e.g.*, *Chenopodium*, *Stapelia*, *Huernia*, *Apteranthes*, etc., and its isomer trimethylamine in many of the Rosaceæ. A tincture of the fresh plant of *Chenopodium vulvaria* has been used medicinally, but practically it is to the animal kingdom we must look for the supply. Professor Awenarius employs exclusively propylamine prepared from cod liver oil, but the French author alluded to adopts that extracted from herring brine. The latter dwells on the uncertainty in composition of the samples he has met with in commerce, and advocates the use of the hydrochlorate as likely to lead to greater uniformity. The dose of propylamine is from a gramme to a gramme and a half, but nearly double the latter quantity has been given without ill effect. The odour and taste are abominable, and it is therefore given with peppermint or other adjuvant having a strong flavour, or, better still, in a capsule. With its therapeutic effects we have less to do. It is described as relieving if not entirely subduing the pains of acute rheumatism within twenty-four hours, increasing the appetite, reducing animal temperature and often producing insomnia.

The introduction of guarana, or rather the resuscitation of its use, by Dr. Wilks, and the employment of copaiba resin in dropsies by the same gentleman, and the proposal of Mr. John Marshall to substitute a definite oleate of mercury for the clumsy and wasteful mercurial ointment, are other noteworthy topics that have of late occupied space in the medical journals. Nor must I omit to call attention to the most interesting and exhaustive paper by Mr. Hanbury (*vide* PHARMACEUTICAL JOURNAL of August 2nd and 9th), on the history and botanical origin of Pareira Brava. Few of us, I suspect, were prepared to learn that this drug had been in more or less repute for a couple of centuries. Its usually accredited botanical source—that is, to *Cissampelos Pareira*—Mr. Hanbury had before shown to be erroneous, but its identification beyond question as the root of *Chondodendron tomentosum* is an important addition to knowledge, and the means of diagnosis of the genuine and spurious drug of great value to the pharmaceutist.

Three new Pharmacopœias are before us—the 'Pharmacopœa Germanica' before referred to, and the 'Pharmacopœa Helvetica,' both bearing date 1872, and the 'Pharmacopœia of the United States,' 1873. I can do little more than direct your attention to them as material for most profitable study. Though as widely diverse in character as the nations they represent, each has an excellence of its own.

Many German formulæ, for example, *Pulvis Glycyrrhizæ compositus*,* *Tinctura colocynthidis*, and *Tinctura Ferri acetici ætherea* have already found their way into English practice, and circumstances may easily increase the number, so that were there no other reason, the pharmaceutist would do well to acquaint himself somewhat with the first named work. The Swiss Pharmacopœia is a model of simplicity. The whole book is but a hundred and eighty pages, the first hundred and fifty-six being occupied with materia medica and formulæ, the remainder being taken up with a series of useful reference tables. Its brevity is partly owing to the curtailment of processes. Formulæ are seldom given for the preparation of chemicals which in practice are manufactured on a large scale and purchased by the pharmaceutist, but the characters of the preparations are detailed with much minuteness, and the tests for purity given with great exactness.

The newly-revised Pharmacopœia of the United States, long waited for, appears fully to satisfy expectation, and is in many ways an example of advanced pharmacy. The elaborate synopsis of its contents which has recently appeared in the pages of the PHARMACEUTICAL JOURNAL, will enable those who have not the work to form some idea of its general character. In some little matters at least the compilers of the new edition of our Pharmacopœia might take useful hints from the transatlantic work—amongst minor details, the accented index seems likely to serve a very good purpose in promoting uniformity of pronunciation in Latin names.

Such then are the events that appear to me to mark the recent progress of pharmacy, and I would that I might stop here, but, *per contra*, I find other occurrences fraught with discouragement. At our last meeting I had occasion to advert to the aspects of pharmacy in relation to that higher scientific training which must be kept in view if the members of our craft in this country desire to take the professional position that is open to them, or to stand on the same intellectual level with the same class in many parts of the continent.

The Pharmaceutical Society with its extended powers and large income, with the halo about it of good work accomplished in past years, seemed then to be the source whence some effort might be expected to remedy deficiences that are not only the object of remark of foreigners, but are generally acknowledged amongst ourselves. It is not for me to criticize from this chair the action of the Society, except in so far as it affects the objects the Conference was established to promote.

The standard of the examinations adopted by the Society on the passing of the Pharmacy Act was very naturally decided in a spirit of extreme consideration for the circumstances of those who were already engaged in business in one capacity or other. For the Preliminary examination of young men *now* entering our ranks there can be no such plea for indulgence, and the recent revision of the examination regulations gave the opportunity for exacting some less discreditable minimum of preliminary education than heretofore. It is surely not too much to expect that a youth proposing to enter a professional or semi-professional calling should have had at least a good grammar-school education. But do not the questions that we see in our present examination papers suggest rather a constituency composed of the idle scholars of a village charity school; and the standard of that better period which is to commence at the end of 1874 is in no respect an advance on that which has hitherto been enforced, save that it requires a little extra knowledge of the table-book. I will not detain you with any remarks on the rest of the revised code, indeed I could add little to what I endeavoured to place before you last year, except the confirmation and extension of the views then expressed, which have arisen from continued observation.

I am not presumptuous enough to undertake a review of the recent fundamental change in the relation of the Society to scientific teaching, because, in common with many others, I have sought in vain for the principle on which the step has been based. If it be an indefensible anomaly, as has been stated, that the Pharmaceutical

* *Pulvis Liquiritiæ compositus* of the New German Pharmacopœia.

Society should be both an educating and an examining body, there can be no doubt that its educational functions ought to cease, seeing that those pertaining to examination cannot. And if this principle were really acted upon some good might perhaps arise from the stimulus that would be given to extra-academical teaching. But the new arrangements are incomprehensible in this light for, *cæteris paribus*, how could any man hope to compete with a rival who was rent-free, and had an annual subsidy in addition to his fees? Looking at the matter in its relation to the advancement of pharmacy in England, it seems obvious that the recent change can only promote that dull, low mediocrity which above all things it should be our aim to avoid. I am far from granting that the union of educational and examining functions in one body is anomalous, for I believe that a closer examination of the subject would lead to the opposite conclusion; but even were it so in this particular case, the anomaly would refer firstly, if not solely, to the Minor or compulsory examination. Education for the Major examination, which is an honorary degree, would certainly involve no anomaly, still less would the provision, which at the present time is of pre-eminent importance, for subsequent and more extended study. The new arrangements point solely to increased facilities for obtaining the minimum amount of knowledge necessary to pass the Minor examination. We are to have our lectures served up in a concentrated form, a *five* months' course guaranteed equal to *ten* according to the old formula, the resulting compound I suppose to be diluted when required for use. Our old acquaintance "Cram" to the front once more, but this time by permission and under the especial patronage of the Society.

The proposal of an eminent pharmaceutist to make the Minor the matriculation examination for students entering the school in Bloomsbury Square may be open to objection, but it would have remedied any anomaly that might have been supposed to exist in the old arrangement, whereas the new regulations perpetuate its worst features. The adoption of two short elementary courses of lectures in each subject in place of one of much more exhaustive character is in reality a provision for smatterers at the expense of those who wish to pursue their studies beyond the mere legal minimum.

That the education of students for a *compulsory* examination at the expense of the body had become undesirable is true in so far as it is no longer necessary, but the Major examination is *not* compulsory, and on that account it would seem to be equally the duty and the interest of the Society to afford facilities to students to prepare themselves for it. For the same reason, it becomes more than ever incumbent upon the Society to offer inducements to young men to pursue a higher education than anything prescribed by mere examination tests. The Society hitherto has had many functions, but if one may judge by recent events, we may fairly look for the time when the Council will have nothing to do but to register the decrees of the Board of Examiners, and to place annually in the Three per Cents. two thousand pounds of the money subscribed by the members for the advancement of pharmacy. It would be well for those who regard the present condition of pharmacy and pharmaceutical education in England with satisfaction, if there be such, to give their attention for a moment to the standard of attainment demanded in other European countries similar in political importance and intellectual standing to our own. I need hardly allude to the regulations in force in France so soon after the interesting papers on the École de Pharmacie of Paris, by Mr. Walter Hills,* but a recent visit to our valued fellow-member, Dr. Flückiger, the newly appointed Professor of Pharmacy in the University of Strasburg, has given me the opportunity of gleaning some information concerning the educational curriculum and qualifications demanded of the pharmaceutist in the new German Empire. I will give the result of my inquiries as nearly as may be in the Professor's own words:—

In Germany the pharmaceutical student must begin his education in a classical school or gymnasium. The period at which he is considered fit to enter on his apprenticeship is controlled by a medical officer (*Kreis-Physicus*). His term of apprenticeship is three years, but it may be reduced to two years and a half if he is very zealous and intelligent, and this is determined by annual examination. When his apprenticeship is completed, the preliminary examination (oral and written) follows, which entitles him to be recognized as an assistant.

In this capacity he must devote three years to actual practice in a pharmacy, and his duties therein are regulated by law. The term of three years may be reduced to two and a half if he enters the voluntary military service, and is actually employed in a military dispensing office for one year. Lastly, he must devote a year and a half to study in a university. Afterwards he presents himself for final examination in the following subjects:—

1st. The translation of two articles in the Latin Pharmacopœia.

2nd. The dispensing of particularly difficult prescriptions.

3rd. The preparation of two chemicals.

4th. The analysis, both qualitative and quantitative of an artificial or natural mixture.

5th. Toxicological analysis, both qualitative and quantitative.

6th. Three notices (brief essays I suppose) on general and analytical chemistry, written without books or other extraneous aid.

7th. The recognition and description of ten or more officinal plants likely to be confounded.

8th. The recognition and description of at least ten officinal drugs.

9th. Relates to pharmaceutico-chemical preparations, their recognition by external characters, preparation, use, falsification, etc.

10th. Lastly comes the oral examination in which the candidate must prove that he is well acquainted with theoretical chemistry, physics, natural history, toxicology, and pharmaceutical legislation.

Professor Flückiger adds that, though he has not yet much practical experience in the working of these examinations, he is under the impression that they are very strictly carried out, as almost everything is in new Germany.

I am far from thinking that so elaborate a scheme as that set forth is desirable, even if it were possible, in England, but it ought to set us thinking whether results as good might not be attained by means which are already in our power. We are ready enough to urge the claims of our body for scientific appointments, such as those which have recently arisen out of the Adulteration Act, but it seems to me that if first attention were paid to raising a class of men who, *as a body*, were competent to undertake the responsible scientific duties involved in such offices, the public would see its own advantage in according them to us. At present, I confess, I cannot see that the mere diploma of the Society is of itself any guarantee of the necessary qualification.

Amongst the events of the past year are some of sorrowful import. The death of one who had identified himself with the Conference from its commencement, and who had served it with a whole heart, even in feeblest health, and that of another, eminent in pharmacy, whose sympathies were ever with us, though his sphere of active life lay in the other hemisphere, are still uppermost in our thoughts:—I need not say I allude to John Cargill Brough and Edward Parrish. Enough has been written concerning both as a memorial of their lives, but it were not fitting that their names should be unremembered here. The services of the late editor of our Year-book it is

* *Vide* PHARMACEUTICAL JOURNAL, 3rd series, vol ii., pp. 121 and 561.

scarcely possible to overrate. The scheme of the Conference was one which coincided exactly with the bent of his own mind. He came amongst us at our first meeting known only by name as the editor of the *Chemist and Druggist*, and from that moment, nay indeed before that, the objects of the Conference had the unswerving support of the journal which he directed. He was the consistent advocate, as indeed it was his nature to be, of the claims of those who seemed likely to suffer from the early proposals in the way of legislation, and in the opportunity for intercourse afforded by our annual meetings he saw the means of softening the differences that at first so grievously divided the general body of chemists to their common injury. Advocacy of high class pharmacy gave way before his sympathy with his fellow men. Trained as a literary man, his connection with pharmacy was so to speak accidental. He lived the up-hill life of a *littérateur*, —one of exhausting labour aggravated by ill-health, perplexed by the cares of a young family, and saddened by bereavements; yet, to the end he fought bravely and cheerfully on.

"And, oh! when Nature sinks, as oft she may,
Through long-lived pressure of obscure distress,
Still to be strenuous for the bright reward,
And in the soul admit of no decay,
Brook no continuance of weak-mindedness—
Great is the glory, for the strife is hard!"

At our meetings his voice was seldom heard; extreme diffidence seemed to prevent his taking much part in discussions. His contributions to our 'Proceedings' consist of three papers,—one in 1865 "On the proposed Introduction of two Systems of Chemical Notation in the British Pharmacopœia," one in 1868 "On Narcotine and the Products of its Decomposition" and another in the same year, "On an improved Differential Thermometer." When the Conference determined to publish a 'Year-book' his singular fitness for the post of editor was at once recognized, but before he had proceeded far with the preparation of the first volume he was compelled by failing health to relinquish the task. A few months before he had received the appointment of Chief Librarian to the London Institution, and there seemed for a time a hope that the unwonted quiet of his new sphere, the relief from care in pecuniary matters, and the congenial nature of his occupation, might have restored him to physical vigour—but it was not so to be. So gradual was his decline that he cherished almost to the last the idea of attending the Conference at Brighton last year.

To the outside world Mr. Brough was known as the editor of the *Laboratory*, and one or two trade journals; as the sub-editor of *Nature*, as the author of 'Fairy Tales of Science,' of some serious and many humorous essays, the latter especially, whether in prose or rhyme, models of felicitous handling. To his friends he seemed the reflex of every noble quality he sought in others; if they speak little of his published works 'tis but from the recollection of his inimitable letters; if they mourn in silence 'tis in the heavy sense of loss that time cannot replace.

Probably few of the present company were personally acquainted with Professor Parrish, yet he was well-known by name to all, and it was not merely from the position he held amongst our American brethren that he was amongst the first whom the Conference elected to its honorary membership. An able writer, a fluent speaker, and an accomplished pharmaceutist, he excelled perhaps more as a teacher than as an original investigator. Of his genial affectionate manner an evidence is seen in the terms by which his students of past years loved to speak of him. He had long intended to revisit England, and looked forward with pleasure to the probability of being able to attend the Conference at Brighton, and even in May last year he spoke of his visit as depending on the completion of a new edition of his book on pharmacy, which was then in the press. Before leaving Brighton I received a letter from him—a kindly message to the Conference, expressing his interest in the success of the meeting, but telling of other duties nearer home that claimed him for the time and prevented his being with us. He alluded to his appointment on a government commission to one of the hostile tribes of Indians in the South-western States, and it was whilst engaged upon this work of peace and reconciliation that he was struck down by fever. His loss, whether in a professional or in a social capacity, has been and must be widely felt; scarcely a society or periodical connected with pharmacy in America but has had some eloquent tribute to his memory.

And now, gentlemen, in conclusion, let me remind you that the Conference has but one object—the advancement of pharmacy—and by that means the material and intellectual advancement of pharmaceutists. There is much to be accomplished, both in scientific and ethical relations before pharmacy in this country can stand in the place that belongs to it of right—so much, that it needs a stout heart to face the future; and let no member think that the efforts of others absolve him from his share of the labour. Abilities, opportunities, inclinations differ, but in the body politic there is a sphere of active usefulness for each, a line of duty easily ascertained, from which no man may shrink and hold himself blameless.

Mr. Ekin (Bath) moved a vote of thanks to the President for his able and interesting address.

Mr. Rimmington (Bradford), in seconding the proposal, said: I have listened with very great pleasure to the able address of the President, and with the great majority of his observations I entirely concur. I cannot but feel that such an address as he has just delivered will tend to raise the *status* of pharmacy in this country, and to extend its sphere of usefulness; and to elevate us above the rank of mere traders by showing that pharmaceutists are men of intelligence and of education. And in my opinion that is one of the main objects which this Association is intended to accomplish. It cannot be disputed that one of the results of the establishment of this Association has been to raise our position, which is far different from what it was ten years ago. It is with much pleasure that I beg to second the vote of thanks to our President for his very able speech.

Mr. J. Williams (Vice-President) having put the question, the vote of thanks to the President was carried amid applause.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The forty-third Annual Meeting of the British Association for the Advancement of Science commenced at Bradford on Wednesday, September 17th. In the evening, at St. George's Hall, the President-Elect, Professor A. W. Williamson, F.R.S., delivered the following

Presidential Address.

Ladies and Gentlemen,—

Instead of rising to address you on this occasion I had hoped to sit quietly amongst you, and to enjoy the intellectual treat of listening to the words of a man of whom England may well be proud—a man whose life has been spent in reading the great book of nature, for the purpose of enriching his fellow men with a knowledge of its truths —a man whose name is known and honoured in every corner of this planet to which a knowledge of science has penetrated—and, let me add, a man whose name will live in the grateful memory of mankind as long as the records of such noble works are preserved.

At the last meeting of the Association I had the pleasure of proposing that Dr Joule be elected President for the Bradford Meeting, and our Council succeeded in overcoming his reluctance and in persuading him to accept that office.

Nobly would Joule have discharged the duties of President had his bodily health been equal to the task; but it became apparent after a while that he could not rely upon sufficient strength to justify him in performing the

duties of the chair, and, in obedience to the order of his physician, he placed his resignation in the hands of the Council about two months ago. When, under these circumstances, the Council did me the great honour of asking me to accept their nomination to the Presidentship, I felt that their request ought to have with me the weight of a command.

For a good many years past chemistry has been growing at a more and more rapid rate, growing in the number and variety of facts which are added to its domain, and not less remarkably in the clearness and consistency of the ideas by which these facts are explained and systematized. The current literature of chemical research extends each year to the dimensions of a small library; and mere brief abstracts of the original papers published annually by the Chemical Society, partly aided by a grant from this Association, take up the chief part of a very stout volume. I could not, if I would, give you to-night even an outline of the chief newly-discovered compounds and of the various changes which they undergo, describing each of them by its own name (often a very long one) and recording the specific properties which give to each substance its highest scientific interest. But I am sure that you would not wish me to do so if I could; for we do not meet here to study chemistry; I conceive that we meet here for the purpose of considering what this wondrous activity in our science means, what is the use of it, and, true to our object as embodied in the name of this Association, to consider what we can do to promote the advancement of science. I propose to lay before you some facts bearing on each of these questions, and submit to you some considerations respecting them.

In order to ascertain the meaning of the work which has been going on in chemistry, it will, I think, be desirable for us to consider the leading ideas which have been in the minds of chemists, and which guided their operations.

Now, since the father of modern chemistry, the great Dalton, gave to chemists a firm hold of the idea of atoms, their labours have been continually guided by that fundamental idea, and have confirmed it by a knowledge of more and more facts, while at the same time steadily adding to our knowledge of the properties of atoms. Every chemist who is investigating a new compound takes for granted that it must consist of a great number of atom-clusters (called by him molecules), all of them alike, and each molecule consisting of a certain number of atoms of at least two kinds. One of his first endeavours is to ascertain how many atoms of each kind there are in each molecule of the compound. I must not attempt to describe to you the various kinds of experiment which he performs for the purpose of getting this information, how each experiment is carried out with the aid of delicate instruments and ingenious contrivances found by long experience to enable him to obtain the most trustworthy and accurate results; but I want to draw your attention to the reasoning by which he judges of the value of such experiments when they agree among themselves, and to the meaning which he attaches to their results.

If the result of his experiments does not nearly agree with any atomic formula (that is, if no conceivable cluster of atoms of the kinds known to be in the compound would on analysis give such results as those obtained), the chemist feels sure that his experiments must have been faulty: either the sample of substance which he worked upon contained foreign matter, or his analyses were not made with due care. He sets to work again, and goes on till he arrives at a result which is consistent with his knowledge of the combining-properties of atoms. It is hardly necessary to say that even the best experiment is liable to error, and that even a result obtained with the utmost care cannot be expected to afford more than an approximation to the truth. Every good analysis of a pure compound leads to results which approximate to those required by the atomic theory; and chemists trust so thoroughly to the truth of that guide, that they correct the results of such analysis by the aid of it.

The chemical idea of atoms serves for two purposes:—

1. It gives a clear and consistent explanation of an immense number of facts discovered by experiment, and enables us to compare them with one another and to classify them.

2. It leads to the anticipation of new facts, by suggesting new compounds which may be made; at the same time, it teaches us that no compounds can exist with their constituents in any other than atomic proportions, and that experiments which imply the existence of any such compound are faulty.

We have the testimony of the great Berzelius to the flood of light which the idea of atoms at once threw on the facts respecting combining proportions which had been accumulated before it was made known; and from that time forward its value had rapidly increased as each succeeding year augmented the number of facts which it explained.

Allow me at this point of my narrative to pause for a moment, in order to pay a tribute of respect and gratitude to the memory of one who has recently passed from among us, and who in the time of his full activity was a leader of the discoveries of new facts in the most difficult part of our science. Liebig has been generally known in this country through his writings on agricultural chemistry, through his justly popular letters on chemistry, and other writings, by means of which his brilliant intellect and ardent imagination stimulated men to think and to work. Among chemists he was famed for his numerous discoveries of new organic compounds, and their investigation by the aid of improved methods; but I believe that the greatest service which his genius rendered to science was the establishment of the chemical school of Giessen, the prototype of the numerous chemical schools for which Germany is now so justly celebrated. I think it is not too much to say that the Giessen laboratory, as it existed some thirty years ago, was the most efficient organization for the promotion of chemistry which has ever existed.

Picture to yourselves a little community of which each member was fired with enthusiasm for learning by the genius of the great master, and of which the best energies were concentrated on the one object of experimental investigation.

The students were for the most part men who had gone through a full curriculum of ordinary studies at some other University, and who were attracted from various parts of the world by the fame of this school of research.

Most of the leading workers of the next generation were pupils of Liebig; and many of them have established similar schools of research.

We must not, however, overlook the fact that Liebig's genius and enthusiasm would have been powerless in doing this admirable work, had not the rulers of his Grand-Duchy been enlightened enough to know that it was their duty to supply him with the material aids requisite for its successful accomplishment.

Numberless new compounds have been discovered under the guidance of the idea of atoms; and in proportion as our knowledge of substances and of their properties became more extensive, and our view of their characteristics more accurate and general, were we able to perceive the outlines of their natural arrangement, and to recognize the distinctive characteristics of various classes of substances. I wish I could have the pleasure of describing to you the origin and nature of some of these admirable discoveries, such as homologous series, types, radicals, etc.; but it is more to our purpose to consider the effect which they have had upon the idea of atoms, an idea which, still in its infancy, was plunged into the intellectual turmoil arising from a variety of novel and original theories suggested respectively by independent workers as best suited for the explanation of the particular phenomena to which their attention was mainly directed.

Each of these workers was inclined to attach quite sufficient importance to his own new idea, and to sacrifice for its sake any other one capable of interfering with its due development.

The father of the atomic theory was no more; and the little infant had no chance of life, unless from its own sterling merits it were found useful in the work still going on.

What then was the result? Did it perish like an ephemeral creation of human fancy? or did it survive and gain strength by the inquiries of those who questioned Nature and knew how to read her answers?

Although anticipating my answer to these questions, you will probably be surprised to hear the actual result which I have to record, a result so wonderful that the more I think of it the more I marvel at it. Not only did these various theories contain nothing at variance with the atomic theory; they were found to be natural and necessary developments of it, and to serve for its application to a variety of phenomena which were unknown to its founder.

Among the improvements of our knowledge of atoms which have taken place, I ought to mention the better evaluations of the relative weight of atoms of different kinds, which have been made since Dalton's time. More accurate experiments than those which were then on record have shown us that certain atoms are a little heavier or lighter than was then believed, and the work of perfecting our observations is constantly going on with the aid of better instruments and methods of operation. But, apart from these special corrections, a more sweeping change has taken place, not in consequence of more accurate experiments interpreted in the usual way, but in consequence of a more comprehensive view of the best experimental results which had been obtained, and a more consistent interpretation of them. Thus the atomic weight of carbon had been fixed at 6 by Dumas's admirable experiments; and it was quite conceivable that a still more perfect determination might slightly increase or diminish this number. But those who introduced the more sweeping change asserted in substance that two of these supposed atoms, whatever may be the precise weight of each, always are together and never separate from one another; and they accordingly applied the term atom to that indivisible mass of carbon weighing twice as much as a carbon atom had been supposed to weigh. So also with regard to other elements, it has been shown that many atoms are really twice as heavy as had been supposed, according to the original interpretation of the best experiments. This change was brought about by what I may be permitted to call the operation of stock-taking. Dalton first took stock of our quantitative facts in a business-like manner; but the amount and variety of our chemical stock increased so enormously after his time, that the second stock-taking absorbed the labours of several men for a good many years. They were men of different countries and very various turns of mind; but, as I mentioned just now, they found no other fundamental idea to work with than Dalton's; and the result of their labours has been to confirm the truth of that idea, and to extend greatly its application.

One of the results of our endeavours to classify substances according to their natural resemblances has been the discovery of distinct family relationships among atoms, each family being distinguished by definite characteristics. Now, among the properties which thus characterize particular families of atoms, there is one of which the knowledge gradually worked out by the labours of an immense number of investigators must be admitted to constitute one of the most important additions ever made to our knowledge of these little masses.

I will endeavour to explain it to you by a simple example. An atom of chlorine is able to combine with one atom of hydrogen or one atom of potassium; but it cannot combine with two atoms. An atom of oxygen, on the other hand, can combine with two atoms of hydrogen or with two atoms of potassium, or with one atom of hydrogen and one of potassium; but we cannot get it in combination with one atom of hydrogen or of potassium solely.

Again, an atom of nitrogen is known in combination with three atoms of hydrogen; while an atom of carbon combines with four of hydrogen. Other atoms are classified, from their resemblance to these respectively, as monads, dyads, triads, tetrads, etc.

The combining value which we thus recognize in the atoms of these several classes has led us naturally to a consideration of the order in which atoms are arranged in a molecule. Thus, in the compound of oxygen with hydrogen and potassium, each of these latter atoms is directly combined with the oxygen, and the atom of oxygen serves as a connecting link between them. Hydrogen and potassium have never been found capable of uniting directly with one another, but when both combine with one atom of oxygen they are in what may be called indirect combination with one another through the medium of that oxygen.

One of the great difficulties of chemistry some few years ago was to explain the constitution of isomeric compounds, those compounds whose molecules contain atoms of like kinds and in equal numbers, but which differ from one another in their properties. Thus a molecule of common ether contains four atoms of carbon, ten atoms of hydrogen, and one of oxygen. Butylic alcohol, a very different substance, has precisely the same composition. We now know that in the former the atom of oxygen is in the middle of a chain of carbon atoms, whereas in the latter it is at one end of that chain. You might fancy it impossible to decide upon anything like consistent evidence such questions as this; but I can assure you that the atomic theory, as now used by chemists, leads frequently to conclusions of this kind, which are confirmed by independent observers, and command general assent. That these conclusions are, as far as they go, true descriptions of natural phenomena is shown by the fact that each of them serves in its turn as a stepping-stone to further discoveries.

One other extension of our knowledge of atoms I must briefly mention, one which has as yet received but little attention, yet which will, I venture to think, be found serviceable in the study of the forces which bring about chemical change.

The original view of the constitution of molecules was statical; and chemists only took cognizance of those changes of place among their atoms which result in the disappearance of the molecules employed, and the appearance of new molecules formed by their reaction on one another. Thus, when a solution of common salt (sodic chloride) is mixed with a solution of silver nitrate, it is well known that the metallic atoms in these respective compounds change places with one another, forming silver chloride and sodic nitrate; for the silver chloride soon settles to the bottom of the solution in the form of an insoluble powder, while the other product remains dissolved in the liquid. But as long as the solution of salt remained undecomposed, each little molecule in it was supposed to be chemically at rest. A particular atom of sodium which was combined with an atom of chlorine was supposed to remain steadily fixed to it. When this inactive solution was mixed with the similarly inactive solution of silver nitrate, the interchange of atoms known to take place between their respective molecules was nominally explained by the force of predisposing affinity. It was, in fact, supposed that the properties of the new compounds existed and produced effects before the compounds themselves had been formed.

I had occasion to point out, a good many years ago, that molecules which appear to be chemically at rest are reacting on one another when in suitable conditions, in the same kind of way as those which are manifestly in a state of chemical change—that, for instance, the molecules of liquid sodic chloride exchange sodium atoms with one another, forming new molecules of the same compound undistinguishable from the first, so that, in an aggregate of like molecules, the apparent atomic rest is the result of the interchange of like atoms between contiguous molecules.

Such exchanges of atoms take place not only between molecules of identical composition, but also between contiguous molecules containing different elements. For instance, in a mixture of sodic chloride and potassic iodide an interchange of metallic atoms takes place, forming potassic chloride and sodic iodide. The result of the exchange in such a case is to form a couple of new molecules different from the original couple. But these products are subject to the same general law of atomic exchanges, and their action on one another reproduces a couple of molecules of the materials.

Thus a liquid mixture formed from two compounds, contains molecules of four kinds, which we may describe as the two materials and the two products. The materials are reacting on one another, forming the products; and these products are, in their turn, reacting on one another, reproducing the materials.

If one of the products of atomic exchange between two molecules is a solid, while the other remains liquid (as when sodic chloride is mixed with silver nitrate), or if one is gaseous while the other remains liquid, so that the molecules of the one kind cannot react on those of the other kind and reproduce the materials, then the continued reaction of the materials on one another leads to their complete mutual decomposition. Such complete mutual decomposition of two salts takes place whenever they react on one another under such conditions that the products cannot react on one another and reproduce the materials; whereas partial decomposition takes place whenever the materials form a homogeneous mixture with the products.

Now, if in any such homogeneous mixture more exchanges of atoms take place between the materials than between the products, the number of molecules of the products is increased, because more of them are being made than unmade; and reciprocally, if more exchanges of atoms take place between the products than between the materials, the number of molecules of the materials is increased. The mixture remains of constant composition when there are in the unit of time as many decomposing changes as reproducing changes.

Suppose that we were to determine by experiment the proportion between the number of molecules of the materials, and the number of molecules of the products, in a mixture the composition of which remains constant, and that we found, for instance, twice as many of materials as of products; what would this mean? Why, if every two couples of materials only effect in the unit of time as many exchanges as every one couple of products, every couple of materials is only exchanging half as fast as every couple of products.

In fact you perceive that a determination of the proportion in which the substances are present in such a mixture will give us a measure of the relative velocities of those particular atomic motions; and we may thus express our result:—The force of chemical combination is inversely proportional to the number of atomic interchanges.

I cannot quit this part of our subject without alluding to the fact that some few chemists of such eminence as to be entitled to the most respectful attention have of late years expressed an opinion that the idea of atoms is not necessary for the explanation of the changes in the chemical constitution of matter, and have sought as far as possible to exclude from their language any allusion to atoms.

It would be out of place on this occasion to enter into any discussion of the questions thus raised; but I think it right to point out:—

1. That these objectors have not shown us any inconsistency in the atomic theory, nor in the conclusions to which it leads.

2. That neither these nor any other philosophers have been able to explain the facts of chemistry on the assumption that there are no atoms, but that matter is infinitely divisible.

3. That when they interpret their analyses, these chemists allow themselves neither more nor less latitude than the atomic theory allows; in fact, they are unconsciously guided by it.

These facts need no comment from me.

Our science grows by the acquisition of new facts which have an intelligible place among our ideas of the order of nature; but in proportion as more and more facts are arranged before us in their natural order, in proportion as our view of the order of nature becomes clearer and broader, we are able to observe and describe that order more fully and more accurately—in fact, to improve our ideas of the order of nature. These more extensive and more accurate ideas suggest new observations, and lead to the discovery of truths which would have found no place in the narrower and less accurate system. Take away from chemistry the ideas which connect and explain the multifarious facts observed, and it is no longer a science; it is nothing more than a confused and useless heap of materials.

The answer to our question respecting the meaning of the earnest work which is going on in our science must, I think, now be plain to you. Chemists are examining the combining properties of atoms, and getting clear ideas of the constitution of matter.

Admitting, then, for the present, that such is the meaning of chemical work, we have to consider the more important question of its use; and I think you will agree with me that, in order to judge soundly whether and in what manner such a pursuit is useful, we have to consider its effect upon man. What habits of mind does it engender? What powers does it develop? Does it develop good and noble qualities and aspirations, and tend to make men more able and more anxious to do good to their fellow men? Or is it a mere idle amusement, bearing no permanent fruits of improvement?

You will, I think, answer these questions yourselves if I can succeed in describing to you some of the chief qualities which experience has shown to be requisite for the successful pursuit of chemistry, and which are necessarily cultivated by those who qualify themselves for such a career.

One of the first requirements on the part of an investigator is accuracy in observing the phenomena with which he deals. He must not only see the precise particulars of a process as they present themselves to his observation; he must also observe the order in which these particular appearances present themselves under the conditions of each experiment. No less essential is accuracy of memory. An experimental inquirer must remember accurately a number of facts; and he needs to remember their mutual relations, so that one of them when present to his mind may recall those others which ought to be considered with it. In fact, he cultivates the habit of remembering facts mainly by their place in nature. Accuracy in manual operations is required in all experimental inquiries; and many of them afford scope for very considerable skill and dexterity.

These elementary qualities are well known to be requisite for success in experimental science, and to be developed by careful practice of its methods; but some higher qualities are quite as necessary as these in all but the most rudimentary manipulations, and are developed in a remarkable degree by the higher work of science.

Thus it is of importance to notice that a singularly good training in the accurate use of words is afforded by experimental chemistry. Every one who is about to enter on an inquiry, whether he be a first year's student who wants to find the constituents of a common salt, or whether he be the most skilled and experienced of chemists, seeks beforehand to get such information from the records of previous observations as may be most useful for his purpose. This information he obtains through the medium of words; and any failure on his part to understand the precise meaning of the words conveying the information requisite for his guidance is liable to lead him astray.

Those elementary exercises in analytical chemistry, in which brief directions to the students alternate with their experiments and their reports of experiments made and conclusions drawn, afford a singularly effective training in the habit of attending accurately to the meaning of words used by others, and of selecting words capable of conveying without ambiguity the precise meaning intended. Any inaccuracy in the student's apprehension of the directions given, or in the selection of words to describe his observations and conclusions, is at once detected, when the result to which he ought to have arrived is known beforehand to the teacher.

Accuracy of reasoning is no less effectively promoted by the work of experimental chemistry. It is no small facility to us that the meaning of the words which we use to denote properties of matter and operations can be learnt by actual observation. Moreover, each proposition comprised in chemical reasonings conveys some distinct statement susceptible of verification by similar means; and the validity of each conclusion can be tested, not only by examining whether or not it follows of necessity from true premisses, but also by subjecting it to the independent test of special experiment.

Chemists have frequent occasion to employ arguments which indicate a probability of some truth; and the anticipations based upon them serve as guides to experimental inquiry by suggesting crucial tests. But they distinguish most carefully such hypotheses from demonstrated facts.

Thus a pale green solution, stated to contain a pure metallic salt, is found to possess some properties which belong to salts of iron. Nothing else possesses these properties except salts of nickel; and they manifest a slight difference from iron salts in one of the properties observed.

The analyst could not see any appearance of that peculiarity which distinguishes nickel salts; so he concludes that he has probably got iron in his solution, but almost certainly either iron or nickel. He then makes an experiment which will, he knows, give an entirely different result with iron salts and nickel salts; and he gets very distinctly the result which indicates iron.

Having found in the green liquid properties which the presence of iron could alone impart, he considers it highly probable that iron is present. But he does not stop there; for, although the facts before him seem to admit of no other interpretation, he knows that, from insufficient knowledge or attention, mistakes are sometimes made in very simple matters. The analyst therefore tries as many other experiments as are known to distinguish iron salts from all others; and if any one of these leads distinctly to a result at variance with his provisional conclusion, he goes over the whole inquiry again, in order to find where his mistake was. Such inquiries are practised largely by students of chemistry, in order to fix in their minds, by frequent use, a knowledge of the fundamental properties of the common elements, in order to learn by practice the art of making experiments, and, above all, in order to acquire the habit of judging accurately of evidence in natural phenomena. Such a student is often surprised at being told that it is not enough for him to conduct his experiments to such a point that every conclusion except one is contrary to the evidence before him—that he must then try every confirmatory test which he can of the substance believed to be present, and ascertain that the sample in his hands agrees, as far as he can see, in all properties with the known substance of which he believes it to be a specimen.

Those who tread the path of original inquiry, and add to human knowledge by their experiments, are bound to practise this habit with the most scrupulous fidelity and care, or many and grave would be the mistakes they would make.

Thus a chemist thinks it probable that he might prepare some well-known organic body of the aromatic family by a new process. He sets to work and obtains a substance agreeing in appearance, in empirical composition, in molecular weight, and in many other properties with the compound which he had in view. He is, however, not satisfied that his product is a sample of that compound until he has examined carefully whether it possesses all the properties which are known to belong to the substance in question. And many a time is his caution rewarded by the discovery of some distinct difference of melting-point, or of crystalline form, etc., which proves that he has made a new compound isomeric with the one which he expected to make. It seemed probable, from the agreement of the two substances in many particulars, that they might be found to agree in all, and might be considered to be the same compound; but complete proof of that conclusion consists in showing that the new substance agrees with all that we know of the old one.

In the most various ways chemists seek to extend their knowledge of the uniformity of nature; and their reasonings by analogy from particulars to particulars suggest the working hypotheses which lead to new observations. Before, however, proceeding to test the truth of his hypothesis by experiment, the chemist passes in review, as well as he can, all the general knowledge which has any bearing on it, in order to find agreement or disagreement between his hypothesis and the ideas established by past experience. Sometimes he sees that his hypothesis is at variance with some general law in which he has full confidence, and he throws it aside as disproved by that law. On other occasions he finds that it follows of necessity from some known law; and he then proceeds to verify it by experiment, with a confident anticipation of the result. In many cases the hypothesis does not present sufficiently distinct agreement or disagreement with the ideas established by previous investigations to justify either the rejection of it or a confident belief in its truth; for it often happens that the results of experience of similar phenomena are not embodied in a sufficiently definite or trustworthy statement to have any other effect than that of giving probability or the contrary to the hypothesis.

Another habit of mind which is indispensable for success in experimental chemistry, and which is taught by the practice of its various operations, is that of truthfulness.

The very object of all our endeavours is to get true ideas of the natural processes of chemical action; for in proportion as our ideas are true do they give us the power of directing these processes. In fact our ideas are useful only so far as they are true; and he must indeed be blind to interest and to duty who could wish to swerve from the path of truth. But if any one were weak enough to make the attempt, he would find his way barred by innumerable obstacles.

Every addition to our science is a matter of immediate interest and importance to those who are working in the direction. They test in various ways the statements of the discoverer, and seldom fail to notice further particulars, and to correct any little errors of detail into which he may have fallen. They soon make it a stepping-stone to further discoveries. Anything like wilful misrepresentation is inevitably detected and made known.

(*To be continued.*)

In consequence of the great pressure upon our space this week, due to the reports of the scientific meetings at Bradford, we are compelled to defer the insertion of several communications.

C.—As you will see by reference to the acknowledgment of its receipt, Mr. B. S. Proctor's new work on Practical Pharmacy is published by Messrs. J. and A. Churchill, New Burlington Street.

"*Nummi.*"—We believe it is intended to publish an Appendix to the present British Pharmacopœia, but cannot say when nor what it will include.

W. J. Smith.—See Mr. Brady's remarks on croton-chloral hydrate on p. 233 of the present number.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. W. Ransom, Mr. J. Tully, Mr. J. Abraham, Mr. H. Horncastle, Mr. Harper, Professor Attfield, Mr. E. Nicholson, Mr. J. Oakman, Mr. J. Burt, Dr. De Vrij, "Midland," "Granum," "Lotio," "Compositæ," "Scott," A. D. P., S. C., L. P. S.

THE SEPARATION OF THE MIXED ALKALOIDS FROM CINCHONA BARKS.

BY DR. J. E. DE VRIJ.

Recently a London firm of manufacturing chemists, who had read with interest my paper on cinchona alkaloids published in this Journal, applied to me to inform them "by what means I separate the mixed alkaloids from the dry bark." I therefore suppose it may perhaps be useful also for other readers of this Journal if I publish my actual method—which has been published in a Dutch periodical in 1871—also in this Journal. 20 grammes of powdered and sifted bark, dried at 100° C., are mixed with milk of lime, made of 5 grammes of dry slaked lime and 50 grammes of water. This mixture is slowly dried, and when entirely dry, heated in a flask with 200 cubic centimètres of very strong spirit (the strongest possible) till it boils. After cooling and subsiding, the clear liquid is poured on a filter large enough to contain all the bark, but not larger than is strictly necessary (a filter of 15 centimètres diameter is sufficient). The residue in the flask is now mixed again with 100 cubic centimètres of spirit, this mixture well shaken, and poured on the filter. When all the liquid has passed through the filter, the powder remaining on the filter is washed with 100 cubic centimètres of alcohol, so that in the whole 400 cubic centimètres of alcohol are used for 20 grammes of bark. The united liquors are now slightly acidulated with weak sulphuric acid, whereby a precipitate of sulphate of lime is formed. After this has subsided the greater part of the liquor can be poured off, the rest being filtered through a small filter. The clear liquid is now distilled to obtain the greater part of the spirit used, and the remaining liquid poured into a capsule, to which is added the spirit and the water by which the distilling apparatus is subsequently washed. The capsule is now heated on a water-bath till all the spirit has been expelled, and the remaining liquor which contains all the alkaloids in the form of acid sulphates, is, after cooling, filtered through a small filter. On the filter remains a mixture of quinovic acid and fatty substances, which must be washed repeatedly with water slightly acidulated by sulphuric acid till caustic soda no longer produces any turbidity in the passing liquid. The filtrate is now reduced to a small volume by heating on a water-bath, and while *still warm* precipitated by a slight excess of caustic soda. The benefit derived from this kind of precipitation is that the alkaloids precipitated from a warm solution are less voluminous, and can, therefore, more easily be washed. The drawback, however, is that the alkaloids from some barks melt under these circumstances, which drawback can, however, easily be rectified by powdering carefully the alkaloids after the cooling of the liquor, and collecting this powder on a small filter. After washing with the smallest possible quantity of distilled water, sufficient to remove the soda salt but not to dissolve quinine, the filter is laid upon blotting paper, and this so often renewed till the mixed alkaloids can easily be separated from the filter without adhering to it, which can be done before they are entirely dry, but requires some practice. They are then heated in a weighed capsule on the water-bath, till repeated weighings show that the weight remains constant. The observed weight multiplied by five gives the amount of mixed alkaloids in 100 parts of bark.

The amount of quinovic acid can be ascertained in the meantime, if the mixture of quinovic acid and fatty substances be treated with a weak solution of caustic soda, by which a great part of this mixture is dissolved. If to this turbid solution a slight excess of chloride of calcium is added, only the quinovate of lime remains in solution and can be obtained in the shape of a clear slightly-coloured liquid by simple filtration. If this clear liquid be acidulated by hydrochloric acid, the quinovic acid is precipitated in the shape of a voluminous jelly. As the amount of quinovic acid is generally very small, its quantity can rarely be ascertained with accuracy, unless the amount of bark be not under 40 grammes. As I generally make two analyses of 20 grammes of bark, I combine the mixture of quinovic acid, etc., of the two filters for the determination of the quinovic acid. If the two analyses are carefully performed under the *same* circumstances, the results differ only very slightly, as may be seen in my analysis of some Jamaica barks, published on p. 121 of this Journal.

The Hague, 17th September, 1873.

PHARMACEUTICAL RESULTS OF THE CALCUTTA BOTANIC GARDENS.

Acclimatization of Ipecacuanha.

(*Continued from p.* 222.)

"The plants in Sikkim are located about 3000 feet above the sea, in glass-covered frames, and planted in a mass of well-drained leaf-mould, but without bottom heat, which is only used when cuttings are being struck. Nothing could be more healthy in appearance than the young plants in the frames. Their leaves are of a dark green colour, and without a single spot or blemish; but the plant is a slow growing one, and we have evidently not yet discovered the conditions under which it will thrive in the open air. I believe it requires a moist, hot, equable climate, with a soil porous and well drained—in fact, resembling leaf-mould. Mr. Gammie thinks they will not do, as recommended by Mr. Kurz, in places subject to periodical inundations. I have asked Mr. Kurz how he came to recommend such situations, and he has given me the following note:—

Memorandum by Mr. Kurz.

"'It is right to state, in explanation to Mr. Gammie's remark about my statement regarding the ipecacuanha plant, that I have based my deductions regarding its requirements upon Professor Grisebach's recent work, and upon his review of Weddell's paper on the ipecacuanha.

"'Dr. Grisebach states therein (*Bericht über die Lerstungen in der Pflanzengeographie für* 1849, p. 57), that the ipecacuanha grows in the dense shade of certain palms and trees on marshy grounds (*quellichte gruende*), whereas on a perusal of Weddell's French original, I find it distinctly stated that the plant grows chiefly on firm grounds surrounding these little marshes (*surtout sur la terre ferme qui entoure ces petits marais*).

"'I think that Weddell's excellent paper (*Note sur le Cephaëlis Ipecacuanha, son mode de végétation, etc.*, in *Annales des Sciences Naturelles*, série 3, xi, 193-202), which I could not consult when I formed my views on the plant, should leave no doubt as to the real requirements of the ipecacuanha plant" (l. c., page 197-198).'

"I have read the excellent paper of Mr. Weddell's which Mr. Kurz refers to, and as it is one of the most important documents on the subject we have yet got, I give a translation of it. It is published in the *Annales des Sciences Naturelles*, troisième série (*Botanique*), page 193, and is entitled *Note sur le Cephaëlis Ipecacuanha, son mode de végétation, et son exploitation dans la Province de Matto Grosso, en Brazil.* One of the most important pieces of information contained in this paper is that in three or four years after ipecacuanha roots have been dug up, they are reproduced from the fragments of root left in the ground, so that a crop is got every three or four years without any replanting. There is another encouraging fact which Mr. Gammie has just brought to my notice, namely, that some of the plants which have very little foliage, and do not seem to be thriving, are found, on being dug up, to have made a large quantity of roots; and as what is generally called the root of ipecacuanha is in reality an underground stem, it probably performed, in part at least, the function of foliage, particularly where grown in loose leaf-mould, which is freely permeated by air, as all our plants have hitherto been grown."

The following is a translation of the paper above referred to by Dr. Henderson:—

The medicine called by the name of ipecacuanha is known to be the product of several species of plants. The same name is generally given to all emetic roots, whatever may be the natural family to which they belong. The product of this name, which is now commonly used in Europe, is derived from a plant of the rubiaceæ family (the *Cephaëlis Ipecacuanha;* M. A. Richard has given it the name of annulated (*annelé*) ipecacuanha. The striated (*strié*) ipecacuanha of the same author (very rare in pharmacy in our day) is produced by the *Psychotria emetica* of Mutis. The last is indigenous in New Granada; the *Cephaëlis*, on the contrary, is peculiar to Brazil. It is this last which I have had special means of observing, and of which I shall here endeavour to give some account.

Several points in the history of this plant are so generally known that it is useless for me to go over them, but I shall dwell on those which are only treated of in little-known works, and I shall endeavour principally to make known the geographical distribution of the plants, the manner of gathering the roots, and the means used by nature for favouring its reproduction. This part of the question has appeared to me so much the more interesting as its solution is a complete answer to the fears that have been entertained of this plant becoming extinct.

The word ipecacuanha appeared in Europe with the works of Pison and Marcgraff, and seems to be the name by which the *Cephaëlis* was known in that part of Brazil where the Portuguese first learnt to make use of it. Still it may be, as some accounts lead one to believe, that it has been with ipecacuanha as with Jesuit's bark, which has usurped a name which had been created for another plant. The term ipecacuanha is, in short, in no part of Brazil applied to the *Cephaëlis*, which is now known everywhere by the name of *poaya*, a term which, according to M. Auguste St. Hiliare, would be a corruption of the Indian words "*y cipo ayaca*," which means "*liane-à-panier.*" This etymology is so much the more probable, as the European Portuguese still often call ipecacuanha by the name of *cipo* or *liane.* One of the best emetic roots of Brazil is indeed the product of a little plant which is remarkable for the brilliancy of its flowers, and it is not at all impossible that the discovery of this plant may have preceded that of other species of poaya, and given its name to them.

The first knowledge of ipecacuanha appears, according to the general assent of authors, to go back to the Indians, who preceded the Portuguese in Brazil, and here, as in other circumstances, tradition has it that man was preceded by animals. There were wolves which having indigestion had the idea of curing themselves by chewing the roots of the *Cephaëlis*, and were afterwards imitated by the Indians. The tale will recall that of the falcon of New Granada drawing the attention of the aborigines of the country to the famous cure for poisoning, known as guaco, as well as that of the lions of Loxa curing themselves of fever with the water of the ponds where the stems of the cinchona had been macerated.

(*To be continued.*)

A SUMMER DAY'S DISCOURSE.*

BY THE REV. W. C. GANNETT.

(*Concluded from* p. 208.)

Nature paints flowers, too; she gives them colour. If any one seems ugly, as a whole, take a bit and put it under a microscope, and see what firmaments of colour, what mines of sparkling gems, you have burst into! Under the lens a quarter-inch of rosy petal flushes and spreads like a sunset sky! A mottled streak turns into a glorious sunrise! You can think of nothing else for fit comparison. And then, instead of speech, she gives them fragrance. They have no language, but in this way "their music goes forth through all the earth, and their word to the end of the world." Unless, indeed, Huxley's fancy be true, and by ears fine enough (possibly only insect-fine), a voice also could be heard, "a beauty born of murmuring sound" would pass into our face as we bent over them—sound such as streams have that run through secret channels. If so, what choruses rise through all our fields that some one hears!

But what is all this lavish sculpture and painting and fragrance for?—lavished on the waste where no eyes see as well as in the garden-bed; lavished on the inner slopes and curves where human eyes cannot detect it, as well as on the inch of outward surface. We used to say, God made it so! We used to say, see His delight in simple beauty by itself! We used to say—

"If eyes were made for seeing,
Then beauty is its own excuse for being;"

but to-day again steps forward with a new and better word, and hints—not that the beauty is not beauty—that use is the end, and that all this beauty and fragrance is but a path to that end. We can see plainly enough that all the energy of the plant goes to secure reproduction, that all the parts of the flower subserve the purpose of seed-making. Deep hidden within the flower's heart lies the little nursery where the seeds are to be born; most cunningly the pistil and the stamen watch each other like true lovers for a greeting; tenderly the petals close around them in the cool, and open through fit hours of sunlight. And when the stamens and the pistils cannot meet directly, but the message must be borne by insect rovers, then the complication of contrivance to secure the transport of the message almost exceeds belief. The pollen must be brought from one certain spot in one flower and left upon a certain spot upon another. Says one, speaking of Darwin's search into the fertilization of the orchids:

* Abstracted from a sermon preached at Boston, Massachusetts, and quoted in the *Gardeners' Chronicle.*

—"'Moth-traps and spring-guns set on these grounds' might well be the motto of these flowers. There are channels of approach along which the nectar-loving insects are surely guided so as to compel them to pass the given spots; there are adhesive plasters nicely adjusted to fit their proboscides or to catch their brows, and so unload their pollen burden; sometimes where they enter for the honey there are hair-triggers carefully set in their necessary path, communicating with explosive shells that project the pollen-stalks with unerring aim upon their bodies." And now Darwin adds to his explanations the thought (it is not yet wholly proved, but it is well advanced in proof) that the lustrous colours of the flowers and their rich odours are also contrivances to aid in the reproduction. He has found it "an invariable rule that flowers fertilized by the wind never have the gaily-coloured petals," and draws the inference that the beauty and the fragrance come upon the blossoms by long processes of natural selection, because attractive to the insects that are needed to assist in fertilizing them. The colours and the songs of birds and insects, he shows in part, are similarly brought about—and thus all that gives the life and motion and peculiar gladness to the fields in spring would be literally but the deep inbreathing of the spirit of love in Nature. How far down it goes! It touches the whole planet to grace and beauty! Or rather how it lifts the reins of our poor thought and gives our highest conception of love a glory of meaning we never guessed before! It seems to make real the thought of a Father's heart beating in all things.

And in this distinction of sex the plants lay hold of us. They come between the mineral and animal kingdoms as the connecting link. They not only exercise the primitive digestion, organizing minerals into the food on which we higher creatures live; they not only thrive while they prepare our respiration, draining clear the air of that which poisons us, and re-stocking it with that which we must breathe; but in this distinction of sex in flowers they rise to the height of their stature and foreshadow the third great function of the animal world—that of reproduction. So the flower is the plant-part nearest to the animal. Like us it breathes oxygen and gives out the other gas. Like us it therefore gives out heat; the flower is the hottest part of the plant. Like us, it has rest seasons; sleep, so-called; and for reproduction needs to hoard, and in the process exhausts vitality. And, like animals, plants have ancestry and kindred, and can only be arranged in a true system when we consider them physiologically as they truly exist in Nature. When we "consider" the flowers and find such thoughts as these all waiting for us, the words of Tennyson grow very real to us:—

> "Flower, in the crannied wall,
> I pluck you out of the crannies;
> Hold you here, root and all, in my hand,
> Little flower; but if I could understand
> What you are, root and all, and all in all,
> I should know what God and man is!"

But I must leave the flowers themselves to speak a word about flower-love.

The Arabs, passing a rich harvest-field or a tree in full bloom, will greet it with a "Barak-Allah!"—May God bless you! That hints the world-wide feeling. And the Arab beggars name their children Ruby and Diamond, Lily, Rose, and Jessamine. So still do we. Gems and flowers, each the highest product of its kingdom, for a gem is the exquisiteness of flint or clay, and a flower the transfiguration of the plant; instinctively and fitly we take them to name all other things precious and beautiful.

This flower-love declares itself in many ways. We set the pots like traps to catch the sunbeams at our windows, and like to have creation going on in our parlours. We make believe at "woods" in little ferneries. We concentrate the fields in our gardens and concentrate the climates in our greenhouses. The Horticultural Society in Boston holds its Saturday morning worship all through the summer, and it is better than cathedral joy to linger at their altars. In southern France there are flower-farms. In some parts of England the rich people have established working men's flower exhibitions. The little gardens that furnish the competitors are window-ledges in the back streets of London, or little plots six feet by ten before the country door. A boy will bring his solitary geranium, a girl her carnation, the father has one or two rare roses (perhaps the money that bought them was saved from the alehouse), roses whose every leaf-bud has made breakfast-talk and after-supper watchings for the family. Each competing pot must have its seal and knot of ribbon. And when the day arrives the lords and ladies come and look and praise; and then the 6*d.* admission lets in the eager, well-dressed crowd, and all get prizes, I believe; and the factory-hands go home deciding what flower they will train to enter at the next annual show. The factory-hand's life holds room for that! Once in Holland this flower-love drove the sober-headed Dutchmen crazy. They grew ecstatic over tulips, so crazily fond of tulips that 2000 dols. was cheap for a certain bulb. All ranks, high and low, were carried off their understandings into speculations; the towns had their tulip exchange; the public notary became almost the tulip notary. And when the bubble burst, and the general repudiation came, fortunes vanished, the panic was national, and the country did not get over the shock to its commerce for several years.

But in other deeper ways than this of cultivation the ancient world-wide love has shown itself. Art has always fed itself on flowers. Architecture tells the story earliest. The heavy Egyptian column imitates, it is supposed, the palm tree's trunk, and its capital the lotus bud of the Nile. The Corinthian capital is the acanthus leaf, and the stones of Gothic architecture conspire in a hundred forms to imitate the vegetable structure.

Poetry is full of flower-fields, because each flower seems so full of poetry to us. The very flower-names are often poems. Some come down to us impearled with old myth, and story, and tradition—like the hyacinth, narcissus, Solomon's seal, arethusa, and passion-flower. What sacred romances the lotus flower, the martyr's palm, the victor's laurel recall! Those long, uncouth Greek names we dread in botany hide nature meanings in them, only they are Greek to us. Heliotrope is "she who turns to the sun;" Mesambryanthemum is simply "flower of the mid-day;" nasturtium carries its meaning of "bent nose" in its face; geranium is "crane's bill" (let the seed vessel grow and it will tell the reason why); saxifrage is rock-cleaver (named so from its birth-place); anemone is "wind-flower." These were all but simple heart and eye names to the Greeks or Romans—each people has its own—just as we call the pets heartsease, day's-eye, morning-glory, honeysuckle, mignonette. And when the lovers want to tell the unutterable words they still betake themselves to the dumb messengers that have learned to say so much. There is probably no famous poet that has not sealed his fame into a song about some favourite of the fields. Wordsworth's celandines and daffodils are noted, and Burns' daisy, and Herbert's rose, and Emerson's rhodora, and Lowell's dandelion; while in Chaucer the whole spring buds and sings, and all along the lines of Tennyson flowers brush you with fine touches. Nay, every one plays poet with them, though he write no verses.

We use them to interpret all the tenderest things in life. When we want to remember a hill-top view, a meeting that has made a holiday, some spot holy with old history, we pluck a flower to hold the memory fast. If we want to send the home-presence tangibly in a letter, a flower from the window or the field close by will carry it best. Old books drop out the "faded yellow blossoms 'twixt page and page"—put there "to mark great places with due gratitude." The California miner saw the mountain heartsease where his pick was going to fall, and, before it fell, he was at home across the continent, quicker than telegrams can fly, and in his own pasture where he drove the cows a thousand times. Hollyhocks or lilacs—who thinks of them and does not see a quiet country

dooryard in the sunshine ! How the sick soldiers in army hospitals, longing for certain faces and certain tones and touches, greeted the spring flowers as the nearest substitute ! "Now, I've got something for you !" said a woman-nurse, holding the bunch behind her, to a very sick New England soldier—"something for you just like what grows in your front dooryard at home ! Guess !" "Lalocs !" he whispered ; and she laid them on his folded hands. "Oh, lalocs !—how did you know that !" The lilacs outlived him. And so the flower-love, mounting, comes to show itself in man's worship also ; and the thought never rises more naturally up to God, I think, than when it rises from bending over flowers. In Buddhist lands they have long been the choicest offering that man brings his Maker, and there are holy blossoms that have symbolized the sun, the world, and God's throne ! We bring them into church ; like visible music they fill the pauses ; and who comes here with purer face or life of sweeter obedience to the great laws of Nature !

So sweet, so pure, they are, that, like our holiest friends, they fit not joy and wedding moments only, but still more naturally they come in together with the tragedies, the silences, the heart-break. And why ? Is not this the reason ?—

"When heaven grows dim, and faith seeks to renew
The image of its everlasting dower,
I know no argument so sweet as through
The bosom of a flower—
A wicket-gate to heaven (of which death
Is the grand portal sealed to mortal eyes),
Between whose little bars there comes the breath
Of airs from Paradise."

When the "grand portal" has opened and shut close to us, and we are left with straining gaze outside, the "wicket-gate" seems to give comfort. It seems to grant some little vision into the hidden heart of things, suggesting that the darkness everywhere holds possibilities better than our brightest hopes. Save for the flower-fact here before us, who could have dreamed that such beauty lurked in the dark earth, was latent in the tiny seed ! So we place the flowers around the still, cold face ; we lay them on our soldiers' graves ; we bring them to the sick-room and the bedside of the dying ; and everywhere, after words fail and even music hushes, the presence abides—a voiceless, unconfuted argument that the power within all silences, and pains, and tragedies, is love, and that the possibilities of life are infinite.

Flowers and art. Flowers and poetry. Flowers and worship. But the flower-thought of all is that I spoke of—growth ; and so we add the flowers and science. For in the flower "a new name is written," and that name now is found to have been written in all things that are. The old name was revelation ; it is not false ; but the new name, evolution, widens out its meaning. All things grow—all. The flower is type of the universe, and the lily of the field is solving over again all problems.

THE CONFERENCE EXCURSION TO BOLTON ABBEY AND WOODS.

By the courtesy of the Local Committee, the members of the Conference were invited to form an excursion party, devoting Friday, September 19th, to the exploration of some of the beautiful scenery of Wharfedale, notably that of Bolton Abbey and its surrounding woods. At 9.45 a.m., the party, which included several ladies, left Bradford by train in a saloon carriage, its number, after some reinforcement from Leeds, being about thirty persons. An hour's ride led first along a part of Airedale, and afterwards through the elevated ground which separates that busy manufacturing valley from the more rural vale of Wharfe. Here our tourists noticed the commanding turrets of that famous health-resort, Ben Rhydding, where the water-treatment finds full play, and is supplemented by the compressed air-bath, and other adjuncts. The terminus of the railway is at Ilkley, a mile further, where four other hydropathic establishments open their doors to various ranks of invalids. The springs of this favourite watering-place offer no variety such as its neighbour Harrogate can boast of. Water so pure as to contain but two or three grains of solid matter per gallon, leaves little for the chemist to descant upon. Its gathering ground is the breezy plateau of Rombald's Moor upon the mill-stone grit formation. Ilkley nestles beneath this, and no longer rests content with its ancient fame as Olicana of the Romans. The last few years have seen its reconstruction—thatch and white-washed walls giving place to handsome stone buildings. The trepidation of some of its inhabitants and of more of its visitors, consequent upon a probability that a permanent military camp would be established in its vicinity, has just passed away. The rocks here have a strikingly bold character, and the elevated masses known as the "Cow and Calf" form a landmark to be seen from a long distance. In the churchyard are three Saxon stone crosses, covered with designs introducing animals.

The vehicle of the district is the waggonette, and into three of these commodious and sociability-promoting conveyances the company was distributed. A drive of five miles up the valley, passing through the quiet village of Addingham, brought the party to Bolton Bridge. Here the road enters the woods, and for two or three miles the road follows the narrowed and richly-wooded valley which forms the upper end of Wharfedale. Well might the Yorkshire members feel pride in pointing out new beauties at every turn, as the ruined abbey came in sight, followed in quick succession by ever-changing glimpses of the rapid and brilliant river—here to be crossed in drier weather by the long line of "stepping-stones ;" there broken by islets at a spot known as "the meeting of the waters ;" again, showing a long reach or a briefer peep through overhanging trees. The carriages halted, and a few paces brought the party to the most striking natural object of the valley. This was the Strid, immortalized by Wordsworth in the well-known lines—

"The pair have reached that fearful chasm ;
How tempting to bestride !
For lordly Wharfe is there pent in
With rocks on either side."

But the volume of surging, peat-stained water that poured through the Strid to-day was enough to check any venturesome spirits.

A short walk through the woods brought the party to more open country, overlooked by the grey front of Barden Tower, long the home of the Cliffords. The word was passed to return by a deviating path, and the walk finished with an inspection of the grand old abbey. A portion of the building has been roofed over and is used for Divine service, this restoration being the work of the noble owner, the Duke of Devonshire, whose shooting-box adjoins the ruins.

And now many seemed to agree in the opinion of Dr. Johnson, that "the finest landscape is much improved by a good hotel in the foreground." Such was found in the famed "Devonshire Arms," where ample preparation was made for appeasing any pangs of hunger. A cold collation was already spread and received full justice, until a satisfied, if not satiated, chemist declined further action upon the pastry, and was taunted with his unreasonable objection to *Bi-tart*rates ! The repast was all that need be desired, and if the necessities of an hostelry far removed from towns limited it to modest pretensions, there were some who thought this no fault, and that the Conference interests were then as well served as if greater display had been possible. But one toast was given—"Our next merry meeting," and it was received enthusiastically. Then the return journey began, and by seven o'clock the party reached Bradford, under the charge of the two gentlemen, Mr. Rimmington and Mr. Bell, to whose excellent arrangements and guidance this delightful excursion owed all success beyond that dependent upon most propitious weather.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 27, 1873.

Communications for this Journal, and books for review, etc. should be addressed to the EDITOR, 17, *Bloomsbury Square*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BRITISH ASSOCIATION AT BRADFORD.

ON Wednesday last the forty-third meeting of the British Association for the Advancement of Science, so ably inaugurated on that day week by Professor A. W. WILLIAMSON, F.R.S., in the Address which appears in our columns, was brought to a close. One or two excursions remained to be enjoyed, but the business of the meeting was then concluded. The number of members and associates attending it, 1983, and the receipts, £2102, have been the lowest since the meeting at Exeter in 1869. This probably is due in great measure to the situation and characteristics of the town of Bradford, but also in no little degree to the exorbitant charges demanded by the hotel keepers, in regard to which the dissatisfaction has been general among members of the British Association, and the course adopted has been strongly condemned by the people of Bradford.

The multiplicity of the papers read prevents any attempt even to recapitulate them here. The Chemical Section was opened by the President, Dr. W. J. RUSSELL, F.R.S., with a valuable address, the principal topic of which was the history of the colouring matter found in madder, the steps leading up to the artificial production of alizarine, and how it is superseding for manufacturing purposes the long used natural product. Dr. SIEMENS has lectured to the working classes on the all important subject of "Fuel." Professor CLERK MAXWELL has discoursed to the members on "Molecules." Dr. CARPENTER and Professor W. C. WILLIAMSON, though not pledged teetotallers, have expatiated on the blessings of temperance. And although no "discoverer of LIVINGSTONE" was present, there was news from the LIVINGSTONE expedition, from Sir SAMUEL BAKER, and from the "Polaris;" while the Section for Economic Science and Statistics had a Cabinet minister for its president. Another Sewage report has been presented, and one on the Metric System, and during the discussion of the latter it transpired that while the Committee was unanimous in favour of the application of the metric system to weights and measures it was not agreed as to the principles of a decimal coinage.

At the meeting of the General Committee on Monday, it was decided to accept the invitation to hold the meeting for 1875 in Bristol. Upon a proposition being made that Professor TYNDALL should be appointed the President-Elect for the meeting at Belfast next year, there arose a warm discussion; the MAYOR OF BELFAST, who was present with a deputation, opposing the motion, on the ground that they possessed in Belfast, among themselves, a gentleman well fitted for the post in the person of Dr. ANDREWS, of Queen's College. The PRESIDENT, however, after a high eulogium upon Dr. ANDREWS as a cultivator of science, expressed his confidence that the effect of the work of the President's office upon one in his state of health might result in serious injury to him, and Dr. CARPENTER expressed a similar opinion, after which the opposition was withdrawn, and Professor TYNDALL was elected. Although election to preside over the British Association is often considered the highest honour that can be conferred on a scientific man in this country, there can be no doubt that the occupation of the presidential chair by Dr. ANDREWS would have been far more an honour to the Association than his election would have been an honour to him. However, as we find it pointedly stated in the *Times* that Dr. ANDREWS has declined to accept the office of President, the Council of the Association may have had better reason than is apparent for nominating Professor TYNDALL. It was announced that the sum of £1545 had been voted for scientific purposes during the ensuing year.

A deputation from Glasgow invited a visit from the Association in 1876, and there seemed to be a general impression that this would be accepted next year.

COCOA.

CONSEQUENT upon the passing of the recent Adulteration Act, the sale and manufacture of cocoa have received considerable attention of late, and have much puzzled certain metropolitan magistrates and analysts, who seem to be very uncertain in their opinion as to the best form in which cocoa should be sold to the public. On the one hand, it is asserted that, scientifically speaking, cocoa is at present sold and manufactured in a not altogether commendable manner. As our readers are aware, "admixture" is a great element in the manufacture, and the many soluble cocoas offered to the public all contain a greater or less amount of sugar and farina in their composition. There are certain scientific men who contend that this is unquestionably an adulteration of cocoa, that the article does not require these admixtures, that they debase it, and that the public ought to get the benefit of the cocoa-nib in its pure form. On the other hand, the manufacturers of the cheap, loose cocoa assert that these admixtures do not in any way depreciate the cocoa, that, in fact, they improve it, and render it saleable as a cheap commodity amongst consumers, and that, generally speaking, they repudiate the idea of adulteration in connection with these goods. Prosecutions have arisen with regard to cocoa under the Adulteration Act, and one of the most important (that heard before Mr. D'Eyncourt, the magistrate at Marylebone) was reported in the PHARMACEUTICAL JOURNAL at the time. In this case

the cocoa manufacturers got the best of it. They showed conclusively that there was nothing deleterious in the article as they made it, and that, as a practical fact, the admixture of sugar and farina was necessary, in order to popularize that article with the public, and make it a general and cheap article of sale. Mr. D'Eyncourt, after hearing lengthened arguments on each side, dismissed the summons, declaring his opinion that the soluble cocoa could not be regarded as an adulterated article.

It will not be uninteresting if we shortly point out how materially this branch of our commerce has developed. Going as far back as thirty years, or say to 1840, we find that the imports of cocoa into the United Kingdom then amounted to 3,499,746 lbs.; in 1850 this amount had increased to 4,478,252; in 1860 it was 9,009,860 lbs.; and in 1870 the total reached the vast amount of 14,793,950 lbs. This augmentation is a remarkable fact, and speaks volumes as to the increasing popularity of the article with the public. Most of this cocoa, as thus imported, is manufactured into the loose soluble cocoas which we see in the shops, and here we have convincing proof that the method of manufacture adopted of late years has been a great success, or our imports of cocoa would not have increased with such startling rapidity. It may be mentioned, too, as an interesting fact that the imports of cocoa for the first eight months of the present year amounted to no less than 15,372,502 lbs. against 13,284,369 lbs. in the same period of 1872, and 13,688,749 lbs. in the corresponding period of 1871.

The importance of the cocoa trade, as a distinct branch of the industry of the country, will be readily perceived from the statistics which we have just quoted. We thus see the amount which is imported, and which is manufactured into the various forms in which the article is generally sold to the British public. The greater portion—in fact, nearly all—finds its way into consumption in the shape of cocoa-powder, commonly and popularly known as soluble cocoa, and we are quite right in saying that very little of the pure nib is sold. The public much prefer the article as it is ordinarily sold, and do not seem to be partial to the theory that the pure nib is better for them. Considering the matter quite impartially, it is certain that as a beverage we get cocoa very good now-a-days, and we cannot conscientiously complain of our cocoa manufacturers. With regard to the prosecutions which have already resulted, it is satisfactory that they have nearly always ended in favour of the manufacturers, and corroborate the position they assume—viz., that they sell a perfectly pure and wholesome article of consumption, most useful and acceptable to the community at large.

On Wednesday evening next, October 1st, the Sessional Prizes and Certificates awarded to students in the School of Pharmacy will be distributed at 17, Bloomsbury Square; after which George Webb Sandford, Esq., will deliver an Address to the students. The Chair will be taken at 8.30 precisely. Ladies are invited to attend.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

Tuesday, September 16th.

(*Continued from p.* 236.)

After the delivery of the President's address, the ordinary business of the meeting was proceeded with. The first paper read was—

A Proposition for a Sign to be Used by Medical Men to Mark Unusual Doses in Prescriptions.

by R. Hampson.

In proposing a sign, for the adoption of medical men, to denote with unerring significance the prescribing of unusual doses, I feel that I may almost be open to the charge of trespassing upon medical ground, and I must admit that a proposal of this kind would have come with greater propriety from medical men themselves. I believe, however, in the light of a recent painful event, that the time has arrived when the adoption of a distinctive sign will be welcomed both by the prescriber and the dispenser.

The interests of pharmaceutists are in a great measure so identical and so intimately bound up with the physician's interest in his patients' welfare, that the adoption of a sign, if recommended by this Conference, will, I have no doubt, be received by the medical profession with proper consideration and respect.

An unusual dose I define as a dose in excess of the maximum adult dose of the Pharmacopœia, or a dose exceeding that commonly administered.

Our experience as dispensers of medicines will have fully proved to us that the marking of unusual doses would be accepted as a long desired boon by all concerned.

The prescriber, in employing an accepted sign, of easy recognition, would be assured by its use that it would remove all hesitation and questioning doubt from the mind of the dispenser, and that it would ensure for his patients the receiving of the prescribed medicines without needless delay—which delay, in some cases, may mean loss of life or the suffering of unnecessary pain and watchfulness.

The pharmaceutist, whose occupation it would be to dispense the duly marked doses, would greet these unmistakeable signs with genuine pleasure and relief, and their use would save him considerable anxiety, as well as the loss of much time and the inconvenience so often caused in seeking out the prescriber's real intentions.

I shall not take up time in citing cases which have occurred to me individually, or in alluding to any brought under my notice, to prove that the use of a sign is imperatively demanded by the exigencies of the case. Everyone present whose vocation it is to dispense prescriptions will call to mind frequent instances when an indicating sign to mark the unusual doses would have saved considerable time, trouble, and vexation.

It is certainly very remarkable that, in this country of practical expedients, a rule of this kind should not years ago have been in use.

In Germany and Austria, where many things are arranged by the strong hands of the state, a clearly defined rule, of a too arbitrary character for adoption here, set forth in the pharmacopœias of those countries, has been employed for some time, and this fact is presumptive evidence that a rule, or rather a sign, of some kind is required in this country.

It is folly to suppose, as averred, that we can have any conceivable interest in "limiting medical practice," or in any way passing a shade of criticism upon it. Our interest is almost necessarily in a contrary direction, and our duty is obviously clear and well defined. It is simply to provide with perfect integrity the medicines prescribed; but I certainly think we are entitled to have them prescribed as plainly and as legibly as possible; and when an

unusual dose is required it is only reasonable to request that it shall be so described and signally marked that there shall be no room for doubt in the mind of the dispenser that the dose is really intended, and not *mis*-prescribed.

If doubt should exist as to whether a prescribed dose is intended, it is the dispenser's acknowledged duty to communicate speedily with the prescriber to ascertain his intentions.

We must not, however, let it be supposed that a pharmaceutist is *not* at liberty to decline to dispense a prescription in which an unusual dose of a remarkable character is prescribed.

My experience includes the dispensing of some very unusual doses, and I cannot forget the grave sense of personal responsibility dwelling in my mind whilst dispensing these particular prescriptions.

If we feel the responsibility too oppressive, we ought to consider ourselves fully at liberty to decline to dispense prescriptions of this exceptional character. I am sure we should never lightly exercise this undoubted right of refusal, or in any way forget to show, on such occasions a proper and due regard for the delicate professional position of the prescriber.

As the object we have in view is of more importance to medical men than to pharmaceutists, I trust the medical profession will give their willing and necessary aid in bringing about the general adoption of a sign to mark unusual doses. We may, I hope, also look with confidence to the medical journals to endorse our efforts to establish the use of that sign which may be considered to be best suited for the purpose intended.

In Germany and Austria a point of exclamation is used to denote an unusual dose ; thus—

Tincturæ Digitalis . . . . . ℥iv !

This is an excellent sign, and might answer the purpose in this country, but I am strongly disposed to think the use of the initial letters of the prescriber's name is the best and most appropriate sign to be employed.

It is a custom in England to use the initial letters of a signature when a deed is altered to denote agreement or acquiescence, and there would be a legal value attached to the initial letters written by the prescriber, and they would be useful to compare with the actual signature, if a dispute at any time arose concerning a prescription to which they were attached.

The sign I offer for your acceptance is therefore the prescriber's initials in brackets, written immediately after the unusual dose ; thus—

Tincturæ Digitalis . . . . ℥iv. [J.R.L.]

It would also be of inestimable advantage if the name and address of the prescriber were printed or written upon *every* prescription.

In the United States this is invariably done.

The loss of much valuable time would be obviated if the latter suggestion became the rule.

The prescriber's initials, which may be known only to a few pharmaceutists, are not sufficient to denote proper authenticity, and the full name and address would also afford protection to the prescriber and dispenser alike.

I hope this Conference will not only fully deliberate upon this important question, but will decide *unanimously* upon the sign to be suggested to the medical profession for their adoption, and it is equally desirable that a resolution embodying your decision be carried and duly published.

The Secretary then read the following note from Mr. Henry Whitfield, of Worcester, upon the same subject:—

To Professor Attfield.

Sir,—I enclose two prescriptions, which I should feel obliged by your showing at the forthcoming meeting of the Pharmaceutical Conference, if you think that they would prove interesting. The one shows a dose of tincture of digitalis identical with that ordered in the recent Ramsgate case, and the other a somewhat unusual dose of morphia. The patient, a very strong man, was suffering from a second attack of delirium tremens, but under the treatment recovered, and having taken (and kept) the pledge for about twelve months, is now in good health. The late Mr. Carden, of Worcester, who prescribed the above, himself called and explained the circumstances, so it was all plain sailing ; but in another case, where three draughts were ordered, each containing half an ounce of tincture of digitalis, and one to be taken every four hours, it was deemed advisable to consult the medical man before making up the prescription. The moral is, that if the prescriber, when ordering a very unusual dose, is unable or unwilling to call on the chemist, he need only underline the dose, or place his initials opposite to it, for the chemist to be sure that the large dose is really intended. Had this been the case in the recent case at Ramsgate, much ill-feeling and unpleasantness would have been spared to all parties.

I will thank you to hand over the prescriptions to the Pharmaceutical Society after the meeting, for insertion in the book at Bloomsbury Square.—I am, Sir, yours truly,

Worcester. Henry Whitfield.

M. 49819.

℞ Tinct. Digitalis . . . . . ℥i

Sumat dimidium statim e cerevisia et alteram partem hora decubitus si opus sit.

M. 49826.

℞	Morphiæ Chlor.	gr. iv.
	Tinct. Lupuli	℥ iv.
	Aq. Puræ	℥ vij.
	Sp. Æth. Chlor.	℥j.

Sumat ℥ j 4tis. horis.

The President : It will probably be thought fitting to take the discussion on this question now, and I will merely suggest that it is rather a wide subject, and may become unmanageably large unless the point is adhered to closely. We have not now to discuss the propriety of giving extraordinary doses, but merely whether it is our duty to recommend to the medical profession the adoption of some manner of writing prescriptions which will prevent accidents when unusually large doses are ordered unintentionally, and will ensure the dispensing of the prescription when it is intended that extreme quantities should be administered.

Mr. Martindale (London) : I quite agree with Mr. Hampson that the medical man's initials placed against the quantity would be the best mode of indicating when it is his intention that an unusual dose shall be given, and I know that that course is adopted by many physicians in London. There are one or two points in connection with this subject to which I should wish to draw attention. In the first place I think that for our general security prescriptions should be stamped with authority as much as a bank note, and for this purpose it has been suggested that they should bear the name and address of the physician prescribing. There might however be some little difficulty in getting physicians to write their names in full on account of professional delicacy. But if physicians would place their address on their prescriptions their names could be easily ascertained by reference to the medical directory. I have known cases in which the authenticity of hospital prescriptions has been open to doubt, and several of the hospitals require all their prescriptions to be written on hospital paper ; I think some similar plan might be adopted in reference to general prescriptions.

Mr. Hasselby (Goole) : Twelve years ago when I was an assistant a prescription prescribing an unusually large dose of digitalis was brought to me. After consultation we sent to the physician who had written the pre-

scription and ascertained that he had intended that the unusual dose should be given. In the case of Mr. Fisher, at Ramsgate, I should have made great effort to see the physician and should have taken no notice of the impertinence of the messenger, except to order him out of the shop. In country places however where the customer cannot wait and the physician may live miles away, it might be impossible to take the course I have suggested of seeing the physician in case of doubt. In all such cases therefore we ought to make a dead stand upon this point and insist that physicians should distinguish unusual doses which they desire to be given by some distinct mark. We have plenty of responsibility and little enough pay for what we do, and I think that the medical profession should relieve us from as much of the responsibility as they can.

Mr. COTTRILL (Shepton Mallet) : I wish to speak in favour of the physician's initials being used as the distinguishing marks of an unusual dose. We may be thoroughly up in the nature and the properties of drugs, but we cannot be expected always to divine the intention of the physician. Some years ago, when I was in the establishment of a firm doing an extensive business in Exeter, a physician with whom I had occasion to communicate on two occasions in connection with his prescriptions said to me, "Whenever I make a mistake, or you think I have done so, just do what you think I intended you should do, and let me know what you have done." That was all very well in its way as a compliment to me, but if Mr. Fisher's case had come before me I should have made an alteration in the prescription and the result would have been the same—the man would have died.

Mr. L. SIEBOLD (Manchester) : I think the initials would be preferable as a distinguishing mark to a note of exclamation, and that the chemist should decline to undertake the responsibility of dispensing an obviously fatal dose of a poison, notwithstanding its being distinguished by the initials of the medical man. Where unusual doses which are distinguished by the physician's initials are given, the chemist should be allowed to retain the original prescription, to be used if needed in his own defence. For if not retained by him, the prescription may be lost or destroyed and the dispenser thus deprived of the most valuable piece of evidence.

Mr. RIMMINGTON (Bradford) : I have taken considerable interest in this question for a long time, before the case occured to which reference has been made. Every dispenser must have felt the necessity for unusual doses being distinguished by some distinct mark, so as to relieve him from the anxiety he now undergoes. Under the present system it is often difficult to identify the physician who writes the prescription, and it is perfectly impossible to communicate with him. In such cases the chemist should simply exercise his own judgment as to the propriety of making up the prescription. In one instance we once received a prescription directing thirty-three grains of arsenic to be made up into four hundred pills, three of which were to be taken at dinner time. That prescription bore no signature whatever and we scarcely knew what to do in the matter. Having reckoned up the amount to each dose we found that it was in excess of the maximum dose, but we also found on inquiry that the patient had frequently taken the dose before, and we therefore came to the conclusion that he was suffering from some cutaneous disease which probably required this excessive dose to be administered. We therefore made up the pills according to the prescription, which was registered for reference in case of necessity. In another case where a grain of strychnine was prescribed, it turned out on reference to the physician that a grain of extract of *nux vomica* was intended. I think that the initials of the physician placed opposite to the unusual dose would be the best safeguard, and I have often wondered why we could not adopt some such plan in this country as is the custom on the continent. If such a course be adopted all doubt, to a great extent, will be removed. The question whether the physician's address should be put in full is probably open to some discussion, although I know some leading physicians in London who write their names in full on their prescriptions—and in fact it is difficult to recognize the writing of many physicians.

Mr. GREENISH (London) : Having been engaged for many years in dispensing medicine, I am prepared to say that the time has arrived when we may fairly call upon the medical men to attach some sign to unusual doses. It was my idea at first that the sign (!) would be better than the initials as a mark of distinction, the former mode having been adopted in Germany and Austria ; and it being desirable, if possible, that such signs should be universal. After consideration, however, I have come to the conclusion that the initials would be preferable. I am satisfied that if this matter were brought fairly before the medical profession, they would coincide with our views. The medical man expects us when we have any doubt about the strength of the doses to apply to him. It is very often difficult now to ascertain where he lives ; if, however, his address were placed on the prescription, it would be easy to find him, and the necessity of applying to the patient would be avoided. But I agree with Mr. Hampson in thinking that, even when the signature is attached, if we feel the responsibility too oppressive, we are quite at liberty to decline to dispense prescriptions of this exceptional character.

Mr. SAVAGE : I think that Mr. Hampson is quite right in the view he takes in his paper, and that we should not advert to any particular case, but deal with the question as a general one. I think, as a body, we ought to be in accord with the medical man. It seems to me that medical men and pharmacists and the medical and pharmaceutical press should all be in accord with one another on this matter. I should prefer the use of initials as a distinguishing mark for unusual doses. I have seen it suggested that the quantity should be written out in full when unusual doses are ordered, but I do not see what additional security that would give us, because it might be repudiated by the medical man ; whereas, if he puts his initials for the dose that would be a sufficient authority for us to dispense it. I think if we were to respectfully make this suggestion to the medical profession it would be adopted to our mutual advantage.

Mr. R. REYNOLDS (Leeds) : The unanimity of feeling on the part of the meeting on this subject may be easily gathered from the expressions of opinion which have fallen from the various speakers ; the only question therefore that remains is the form into which we shall put the suggestion. I feel sure the medical profession will regard with approval this proof of the vigilance of the pharmaceutical body, and that they will give their careful attention to any suggestion which this Conference may offer. It appears to me desirable that besides the main question of indicating extraordinary doses, other proposals made in the course of discussion should be sifted more closely than would be possible in this meeting. I beg, therefore, to move the appointment of a small committee, to whom shall be entrusted the drawing up of a resolution ; such committee to consist of Messrs. Hampson, Greenish, Rimmington, Benger, and Martindale.

Mr. M. ROGERSON (Bradford) : I think it very desirable that some definite resolution should be come to on this subject, and that a committee should be appointed, as suggested by Mr. Reynolds.

Mr. WILLIAMS (London) : As to retaining the prescription prescribing the unusual dose, I do not think there is any use in returning it to the patient, because such dose would only be given with some special object, and therefore it would be improper for the dose to be repeated without reference being made to the medical man. I think, therefore, the chemist ought to retain it in his own possession.

Mr. DYER (Halifax) : While agreeing with Mr. Williams that the chemist should be entitled to retain the unusual prescription, I think that he ought to send a copy of it to the

patient, so that the medical man might have an opportunity of seeing what he had written.

The resolution appointing the committee was then put and carried.

The next paper read was on—

Urinary Examinations in General, and the Tests for Albumen and Sugar in Particular.

BY LOUIS SIEBOLD.

As pharmacists are now fast advancing from the position of mere traders to the rank of scientific men, the testing of urine will be more frequently entrusted to them by the medical practitioners, who themselves—as a rule—have not the necessary practical experience for conducting such examinations. Pharmacists, I think, cannot be too strongly recommended to devote some of their time and energy to the acquisition of an intimate knowledge of urinary analysis, especially as we find that our professional analysts in general are but imperfectly acquainted with this branch of analytical chemistry. In bringing this subject before you, gentlemen, I shall, of course, not attempt to treat it in its entirety, for this would be impossible to do, even in a very superficial manner, in the short time at my disposal. I merely wish to draw your attention to the commonest and most important tests, and to point out some great errors in connection with urine-testing which are very generally committed by medical practitioners—errors which in many cases render the examination quite worthless. Let us at once pass on to instances of this kind. A medical man requests his patient to send him a sample of his urine, and a quantity varying from two to eight fluid ounces is supplied in due course and examined. Now if the question to be decided is simply the presence or absence of an abnormal substance, such as sugar, bile, or albumen, the sample of urine thus supplied will answer the purpose. But if the specific gravity be required, or if the percentage of urea, phosphates, chlorides, sulphates, or of any other constituent is to be ascertained, then this mode of examining a sample of urine which does not represent the chemical composition of the entire renal discharge of twenty-four hours is highly objectionable. If I say that portions of urine passed by the same man at different hours of the day or night vary very considerably in their composition, and that the quantitative analyses of any such single portion, whether passed in the morning, afternoon, or evening, affords no satisfactory insight into the patient's condition, I am merely uttering a truth which is known, or ought to be known, to every medical practitioner. Nevertheless, this truth is very generally ignored. Small samples of urine, which in no way represent the daily discharge, pass day after day from the medical man, or, by his orders, direct from the patient, into the hands of the analysts, and however correct the analyses may be, they will be useless in very many cases, and lead to erroneous conclusions. Instead of so doing the whole quantity of urine passed within twenty-four hours should be collected, mixed and measured, and a portion of this mixture submitted to an analysis. If medical men forget this fact, let chemists who are called upon to undertake urinary analyses remind them of it, and let them do so persistently as long as their efforts are not successful. Let us look at a few practical instances. The specific gravity of healthy urine collected during twenty-four hours usually ranges between 1·016 and 1·024, the normal quantity discharged within that time being from 1200 to 1600 cubic centimetres, or from 40 to 56 fluid ounces. The density of the various samples collected during that time, if estimated separately, may however vary far more considerably, so that the density of one portion may be below 1·016, and that of another portion may be above 1·030, although the whole mixture shows the average normal density of 1·020. If by copious water drinking the daily quantity of urine from a healthy person be increased to 2000 c.c. or beyond, or if it be decreased in another case by a scanty consumption of liquids to 800 c.c., or below, the specific gravity of the urines would be lower or higher accordingly, and although the percentage of solid constituents in such urines might appear abnormal, yet the total quantity of solid matter discharged within twenty-four hours would be about equal in both cases, and would indicate a healthy condition in either of the two persons. Thus it will be seen that if the precaution of collecting and measuring the entire quantity of twenty-four hours be neglected the density may vary enormously. It may be as low as 1·005 in one case, and it may be 1·035 in another case, and yet a medical man might commit a serious error were he to assume a hydraemic state in the former or a diabetic state in the latter case. No reliable conclusion of any kind can be drawn from the specific gravity in either instance, and it might therefore just as well be left undetermined. The only exceptional instance in which the mere density, regardless of the above precautions, affords a valuable diagnostic expedient is that of a pale-coloured urine of very high specific gravity. In many cases it is of great importance to ascertain the exact quantity of urea or that of phosphates or chlorides, but here again it is almost equally necessary, if not more so, to take the total daily volume of urine into account as the mere percentage of those substances contained in a small sample of the urine proves nothing whatever. Yet we are constantly called upon to carry out such examinations and the most unwarrantable inferences are often drawn from our results by members of the medical profession. Contrary to my clearly expressed desire as to the form in which the urine should be supplied to me for the purpose of a quantitative analysis, I have had to undertake many such analyses of samples of urine not representing the composition of the whole day's discharge, which had never been collected or measured; and whatever the value of the qualitative and the miscroscopic examinations may have been in such cases, the quantities per cent. of urea, phosphoric acid, etc., might as well have been left out from the report. On one occasion a large percentage of phosphates was found, and the medical gentleman, a physician of high repute, looked upon this as indicating an increased waste of nerve substance. A careful examination however showed that the phosphates discharged with the urine within twenty-four hours fell considerably short of their normal amount. A gentleman suffering from saccharine diabetes had his urine examined by a chemist on the continent who found 5·5 per cent. of sugar. Shortly afterwards he requested me to make an analysis of his urine and supplied me with the entire quantity collected in twenty-four hours, amounting to 2600 cubic centimetres. I found 5·3 per cent. of sugar, which represents a discharge of 138 grammes of sugar per day. He went again on a tour to the continent, and improved much in general health and strength. When he returned to England four months afterwards he seemed much alarmed by the result of an analysis of his urine made by a French chemist who had found six per cent. of sugar. I also examined his urine with the same result, but far from there being any cause for alarm, the patient was undoubtedly much better, for though the sugar amounted to six per cent. the quantity of urine passed within twenty-four hours was only 1550 cubic centimetres, showing that the daily discharge of sugar had fallen from 138 to 93 grammes. The percentage alone seemed to indicate a worse condition, but in combination with the measurement of the urine it showed a vast improvement. I may here mention that the percentage of sugar in the urine of a diabetic patient also varies exceedingly at different hours of the day and night and under the influence of diet.

Of course, there is not always a necessity for mixing the urines passed during the whole day and night, in order to make a useful quantitative analysis. In cases of acute inflammatory diseases and the like, where a careful and uniform diet is observed day and night, there is not much variation in the composition of the urines passed at different hours, so that any sample may be looked upon

as fairly representative, and fit for the determination of specific gravity, urea, phosphates, etc. But even then the quantity of urine passed in twenty-four hours should be at least approximately known and taken into consideration. In these cases a quantitative analysis will have more of a prognostic than a diagnostic importance, whilst my remarks refer chiefly to the numerous instances of chronic disorders in which a quantitative analysis is desired for the diagnosis.

From these general remarks on quantitative analyses of urine, I will now turn to the qualitative tests for albumen and sugar, the two abnormal substances most commonly sought for in urine.

The means generally employed for the detection of albumen are:—1. The application of heat; and 2. The addition of nitric acid. The manner in which these tests are performed and the precautions which must be observed to avoid mistakes are so generally known to chemists, that I will not trouble you with a description of them. Whichever of the two tests is used, the detection of an appreciable amount of albumen is always an easy matter. But when we have to search for exceedingly small traces of that substance, which no doubt occur in the urine of patients long before the chronic state of Bright's disease is suspected or recognized, then the question which of the tests should be preferred becomes undoubtedly one of great importance. Our modern authors have decided this question unhesitatingly in favour of the nitric acid test, which is to be so applied that the acid is poured very carefully into the urine, so that it does not mix with it, but forms a distinct layer at the bottom, above which the hazy zone of coagulated albumen shows with great precision. This is no doubt a delicate test, but, on the strength of very numerous experiments which I have made on the subject, I am justified in asserting that it is far surpassed in delicacy by a simple modification of the heat test, which I shall presently describe. You all know that albumen is not coagulated by heat in alkaline urines, and that it is not completely coagulated if the reaction of the urine be neutral, for which reasons alkaline or neutral urines are slightly acidified by acetic acid before the heat test is applied. It is also well known that an excess of acetic acid will greatly interfere with the test and completely prevent the coagulation of traces of albumen. Analysts who have devoted much attention to the tests for albumen will agree with me that even as little as a few drops of acetic acid, the quantity generally recommended to be added to about half a test-tubeful of neutral urine, may be sufficient to prevent the detection of very minute traces of albumen. If the urine be acid, there is of course no acetic acid added before heating, but in this case also small traces of albumen are often overlooked, as Bence Jones has pointed out to be the case, where large doses of nitric or hydrochloric acid are taken medicinally. In such cases it is recommended to neutralize the urine or almost to neutralize it by ammonia. There are however acid states of the urine in patients who have not taken any mineral acids, which also prevent the coagulation of very small traces of albumen, and numerous experiments which I have made have convinced me that in every instance in which a trace of albumen could be detected by the nitric acid test and not by heat, the failure in the latter test was attributable to the acid state of the urine. I therefore propose the following modification of the heat test which I have found to answer remarkably well. Add solution of ammonia to the urine until just perceptibly alkaline, filter and add diluted acetic acid very cautiously until the urine acquires a faint acid reaction, avoiding the use of a single drop more than required. Now place equal quantities of this mixture into two test tubes of equal size, heat one of them to ebullition and compare it with the cold sample contained in the other test tube. The least turbidity is thus distinctly observed and gives absolute proof of the presence of albumen, the error of confounding phosphates with albumen being out of the question, as they are precipitated by the ammonia and removed by filtration. Proceeding in this way we can find even such faint traces of albumen as will escape detection by the nitric acid test. This test can of course be used in every instance, whilst the nitric acid test is not suitable for urines containing deposits of urates. It surpasses the nitric acid test in general applicability and in delicacy.

How greatly the internal use of mineral acids may interfere with the detection of albumen by the ordinary mode of heating may be seen from the following case. A physician delivered to me a sample of blood-red coloured urine from a patient suffering from hæmatinuria, and requested me to estimate the quantity of urea. To do this it was of course necessary first to remove the albumen which as a matter of course was present. The urine was strongly acid and remained perfectly clear upon boiling, and also upon boiling with a drop of acetic acid, not a trace of albumen being coagulated. After treating it with solution of ammonia and then with dilute acetic acid in the manure described, a very considerable quantity of coagulum separated upon boiling, and the pale yellow filtrate was now perfectly fit for the determination of urea. I concluded that mineral acids had been administered, and the physician confirmed my supposition.

Permit me now to offer a few remarks on the detection of sugar in urine, or rather on the copper test, which is generally acknowledged to be the best and most reliable. This test is certainly a delicate and reliable one in the hands of an experienced manipulator, but it is altogether unsafe in the hands of medical men or of analytical chemists who have not made a close and special study of urinary examinations. Thus we find that in applying the copper test in the ordinary and well known way, sugar is very frequently found where there is none, and is not detected where it is present, and such mistakes are made, too, by analysts of scientific eminence. Not that there is any difficulty in detecting sugar in a decidedly diabetic urine, for such urine may be looked upon as almost a pure solution of grape sugar, containing the ordinary normal constituents of urine in such small quantities that they do not interfere with the test, but the detection of traces of sugar in non-diabetic urine is a very different and much more difficult task, yet it is one of very great importance indeed, as it may enable the physician to discover and perhaps to remove a tendency to diabetes before it develops into the actual disease. As a rule diabetes is not recognized or suspected until one or more of the peculiar symptoms manifest themselves, and the urine is then found on examination to be of a decidedly diabetic character. But it can hardly be supposed that this disease comes on suddenly, or that a man is quite healthy to-day, and discharges urine containing 5 per cent. of sugar to-morrow. There is most probably a time, long before the actual disease shows itself by outward symptoms, when the urine still contains the ordinary constituents in normal quantities, and in addition to them a minute trace of sugar, which may gradually increase until its quantity is such that the disease is confirmed and perhaps incurable. If this be so, it must appear important that we should be able to discover even very small traces of sugar in otherwise healthy urine. Numerous modifications of the copper test have been recommended, most of which still require experienced hands, and yet will fail to detect sugar if present in mere traces. There is one, however, which appears perfectly satisfactory, and which is so strikingly superior to all the others, that I think it ought to be universally adopted. I mean the modification of the copper test proposed by Dr. William Roberts, in his work on 'Urinary and Renal Diseases.' It enables an analyst, inexperienced in urine testing, to find $\frac{1}{20}$ of a per cent. of sugar, whilst with a little practice he will soon learn to detect as little as a $\frac{1}{40}$ of a per cent. without fear of an error. The test is best performed in the following way:—Heat in a test tube two fluid drachms of Fehling's standard solution of copper, and, when boiling, add five to ten drops of the

urine to be tested; if sugar be abundant, as in a decidedly diabetic urine, a yellowish or brick-red opacity and deposit will be produced. If no such reaction ensue, test for traces of sugar by adding one and a-half fluid drachms of the urine to the hot liquid, heat again to ebullition, and set aside for some time. If no milkiness is produced as the mixture cools, the urine is either quite free from sugar, or at any rate contains less than $\frac{1}{40}$ of a per cent. If the quantity of sugar is very small, viz., from $\frac{1}{2}$ of a per cent. to $\frac{1}{40}$ of a per cent., the precipitation of the yellow or red cuprous oxide does not take place immediately, but occurs after some time as the liquid cools, and the manner of the change is peculiar. First, the mixture loses its transparency, and passes from a clear bluish green to a light greenish opacity, looking just as if some drops of milk had fallen into the tube. This green milky appearance is quite characteristic of sugar. In performing this test for the first time, a difficulty may be experienced on account of the phosphates of the urine being precipitated by the alkali of the test solution. These phosphates, however, are thrown down in large flakes, which are seen floating in a clear bluish-green medium by holding the tube between the eye and the light. The presence of sugar does away with all transparency, which gives place to a milky greenish or yellowish opacity. This mode of applying the copper test is simple, very delicate, and thoroughly reliable. It is based upon the fact that urine which is free from sugar never discharges the colour from more than an equal bulk of Fehling's solution. For this reason, a little more of test solution is used than of the urine. Fehling's solution is apt to deteriorate by keeping, so that without any addition it may cause a precipitation of cuprous oxide upon boiling: and for this reason, Lehmann and others have condemned it as a test for sugar. Proceeding, however, in the manner described, the test solution is boiled first, and if it remains clear there is a proof that it is in good condition. If instead, it forms a deposit on boiling, it must be rejected and a fresh supply of it made.

I have dwelt at such length on this modification of Trömmer's copper test, because I believe it is not generally known amongst chemists, and because I am so thoroughly convinced of its practical utility and its superiority over all other sugar tests that I feel sure it need only be tried to be at once adopted. The other tests for sugar in urine, viz., fermentation, boiling with solution of potash, boiling with carbonate of sodium and subnitrate of bismuth, etc., are far less delicate, and very apt to lead to errors, whenever traces of sugar are sought for.

Professor ATTFIELD: I quite agree with all, or at all events, with nearly all that has fallen from Mr. Siebold on this question, and I should merely wish to add the remark that it is highly important that pharmaceutists and others in examining urine should remember that these small quantities of albumen and calcic oxalate may occur in urine temporarily and be of almost no significance. They should also not forget that small quantities of sugar really form part of the normal constituents of urine, as was demonstrated by Brücke and confirmed by Dr. Bence Jones. Not only should the chemist examine the whole of the urine passed in the twenty-four hours, and note the quantity, but he should, if possible, examine it from day to day for several days. I quite agree with Mr. Siebold that very delicate tests for albumen and sugar are important, but unless we find that sugar and albumen are present from day to day we cannot draw the conclusion that the presence of such very small quantities on one or two occasions is of any significance.

Mr. EKIN: I think it will be found that urines are often condemned as containing sugar in consequence of the impurity of the reagents employed.

The Conference then adjourned for luncheon. On reassembling a paper was read on—

THE AMOUNT OF CALCIC OXALATE EXCRETED IN OXALURIA.

BY PROFESSOR ATTFIELD.

The appearance of the minute octohedra of calcic oxalate must be familiar to every microscopist who has frequently examined urinary sediments, but I am not aware that the proportion of this deposit has ever been determined. Believing the matter to possess some pathological interest, I recently embraced an opportunity of estimating the total amount of calcic oxalate excreted in twenty-four hours by a gentleman in whose urine his medical attendant and I myself had frequently detected this substance. I communicate the result to the Pharmaceutical Conference, because I know that the aid of the educated pharmacist is frequently sought by the physician in cases involving the chemical characters of urine.

Two and a-half pints of urine were excreted by the patient between 10 p.m. on one day and 10 p.m. on the following day. The whole quantity contained 425 grains of urea, an amount beyond the average secreted by healthy adult males, but not more than that commonly given by patients suffering from oxaluria. The sediment, which was not unusually voluminous, consisted of urates and mucus, studded with octohedra of calcic oxalate. No trace of oxalate remained in solution in the urine. The specific gravity of the urine was 1027; in other respects it was normal. The sediment was collected on a Swedish filter, and every trace of oxalate was found to be thus secured. It was then treated with a little warm diluted hydrochloric acid, no particle of oxalate remaining undissolved. Ammonia, added to the filtered acid liquid, gave a precipitate of calcic oxalate which after some time was collected, slightly washed, dried, and weighed. The amount was two-thirds of a grain, or exactly 0·68 (or, in one litre, 0·031 of a gram).

Less than a grain, therefore, of calcic oxalate was excreted by this patient in twenty-four hours. Whether or not this small quantity represents the average amount in such cases I cannot state. Further analyses must be made before this point can be decided. If one may judge from one's memory of appearances under the microscope I should say that I have frequently met with instances in which the proportion of calcic oxalate was three or four times that just mentioned. But whatever be the amount, some effort should be made to determine it, for the occurrence of calcic oxalate in the urine is said to be highly significant, although its source and mode of action in the system is obscure. If the influence of the oxalic acid or other oxalic compound be toxic, the extent of its action will depend very greatly on its amount. If the oxalic radical occurs in the blood as oxalic acid, and its action, as held by some, is that of a solvent of calcic phosphate, then again the extent of its influence will turn upon its amount. A few quantitative analyses would scarcely fail to throw light on these points, and to possess chemical, pathological, and physiological interest. I should myself be quite willing to estimate the amount of calcic oxalate in the urine in well marked cases of oxaluria if the medical practitioner, or the microscopist, or pharmacist who may examine the urine will send portions to me at the laboratories of the Pharmaceutical Society, 17, Bloomsbury Square, London.

The PRESIDENT: I think there can only be one opinion amongst us, and it is that our best thanks are due to Professor Attfield for having brought forward this important question. The analysis of urine is daily becoming more and more important to the pharmaceutist in his character as the scientific adviser, on many points, of the medical man; and there can be no doubt that an accurate means of estimating oxalic acid in urine is very much needed.

Mr. SIEBOLD (Manchester): I have often been surprised to find that the authors of books on urinary analysis never allude to the quantity of oxalate of lime discharged, for I feel perfectly sure that that part of the question is of the highest importance. It may also be important to

ascertain the quantity of oxalic acid which is left in urine in a dissolved state. Cases have occurred, not unfrequently, where with great care oxalic acid in a dissolved state could be detected by mixing the clear urine with a small quantity of solution of calcium chloride, evaporating to about $\frac{1}{8}$th of its original volume, acidulating with a sufficient quantity of hydrochloric acid, filtering after some time, and adding to the clear filtrate strong solution of sodium acetate in excess. The precipitate formed contains all the oxalic acid in the shape of calcic oxalate. To ensure complete precipitation, the mixture should be allowed to stand for twelve hours.

Professor ATTFIELD: Mr. Siebold's remarks confirm those which Mr. Day has made in his 'Physiological Chemistry,' where he alludes to some experiments which seem to show that after the liquid has been set aside for twenty-four hours, urine apparently containing no oxalic acid at length deposits crystals. As regards the amount of calcic oxalate in urine, I brought the matter under the notice of Dr. Lionel Beale, who is an excellent authority on the question. He told me that he did not know of any paper where the amount was mentioned, and he was of opinion that the subject was one which called for the attention of microscopists. It is for that reason I have read this paper to the Conference to-day.

Mr. REYNOLDS (Leeds): Those who are in the habit of examining the deposits in urine are aware that, although no crystals of oxalate of lime may at first be detected, yet if the liquid be set at rest for a longer time, crystals may appear after all. The microscopist plays an important part, but I think the chemist is not less essential than he in the investigation.

Professor Attfield then read a paper on

AMMONIACAL SALTS AND THEIR USUAL IMPURITIES.

BY ALFRED PAYNE, F.C.S.

In this paper, in response to a query in the list of subjects for research issued by the British Pharmaceutical Conference, I beg to offer to pharmacists some of my experiences in ammonia manufacture gained during the past forty years.

Bones, tar liquor, and gas liquor are the only commercial sources of ammonia.

Up to about 1840 bones were the chief source of ammonia. They were burnt largely to produce animal charcoal and bone ash. The liquor which distils from them is rich in ammonia, twenty tons of bones yielding about one ton of rough ammoniacal salt.

The chief impurity in ammoniacal salts made from bones is the dipples oil. This oil is a complex body and contains, picolin, lutidin, collidin, and other compounds.

Although the elements of ammonia (nitrogen and hydrogen) occur largely in bones, the bones contain no trace of ammonia itself, nor any of the above named principles, nor are any of these principles formed when bones decompose spontaneously, but, on the other hand, are produced when bones are suddenly heated to redness. There is a definite temperature at which ammonia forms, and another at which the oil is produced; and if the ammonia-forming temperature could be uniformly applied to the burning bones we should increase that valuable product, and more or less avoid the formation of the offensive oils. There is also formed some phosphoretted hydrogen in bone burning, which oxidizes in the condensers, producing a little phosphate of ammonia. These two impurities, viz., dipples oil and phosphate of ammonia, we may expect in bone-ammonia.

Since 1840, about which time bones came largely into use for agricultural purposes, the price of them has more than doubled, and their ammoniacal value has been diminished by treatment for the extraction of glue, size, and fat, so that they are rarely used now for this purpose. The ammoniacal liquor produced at gas works is almost the only source from which commercial ammonia is now derived.

The elementary matters found in gas liquor are hydrogen, oxygen, nitrogen, carbon, sulphur, iron, phosphorus, arsenic, and sometimes traces of potassium and calcium. The proximate principles into which these group themselves are numerous, and vary much according to the temperature used in carbonizing the coals (or in gas making) and of course they affect the purity of the salts formed from the liquor which contains them.

Coals, also, contain neither ammonia nor oils, and the numerous principles derived from them by distillation are formed at the respective temperatures met with in the retorts from the moment the cold coals are thrown in till the vapours arising from them come into contact with the bright red sides of the retort.

Some of these principles have acid qualities and adhere with such tenacity to the volatile alkali of the gas liquor that they cannot be separated from it either by oxidation, distillation, or by detergent agents. For instance we may separate the sulphur by a hydrated metallic oxide, then treat the filtrate with permanganate, and distil it two or three times and we shall get a product sweet and brilliant; but after standing a month in a white glass bottle a deep indigo blue deposit forms on the glass.

Twenty years ago I formed the opinion that this deposit is a true indigo resulting from a rearrangement of the elements of the gas tar and the ammonia, and subsequent discoveries as to the constituents of gas tar confirm the impression. The tendency to form this blue deposit renders such liquor ammoniæ unfit for pharmaceutical and some other purposes.

Thus before we can produce even plain liquor ammoniæ pure enough for use, the ammonia must be reduced by saturation to a fixed salt, and the adhering impurities then got rid of. But here a new difficulty presents itself. Part of the carbon, nitrogen, and sulphur which the gas liquor contains are always found grouped together as sulpho-cyanogen, and this with the ammonia forms a fixed salt which remains as an impurity in the sulphate or chloride of ammonium, rendering those salts, if made by direct saturation, unfit for most purposes. At certain temperatures also, the elements assume a different arrangement and form bisulphide of carbon. Though in this decomposition a saving of ammonia is effected, the nitrogen of the cyanogen coming out as ammonia, still it does not compensate for the danger; for I have seen a strong wrought iron still eight feet long blown into pieces by the accidental ignition of gases liberated in this reaction: besides which the resulting ammonia is always tinted and impure.

For these reasons, the direct saturation of gas liquor by fixed acids is almost everywhere abandoned.

If, however, the gas liquor be first distilled, the sulphocyanides remain behind; whilst the distillate contains ammonia, sulphur, carbonic acid, sulphide of ammonium, and hydrocarbon oils. There is great liability to loss in conducting this process on a large scale, and the most careful attention to all the physical laws concerned in it is necessary to ensure a good economic result; but on saturating the distillate and filtering and boiling the liquor, a good white commercial salt (either sulphate or muriate) is obtained. Even this, however, will contain traces of the hydrocarbon oils and their colour-forming principles; also metallic impurities derived from the saturating acids, and from the wear and tear of the apparatus, and if absolutely pure products are desired, it is at this stage that these impurities must be eliminated.

Solution, filtering through animal charcoal, and repeated crystallizations, will separate the hydrocarbon oils.

Magnesia salt, carefully added, will separate the phosphates (provided the solution contains a slight excess of ammonia).

Arsenic (derived either from the coals used in gas-making or from pyrites acid) may be detected by Marsh's test, using magnesium, which will also manifest the presence of copper, lead, mercury, zinc, and other poisonous metals.

If chloride of ammonium contains arsenic it should be

boiled with excess of acid, when the arsenic will pass off in vapour as terchloride.

If sulphate contains arsenic it can be separated by boiling with zinc and excess of acid, when the arsenic passes off as arsenuretted hydrogen.

All other probable metallic impurities may be separated by first rendering the solution acid, treating with sulphuretted hydrogen, and filtering out the precipitate, then rendering the filtrate alkaline with ammonia, and precipitating with sulphide of ammonium, and again filtering bright and crystallizing.

It may be assumed that an ammoniacal salt which has been subjected to this treatment is pure, *i.e.*:—

1. Boiling with animal charcoal, filtering, and recrystallizing.
2. Precipitating its alkaline solution with magnesium salt, and filtering.
3. Boiling (if a chloride) with excess of hydrochloric acid, or (if a sulphate) with zinc and excess of acid.
4. Treating the *acid* solution with sulphuretted hydrogen and filtering.
5. Treating the *alkaline* solution with sulphuretted hydrogen and filtering.
6. And finally, recrystallizing from an accurately neutral solution, which has previously been cleansed from sulphuretted hydrogen by boiling with a slight excess of acid.

The above treatment ensures a pure salt, from which all the preparations of ammonia may be safely made when only the *legitimate* commercial raw materials have been used.

But unfortunately, the competition of trade and the struggle to produce cheap articles lead some manufacturers to utilize waste products as saturators, by which other classes of impurities are introduced. The commonest of these is the residuum (chiefly chloride of manganese) left in the stills after the generation of chlorine. When this is used the chlorine combines with its equivalent of ammonium, but the manganese does *not* subside; it attaches itself to the cyanogen of the crude gas liquor (for, of course, these crude saturators would not be used with the distilled liquor), and thus forms mangano-cyanogen, from which results a mangano-cyanide of ammonium, a salt which can scarcely be separated from the various preparations in which the ammonia is afterwards used.

To the sesquicarbonate it imparts a red tint, often exhibited in thin lines or layers on the fractured surface; all such ammonia should at once be rejected as unfit for use.

Gypsum, or sulphate of lime, is sometimes used as a saturator in districts where mineral acids are not made; portions of this, and sometimes of sulphide of calcium, often remain as impurities in the resulting salt, but these are easily separated by careful recrystallization.

In conclusion, the pharmacist has to do with only liquor ammoniæ, sesquicarbonate of ammonia, hydrochlorate of ammonia, nitrate of ammonia.

The liquid preparations he will himself prepare from the above.

Liq. ammoniæ should make a clear and colourless solution with either nitrate of bismuth or nitrate of silver, which shows the absence of hydrocarbon oils.

The nitrate of ammonia should be scrupulously neutral, or it will be unfit for making the anæsthetic gas. For further examination each of the preparations should be tested thus :—

For phosphates make the solution slightly alkaline, and try magnesia salt.

For arsenic try the acid solution in Marsh's apparatus with magnesium.

For other metals try an acid solution with sulphuretted hydrogen, and then an alkaline solution with sulphide of ammonium.

If the ammoniacal preparations will pass this ordeal, and meet these reagents, without cloud, tint, or other indication of impurity, they may be regarded as perfect, and fit for any purpose in pharmacy or the arts.

Professor ATTFIELD: There is one other commercial source of ammonia beside that mentioned by Mr. Payne, and, with reference to it, I think it is important we should have the experience of gentlemen who, like him, have been engaged for many years in the manufacture and examination of salts of ammonia. I refer to volcanic ammonia. This is a source of ammonia now introduced to pharmacists. It is only fair to say that pure salts are made from the ammoniacal liquor of gas works, as pointed out by Dr. Parkinson at our meeting held at Birmingham.

Mr. BOOTH (Heckmondwicke): There is another source of ammonia that has not been mentioned, namely, the waste product of woollen manufacture. Formerly all, and still a good deal of this waste product is sent down into Kent for the purpose of manuring the hop plants. The animal charcoal is used principally in iron manufacture for blackening models, so that they may be drawn away from the sand more easily. The ammoniacal liquor is used principally for scouring and washing purposes.

Mr. COUPLAND (Harrogate): Another salt is the benzoate of ammonia, which for some weeks I regularly compounded as a medicine, but owing to an interruption of supply I was obliged to make application to a local chemist. He opened a fresh bottle, and sent me some. Its odour was unmistakeably disagreeable, and rendered it unsuitable for the purpose for which I wanted it. I secured a portion of the sample, as I thought it desirable to have it submitted to analysis. It had a coal tar odour. I think it desirable the attention of the Conference should be directed to this matter, as no reference has been made to it in the paper, and chemists should recognize the fact that in the course of business other preparations of ammonia may be met with subject to contamination from similar sources of impurity.

Mr. WILLIAMS: It should not be forgotten that benzoic acid produced from gum, though properly used for medicinal purposes, is not entirely true benzoic acid, but contains a considerable quantity of cinnamic acid. For strictly chemical purposes, not for medical purposes, benzoic acid produced from urine is the pure body. However, the price of gum having materially decreased of late years, I believe the acid made from it has been quite as cheap as that made from the urine of horses and cows. The acid made from the urine of cows, I believe, comes principally from Germany, while that made from gum is principally prepared in England.

(*To be continued.*)

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE PRESIDENT'S ADDRESS.

(*Concluded from page* 240.)

It must not, however, be supposed that the investigator drifts unconsciously into the habit of truthfulness for want of temptation to be untruthful, or even that error presents itself to his mind in a grotesque and repulsive garb, so as to enlist from the first his feelings against it; for I can assure you that the precise contrary of these things happens. Error comes before him usually in the very garb of truth; and his utmost skill and attention are needed to decide whether or not it is entitled to retain that garb.

You will easily see how this happens if you reflect that each working hypothesis employed by an investigator is an unproven proposition, which bears such resemblance to truth as to give rise to hopes that it may really be true. The investigator trusts it provisionally to the extent of trying one or more experiments, of which it claims to predict the specific result. Even though it guide him correctly for a while, he considers it still on trial until it has been tested by every process which ingenuity can suggest for the purpose of detecting a fault.

Most errors which an experimentalist has to do with

are really imperfect truths, which have done good service in their time by guiding the course of discovery. The great object of scientific work is to replace these imperfect truths by more exact and comprehensive statements of the order of nature.

Whoever has once got knowledge from nature herself by truthful reasoning and experiment, must be dull indeed if he does not feel that he has acquired a new and noble power, and if he does not long to exercise it further, and make new conquests from the realm of darkness by the aid of known truths.

The habit of systematically searching for truth by the aid of known truths, and of testing the validity of each step by constant reference to nature, has now been practised for a sufficiently long time to enable us to judge of some of its results.

Every true idea of the order of nature is an instrument of thought. It can only be obtained by truthful investigation; and it can only be used effectively in obedience to the same laws. But the first idea which is formed of anything occurring in nature affords only a partial representation of the actual reality, by recording what is seen of it from a particular point of view. By examining a thing from different points of view we get different ideas of it; and when we compare these ideas accurately with one another, recollecting how each one was obtained, we find that they really supplement each other.

We try to form in our minds a distinct image of a thing capable of producing these various appearances; and when we have succeeded in doing so, we look at it from the different points of view from which the natural object had been examined, and find that the ideas so obtained meet at the central image. It usually happens that an accurate examination of the mutual bearings of these ideas on the central image suggests additions to them, and correction of some particulars in them.

Thus it is that true ideas of a natural phenomenon confirm and strengthen one another; and he who aids directly the development of one of them is sure to promote indirectly the consolidation of others.

Each onward step in the search for truth has made us stronger for the work; and when we look back upon what has been done by the efforts of so many workers simply but steadily directed by truth towards further truth, we see that they have achieved, for the benefit of the human race, the conquest of a systematic body of truths which encourages men to similar efforts while affording them the most effectual aid and guidance.

This lesson of the inherent vitality of truth, which is taught us so clearly by the history of our science, is well worthy the consideration of those who, seeing that iniquity and falsehood so frequently triumph for a while in the struggle for existence, are inclined to take a desponding view of human affairs, and almost to despair of the ultimate predominance of truth and goodness. I believe it would be impossible at the present time to form an adequate idea of the vast consequences which will follow from the national adoption of systematic measures for allowing our knowledge of truth to develop itself freely through the labours of those who are willing and able to devote themselves to its service, so as to strengthen more and more the belief and trust of mankind in its guidance, in small matters as well as in the highest and most important considerations.

I am desirous of describing briefly the more important of those measures; but first let me mention another habit of mind which naturally follows from the effective pursuit of truth—a habit which might be described in general terms as the application to other matters of the truthfulness imparted by science.

The words which the great German poet put into the mouth of Mephistopheles when describing himself to Faust afford perhaps the most concise and forcible statement of what we may call the anti-scientific spirit:—

> "Ich bin der Geist der stets verneint,
> Dem alles, was entsteht, zuwider ist."

The true spirit of science is certainly affirmative, not negative; for, as I mentioned just now, its history teaches us that the development of our knowledge usually takes place through two or more simultaneous ideas of the same phenomenon, quite different from one another, both of which ultimately prove to be parts of some more general truth; so that a confident belief in one of those ideas does not involve or justify a denial of the others.

I could give you many remarkable illustrations of this law from among ideas familiar to chemists. But I want you to consider with me its bearing on the habit of mind called toleration, of which the development in modern times is perhaps one of the most hopeful indications of moral improvement in man.

In working at our science we simply try to find out what is true; for although no usefulness is to be found at first in most of our results, we know well that every extension of our knowledge of truth is sure to prove useful in manifold ways. So regular an attendant is usefulness upon truth in our work, that we get accustomed to expect them always to go together, and to believe that there must be some amount of truth wherever there is manifest usefulness.

The history of human ideas, so far as it is written in the records of the progress of science, abounds with instances of men contributing powerfully to the development of important general ideas by their accurate and conscientious experiments, while at the same time professing an actual disbelief in those ideas. Those records must indeed have been a dead letter to any who could stand carping at the intellectual crotchets of a good and honest worker, instead of giving him all brotherly help in the furtherance of his work.

To one who knows the particulars of our science thoroughly, and who knows also what a variety of ideas have been resorted to in working out the whole body of truths of which the science is composed, there are few more impressive and elevating subjects of contemplation than the unity in the clear and bold outline of that noble structure.

I hope that you will not suppose, from my references to chemistry as promoting the development of these habits and powers of mind, that I wish to claim for that particular branch of science any exclusive merit of the kind; for I can assure you that nothing can be further from my intention.

I conceived that you would wish me to speak of that department of science which I have had occasion to study more particularly; but much that I have said of it might be said with equal truth of other studies, while some of its merits may be claimed in a higher degree by other branches of science. On the other hand, those highest lessons which I have illustrated by chemistry are best learnt by those whose intellectual horizon includes other provinces of knowledge.

Chemistry presents peculiar advantages for educational purposes in the combination of breadth and accuracy in the training which it affords; and I am inclined to think that in this respect it is at present unequalled. There is reason to believe that it will play an important part in general education, and render valuable services to it in conjunction with other scientific and with literary studies.

I trust that the facts which I have submitted to your consideration may suffice to show you how fallacious is that materialistic idea of physical science which represents it as leading away from the study of man's noblest faculties, and from a sympathy with his most elevated aspirations, towards mere inanimate matter. The material work of science is directed by ideas towards the attainment of further ideas. Each step in science is in addition to our ideas, or an improvement of them. A science is but a body of ideas respecting the order of nature.

Each idea which forms part of physical science has been derived from observation of nature, and has been tested again and again in the most various ways by reference to nature; but this very soundness of our materials

enables us to raise upon the rock of truth a loftier structure of ideas than could be erected on any other foundation by the aid of uncertain materials.

The study of science is the study of man's most accurate and perfect intellectual labours; and he who would know the powers of the human mind must go to science for his materials. Like other powers of the mind, the imagination is powerfully exercised, and at the same time disciplined, by scientific work. Every investigator has frequent occasion to call forth in his mind a distinct image of something in nature which could produce the appearances which he witnesses, or to frame a proposition embodying some observed relation; and in each case the image or the proposition is required to be true to the materials from which it is formed. There is perhaps no more perfect elementary illustration of the accurate and useful employment of the imagination than the process of forming in the language of symbols, from concrete data, one of those admirable general propositions called equations; on the other hand, the contemplation of the order and harmony of nature as disclosed to us by science supplies the imagination with materials of surpassing grandeur and brilliancy, while at the same time affording the widest scope for its efforts.

The foregoing considerations respecting the meaning and use of scientific work will, I trust, afford us aid in considering what measures ought to be taken in order to promote its advancement, and what we can do to further the adoption of such measures.

Like any other natural phenomenon, the growth of knowledge in the human mind is favoured and promoted by certain circumstances, impeded or arrested by others; and it is for us to ascertain from experience what those circumstances respectively are, and how the favourable ones can be best combined to the exclusion of the others.

The best and noblest things in this world are the result of gradual growth, by the free action of natural forces; and the proper function of legislation is to systematize the conditions most favourable to the free action which is desired.

I shall consider the words "Advancement of Science" as referring to the development and extension of our systematic knowledge of natural phenomena by investigation and research.

The first thing wanted for the work of advancing science is a supply of well-qualified workers. The second thing is to place and keep them under the conditions most favourable to their efficient activity. The most suitable men must be found while still young, and trained to the work. Now I know only one really effectual way of finding the youths who are best endowed by nature for the purpose; and that is to systematize and develop the natural conditions which accidentally concur in particular cases, and enable youths to rise from the crowd.

The first of these is that a young man gets a desire for knowledge by seeing the value and beauty of some which he has acquired. When he has got this desire he exerts himself to increase his store; and every difficulty surmounted increases his love of the pursuit, and strengthens his determination to go on. His exertions are seen by some more experienced man, who helps him to place himself under circumstances favourable to further progress. He then has opportunities of seeing original inquiries conducted, perhaps even of aiding in them; and he longs to prove that he also can work out new truths, and make some permanent addition to human knowledge. If his circumstances enable him to prosecute such work, and he succeeds in making some new observations worthy of publication, he is at once known by them to the community of scientific men, and employed among them.

We want, then, a system which shall give to the young favourable opportunities of acquiring a clear and, as far as it goes, a thorough knowledge of some few truths of nature such as they can understand and enjoy—which shall afford opportunity of further and further instruction to those who have best profited by that which has been given to them, and are anxious to obtain more—which shall enable the best students to see what original investigation is, and, if possible, to assist in carrying out some research—and, finally, which shall supply to each student who has the power and the will to conduct researches, all material conditions which are requisite for the purpose.

But investigators, once found, ought to be placed in the circumstances most favourable to their efficient activity.

The first and most fundamental condition for this is, that their desire for the acquisition of knowledge be kept alive and fostered. They must not merely retain the hold which they have acquired on the general body of their science; they ought to strengthen and extend that hold by acquiring a more complete and accurate knowledge of its doctrines and methods; in a word, they ought to be more thorough students than during their state of preliminary training.

They must be able to live by their work without diverting any of their energies to other pursuits; and they must feel security against want, in the event of illness or in their old age.

They must be supplied with intelligent and trained assistants to aid in the conduct of their researches, and whatever buildings, apparatus, and materials may be required for conducting those researches effectively.

The desired system must therefore provide arrangements favourable to the maintenance and development of the true student-spirit in investigators, while providing them with permanent means of subsistence, sufficient to enable them to feel secure and tranquil in working at science alone, yet not sufficient to neutralize their motives for exertion; and at the same time it must give them all external aids, in proportion to their wants and powers of making good use of them.

Now I propose to describe the outlines of such a system, framed for the sole purpose of promoting research, and then to consider what other results would follow from its working.

If it should appear possible to establish a system for the efficient advancement of science, which would be productive of direct good to the community in other important ways, I think you will agree with me that we ought to do all that we can to promote its adoption.

Let the most intelligent and studious children from every primary school be sent, free of expense, to the most accessible secondary school for one year; let the best of these be selected and allowed to continue for a second year, and so on, until the *élite* of them have learnt all that is to be there learnt to advantage. Let the best pupils from the secondary schools be sent to a college of their own selection, and there subjected to a similar process of annual weeding; and, finally, let those who get satisfactorily to the end of a college curriculum be supplied with an allowance sufficient for their maintenance for a year, on condition of their devoting their undivided energies to research, under the inspection of competent college authorities, while allowed such aids and facilities as the college can supply, with the addition of money-grants for special purposes. Let all who do well during this first year be allowed similar advantages for a second, and even a third year.

Each young investigator thus trained must exert himself to obtain some appointment which may enable him to do the most useful and creditable work of which he is capable, while combining the conditions most favourable to his own improvement.

Let there be in every college as many professorships and assistantships in each branch of science as are needed for the efficient conduct of the work there going on, and let every professor and assistant have such salary and such funds for apparatus, etc., as may enable him to devote all his powers to the duties of his post, under conditions favourable to those duties; but let each professor receive also a proportion of the fees paid by his pupils, so that it may be his direct interest to do his work with the utmost attainable efficiency, and attract more pupils.

Let every college and school be governed by an independent body of men, striving to increase its usefulness and reputation, by sympathy with the labours of the working staff, by material aid to them when needed, and by getting the very best man they can, from their own or any other college, to supply each vacancy as it arises.

In addition to colleges which are and always have been the chief institutions for the advancement of learning, establishments for the observation of special phenomena are frequently needed, and will doubtless be found desirable in aid of a general system for the advancement of science.

Now, if a system fulfilling the conditions which I have thus briefly sketched out were once properly established on a sufficient scale, it ought to develop and improve itself by the very process of its working; and it behoves us, in judging of the system, to consider how such development and improvement would come about.

The thing most needed at the present time for the advancement of science is a supply of teachers devoted to that object—men so earnestly striving for more knowledge and better knowledge as to be model students, stimulating and encouraging those around them by their example as much as by their teaching. Young men do not prepare themselves in any numbers for such a career :—

1. Because the chief influences which surround them at school and at college are not calculated to awaken in them a desire to obtain excellence of such kind.

2. Because they could not expect by means of such qualities to reach a position which would afford a competent subsistence.

Let these conditions be reversed, to the extent that existing teachers have powerful inducements to make their students love the study of science for its own sake, with just confidence that they will be able to earn a livelihood if they succeed in qualifying themselves to advance science, and the whole thing is changed. The first batch of young investigators will be dispersed among schools and colleges according to their powers and acquirements, and will at once improve their influence upon the pupils, and enable them to send up a second batch better trained than the first. This improvement will go on increasing, if the natural forces which promote it are allowed free play; and the youth of each successive generation will have better and more frequent opportunities of awakening to a love of learning, better help and guidance in their efforts to acquire and use the glorious inheritance of knowledge which had been left them, better and more numerous living examples of men devoting their whole lives to the extension of the domain of truth, and seeking their highest reward in the consciousness that their exertions have benefited their fellow men, and are appreciated by them.

A young man who is daily qualified for the work of teaching the investigation of some particular branch of science, and who wishes to devote himself to it, will become a member of an association of men selected for their known devotion to learning, and for their ability to teach the methods of investigation in their respective subjects. Around this central group is arranged a frequently changing body of youths, who trust to them for encouragement and guidance in their respective studies.

Our young investigator finds it necessary to study again more carefully many parts of his subject, and to examine accurately the evidence of various conclusions which he had formerly adopted, in order that he may be able to lead the minds of his pupils by easy and natural yet secure steps to the discovery of the general truths which are within their reach. He goes over his branch of science again and again from the foundation upwards, striving each time to present its essential particulars more clearly and more forcibly, arranging them in the order best calculated to stimulate an inquiring mind to reflect upon their meaning, and to direct its efforts effectively to the discovery of the general ideas which are to be derived from them. He is encouraged in these efforts by the sympathy of his colleagues, and often aided by suggestions derived from their experience in teaching other branches of science, or by information respecting doctrines or methods which throw a light upon those of his own subject.

No known conditions are so well calculated to give a young investigator the closest and strongest grasp of his subject of which he is capable as those in which he is placed while thus earnestly teaching it in a college; and inasmuch as a thorough mastery of known truths is needed by every one who would work to advantage at the discovery of new truths of that kind, it will, in most cases, be an object of ambition to the ablest young investigators to get an opportunity of going through the work of teaching in a college, in order to improve themselves to the utmost for the work of original research. There is, however, another advantage to them in having such work to do; for the best way to ascertain at any one time what additions may be made to a science is to examine the facts which have been discovered last, and to consider how far they confirm and extend the established ideas of the science, how far they militate against those ideas. An investigating teacher is constantly weaving new facts into the body of his science, and forming anticipations of new truths by considering the relation of these new facts to the old ones.

When our investigator has thus got a thorough mastery of his science and new ideas for its extension, he ought to have the opportunity of turning his improved powers to account by devoting more of his time to original research; in fact he ought to teach research by example more than hitherto, and less by elementary exercises upon known facts. If he has discharged the duties of his first post with manifest efficiency, he will be promoted, either in his own or some other college, to a chair affording more leisure and facility for original research by his own hands and by those of his assistants and pupils. Some investigators may find it desirable to give up after a while all teaching of previously published truths, and confine themselves to guiding the original researches of advanced pupils, while stimulating them by the example of their own discoveries. But most of them will probably prefer to do elementary teaching work from time to time, for the sake of the opportunity of going over the groundwork of their science, with a knowledge of the new facts and enlarged ideas recently established.

Now it must be observed that such a system as the above, once developed to its proper proportions, so as to send annually to secondary schools many thousands of poor children who would otherwise never enjoy such advantages, and so as to train to original investigation a corresponding proportion of them, would not only provide more young investigators than would be needed for systematic teaching functions, but would also give a partial training of the same kind to many whose abilities proved to be insufficient, or whose tastes were not congenial to such pursuit. Some would be tempted by an advantageous opening in an industrial pursuit or in the public service to break off their studies before completion, and others would find, after completing their training, a position of that kind more desirable or more attainable than a purely scientific appointment. Not only would much good of other kinds be accomplished by this circumstance, but we may say with confidence that the system could not work with full advantage for its own special purpose of promoting the advancement of science if it did not diffuse a knowledge of the truths and methods of science beyond the circle of teachers.

There is an urgent need of accurate scientific knowledge for the direction of manufacturing processes, and there could not be a greater mistake than to suppose that such knowledge need not go beyond the elementary truths of science. In every branch of manufacture improvements are made from time to time, by the introduction of new or modified processes which had been discovered by means of investigations as arduous as those conducted for purely

scientific purposes, and involving as great powers and accomplishments on the part of those who conducted them.

Any manufacturer of the present day who does not make efficient arrangements for gradually perfecting and improving his processes ought to make at once enough money to retire; for so many are moving onwards in this and other countries, that he would soon be left behind.

It would be well worth while to establish such a system of scientific education for the sake of training men to the habits of mind which are required for the improvement of the manufacturing arts; and I have no doubt that the expense of working the system would be repaid a hundred times over by the increase of wealth of the community; but I only mention this as a secondary advantage of national education.

A system of the kind could not expand to due dimensions, nor could it, once fully established, maintain itself in full activity, without intelligent sympathy from the community; and accordingly its more active-minded members must be taught some good examples of the processes and results of scientific inquiry before they can be expected to take much interest in the results achieved by inquirers, and to do their share of the work requisite for the success of the system. I need hardly remind you that there are plenty of other strong reasons why some such knowledge of the truths of nature, and of the means by which they are found out, should be diffused as widely as possible throughout the community.

You perceive that in such educational system each teacher must trust to his own exertions for success and advancement; and he will do so if he is sure that his results will be known and compared impartially with those attained by others. Each governing body must duly maintain the efficiency of its school or college, if support depend in some degree on the evidences of that efficiency; and it will try to improve the school if it knows that every improvement will be seen and duly appreciated.

The keystone of the whole structure is the action of the State in distributing funds carefully among schools and colleges proportionally to the evidence of their doing good work which could not be continued without such aid.

I am inclined to think that the State ought, as far as possible, to confine its educational grants to the purpose of maintaining and continuing good work which is actually being done, and rarely if ever to initiate educational experiments; first, because it is desirable to encourage private exertions and donations for the establishment of schools and colleges upon new systems, or in new localities, by giving the public full assurance that if any new institution establishes its right to existence, by doing good work for a while, it will not be allowed to die off for want of support; and, secondly, because the judicial impartiality required in the administration of public funds, on the basis of results of work, is hardly compatible with an advocacy of any particular means of attaining such results.

On the other hand, experience has shown that special endowments, which tie up funds in perpetuity for a definite purpose, commonly fail to attain their object under the altered circumstances which spring up in later generations, and not unfrequently detract from the efficiency of the institutions to which they are attached, by being used for objects other than those which it is their proper function to promote.

When there is felt to be a real want of any new institution for the promotion of learning, men are usually willing enough to devote time and money to the purpose of establishing it and giving it a fair trial. It is desirable that they should leave the State to judge of their experiment by its results, and to maintain it or not, according to the evidences of its usefulness. No institution ought, for its own sake, to have such permanent endowments as might deprive its members of motives for exertion.

The State could not, however, discharge these judicial functions without accurate and trustworthy evidence of the educational work done at the various schools and of its success. For this purpose a record must be kept by or under the direction of every teacher of the weekly progress of each pupil, showing what he has done and how he has done it. Official inspectors would have to see to these records being kept upon a uniform scale, so that their results might be comparable. The habit of keeping such records conduces powerfully to the efficiency of teachers; and, for the sake of the due development of the teaching system, it ought to prevail generally. Having such full and accurate means of knowing what opportunities of improvement pupils have enjoyed and what use they have made of those opportunities, Government ought to stimulate their exertions and test their progress by periodical examinations. It is of the utmost importance to allow any new and improved system of instruction to develop itself freely, by the exertions of those who are willing to undertake the labour and risk of trying it on a practical scale; and the pupils who acquire upon such new system a command of any branch of science, ought to have a fair opportunity of showing what they have achieved and how they have achieved it. An able and impartial examiner, knowing the new systems in use, will encourage each candidate to work out his results in the manner in which he has been taught to work out results of the kind.

Examinations thus impartially conducted with a view of testing the success of teachers in the work which they are endeavouring to do, have a far higher value, and consequent authority, than those which are conducted in ignorance or disregard of the process of training to which the candidates have been subjected; and we may safely say that the examination system will not attain its full usefulness until it is thus worked in intimate connection with a system of teaching.

In order to give everyone employed in the educational system the utmost interest in maintaining and increasing his efficiency, it is essential that a due measure of publicity be given to the chief results of their respective labours. Schools and colleges ought, to a considerable extent, to be supported by the fees paid by pupils for the instruction received; and every professor being in part dependent upon the fees of his pupils will have a direct interest in attracting more pupils to his classes or laboratories. The fame of important original investigations of his own or his pupils, published in the scientific journals, is one of the natural means by which a distinguished professor attracts disciples, and the success of his pupils in after life is another. His prospects of promotion will depend mainly on the opinion formed of his powers from such materials as these by the governing bodies of colleges and by the public; for if each college is dependent for success upon the efficiency of its teaching staff, its governing body must do their best to fill up every vacancy as it arises by the appointment of the ablest and most successful professor whom they can get; and any college which does not succeed in obtaining the services of able men will soon lose reputation, and fall off in numbers.

There are, however, further advantages to the working of the system to be derived from full publicity of all its more important proceedings. It will supply materials for the formation of a sound public opinion respecting the proceedings of the authorities in their various spheres of action. A claim for money might be made upon Government by the rulers of some college upon inadequate grounds; or a just and proper claim of the kind might be disregarded by Government. Neither of these things will be likely to happen very often if the applications, together with the evidence bearing on them, are open to public scrutiny and criticism; and when they do occasionally happen, there will be a natural remedy for them.

If I have succeeded in making clear to you the leading principles of the plan to be adopted for the advancement of science, including, as it necessarily must do, national education generally, you will, I think, agree with me that, from the very magnitude and variety of the interests involved in its action, such system must of necessity be under the supreme control of Government. Science will

never take its proper place among the chief elements of national greatness and advancement until it is acknowledged by that embodiment of the national will which we call the Government. Nor can the various institutions for its advancement develop duly their usefulness until the chaos into which they are now plunged gives place to such order as it is the proper function of Government to establish and maintain.

But Government has already taken, and is continuing to take, action in various matters affecting elementary popular education and higher scientific education, and it would be difficult to arrest such action, even if it were thought desirable to do so. The only practical question to be considered is how the action of Government can be systematized so as to give free play to the natural forces which have to do the work.

By establishing official examinations for appointments and for degrees, Government exerts a powerful influence on the teaching in schools and colleges, without taking cognizance, except in some few cases, of the systems of teaching which prevail in them. Again, it gives grants of public money from time to time in aid of colleges or universities, or for the establishment of a high school under its own auspices. Sometimes it endows a professorship. In taking each measure of the kind it is doubtless influenced by evidence that is in itself a good thing, calculated to promote the advancement of learning. But a thing which is good in itself may produce evil effects in relation to others, or good effects incommensurate with its cost. Thus examinations afford most valuable aid to educational work when carried on in conjunction with earnest teachers; yet when established in the absence of a good system of education, they are liable to give rise to a one-sided training, contrived with a special view of getting young men through the examinations. If no properly educated young men were found for a particular department of the public service, and an examination of all candidates for such appointments were to be established for the purpose of improving the system of training, candidates would consider their power of answering such questions as appeared likely to be set as the condition of their obtaining the appointments, and they would look out for men able and willing to train them to that particular work in as direct and effective a manner as possible. The demand for such instruction would soon be supplied. Some teachers would undertake to give instruction for the mere purpose of enabling candidates to get through the examination; and by the continued habit of such work would gradually come to look upon the examiners as malignant beings who keep youths out of office, and whose vigilance ought to be evaded by such means as experience might show to be most effective for the purpose. Once this kind of direct examination-teaching has taken root, and is known to produce the desired effect of getting young men through the examinations, its existence encourages the tendency on the part of the candidates to look merely to the examination as the end and aim of their study; and a class of teachers is developed whose exertions are essentially antagonistic to those of the examiners.

There are no doubt teachers with a sufficiently clear apprehension of their duty, and sufficient authority, to convince some of the candidates that the proper object of their study should be to increase their power of usefulness in the career for which they are preparing themselves, by thoroughly mastering up to a prescribed point certain branches of knowledge; and that until they had honestly taken the means to do this and believed they had done it effectually, they ought not to go up for examination nor to wish to commence their career.

But it is desirable that all teachers be placed under such circumstances that it may become their interest as well as their duty to co-operate to the utmost of their powers in the object for which the examiners are working. For this purpose their records of the work done under their guidance by each pupil ought to be carefully inspected by the examiners before framing their questions, and ought to be accepted as affording the chief evidence of the respective merits of the pupils.

This is not the place for considering how the general funds for an effective system of national education can best be raised, nor how existing educational endowments can best be used in aid of those funds. It is well known that some colleges of Oxford and Cambridge are possessed of rich endowments, and that many distinguished members of those universities are desirous that the annual proceeds of those endowments should be distributed upon some system better calculated to promote the advancement of learning than that which generally prevails. Indeed we may confidently hope that, true to their glorious traditions, those colleges will be led by the high-minded and enlightened counsels of their members to rely upon improving usefulness in the advancement of learning as the only secure and worthy basis of their action in the use of their funds, so that they may take a leading part in such system of national education as may be moulded out of the present chaos.

But the foundations of a national system of education ought to be laid independently of the present arrangements at Oxford and Cambridge, for we may be sure that the more progress the system makes the more easy will become the necessary reforms in the older universities and colleges.

It is clearly undesirable that Government should longer delay obtaining such full and accurate knowledge of the existing national resources for educational purposes, and of the manner in which they are respectively utilized, as may enable it to judge of the comparative prospects of usefulness presented by the various modes of distributing educational grants. It ought to know what has been done and what is doing in the various public educational establishments before it can judge which of them would be likely to make the best use of a grant of public money.

We have official authority for expecting such impartial administration of educational grants; and it cannot be doubted that before long due means will be taken to supply the preliminary conditions.

You are no doubt aware that a Royal Commission was appointed some time ago, in consequence of representations made to Government by the British Association on this subject, and it is understood that its instructions are so framed as to direct its particular attention to the manner in which Government may best distribute educational grants. The Commission is moreover composed of most distinguished men, and we have every reason to anticipate from their labours a result worthy of the nation and of the momentous occasion.

In speaking of public educational establishments, I refer to those which by their constitution are devoted to the advancement of learning without pecuniary profit to their respective governing bodies. The annual expenditure requisite for keeping up a national system of popular education will necessarily be considerable from the first, and will become greater from year to year; but once Englishmen are fully alive to the paramount importance of the object, and see that its attainment is within their reach, we may be sure that its expense will be no impediment. England would not deserve to reap the glorious fruits of the harvest of knowledge if she grudged the necessary outlay for seed and tillage, were it even ten times greater than it will be. It is no use attempting to establish a national system on any other than a truly national basis. Private and corporate funds inevitably get diverted from popular use, after a few generations, to the use of the influential and rich. A national system must steadily keep in view the improvement of the poor, and distribute public funds each year in the manner best calculated to give to the youths of the poorest classes full opportunities of improvement proportional to their capacities, so that they may qualify themselves for the utmost usefulness to their country of which they are capable. The best possible

security for the proper administration of the system will be found in the full and speedy publicity of all the particulars of its working.

It has been frequently remarked that a great proportion of English investigators are men of independent means, who not only seek no advancement as a reward of their labours, but often sacrifice those opportunities of improving their worldly position which their abilities and influence open up to them, for the sake of quietly advancing human knowledge. Rich and powerful men have very great temptations to turn away from science, so that those who devote their time and money to its service prove to us how true and pure a love of science exists in this country, and how Englishmen will cultivate it when it is in their power to do so.

Now and then a youth from the poorer classes is enabled by fortunate accidents and the aid of a friendly hand to climb to a position of scientific activity, and to give us, as Faraday did, a sample of the intellectual powers which lie fallow in the great mass of the people.

Now, the practical conclusion to which I want to lead you is, that it rests with you, who represent the national desire for the advancement of science, to take the only measures which can now be taken towards the establishment of a system of education worthy of this country, and adapted to the requirements of science. In the present stage of the business, the first thing to be done is to arouse public attention by all practicable means to the importance of the want, and to get people gradually to agree to some definite and practicable plan of action. You will, I think, find that the best way to promote such agreement is to make people consider the natural forces which have to be systematized by legislation, with a view of enabling them to work freely for the desired purpose. When the conditions essential to any national system come to be duly appreciated by those interested in the cause of education, means will soon be found to carry out the necessary legislative enactments.

The highest offices in the State are on our present system filled by men who, whatever their political opinions and party ties, almost infallibly agree in their disinterested desire to signalize their respective terms of office by doing any good in their power. Convince them that a measure desired by the leaders of public opinion is in itself good and useful, and you are sure to carry it.

And, on the other hand, England is not wanting in men both able and willing to come forward as the champions of any great cause, and to devote their best powers to its service.

I may well say this at Bradford after the results achieved by your member in the Elementary Education Act.

Objections will of course be raised to any system on the score of difficulty and expense, more especially to a complete and good system. Difficult of realization it certainly must be, for it will need the devoted and indefatigable exertions of many an able and high-minded man for many a long year. Only show how such exertions can be made to produce great and abiding results, and they will not be wanting. And as for expense, you will surely agree with me that the more money is distributed in such frugal and effective manner, the better for the real greatness of our country.

What nobler privilege is attached to the possession of money than that of doing good to our fellow men? and who would grudge giving freely from his surplus, or even depriving himself of some comforts, for the sake of preparing the rising generation for a life of the utmost usefulness and consequent happiness?

I confidently trust that the time will come when the chief item in the annual budget of the Chancellor of the Exchequer will be the vote for National Education; and when in some later age our nation shall have passed away, when a more true civilization has grown up and has formed new centres for its throbbing life, when there are but broken arches to tell of our bridges and crumbling ruins to mark the sites of our great cathedrals—then will the greatest and noblest of England's works stand more perfect and more beautiful than ever; then will some man survey the results of Old England's labours in the discovery of imperishable truths and laws of nature, and see that her energy and wealth were accompanied by some nobler attributes—that while Englishmen were strong and ambitious enough to grasp power, they were true enough to use it for its only worthy purpose, that of doing good to others.

I must not, however, trespass longer upon your time and your kind attention. My subject would carry me on, yet I must stop without having half done justice to it.

If I have succeeded in convincing you that a national system of education is now necessary and possible, and in persuading you to do what you respectively can to prepare the way for it, I shall feel that the first step is made towards the great result.

Parliamentary and Law Proceedings.

The Liverpool Butter Case.—Report of Professor Anderson.

At the Liverpool Borough Police Court, on Thursday, September 11th, before Mr. Raffles, the charge against Mr. George Kelly, of selling adulterated butter, was finally disposed of, after being in several forms before the court since December last, when the summons was first laid. On the 18th of that month the Liverpool health committee issued a summons against Mr. Kelly for selling adulterated butter, but the magistrate dismissed the case. An appeal against the decision was then made to the Court of Queen's Bench, and resulted in the case being sent back to the police-court for a decision upon its merits. But there was a conflict of opinion between the public analyst, Dr. Campbell Brown, and Mr. Martin Murphy, principal of the Liverpool College of Chemistry, as to the quality of the butter. It was decided to refer the matter to a third gentleman whose testimony should be held conclusive, and accordingly several eminent analysts were applied to, but they declined to undertake the examination. Ultimately, however, Professor Anderson, of the University of Glasgow, consented to analyse the butter, and the professor's report upon it as follows was now read:—

"I have carefully examined and analysed a sample of butter sent by Messrs. Anderton and Ellis, for the purpose of ascertaining whether it is adulterated, and find it to contain:—

Fatty matter	84·77
Curd	1·12
Salt	5·65
Water	8·46
	100·00

"As far as the results of chemical analysis are concerned, this sample of butter presents no special peculiarities. The salt is present in almost exactly the proportion in which it is said to be used in the best dairies—namely, one ounce to the pound of butter. The water is not excessive, and the curd only a very little above the proportion usually found in good butter. It is therefore obvious that neither salt nor water—the two substances most generally employed as adulterants—have been used in this case, and if any foreign substance be present it must be some inferior variety of fat.

"I have therefore directed my attention most particularly to this point, and in examining the different processes described in books for detecting foreign fats in butter, I am bound to say that I have found the whole subject in an exceedingly unsatisfactory state. Microscopic examination is the process on which the greatest reliance is placed. Ordinary butter under the microscope is seen to consist entirely of exceedingly minute granules, in which no trace of crystalline structure can be detected; while all ordinary fats, such as tallow, lard, etc., are completely crystalline, and consist of small radiated groups of needle-shaped crystals. The appearance of these crystals

does not afford any means of determining the nature of the fat in which they are formed, for the constituents of all fats are so similar in external characters that they cannot be identified except in those cases in which they contain some peculiar substances. Thus, tallow and cocoanut oil may be distinguished in a rough manner by their peculiar smells, which are really due to the presence of a small quantity of certain odorous fats and of other odorous principles the nature of which is still very imperfectly understood.

"If the mere presence of a crystalline fat is to be taken as conclusive evidence of adulteration, then this sample of butter must undoubtedly be considered as adultered. But it appears to me that there are other matters to be taken into consideration which must materially modify this opinion; and of these the proportion which these crystals bear to the whole mass of the butter is a matter of primary importance.

"It is here necessary for me to point out a very important difference between a chemical analysis and a microscopic examination. In the former, the different constituents are actually separated, and their relative proportions determined by weight. In the latter, the separation and weighing of the different substances is impracticable, and any estimate of the relative proportions of the different constituents is a matter of judgment and opinion, the value of which mainly depends on the experience of the individual, and is at best no more than an approximation. After careful and repeated examination, I am of opinion that the crystals contained in this sample of butter certainly do not exceed five per cent. of its whole weight, and are probably considerably less than that quantity.

"Now, it appears to me that the facts just stated are entirely opposed to the view that these crystals are the result of deliberate adulteration. The person who has made up his mind to adulterate is not likely to be satisfied with the additional profit which would be obtained by the addition of five per cent. of the cheapest fat that could be purchased, and it is scarcely necessary to say that the number of fats which could be profitably used to adulterate a butter which, I understand, is sold at 7*d.* per pound is necessarily extremely restricted.

"A number of experiments which I have made, chiefly in connection with this case, further lead me to doubt how far the presence of crystals in butter can be considered as an indisputable proof of adulteration. I find that nothing is easier than to make pure butter assume a completely crystalline appearance under the microscope, so that the eye cannot distinguish it under the microscope from tallow. On the other hand, tallow can be converted into a state in which under the microscope it might possibly pass for genuine butter. It further appears to me by no means certain that genuine butter when kept for a long time may not to a certain extent acquire a crystalline character. I have been unable to find any facts bearing on this opinion in books, and, of course, have not had time or opportunity of making any experiments on the matter. But it is well known that a similar change takes place in other substances, and there are various circumstances which make me think it not impossible that it may occur in butter.

"As the result of my whole examination, I am forced to come to the conclusion that there is no evidence to show that this sample of butter is adulterated. It is undoubtedly of most inferior quality, and I am not surprised that suspicion has arisen as to its genuineness; but I am not prepared to describe it as adulterated, and, in fact, believe that much of its present peculiarities are due to the length of time it has been kept.

"(Signed) THOMAS ANDERSON.

"University of Glasgow, 6th Sept., 1873."

Mr. Raffles said he was very much obliged to Professor Anderson for the trouble he had taken in conducting the analysis, and, after the opinion expressed by the professor, the only course to adopt was to dismiss the summons.

An application on behalf of Mr. Kelly for costs was refused.

Obituary.

NÉLATON.

One of the last and not the least distinguished of the late Emperor Napoleon's *entourage* has just passed away in Auguste Nélaton, who for the last fifteen years of his life enjoyed the reputation of being the greatest of European surgeons. A pupil of Dupuytren, he early showed himself worthy of such a master. He educated himself in the whole circle of medical science, and graduated as M.D. at the University of Paris before making pure surgery the business of his life. He became connected with the Hôtel Dieu, and rapidly drew around him an enthusiastic audience by the clearness, comprehensiveness, and practical bearing of his clinical prælections. So numerous were his classes, including as they did not only students in their novitiate, but elderly practitioners, French as well as foreign, that it was difficult to get near enough to him in his morning rounds. He was a model operator, especially careful and circumspect in diagnosis, while swift and sure-handed with the knife. After-treatment—that walk of surgery to which justice has been rendered only of late years—was always a matter of paramount importance with him. He rarely lost a case; and such was his reputation for success, that Paris owed to the attraction he possessed for patients from all parts of the world, not a little of her floating population. The Emperor's belief in him was unbounded. After putting the Italian and English surgeons to shame by extracting from Garibaldi's foot, in 1862, the bullet which they had denied to be present, he was telegraphed for from Paris to Switzerland to attend the Empress and suite, who had sustained a carriage accident. By this time he was high in court favour, which was still further enhanced by the skill and courage he showed in curing the Prince Imperial of a deep-seated abcess in the hip, which no other surgeon had diagnosed. The Emperor, departing from traditional usage, made him a Senator—an act as creditable to himself as to Nélaton; while he also promoted him to the rank of Grand Officer of the Legion of Honour—a distinction shared by only two other medical men, Ricard and Larrey.

Nélaton did not write much. But the books he has left, notably his treatise on 'Surgical Pathology,' are models of method, comprehensiveness, and clearness of exposition. For the last two or three years the cares of a practice, which usually brought him in £20,000 a-year, began to tell upon him, and symptoms of heart disease declared themselves. He retired from active life, though still giving advice occasionally to favoured clients, and for a time it was thought that the relaxation from work and the quiet of his country *villeggiatura* would restore him to health. But dropsy set in; and after several weeks of suffering he expired on Sunday, the 21st instant, in his sixty-seventh year.

We regret to have also to record the death, on Monday, September 15, of Mr. Jonathan Chater, Pharmaceutical Chemist, of Watford, from epilepsy. Mr. Chater was one of the founders of the Pharmaceutical Society, and for several years acted as one of its local secretaries.

Orient.—The seeds sent are anatto seeds (*Bixa Orellana*).

"*Scott.*"—The question is open to doubt. The infusion may have been intended, or the water may have been omitted. But similar prescriptions have been dispensed in London.

J. N.—Yes. The new regulations are to come into force October 1, 1874.

R. D. M.—The preparation mentioned, if made strictly according to the British Pharmacopœia, will retain its shape.

W. Ballard.—In July, 1874.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Mason, Newbould, Proctor, Ballard, Nicholson, H. M. C., S. X., "Pharmacien."

PHARMACEUTICAL RESULTS OF THE CALCUTTA BOTANIC GARDENS.

Acclimatization of Ipecacuanha.

(Concluded from page 242.)

As to the introduction of ipecacuanha into European pharmacy, it only dated from the end of the seventeenth century, about fifty years after the publication of Pison's work, entitled 'De Medicina Brasiliensis.' Up to this time, though the most important properties of this root were known, the profession hesitated to make use of it; and even a little later some accidents following the inconsiderate use of it were the cause of its falling almost completely into disuse. It was only when a French merchant, named Grenier, had brought to Paris a quantity sufficient for making the following experiments that all prejudice disappeared, and the "root of Brazil" took that place in the medical world which it deserved.

The physician Adrien Helvetius, with whom Grenier had united to facilitate the adoption of this remedy, induced no doubt by the example of the brilliant fortune which cinchona had just procured to the Englishman Talbot, succeeded in his turn in interesting Louis XIV. in the fate of ipecacuanha.

It was in consequence of the experiments made by his order in the Hôtel Dieu of Paris, that the advantage to be derived from the use of ipecacuanha in certain diseases, and specially diarrhœa and dysentry, was finally proved; and the remedy which up to that time had been kept more or less secret was from that moment, thanks to the munificence of the great king, made publicly known.

I have said that tradition refused to Europeans the merit of discovering ipecacuanha, but none can ever contest that of their having immensely extended the limits of the region where it is gathered. I will pass over here in silence the first steps taken towards these discoveries to refer at once to those of later years.

The most recent works which treat of ipecacuanha only indicate its existence in those parts of the Brazilian empire which adjoin more or less immediately the Atlantic Ocean; for example, the provinces of Para, Maranhao, Pernambuco, Bahia, Espirito Santo, Minas Geraes, Rio de Janeiro, and Sao Paulo, in all of which, on a larger or smaller scale, the precious root is gathered. Thus defined, the region of cephaëlis would have natural enough limits, since commencing at the equinoctial line and going southwards, it stops almost exactly at the tropic, on the the east it appears confined by the Atlantic, and on the west to a great extent by the high lands of the interior. These limits, however, are happily entirely hypothetical. Now, indeed, we know that the region of *Cephaëlis ipecacuanha*, far from being limited to the comparatively narrow strip along the sea shore, possesses, on the contrary, a much wider range of longitude than of latitude, since it extends to about 25 degrees into the interior of the continent, or to 50 degrees longitude west of Paris, that is to say, almost to the confines of Bolivia. Credible observers have even assured me that the plant has been discovered in the forests of this republic in the province of Chiquitos, but I have not myself observed it beyond the Brazilian frontier. The fertility of the newly discovered districts is after all such that they alone are almost sufficient to supply the European market.

From the little that I have said it will be seen that almost the whole of the new addition made to the field of production of ipecacuanha is to be found in the immense province of Matto Grosso. It was in the year 1824 that the first plants of *Cephaëlis* were discovered in this part of Brazil, in the neighbourhood of Villa Maria, a little village situated on the left bank of the Rio Paraguay. They were recognized by a doctor of Matto Grosso, who accompanied the "Guarda-Mor" sent to test the auriferous sands of Rio Cabaçal, but for a long time no one thought of making the plant an object of commerce, and the utmost expected was that its use as a medicine would spread to a small extent in the country. Later, towards the year 1830, an old forester named Motta, who had acted as guide to the expedition, and who himself gave me the details, recognized the same root in the forests which bound Rio Suputoba, and drew the attention of a merchant of Villa Maria to it. The latter, struck with the similarity between this root and that which was gathered with so much profit in the sea-bound provinces, sent samples of it to Rio de Janeiro, and from that moment the collection of it commenced. The forests in which the *Cephaëlis* thrives have a peculiar character, which it is difficult to forget; this is due to the presence of several remarkable vegetables. Almost all those of Matto Grosso are situated in the valley of the Paraguay, above Villa Maria, or even in those of the affluents which it receives at this part of its course. In order to be able to judge better of the parts inhabited by such an interesting plant, I went myself to one of these forests, situated on the Rio Cabaçal. Six days of navigation through a bower of verdure brought me to the end of my journey. I had quitted the Rio Cabaçal some hours previously by a little river which flows into it, the Rio Vermelbo, on the banks of which a little *hangar* of leaves of the palm indicates that the commencement of the domains of the *Cephaëlis* is reached. This place has received the name of Port de Rueno; it was more than a year since any one had visited it.

The woods which immediately adjoin the river are situated too low for the *Cephaëlis* to succeed there, and when the river is in flood the soil is covered to a very considerable distance from the banks, a state of matters which often lasts during several months of the year. The growth of other vegetables is, however, only the more active; and when I entered on the path which leads towards the interior, I soon found myself in the heart of a vegetation of the most grievous description, which, without the large knives with which my Indians were armed, would have formed a barrier difficult to break through. The bamboos, in particular, have here in this part of the forest formed such a compact network that I almost became entangled like a fly in a spider's web. However, at about a mile-and-a-half from the river banks the ground begins sensibly to rise; the soil now consisted only of sand, slightly humid and impregnated, if I may so speak, with the *detritus* of vegetables which have replaced its surface. Some new features of vegetation showed at last that I had reached a botanical region rather different from that which I had just quitted. Several species of palms with which I had not met up to that point, arrested my attention, particularly *Euterpe oleracea*, or "palmetto molle," with a slim, tall trunk, and the *Enocarpus bacaba*, with distichous leaves, were there conspicuous, and entirely replaced the *Cocos capitata* which had accompanied me until then. Still further, in places where the

depressed surface allowed some affluent source of the river to filtrate, there appeared in the midst of *Mauritia* and tree ferns the *Iriartea exorrhiza*, very striking on account of the disposition of the aerial roots, which its trunk produces at fully two metres (six feet) above ground, and which descend obliquely to it, forming so many natural supports upon which the tree rests. It is specially in the firm ground that surrounds these little marshes, and in the perpetual shade of those other trees which grow in company with the vegetables that I have just named, that the *Cephaëlis* delights. It is a small shrub, with a stem plain and bare towards the base, where it is often bent and more or less radical; its leaves, generally close to the top of the plant, give it some resemblance to the *Daphne* of our woods.

The *Cephaëlis* rarely grows singly; it is much more common to find a number of plants clustered in the form of a loose round bush, which the collectors of *poaya*, or *poayeros* (as they are called), know by the name of *redoleros*. In gathering the root of the *Cephaëlis*, the poayero seizes with one hand, and if possible at one time, all the stems which form a bunch, whilst with the other he drives somewhat obliquely into the soil and under the base a strong pointed stick called *saracoa*, with which he afterwards makes a see-saw movement. The mass of earth which imprisons the roots is thus raised, and when the operation has been dexterously made, all the roots attached to the bunch are at once obtained, and almost without fracture. The poayero then separates the part used, shakes it lightly free from the adherent earth, and puts it in a large bag, which he carries for this purpose suspended at his side; then he proceeds to attack another clump, and so on. A workman who possesses all the requisite qualities may, under the most favourable circumstances, gather in a day about fifteen kilograms of ipecacuanha; but the harvest of an ordinary labourer seldom exceeds five to six kilograms; some even scarcely collect three or four in the same space of time. The season also influences considerably the facility for the work.

In the rainy season the earth being much more easy to till, the operation of gathering goes on much more rapidly, and the root then obtained is not only heavier but is less fragile than in the dry season. Towards the fall of night, the workmen dispersed in the forests, and who are, as I shall be able to say later on, under a unique direction, reassemble at the camp. Each poayero then pours the result of his labours into the hands of a steward, who weighs and spreads it upon hides to dry. The more rapid this last process, so much the more successful is it; and as far as is possible it is carried out in the full blaze of the sun. In favourable weather the root is quite dry at the end of two or three days at the most, always supposing that during the night it is sheltered from the dew. When ipecacuanha has been dried slowly, or packed when still somewhat damp, its surface is always more or less mouldy, and it does not break so sharply as when the opposite is the case; nor has it the resinous and roseate appearance which characterizes it when it has had all the wished for care.

The ipecacuanha harvest continues throughout the whole year, but it generally relaxes a little in the rainy season, because of difficulty often experienced in drying the produce. Many extractors, however, prefer this time of year because of the great facilities for gathering it. Now, as the flowering takes place exactly at this season, that is about the months of February and March, there is no doubt, as M. Martius observes, that the fruit of the plant must suffer; and if nature had given to the *Cephaëlis* only that means of multiplication which it has in common with all plants, the usual mode of collection would have been fatal to it. Happily for humanity it has been otherwise decided. It appeared to me that the *Cephaëlis* was much more seldom reproduced by seed than by another process, of which I ought now to speak. No one is ignorant of the great power of reproduction which exists in the roots of some of our garden plants, particularly in that of *Maclura* and of the *Paulownia*. We know that the roots, however small we may cut them, have the faculty of reproducing a new individual from each of the fragments; one may almost compare them in this respect to algæ, or to certain polypes. Well, this is the case to a certain extent, with the root of the *Cephaëlis*. It is by a true system of cuttings, which the poayero makes in spite of himself at each spot, when he effects the uprooting of a plant, that the latter reproduces itself. Each fragment which remains accidentally in the ground after the operation is sufficient to renew the plant. The intelligent poayeros of Matto Grosso, who are well aware of this peculiarity, never fail, when they shake the earth off the plants which they have just taken from the ground, to leave intentionally the roots which have been accidentally broken; and most of them are even careful before rising up to rapidly refill the hole caused by the extraction. Hence it is probable enough that this mode of vegetation in round clumps does not belong normally to the *Cephaëlis*, but that it is owing to that kind of manipulation to which it is subjected, and which, as we see, far from destroying it, appears, if it is done with a small degree of intelligence, to tend to multiply it all the more. Still it must not be thought that the *reboisement* of the forest of ipecacuanha (if I may be allowed to use the expression in connection with such a small vegetable) takes place year after year. According to the most distinct information I have obtained on this subject, about three or four years must necessarily elapse before a district which has been cleared can be again harvested with equal profit.

The gathering of ipecacuanha has just the effect —contrary to what generally takes place in like cases—of submitting the *Cephaëlis* to a kind of accidental culture, eminently suited for its preservation, and the circumstances that I have quoted are not the only ones that have contributed to this happy result. Another plays perhaps a no less important part, that is, the burning of the forests. Before this was vigorously practised the ground was so encumbered with the numerous vegetable remains which accumulated there, that not only did the seeds of the ipecacuanha not find within their reach suitable soil, but it often even happened that full grown plants were in time choked. On the other hand, the extraction of the root was rendered more difficult owing to the necessity of raising each spongy layer before being able to reach the true soil, owing to the existence of the leaves which are now destroyed. One sometimes sees a forest fire in the ipecacuanha region last for several months consecutively.

In conclusion I may say that when the root is dry it is broken into smaller fragments, shaken in a sieve to separate them from the sand or earth which may still adhere to them, and finally put in bales for convenience of transport. Many of the extractors of

Villa Maria construct the boats which are to serve as the means of conveyance in the very forests where the ipecacuanha is gathered. The collection of ipecacuanha in the Matto Grosso only commenced, as I have said, ten or twelve years ago, although it was well known before that period. That first collected was sold on the spot at the rate of 2 francs 60 centimes per pound, and in Rio de Janeiro more than double. This high price attracted a numerous population to the forests of the Upper Paraguay, and after a certain time there was such an immense quantity of the drug in the Rio market that nobody would look at it; it was verily a *drug* in the market; instantly its price fell at least a franc. From 1835 to 1837, 150,000 kilograms of ipecacuanha were taken from the neighbourhood of Villa Maria; the forests were then occupied by from 1200 to 1500 gathering; men, women, and children, bond and free, advanced several days' journey into the forests of Paraguay, and there spent whole months in uprooting the plant. The average price of the "arrobe," about 14½ kilograms, was then from 50 to 60 francs at Villa Maria, and from 78 to 90 francs at Rio de Janeiro. Afterwards from the glut in the market, the enterprise was suddenly and almost completely abandoned; then little by little the price mended, and the poayeros gradually returned to the woods. Now that the produce yearly obtained amounts to about 1000 arrobes, or 15,000 kilograms, its value remains almost stationary. At Villa Maria ipecacuanha of good quality brings in about 25 to 30 francs the arrobe, and conveyed to Rio, from 76 to 80 francs.

THE NEW SYRUP OF THE IODIDE AND TINCTURE OF THE CHLORIDE OF IRON.*

BY JOSEPH P. REMINGTON.

The so-called tasteless iron combinations, which have recently been brought to notice by J. L. A. Creuse, of New York, have attracted much attention of late, and an entire revolution in the manner of making a most useful class of preparations has been threatened.

The advantages claimed for the innovations are numerous: freedom from *nauseous* taste (they cannot certainly be called tasteless), ready solubility in water, non-liability to change in dispensing, little or no destructive action on the teeth, miscibility without decomposition with bark and other desirable tonic preparations.

Setting aside for the present the theories which may be brought forward to prove their composition (the *rationale* of new compounds often being mere collections of symbols twisted into a shape that will explain on *paper* a reaction), the first thoughts that occur to a practical pharmacist in connection with them, are:—

Can they thoroughly replace the old and disagreeable remedies that have been prescribed for years past?

Can desirable processes be devised whereby every pharmacist may make in his own store the new preparations?

Is the claim for stability sustained by experience?

It is the intention of the writer to attempt to answer these questions.

First, in regard to replacing the old remedies. Iodide of iron has been used constantly since 1824, and it is regarded as one of the very best alterative and tonic preparations; yet the objections to its use are numerous, and were it not for its intrinsic merit it would have slept long ago in an unhonoured grave; it is always unpleasant to take, even when freshly prepared, and becomes more so as it gets older.

In practice, but few pharmacists prepare their own syrup; reliance is placed on the general market, and the results, of course, are variable. A syrup one week or two years old may be purchased, possessing various degrees of colour and acridity (agreeing better, however, in the latter quality), and neither the patient nor physician are probably aware of the cause, and practitioners are frequently debarred from prescribing for delicate persons and children on account of the disturbance to the digestive organs.

The new syrup of the iodide of iron does, in the writer's opinion, remove the objection to the old preparation. It has fallen to his lot to make about twelve gallons of the improved syrup at various times, which has been dispensed, and has been used by physicians in their practice for the usual diseases where the old syrup was indicated.

It seems to answer well in scrofulous and syphilitic diseases, in obstinate skin affections, and as an internal remedy where morbid secretions of the glands exist, but particularly for delicate females and children of scrofulous habit requiring an alterative tonic. Its taste is pleasant; the teeth were not discoloured and the digestive functions were not disturbed by its use in any of the cases that were reported. A formula for the preparation is subjoined, which is based on the researches of Creuse in this direction.

New Syrup of Iodide of Iron.

Take of—

Re-sublimed Iodine	378·9 grains.
Iron Wire (card teeth)	90 „
Distilled Water	2 fluidounces.
Citric Acid (dry)	408 grains.
Potassium Carbonate (pure)	475 „ or q. s.

Weigh accurately 252·6 grains of the iodine, and place in a beaker or flask of at least four fluidounce capacity, then add to it the card teeth and half a fluidounce of distilled water, cover the beaker with a watch-glass, and agitate occasionally until the liquid has acquired a green colour and lost the smell of iodine (care should be taken about this point—all the iodine should be in the state of a ferrous salt); filter the liquid from undissolved iron, rinse the iron with a small quantity of the distilled water, pour on the filter, and finally rinse the filter; now add to the filtrate the remaining 126·3 grains iodine, and allow it to dissolve; it forms a rich, ruby-red solution. Place 406 grains of the citric acid in a small evaporating dish, add one and a half fluidounces of distilled water, and apply heat until the acid dissolves and the liquid boils; without removing from the fire add, by small portions, sufficient potassium carbonate to neutralize, avoiding an excess; if a slight excess should happen to be present, correct it by adding the two grains citric acid reserved. Now pour as much of this solution of potassium citrate while hot into the red solution as will change the colour to a bright green, and make up the measure to twenty-six fluidounces with simple syrup. The finished syrup contains about five grains of the salt in each fluid drachm, and the dose would be from one-half to one teaspoonful.

The new tincture of the chloride of iron can replace the old, with advantage, in most cases where the tonic effects are alone desired, without any styptic action.

New Tincture of Chloride of Iron.

Liq. Ferri Chloridi, U.S.P.	1 fluidounce.
Citric Acid	544 grains.
Sodium Carbonate	1000 „ or q. s.
Water (distilled)	1 fluidounce.
Alcohol	a sufficient quantity.

Dissolve the citric acid in the distilled water, and heat to the boiling-point, gradually adding the sodium carbonate until the acid is saturated (the quantity varies with the amount of moisture present in either), mix with the iron solution, which will now acquire a beautiful green colour, and make up the measure to four fluidounces with alcohol.

One of the strongest points in favour of this series of preparations is that they can be made to offer a great variety of desirable combinations. The finished green

* From *The American Journal of Pharmacy* for September, p. 385.

solution of iodide of iron may be evaporated at a low heat, and, as suggested, a salt formed which can readily be made into pills of three grains each, and, of course, requiring no insoluble coating to protect them; it may be dissolved in water in almost any quantity, forming a simple solution, or in syrup to form a syrup of the iodide of iron of any required strength. It may be administered in combination with compound tincture of cinchona and compound tincture of gentian, or it may really, *when added*, put some virtue in the numerous tonic elixirs that are being prescribed so largely throughout the country.

A formula is appended for an elixir which has acquired some sale in Philadelphia. The writer does not wish to be considered as endorsing it, however.

Elixir of Gentian with Chloride of Iron.

Tincture of Chloride of Iron (new) .	6 fluid-drachms.
Tincture of Cardamom	½ fluidounce.
Fluid Extract of Gentian	3 fluid-drachms.
Alcohol	2 fluidounces.
Oil of Cinnamon (true)	1 drop.
„ Coriander (fresh)	1 drop.
„ Anise	1 drop.
„ Orange	3 drops.
Simple Syrup	3 fluidounces.

Water, sufficient to make sixteen fluidounces.

Dissolve the oils in the alcohol, and having mixed the other ingredients together, incorporate all thoroughly, adding sufficient water to make one pint, and filter. Dose: a dessertspoonful. This preparation contains five minims tincture of the chloride of iron in each dose; enough gentian is present to flavour the elixir somewhat, and give it part of a name, and not enough to injure the greatest desideratum—a pleasant taste.

LITTLE THINGS.*

BY ALEXANDER FORSYTH.

There is indeed a veritable world of wee things, animal as well as vegetable, far below our field of vision, that the naked eye hath never seen. Although these subjects are minute they are not the less perfect, and we marvel at seeing things of such little power, and having a sphere of action so limited, exhibit under the microscope so much design, and such elaborate workmanship. Why is that insect roaming at large inside a bellflower no larger then a mustard seed? Is he impregnating the flower, and sipping honey to reward him for his pains? The flower had need of his neat service, and he had need of the flower; and when gardeners isolate flowers, they have to do the work of impregnation, as best they may, with a camel-hair pencil, and thus learn the use of little things.

In attempting to convey accurate ideas of plant life to beginners, I think we miss an important clue by teaching first the development of plants from seeds, whereas the seeds themselves are only a kind of middle state of plants, well adapted for transit, but by no means the beginning of plant life. Certain pollen masses show under the microscope like finely rounded snowballs with outstanding hairs, and no one doubts that the pollen falls on a moist medium, a bed of nectar, and so fertilizes the seed. It is worthy of remark that the dryness essential to the welfare of the pollen, and the moisture equally essential to the healthy character of the stigma, do not interfere with each other, although often less than a hair-breadth apart. Dr. Lindley quoted the speech of a bishop, who said, "the grass had a flower although it was a very small one." Now if any one will examine an ear of wheat when in bloom, and see two bodies about half the size of a cheese mite dangling from a hair almost invisible, and is told that every grain has to be thus treated before we can get either seed or bread corn, he will see of what service small things are, and learn upon what a slender thread our staff of life is hung.

* From the *Gardeners' Chronicle*.

If we turn to cryptogamic plants, and examine the structure of ferns, we find the first botanical link missing; and the spores of ferns acting like the pollen of flowering plants, and falling upon a moist surface, vegetate. In the first appearance of ferns from spores there is no likeness to the parent plant, and some ferns, such as the elk's-horn, have false, or radicle, leaves always. Flowering plants seem to suckle their young by providing starch and sugar, oil, etc., for them to begin their new life with. I would advise beginners to use the microscope, and mark well the difference between the flowerless and the flowering plants, and upon that solid foundation, which no one dares to impugn, let him begin to build, first fishing for small fry to catch how ferns live and propagate their species, for they all attain that important end; and when he has mastered the simplest forms, let him try the next step higher, but by all means let him begin at the bottom of the ladder.

No one can proceed a single inch in the science of plant life—if that science is to be a guide to successful practice—until he has studied the use and service of water. When we see the cells of plants under the microscope, they seem largely composed of water. In the old-fashioned cucumber frame we often see aërial roots protruding from the "hill," white and crisp, like frost on glass; and we know that these roots owe just as much to the "mother liquor" of water in the form of hot vapour, as tadpoles owe to the water of their pond. These delicate aërial roots exhibit above-ground the action that is constantly going on underground, and the activity with which tissue is formed where water and where warmth are not wanting. The botany of books does not hold up to the reader the immense importance of the water to the feeders (spongioles), and of the feeders to the plant, for the rearing of trees like the willow by truncheons, and bushes like the elder by rods, and the whole art of propagating by layers and cuttings, the increasing of succulent plants by their leaves, and of plants generally by seeds, all depend upon getting them to root first. To do this, some, like the truncheons, must be buried; others, like the layers, must be lightly covered, whilst the succulents are left bare on a bed of sand; but one and all must either strike root or die—but see how each sets about this essential work. The succulent, being a bag of water, will root freely without any covering, in dry sand; whereas, the truncheons, twigs, cuttings, and seeds would every one die under the same treatment. Hence the need of a constant supply of moisture, for the microscope clearly shows, as has already been said, that every cell of every root owes more than half its volume to water. Surely, then, there is some art in watering. It is not a watering and done with it that plant life requires when in active growth, but a constant supply of moisture. It is painful to see a clumsy hand watering plants, as he would swill a yard or extinguish a fire. The gentle rain has no body of water beyond its single drops, and they take time to fall, and fall so lightly, that the risk of injury to the foliage is reduced to the minimum, whilst the summer cloud acts the part of a parasol or sun-shade. This, then, is the pattern for watering in perfection.

But when we talk of gentleness in watering, and of constant watering, we have only to look at the loving dew taking into its bosom nightly every blade of grass, and taking every leaf as it were with both hands into its embrace, for the dew seems to rise as well as fall, and all night long it acts like a wet-nurse to both surfaces of the leaf. Surely this moisture is needed, otherwise it would not have been so kindly bestowed; but what a small quantity is here spread over a large space. The ivy on the ruin wall, and the rue in its limestone crevice, get their full share of gentle dew; but the rose that has passed the night bedewed in tears, which it will take the morning sun some hours to dry up, will show the full-bloom flower sweet as well as fair, and plead the cause of looking well to little matters. The practised eye will see the rose leaf carrying the bell at every point, and by that little index know that all is well.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 4, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SCHOOL OF PHARMACY.

THE transition from the holiday occupations of the Conference meeting to the more severe business of another session has this year been so sudden that it is almost with a sense of surprise one finds the inaugural address to the students claiming attention while the echoes of the Conference address are still lingering in our ears. But there may be some advantage in the unusual and accidental approximation of these two important features of the pharmaceutical year, since they are both characterized by reference to the changes recently introduced in the School of Pharmacy, and since the tendencies of the comments on those changes in the two addresses are somewhat different. These circumstances may, therefore, operate beneficially by attracting more general consideration of the subject of education than might otherwise have been the case.

Mr. BRADY, speaking as President of the Pharmaceutical Conference, has emphatically given expression to the opinion that the changes in question are not calculated to conduce to the promotion of that high-class education, the attainment of which has always been the avowed aim of the Pharmaceutical Society. On the contrary, he considers that the new arrangements point solely to increased facilities for obtaining the minimum amount of knowledge necessary for passing the Minor examination. To anyone acquainted with Mr. BRADY'S aspirations in regard to the position of British pharmacy and its followers, or with his labours to advance it, there cannot be any ground for surprise that he should view with suspicion and distaste measures which in any degree fall short of the high standard he would desire to see established. In this respect we heartily sympathize with the feelings which prompted his recent comments; but at the same time we cannot share with him the opinion that the altered educational programme can only promote that "dull, low mediocrity which above all things it should be our aim to avoid."

Under existing conditions it seems imperative that regard should be had to the present legal standard of pharmaceutical qualification, and that, however high may be the aims of the Society for the future, its action for the time being must necessarily and properly be directed towards making the legal minimum of qualification, as far as possible, adequate for the purposes it is intended to serve.

We heartily concur with Mr. BRADY'S approval of the suggestion that the Minor examination should be made a matriculation for students entering the School of Pharmacy at Bloomsbury Square, and that it should be recognized only as a qualification for assistants at the most; but we cannot perceive any reason why the excellent principle of "thoroughness" should not also be acted upon, so far as practicable, in regard to the Minor examination, and that amount of technical education which is necessary to enable students to pass it.

For our own part, we entertain a higher opinion of the examining body than would be consistent with the notion that mere superficial and ephemeral knowledge is sufficient to enable candidates to pass even the Minor examination, and we think it would be setting too low a value on the attainment, even of that standard of qualification, to suppose that mere "cram" can be sufficient to satisfy its requirements.

In Mr. SANDFORD'S remarks on this subject the considerations we have here alluded to seem to have been taken into account. He is equally emphatic in his recommendation that the word "thorough" should be the motto of both students and teachers, and in urging that this principle should be observed in the course of study requisite for the Minor examition he does not at all overlook the desirability of its being regarded only as a preliminary step. Hence he characterizes the change that has been made in the educational arrangements of the Society as being merely a termination of pecuniary or profitable interest in education. There are many reasons to justify this course now, and one of the strongest arguments in favour of it consists in the fact that its adoption does not in any way involve disregard of the Society's original object, that the Major qualification should be obtained by all who desire to practise pharmacy on their own account.

THE BENEVOLENT FUND ELECTION.

AT the meeting of the Council on Wednesday last, it was resolved that, in consequence of the recent death of Mrs. HANNAH GREAVES having occasioned a reduction in the number of annuitants on the Benevolent Fund, two annuitants shall be elected at the forthcoming election on the 24th inst., instead of one, as had been previously advertised.

SPECIAL GENERAL MEETING OF THE PHARMACEUTICAL SOCIETY.

WE are requested to call attention to the official notice on the first page of this week's Journal, issued in compliance with a resolution of the Council, passed on Wednesday last, to the effect that a Special General Meeting of the Members of the Pharmaceutical Society will be held on Wednesday, the 22nd instant, for the purpose of considering and, if thought proper, confirming the alterations in the Bye-Laws made in accordance with the wishes of the Privy Council.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

October 1st, 1873.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT, IN THE CHAIR.

Present — Messrs. Atherton, Baynes, Betty, Brown, Frazer, Hampson, Mackay, Owen, Radley, Robbins, Sandford, Savage, Schacht, Shaw, Urwick, and Williams.

The VICE-PRESIDENT stated that the President would not be present in consequence of the very serious condition of his friend Sir Edwin Landseer.

The minutes of the previous meeting were read and confirmed.

Two associates who had neglected to pay their subscription within the proper time were ordered to be restored to their status on payment of the subscription, together with a fine of one shilling.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

Fletcher, Frederick William ...Totton.
Rammell, Edward.....Byculla, India.

Chemists and Druggists.

Bulmer, Richard Porter .....Pocklington.
Kemp, John .....Lincoln.
Payne, Jacob Hugh .....London.

ASSOCIATE.

The following having passed the Minor examination was elected an "Associate" of the Society:—

Rutter, Thomas Dixon.....Scarborough.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination were elected "Apprentices or Students" of the Society:—

Amery, John.....Taunton.
Gibson, John Chambers .....Manchester.
Howells, William .....Llandovery.
Stedman, Harry Bernard.....London.
Todd, George.....Durham.
Wilson, Erasmus .....Southsea.
Gostling, William Ayton .....Diss.
Mitchell, Charles A.....London.

FINANCE.

The report of this Committee was read and adopted, and sundry payments of salaries and accounts were ordered to be made.

LOCAL SECRETARY AT STOCKPORT.

Mr. Hervey Lowndes was elected Local Secretary for Stockport, in the room of Mr. A. H. Shaw, resigned.

BENEVOLENT FUND.

The report of this Committee was read, and in accordance with its recommendations the following grants were made:—

To a Registered Chemist in Sheffield, who has suffered for some years from the effects of an accident, £10.

To a Pharmaceutical Chemist in Dublin, in very distressed circumstances, £10.

To a Chemist and Druggist at Carmarthen, in very bad health, £5.

AN ADDITIONAL ANNUITANT.

Mr. ROBBINS proposed that in consequence of the recent death of an annuitant, Hannah Greaves, the Council should proceed to elect three annuitants instead of one. He thought more might be done with the funds at their disposal, and with a view to see what really might be accomplished he had procured the Government annuity tables, which gave the following result. Taking the average age of the annuitants when elected at 60, he found that the sum necessary to purchase an annuity of £30 for a man was £316 15*s.*; for a woman, £368 5*s.*, or a mean of £342 10*s.* If therefore they were to place ten annuitants on the fund, it would only require £3425 to provide for them. When the Benevolent Fund was started it was said that they must have a given sum before they could consider themselves safe in granting any annuities, and £10,000 was the sum mentioned. When that was obtained it was considered proper to grant ten annuities. No doubt it was right to have a certain sum in hand to begin with, but the amount mentioned was sufficient to provide annuities for ten persons, not for their lives only, but for all time. He thought there should be some limit to that process, and that they should cease to provide for all time, which simply meant that chemists and druggists in the future should not be required to provide for their own poor at all. The fund now consisted of between £13,000 and £14,000, and consequently there was sufficient to provide ten annuities for all time, and ten more for the lifetime of the annuitants; and this supposing they got no more subscriptions at all. He would propose therefore that three annuitants be elected, instead of one.

Mr. OWEN seconded the motion.

Mr. SHAW doubted whether the resolution was quite in order, as notice had been given of one election only.

The SECRETARY said there were five approved candidates, and he thought it would be open to the Council to arrange for the election of as many as they saw fit.

Mr. WILLIAMS said the question opened by Mr. Robbins was a very wide one, and ought, in his opinion, to be submitted to a committee. It would be a very serious thing to make up their minds suddenly to sacrifice a large portion of their capital.

Mr. URWICK thought the amounts mentioned by Mr. Robbins referred to sums to be actually paid down on the granting of the annuity, and was thus a sinking of the capital. He did not think it would be right to elect an annuitant without having sufficient funds invested to pay his annuity.

Mr. OWEN asked if the annuities granted absorbed all the income.

Mr. URWICK said that there was scarcely sufficient to pay the last annuitant put on the list.

Mr. OWEN said that very much altered the case.

Mr. ROBBINS said if it was the feeling of the Council, he would move the appointment of a committee on the subject.

Mr. BROWN said this was a very important question, and one which was occupying a great deal of attention just at present. As he understood Mr. Robbins' argument, he advocated the purchasing of annuities with the capital of the Benevolent Fund rather than the paying of annuities out of the interest received from that capital, because he stated that for £3425 ten annuities could be purchased. To his mind this would be a most improper expenditure of the capital of the Benevolent Fund, and one which he should never in his capacity as trustee of that fund sanction for one moment. The only proper and just principle in such cases, and the only one acknowledged in the operation of other societies contemplating similar objects, was that the capital should be invested, and the interest received therefrom devoted to the payment of the annuities to the individuals selected to receive them. In the next place, he understood Mr. Robbins to advocate the election of annuitants, although the necessary amount of money to pay the annuities was not invested, and that also seemed to him a departure from the only right and just principles of action; he could not conceive how it was proper to elect a person to an annuity when the capital was not invested to meet it, and some day it might happen that there would not be funds sufficient to pay it. It could not be said that they did not relieve all the deserving cases which came before them, for the Council were always ready to accept the recommendations of the committee who inquired very carefully into every application. No doubt there was a good deal of interest just now excited as to the investment of the Benevolent

Fund, and he thought a great misapprehension existed in the minds of many persons as to the propriety of the action taken by the Council in connection with those investments. He thought therefore it would be very well if, through the JOURNAL or by some other means, a better impression could be produced on the minds of gentlemen throughout the country, for it was a very poor reason for withholding contributions to the fund to state, as had been stated, that it was invested so as only to produce 3 per cent. interest. He did not think such a reason ought to prevail for a moment in restraint of charity, and he should be very glad indeed if such allegations were no longer made as a reason for not contributing. At the same time, he should like the arguments to be fairly set forth in the JOURNAL, showing that the Council had been guided by sound and safe principles, and that they had adopted the only legitimate course in preferring absolute security—although with a lower rate of interest—to greater returns, where the safety would not be so unquestionable. Their great desire was to keep the capital in a secure form, though the interest might be a little lower than in a more risky kind of investment. That was the only proper way of acting, considering, as they ought, not only the best interests of the present, but of the future also. He did not wish in the slightest degree to restrain the discretion of the Council in the distribution of these funds, but at the present time, at any rate, he thought they ought to adhere strictly to the rule which had been laid down of only electing annuitants when they had sufficient funds invested to pay their annuities, and certainly they ought not, by purchasing annuities, to depart from the principle of keeping their own capital.

Mr. ROBBINS said there seemed some little misunderstanding as to his proposal. He did not wish at all to diminish the capital from £13,000 to £10,000, but he was sure that the more there was given the more would be received in contributions, and already there was a large sum coming in annually. Nor did he propose, as Mr. Brown seemed to think, to buy Government annuities, but that they should continue to be their own bankers as hitherto. He simply adduced the Government tables because they were admittedly correct, as a basis for his argument. He did not advocate the diminishing of the amount already invested in any way, but there was a large amount coming in annually, and, as he had shown, ten annuitants would only require the sum of £342 each to secure an annuity for their lives, or for twenty annuitants £600 annually, still leaving more than £400 at their disposal for casual relief and to swell the funds already invested. He should be very pleased to propose the appointment of a committee to go into this subject and report to a future meeting of the Council.

Mr. URWICK said, as he understood, Mr. Robbins wished to pay the annuities out of the funds subscribed, but the fact was they had given that month quite as much as the amount of contributions, so that the question really was whether it were wise to cut off these occasional grants to deserving members, and replace them by annuities.

The discussion then dropped, and it was resolved—

> "That, in consequence of the death of Hannah Greaves having occasioned a reduction in the number of annuitants on the Benevolent Fund, the Council hereby resolve to elect two annuitants at the ensuing election."

RESIGNATION OF MR. MOSS.

A letter from Mr. Moss was read resigning his post as Demonstrator of Practical Chemistry, in consequence of his having accepted an appointment in the laboratory of a large wholesale house in London. Mr. Moss stated that he hoped still to contribute to the evening meetings of the Society.

HOUSE COMMITTEE.

The minutes of this Committee, in reference to the repairs and alterations now going on, were read and adopted.

LIBRARY, MUSEUM AND LABORATORY.

The Report of this Committee was read, containing various recommendations as to the conditions upon which the apparatus, etc., the property of the Society, should be handed over to the Professors for the purpose of lectures and otherwise. The Report was unanimously adopted.

PARLIAMENTARY.

The Report of this Committee stated that the solicitor advised that the alteration in the bye-laws made in accordance with the wishes of the Privy Council would require to be read three times at the Council, and to be then submitted to a special general meeting. The Report was received and adopted. The new bye-law with reference to the appointment of examiners, as agreed to at the previous Council meeting, was read the second time, and it was resolved—

> "That a Special Meeting of the Council be called on the 22nd inst., at 11 a.m., for the purpose of reading the new Bye-Law a third time, and that a Special General Meeting be convened on the same day, at 12 o'clock—noon—for confirmation of such Bye-Law."

The VICE-PRESIDENT said two questions had been put to him by Mr. Frazer with regard to future examinations. In the first place, Would past and future Minors who passed before October, 1874, be able to pass the Major examination on presenting themselves, without regard to their age? It appeared to him there could not be any doubt upon the subject.

Mr. MACKAY said the question seemed to be, Could a young man who had passed his Minor examination when he was nineteen, before October, 1874, go up for the Major even although he were not twenty-one.

The VICE-PRESIDENT said it appeared to him that whenever a candidate presented himself he must conform to the regulations in force at the time being.

Mr. FRAZER said he had no doubt many cases would arise similar to the one he had in his mind, when putting the question, of a young man passing the Minor when about nineteen years of age and going up for the Major shortly afterwards.

The VICE-PRESIDENT said the bye-law was very clear,—after the 31st December, 1874, no person could be admitted to the Major or Minor examination who had not attained the full age of twenty-one. The next question was whether those who passed the present Minor examination before December, 1874, and who went up for the Major examination after that day, would be examined in the subjects embraced in the present or the new Major examination. As to that also there could not be any doubt; they would come under the regulations in force at the time.

Mr. FRAZER said he asked the question, because in the new Major examination the number of subjects had been considerably reduced, whilst those in the Minor had been correspondingly increased, so that by passing the *present* Minor and going in for the *new* Major, the candidates would escape a considerable amount of work.

Mr. BETTY said he believed that was quite understood, for he knew some young men who were intending to avail themselves of the advantage thus afforded.

PROVINCIAL EXAMINATIONS.

The SECRETARY having read the report of the Board of Examiners made to the Council in August last,

Mr. SANDFORD moved the resolutions of which he had given notice, as follows:—

> "That, on the suggestion of the Board of Examiners, so far as regards the examination of candidates for the Jacob Bell Memorial Scholarships, and for the Pereira Medal, and the prize of books, embodied in the report of the Board submitted to this Council on the 6th of August, the Council hereby rescind so much of the regulation agreed to in October, 1872, as will enable future candidates for the Jacob Bell Memorial Scholarships to answer the questions set

for the examination provided for these scholarships elsewhere than in London or Edinburgh."

"That the examination for the Pereira Medal and prize of books shall be wholly conducted by the Board of Examiners in London or Edinburgh only."

When the report of the Board of Examiners came before the Council he gave notice of this motion, and also added to it a further resolution with regard to the Preliminary examination, which he had since thought better to disconnect and bring on as a separate motion; dealing simply in the first instance, with the candidates for the Jacob Bell Memorial Scholarship, the Pereira Medal, and the prize of books. At the same time, what would apply to one case would very much apply to the other. There had always been a feeling in his own mind that these examinations should not take place in the country, because it seemed to him rather too loose a method of conducting any examination at all. He said this without the slightest disrespect to the local secretaries, but the Pereira Medal was the highest honour which the Society had to offer, and if it was not worth the while of candidates to come to London or Edinburgh to pass the examination it was not worth having. On the other hand, if it were taken by a man who passed his examination in the country as now allowed, he should consider it most unfair to those who competed before the regularly constituted Board in London. He could not discuss this question without mentioning certain things which had come to his knowledge as to the method of superintending the Preliminary examinations in the country, for these examinations for prizes were conducted in the same manner; the papers being sent down to the local secretaries. There was sufficient evidence of irregularity in these examinations in many instances, because for one reason the local secretaries were all chemists and druggists, and could not leave their business for two or three hours to sit by a young man while he answered the papers sent down to him. They might be called into their shops, and would be obliged to go, if, as sometimes happened, there was no one else properly qualified to attend to customers. Evidence had been adduced, showing that local secretaries did sometimes absent themselves, sometimes appointed a deputy (but that was without the consent of the Council); and sometimes they changed the time of the examinations. Now these objections would apply as much to the Pereira Medal as to the Preliminary examination. It had also been pretty clearly shown that in some cases candidates had copied the answers of one another, either in the presence of the local secretary or when he was away. It was therefore extremely improper that examinations of such importance as those they were now considering should be conducted so loosely.

Mr. MACKAY seconded the resolution, simply because the examinations referred to were of such a scientific character, and because he knew that on some occasions and in some places there were very grave difficulties in the way of the local secretaries giving the time required for complete *surveillance* of the candidates whilst engaged in answering the questions. He was not, however, prepared to endorse the resolution which was to follow as to the Preliminary examinations.

Mr. WILLIAMS said it was important that this matter should be discussed with as much knowledge as possible, but at the same time he could not but bear in mind that no man had ever yet succeeded in obtaining the Bell Scholarship who was not thoroughly worthy of it He believed it was the same with regard to the Pereira Medal. He should like to know how many on an average competed for the Pereira Medal in the country and also for the Bell Scholarship.

Mr. SANDFORD said the latter had never been competed for in the country, but such competition might take place under the new regulations.

The SECRETARY stated that there were usually about five or six candidates altogether for the Pereira Medal.

Mr. SCHACHT said it was rather strange that the Board of Examiners, as was now stated, found insuperable difficulties in the way of carrying on satisfactorily that which never yet had occurred.

The SECRETARY said the difficulties had occurred with regard to the Pereira Medal and the prize of books, and it appeared the same thing would occur with the Bell Scholarship, the competition for which the Council had proposed should take place in the same manner.

Mr. BAYNES asked if there were any evidence showing that unfit men had obtained these honours.

The SECRETARY said the Board of Examiners had had ample evidence of the very unsatisfactory manner in which some of the Preliminary examinations had been conducted, and as regards the last examination for the prize of books and the Pereira Medal they considered that they had reason to be dissatisfied in some instances with some of the certificates.

Mr. WILLIAMS said it appeared the Council had adopted the suggestions respecting the Bell Scholarship on the recommendation of the Board of Examiners, and now before they had been tried the Board declared them to be impracticable.

Mr. URWICK thought if a failure took place they should have the grounds of it fairly placed before them. He thought all young men in the country should have the greatest facilities afforded them for competing for those prizes.

Mr. HAMPSON thought it would be very unwise in the Council to come to a hasty conclusion on this matter. The resolution contemplated a great change, and the Council had no evidence before it that the examinations had not been satisfactory. And even if there had been something not quite satisfactory in the examinations as conducted it did not necessarily follow that the entire system should be changed; it was quite possible to issue new and more stringent regulations, which would successfully remove every objection. He had the strongest feeling of opposition to this change on general grounds, because it showed what he considered an objectionable tendency to centralization. These examinations being carried on or supervised in the country had a general good effect upon the various places in which they were held, and he should be glad if the system could be extended; in fact if it could be done he should like to see a prize given to the best candidate in each county. If necessary, a committee might be appointed to thoroughly investigate the question, but he certainly hoped this great change would not be made without thorough and substantial reason.

Mr. SCHACHT entirely agreed in the position taken up by the last speaker, and he, as a country member, should feel that the whole of the country portion of the Society were unfairly treated if such a resolution were passed. Mr. Sandford very properly said that these prizes were amongst the highest honours the Society had to award, and because they were the highest honours he thought country associates and members should be as far as possible encouraged to compete for them. It was very convenient for Mr. Sandford to drop the last portion of his original notice of motion, but the whole thing being presented originally showed necessarily what it would lead to if they passed the first portion. He knew some members of the Board of Examiners were opposed to the Preliminary examinations being held in the provinces, as at present, but he, for one, thought it would be a very disastrous thing if they were discontinued. He felt sure that it would be the easiest thing in the world to obtain a whole cloud of supporters of the present system of Preliminary examinations, and very few less in opposition to the resolution now brought forward. At the same time he entirely agreed that they should do their best to make the supervision of the examinations complete and perfect, but he saw no difficulty in that being done. No doubt those local secretaries who were alleged to have failed in their duty had only to be informed as to what their duties really were, and a provision made by which, if unavoidably compelled to be absent, certain conditions should be

observed which would equally guarantee the correctness of the proceedings, and all irregularities would be removed. The same kind of thing was constantly going on with regard to the examinations under the Science and Art Department. He thought, therefore, the best plan would be to refer the matter for further consideration to the Board of Examiners and a committee.

Mr. BROWN said he did not know whether the resolution would not be negatived entirely, but otherwise it would be desirable to propose an amendment in the spirit of the suggestion just made. Every member of the Council would wish to pay the utmost respect to the Board of Examiners, but in order to act wisely and prevent hasty legislation, he thought further consideration should precede any resolution. It was quite possible there might be some grounds of complaint as to the manner in which the examinations were conducted in the country, but probably that arose, not from incompetency but from a little confusion and want of definite ideas as to the proper duties of the local secretaries. He looked with some jealousy on centralization, which no doubt might have its advantages, but the general distribution of examinations throughout the country excited a certain amount of emulation which was, in his opinion, very useful. He would therefore propose as an amendment—

"That the proposal to restrict the examination for the Jacob Bell Memorial Scholarship, the Pereira Medal and the prize of books to London and Edinburgh be referred to the General Purposes Committee, who shall meet a deputation from the Board of Examiners and discuss the question and report to the Council."

Mr. SHAW quite sympathized with the remarks of Mr. Schacht and Mr. Brown with regard to country members who were now in possession of certain privileges which it was not desirable to deprive them of. He should like to have heard more reasons given for making such a change, but if there were any defect in the present arrangements it would be competent for the committee or the Council to take them into consideration.

Mr. BAYNES said there might be cases where the local secretaries failed in their duties, but because such instances occurred it did not follow they must uproot the present system altogether. Why should they not amend the weak places? The subject had been discussed several times in his neighbourhood, and the general opinion seemed to be that there should always be two persons present, and he thought there would be no difficulty in getting a member of the Society to join the local secretary on such occasions. But if the matter were referred to a committee, they would no doubt devise a plan which would do away with existing objections.

Mr. RADLEY also supported the amendment. He thought there were several points in the instructions given to the local secretaries which might admit of amendment, and it was also a great pity that any one should be appointed to such an office contrary to his own wishes, or if he did not feel himself capable of properly discharging the duties. His notion was that these examinations might be held in certain districts, and not quite so much individualized, and he also suggested that a fee should be paid to the local secretary on each occasion, so that the Council might have a better ground for calling him to account in case of any irregularity.

Mr. SANDFORD said he could hardly be considered hasty in bringing forward this question, since it had been before the Council for two months, and the notice had been published in the JOURNAL. As to the centralization, to which Mr. Schacht objected, there was no organization in the country for carrying out the business of the Society, and in such a matter as examinations a clear, definite, well-defined system was required, which could hardly be the case whilst they simply depended on local secretaries, the great mass of whom were totally unknown to all the members of the Council. There might be one here and there who was known; but he should like to have the whole list of names read, and see how much the Council really knew of the great majority of them. As to their not having been informed of what was expected of them, each one was provided with a paper of instructions, giving very full particulars as to the rules to be observed. Even the payment of a guinea each would not prevent them being called off to attend to other engagements. No doubt the amendment would be carried, and probably in the result the question would be properly ventilated and examined, but he thought it would come more regularly if he declined to withdraw his motion.

Mr. BROWN said the amendment was not proposed in any spirit of hostility whatever.

On the question being put, the amendment was carried by a large majority.

Mr. SANDFORD said he thought, from what had been said, he had better withdraw the motion respecting the Preliminary examinations.

Mr. WILLIAMS suggested that that subject also should be referred to the committee, to discuss with the deputation from the Board of Examiners.

Mr. SANDFORD said he should be very glad if that could be done.

Mr. HAMPSON objected to this. He should oppose the resolution *in toto*.

Mr. BROWN thought this matter had better stand over for a time.

Mr. ATHERTON thought this was the most important part of the question, and would naturally form the chief topic of discussion with the deputation from the Board of Examiners.

After some further discussion, Mr. SANDFORD moved the resolution of which he had given notice, as follows, in order that an amendment might be proposed to it similar to that just carried:—

"That, after the 31st day of December, 1874, the system of conducting the Preliminary Examination by sending papers of questions, to be answered by candidates in the presence of local secretaries in different parts of Great Britain, shall be discontinued, and that persons applying to be registered as apprentices or students who cannot produce certificates of having passed the examination of some legally qualified examining body, approved by this Council, must appear before the Board of Examiners in London or Edinburgh for examination."

Mr. WILLIAMS seconded the resolution.

Mr. BETTY said they were all indebted to Mr. Sandford for the spirit which had actuated him in bringing forward this important matter, and for the courage with which he had proposed such a radical measure. The great point, in his mind, to be considered, was what really was the business of the pharmaceutical body, and the duties imposed upon them by the Act of 1868. If they were not an examining body, and had not a sacred trust confided to them by the legislature, what was their *raison d'être?* They had no right to existence, and if they did not watch the efficiency of their examinations, whether Preliminary or the subsequent ones, for what purpose did they exist? He would therefore propose an amendment:—

"That the question of the present system of conducting the Preliminary Examinations in the country be referred for consideration to the General Purposes Committee and the deputation from the Board of Examiners."

Mr. ATHERTON seconded the amendment.

Mr. SCHACHT asked what case had been made out for such a resolution. Not a single thing has been stated with reference to the manner in which the Preliminary examinations were conducted which could make it necessary to send any such matter for re-consideration at the hands of any one. His own experience in the matter, which was not very great, was very strongly in favour of continuing the present system, and in this he was supported by his neighbour, Mr. Stoddart, the local secretary for Bristol. Now and then no doubt they heard vague statements of mistakes having been made and irregulari-

ties occuring, but it was just possible, perhaps, that some mistake might occur even within those walls, but that would be no reason why the entire system should be broken up. The Board of Examiners had not memorialized the Council on this subject, although they had about the other matters, and he thought, therefore, it was quite premature to move in the matter. He should oppose both the amendment and the original motion.

Mr. FRAZER entirely sympathized with Mr. Schacht, feeling that no case had been made out. He should oppose the motion both because it involved a vote of censure on the local secretaries, and also because it would offer another barrier to the entrance of young men into the business. They were, in his opinion, getting too restrictive, and before long would find themselves involved in great difficulties. By high fees and high examinations they had cut off the present stream of druggists, many of whom were leaving the business to go into higher callings, and now they were stopping the springs and preventing young men entering. In this question there was involved a sort of feeling that the present examinations were not sufficient, but it must be remembered that the candidate who passed the Preliminary had no standing in the Society as a scientific body until he passed the Minor. They must have hands to conduct the commercial part of their business, and it would not do to place too many obstacles in the way. With regard to the efficiency of the local secretaries, and so on, it had been stated that some of the candidates assisted each other, but he did not attribute much importance to that, seeing they were all of the same class, and he did not think they would get much assistance from one another. He could not express how strongly he felt the absurdity of their pleading guilty in this manner even before they were accused.

Mr. HAMPSON expressed himself in perfect accord with the last two speakers, and thought trouble was being made where none really existed. They could not expect a perfect system, and he did not believe one existed even in Bloomsbury Square. Still if sufficient evidence were brought forward that there was a grievance, it would be their duty to inquire into it, but he did not think anything like evidence had been brought forward to justify the opening of this question at the present time. He knew some persons were in favour not only of doing away with the Preliminary examinations but the local secretaries themselves, and he feared this would be the first step in that direction, which he should consider a most fatal one.

Mr. BROWN could not see what cause had been shown for taking up this discussion. It was quite true, as had been said, that the Preliminary examination gave no status in the Society, and it would not be wise to throw any further impediment in the way of procuring apprentices. There was already a general complaint of difficulty in that respect, and although some made a great merit of not taking apprentices it would be a very unfortunate thing if that rule became general. If these Preliminary examinations were confined to London and Edinburgh it would be a great expense and inconvenience to parents and also to young men themselves. He hoped therefore that first of all the amendment would be negatived and that the original motion would then be disposed of in the same manner, so that the subject might be allowed to drop for the present at any rate.

Mr. WILLIAMS said there was no idea of making the examinations more stringent, but simply of having them properly superintended. Nor was it true that the Board of Examiners had not complained of the present system, for the Report before referred to by implication involved the inference that they were not satisfied with the fairness with which local examinations were conducted. It seemed to him a great pity to have one question referred to the committee and the deputation and not to allow them also to go into this other and more important question. He should therefore support the amendment, although he had econded the motion as a matter of form.

Mr. BETTY thought it would be a very strange thing if they negatived this amendment after carrying the previous one, seeing that the Preliminary examinations were conducted in precisely the same manner as the others ; the only difference being that in the one case they had perhaps five candidates and in the other something like five hundred. If it was worth the while of the Council to submit the question of the mode of conducting an examination affecting five individuals to a special committee, it certainly would be only right to consider how those same regulations affected five hundred.

Mr. SANDFORD thought the committee would not find it at all difficult to consider the two things together. It was not quite true that no reasons had been given for complaint, for the Secretary had in his possession ample reasons, which, however, he could not discuss there, though he should be quite ready and prepared to do so in committee. It had been said that irregularities might occur within that building, but it would be much more easy to correct them in a single house than in perhaps three hundred houses scattered all over the country. He hoped, therefore, the amendment would be passed.

On a division, the amendment was carried by a majority of one, the names being as follows :—

For : Messrs. Atherton, Betty, Mackay, Radley, Robbins, Shaw, Sandford, and Williams.

Against : Messrs. Baynes, Brown, Frazer, Hampson, Owen, Schacht, and Urwick.

The amendment was then put as a substantive motion and carried.

THE SOCIETY'S CALENDAR.

Mr. URWICK moved, in accordance with notice :—

"That Messrs. Churchill be invited to procure advertisements for the next Calendar of the Society."

He said the calendar was a heavy charge to the society, and it was thought the expense might in some measure be defrayed by advertisements.

Mr. BAYNES seconded the motion.

Mr. MACKAY said that it appeared the Glasgow University Calendar contained a goodly number of advertisements.

Mr. WILLIAMS thought it would be a disgrace to the Society to insert advertisements in the calendar; he would rather not publish it at all.

Mr. BROWN also strenuously opposed the motion, and in accordance with his suggestion, Mr. Urwick withdrew it.

Mr. WILLIAMS suggested that the new Calendar should not be issued until the amended bye-laws had been confirmed, which was agreed to.

PHARMACEUTICAL MEETING.

Wednesday Evening, October 1st.

The Opening Meeting of the Session 1873-4 was held at 17, Bloomsbury Square on Wednesday evening last. The chair was taken by the Vice-President of the Society, Mr. Alexander Bottle.

The CHAIRMAN expressed his regret at having to fill such a position, in consequence of the unavoidable absence of the President, through the death of an old, valued, and intimate friend—Sir E. Landseer.

The following list of donations to the Library and Museum was taken as read, and the thanks of the Society were voted to the donors :—

Des Aconits et de l'Aconitine : from M. Patrouillard,—On the Eucalypts of Australia, by C. Hofmann,—The Toilet of Flora (1784) ; Memoirs of the Botanick Garden at Chelsea (1820) : from Mr. W. Young,—Specimens of Nature-printed Ferns : from Mr. H. C. Baildon,—Report on the Caoutchouc of Commerce, with Memorandum by Dr. Brandis : from Mr. J. Collins,—Fortsetzung von L. Gmelin's Handbuch der Chemie (sundry parts) : from Professor Redwood,—A Monograph of Ebenaceæ : from W. P. Hiern, M.A.,—Eleventh Annual Report of the Birmingham Free Libraries' Committee,—Hygiène

Élémentaire ; La Matière Médicale chez les Chinois ; De l'Ostréiculture : from Dr. J. L. Soubeiran,—General Index to the American Journal of Pharmacy,—A Sketch of the Geology of the Neighbourhood of Banbury : from Mr. T. Beesley, F.C.S.,—Skin Diseases, an Inquiry into their Parasitic Origin and connection with Eye Affections, also the Fungoid or Germ Theory of Cholera : from Mr. J. Hogg,—Glasgow University Calendar, 1873-4,—Two MS. Prescriptions : from Mr. H. Whitfield,—History, etc., of the College of Pharmacy of New York : from Mr. P. W. Bedford.

Specimens of Cape Saffron ; Bush Tea ; a small kind of Buchu Leaves ; and Cape Aloes : from Mr. J. H. Leslie, of Cape Town,—Specimens of White and Black Mustard Flour ; The Husks of Mustard Seed ; and Fixed Oil of Mustard Seed : from Mr. Greenish,—Specimens of Indian Medicinal Plants for the Herbarium : from Mr. George Pugh,—A Mounted Specimen of Chondodendron Tomentosum, consisting of leaves, root, stem, and fruit ; a fine Specimen of the Fruit of the same Plant : from Mr. D. Hanbury,—Specimens of Persian Stick Opium : from Mr. D. Howard,—Specimens of Cinchona Barks, representing the commercial sales of this year : from Mr. J. E. Howard, —Specimens of Indian Sarsaparilla ; and of Gum, gathered in Ceylon from the Blue-Gum Tree : from Mr. A. P. Balkwill,— An abnormally developed Pear : from Mr. S. Steele, —An abnormally developed Cucumber : from Mr. Baijent.

Mr. D. Hanbury exhibited some large leaves of Chinese rhubarb, *Rheum officinale*, the plant, which had been recently brought to Europe, and cultivated, he believed, at Paris and also at Kew ; also specimens of the fruit of grains of Paradise (*Amomum Melagueta*) from the West Coast of Africa, but ripened in this country, he believed, for the first time.

Professor Redwood's Report upon the Chemistry and Pharmacy Class.

The Chairman then called upon Professor Redwood, as the Senior Professor, to present his Report with regard to the Chemistry and Pharmacy Class.

Professor Redwood said it was not a very unusual thing for those who were entering on a campaign to have to announce losses or reverses at the outset, and to purchase experience at the cost of failure, but in that Institution they were accustomed to meet from year to year and each time to commence a new campaign with the announcement of successes. They marshalled out their forces ready for a new encounter, and set before them those who had distinguished themselves in previous engagements. He thought it would be found on the present occasion that their successes had not been less signal than heretofore. They had good men to announce to them who were worthy of the honours about to be conferred upon them, and he had no doubt there were equally good men present who were ready to take their places in the school, and would be prepared to receive similar honours next year. His subject was a large and comprehensive one, and he had no doubt they would agree with him in thinking that taking the range of physics, even the comparatively small part of it comprised in their programme, together with practical pharmacy, and the wide range of inorganic and organic chemistry, it need not be considered any discredit to a student, if out of a large number of questions, embracing different parts of these subjects, he should fail to furnish answers so generally correct that they should contain from 60 to 80 per cent. of matter to which exception could not be taken. The ladder by which their prizes were reached consisted of 100 steps ; at the top was perfection, at the 80th step was the highest prize, and at the 60th step the lowest. Those who attained to these elevations must manifest a large amount of knowledge, and it might truly be said, "All honour to the prizemen." But it must be admitted that there was a certain amount of luck in success. There was no man living who could answer any question that might be put to him on such a subject as chemistry. Much, therefore, of the success on these occasions must depend upon the extent to which the questions propounded happened to accord with the strong points of the student. He who succeeded must be a good man, but he who failed did not thereby necessarily indicate any discreditable want of knowledge.

The student who had obtained the highest prize in his class was undoubtedly one of the best they had ever had, and would do honour to pharmacy if it offered sufficient inducements to him to continue to apply his energies in that direction. Of the others he could say from his personal knowledge of them—and in making the award he knew not who the men were whose answers he was valuing—but knowing them now he could say that their position at the examination very inadequately represented their merits, which might be attributed partly, perhaps, to the fact that they had not the choosing of the questions, and that he had happened to choose the wrong ones for them.

Mr. Sydney Plowman, the first prizeman, had obtained 87 marks out of 100; the next, Mr. Cleaver, having only 73 marks, had not quite, but very nearly, obtained the bronze medal, and he therefore only had a certificate. Mr. Bascombe, who stood third, was also in a similar position ; but they were all good men and deserved all and more than all they obtained.

Chemistry and Pharmacy.

Hours—Ten till One and Two till Five. Standard Number of Marks, 100.

1. What are the qualities required in a good balance, and upon what points in the construction of the balance do those qualities depend ?

2. When was the metrical system of weights and measures introduced ? What was the natural object referred to as the basis of that system ? What is the measure derived from that object called ? What relation does the *litre* bear to that first measure ? What relation does the gramme bear to it ? Does the natural object referred to afford a reliable means of testing the correctness of the measures used in this system ?

3. When was the modern British system of weights and measures first established by Act of Parliament ? What was the object referred to as the basis of that system ? What is the measure derived from that object called ? What relation does the grain bear to that first definite measure ? What relation do the ounce, the pound, the pint, and gallon bear to the grain ?

4. What is the theorem of Archimedes relating to the effect of immersing a solid body in a liquid, and how would you prove it to be true ?

5. What is the composition of the mineral called Iceland Spar ? What is its crystaline form ? What effect does it produce on a ray of light when the ray passes through it in the direction of its optic axis, and also when it passes through two parallel faces of the crystal ?

6. What is a Nicol's prism, and for what purpose is it used ?

7. Explain the dynamical theory of heat, and what is meant by the mechanical equivalent of heat.

8. What is the highest temperature to which a liquid or an extract can be heated in the process of evaporation in a water-bath, and also in a steam-bath, as described in the Pharmacopœia ? Is there any difference in the amount of

heat expended in the vaporization of a pound of water evaporated by boiling with free exposure to the air as compared with its evaporation *in vacuo?*

9. From what source is phosphorus obtained? How is it manufactured? What are its characteristic properties? How is ordinary phosphorus converted into the red amorphous condition? Describe the production of phosphoric acid, with any remarks you may have to make on the process.

10. What is the substance used in medicine under the name of hypochlorite of sulphur? Describe its physical characters and composition.

11. How is hydrofluosilicic acid obtained? What is its composition?

12. What are the principal natural sources of potash? Describe the production of carbonate of potash from these sources, and state what are the most probable impurities of the products so obtained. Describe the production of *liquor potassæ*, with any remarks you may have to make on the process.

13. Describe and comment upon the process of the Pharmacopœia for the production of tartarated antimony, and give its composition.

14. Describe the compound ammonias, and show the relation they are supposed to bear to the natural alkaloids.

Report of Professor Bentley on the Botany and Materia Medica Class.

The Chairman then called upon Professor Bentley to state the results of the examination in the Botany and Materia Medica Class.

Professor Bentley said most persons were accustomed at that season of the year to take what was called recreation, and he had recently spent seven weeks in the country with that object, though, as he had only enjoyed about five fine days during the whole period, and had been at work about nine hours a day, many persons perhaps would think he had not been very fortunate in his pursuit of pleasure. However that might be, he always considered it a recreation in the truest sense to attend in Bloomsbury Square on such occasions as the present to meet a number of new friends as well as old ones. He would not repeat a tale, not thrice told, but twenty-three times told, in making his report as to the class of Botany and Materia Medica, but would say nothing more than that which he always had to say—the class had been everything he could desire. This year also he could speak with particular satisfaction, because he had taken especial means to estimate the diligence of the class by instituting weekly examinations throughout the whole Winter Session, so that he was not only able to speak of the regularity of attendance, but of the attention with which the students listened to the lectures, and of the progress which they had made. With regard to the prize examination, he could cordially agree with his esteemed colleague, Professor Redwood, as to the great merit of the answers given. No honours had ever been awarded in connection with these classes which had not been thoroughly deserved, for four-fifths of the total marks were required in order to entitle a candidate to the silver medal, three-fourths for a bronze medal or certificate of honour, and three-fifths to a certificate of merit. This examination being *vivâ voce* as well as written, he had to give an additional number of marks, and the whole number therefore was 125. Out of that number Mr. Plowman obtained 115, and he therefore thoroughly endorsed what had already been said, that that gentleman would do honour to any profession, though he hoped he would never leave pharmacy. He could also speak of the other prize students in the highest terms. Mr. Cleaver, who had obtained the bronze medal, was worthy of high honour, and the same might be said of Mr. Bascombe, who had been awarded a certificate of honour. Those gentlemen who had obtained certificates of merit, Messrs. Luff, Greenish, and Compton, were somewhat younger; he was perfectly satisfied with the progress they had made, and he had no doubt that on some future occasion they would obtain still higher honours.

Materia Medica and Botany.

Botany.

Hours from Ten till One.

1. What are the substances contained in young cells? Describe the general structure, size, and form of *starch granules*, and show how Maranta starch or West Indian arrow-root may be distinguished from sago meal and potato starch.

2. What are the distinctive characters between roots and stems? Define the following:—Rhizome, bulb, corm, tuber, tubercule, epiphyte, parasite, and spongiole.

3. What do you understand by determinate, indeterminate, and mixed inflorescences? Define a spike, locusta, spadix, umbel, capitulum, amentum, raceme, panicle, cyme, and verticillaster.

4. What is the fruit? How would you distinguish small fruits from seeds?

5. Give the essential characters of the following natural orders, and enumerate the official plants which they respectively contain: Papaveraceæ, Rutaceæ, Convolvulaceæ, Polygonaceæ, Iridaceæ, and Melanthaceæ.

Materia Medica.

Hours from Two till Five.

1. What are the distinctive characters of aconite and horseradish roots? Give the botanical names of the plants which yield them, the natural orders to which they respectively belong, and state their properties, active constituents, and official preparations.

2. What are the botanical and geographical sources of pareira root? Describe its general and chemical characters, its properties and uses, and enumerate its official preparations.

3. What are the botanical and geographical sources of copaiba? Describe how it is obtained, its general and chemical characters; mention the substances which have been substituted for or employed as its adulterants, and the means by which they may be detected.

4. What is saffron? and what are its botanical and geographical sources? Describe the manner in which it is obtained and prepared for use, its general characters, the substances used to adulterate it, and the means of detecting such adulterations.

5. What is ergot? Describe its development, general characters, properties and uses; and enumerate its official preparations and their doses.

Professor Attfield's Report on the Practical Chemistry Class.

The Chairman then called upon Professor Attfield for his report in reference to the class of Practical Pharmacy.

Professor Attfield, in presenting his report, said, that during the past session ninety-nine students of practical chemistry had worked in the laboratories: twenty for the whole session of ten months, about the same number for five months, the others attending for shorter periods. With very few exceptions, these students worked with a genuine desire to obtain lasting knowledge, and not merely for ephemeral information, such as would enable them to pass the Minor examination. As might be expected of such pupils, their attention was well sustained throughout the session, and their conduct was, in a word, that of

gentlemen. At the end of July some twenty-three or twenty-four remained in the laboratories, of whom fourteen decided to enter for the prizes. Two retired as soon as they saw the list of questions, two more at the end of the first of the two days' examination, and the other ten competed. Three obtained less than sixty marks, and were therefore out of the running altogether; and of the seven remaining, eighty-six marks were obtained by the gentleman whose name had been already thrice heard, Mr. Sydney Plowman. Seventy-nine marks were obtained by Mr. Frederick Bascombe, seventy-seven by Mr. Blake, seventy-six by Mr. Fletcher, and the same number by Mr. Thomas E. Greenish; sixty-eight by Mr. Rimmington, and sixty-seven by Mr. Wood. In accordance with the rules made with regard to the distribution of prizes, the Council had awarded the silver medal to Mr. Plowman, the bronze to Mr. Bascombe, certificates of honour to Messrs. Blake, Fletcher, and Greenish, and of merit to Messrs. Rimmington and Wood.

Practical Chemistry.

Hours—Ten to Five. Books and Memoranda permitted.
Standard Number of Marks, 100.

1. Some "mineral water" is placed before you. Ascertain the nature of the salts it contains.
2. Report on the purity of samples of the following preparations:—

Powdered Tartaric Acid.
Powdered Borax.
Phosphate of Iron.
Calomel.
Sulphate of Zinc.
Carbonate of Sodium.

3. How much nitrate of silver is present in one fluid ounce of "the lotion?"
4. Make a complete qualitative and quantitative analysis of the "scale" compound supplied to you.

Note.—Manipulation as well as results will be scrutinized.

The Herbarium Prize.

Professor Bentley, being called upon to give in his report with regard to the Herbarium competition, said he regretted that so few collections had been sent in; at the same time, he was by no means discouraged, because it involved a great deal of labour to make such a collection, and many young men had very limited time at their disposal. He did hope, however, that on future occasions he might have to report that more collections were submitted; but he feared it sometimes happened that many persons heard that a fine collection was coming in just as it was whispered about that a good man was going to compete for a prize, and, as a consequence, many who were admirably qualified to compete, with a little faint-heartedness gave in. His advice to students always was, whenever they had honestly worked, whether in the class-room or in any other way, to try for all the distinctions open to them, and in the long run they would not be disappointed in this, at any rate, that if they did not get the prizes they would get substantial reward in other ways. He had to speak of two apprentices—one, Mr. Bibbings, who sent in a very good collection, comprising 430 plants, and to whom, on his recommendation, the Council had awarded the silver medal. Those who knew the difficulty of collecting plants, drying, preserving, and naming them, and considered that this was done by a young apprentice in the hours he took from recreation, would agree that great credit was due for such a performance. A certificate of honour had also been awarded to Mr. Conrad William Wright for a very creditable collection of plants, and he also well deserved the distinction awarded to him. He hoped that these young men would be induced to prosecute still further the science which they had begun so favourably.

The Vice-President then proceeded to distribute the various prizes to the successful candidates, remarking on the satisfaction which the Council felt in having at the top of the list one of the Bell Scholars. Mr. Sydney Plowman, he said, held out a bright example to young men who were about commencing their studies, since he had competed for the Bell Scholarship with very little assistance except his own persevering industry; and with regard to the other competitors, if they had failed to obtain the highest honours, perhaps because they had such a strong competitor to grapple with, they would carry away from that institution such groundwork of scientific knowledge as would enable them to show to the world that Bloomsbury Square could send out lights from its interior, as well as put in plate-glass windows in the front.

The Pereira Medal.

The Chairman then said that the highest honour the Society could confer—the Pereira Medal—had been awarded to Mr. Sydney Plowman, and he had great pleasure in handing it to him in the name of the Council.

The following were the questions for this examination:—

The Pereira Medal.

chemistry.

Time allowed—Three Hours.

1. Describe the best processes for eliminating the alkaloids of opium. State the physical and chemical properties of the more important of these alkaloids, and mention some of the compounds obtained from them by decomposition.
2. A powder presented for analysis is found to contain chloride, bromide, and iodide of potassium. State minutely the processes which you would adopt for determining the percentage of each constituent.
3. Explain the meaning of the terms isomorphous, isomerous, and homologous, and give a few examples in illustration of your answer.
4. An acid solution contains antimony, arsenic, and tin. How would you separate and identify each?

botany.

Time allowed—Three Hours.

1. Name and describe with examples the different kinds of fruits met with in the natural order Rosaceæ.
2. Explain the terms decussate, distichous, and fascicled as applied to the arrangement of leaves.
3. Describe the arrangement of the parts of the flower in an orchis, selecting an example.

materia medica.

4. Whence comes the eucalyptus recently employed in pharmacy? What is the natural order to which the plant belongs? Mention the species and the products used, and give any particulars you may know respecting them.
5. What plants produce the varieties of ipecacuanha? and what other plants produce roots having more or less similar properties? State the physical characters by which they are respectively distinguished.
6. Define manna. What are its botanical and geographical sources? and what are its constituents and properties?

The Prize of Books.

The Chairman said that the Prize of Books com-

peted for by those who had passed the Minor examination in honours during the year had been awarded to Mr. Walter Tearle.

The following were the questions for this examination :—

PRIZE OF BOOKS.

Time allowed—Two Hours.

State the best method of dispensing the following prescriptions, assign the reasons for the same, and write the labels in suitable language :—

℞ Bals. Copaibæ ℥iij.
Pulv. Acaciæ,
Pulv. Sacchar. āā. ℥iij.
Liq. Potassæ ℥j.
Tinct. Opii ℥iss.
Aqu. Cinnam. ad ℥iv.
M. ft. Mist.

Cuj. cap. coch.j med. ter die, dos. sensim augend. prout caput aut ventric. ferre queat.

℞ Ferri Iodid. gr. xij.
Quinæ Disulph. gr. xxiv.
Ext. Taraxaci q. s. (state quantity).
M. ft. pil. xxiv. capt.j ter die inter sing. dos. mistur.

State the specific gravity of æther purus B. P. and the process for purifying æther.

Describe and explain the B. P. process for making quiniæ sulphas.

State the B. P. process for making tinct. lobeliæ ætherea.

Enumerate the preparations of the Pharmacopœia which contain magnesia and its compounds, and state the strength of them.

THE JACOB BELL MEMORIAL SCHOLARSHIPS.

The CHAIRMAN announced that the Senior Bell Scholarship for the ensuing year had been awarded to Mr. Sydney Plowman, and the Junior to Mr. E. J. H. Thring.

The questions for these examinations were as follows :—

SENIOR BELL SCHOLARSHIP.

Time allowed—Three Hours.

LATIN.

1. Parse—In his rebus circiter dies decem consumit, ne nocturnis quidem temporibus ad laborem militum intermissis.

2. Translate into English—Subductis navibus castrisque egregie munitis easdem copias quas ante præsidio navibus reliquit : ipse eodem unde redierat proficiscitur.

ARITHMETIC.

3. Subtract $\frac{3}{8}$ of a crown from 1·59375.

4. Find the value of $\frac{5}{16}$ of a cwt. ; $\frac{3}{4}$ of a lb. avoirdupois ; $\frac{4}{5}$ of a mile.

5. Find the square root of $\frac{1000 \cdot 10001}{1000}$, and the cube root of ·03.

ENGLISH.

6. State your views as to the correctness or otherwise of the following :—The Queen, our ruler and governor. Mary Edwards is the author of this book.

7. Write some remarks on the advantages of the study of the exact sciences.

CHEMISTRY.

Time allowed—One Hour.

1. A solution contains zinc, alumina, and manganese. How may the presence of each be proved ?

2. How may pure methyl alcohol be prepared ? Explain the action of strong sulphuric acid upon it.

3. When a beam of light undergoes refraction by a prism, you obtain a coloured image which is termed the prismatic spectrum. Describe the spectrum and explain what peculiarity is observed in the spectra of coloured flames.

BOTANY.

Time allowed—One Hour.

1. What is the commercial nutmeg ? Describe and name the coverings that envelop it in its natural state.

2. Give the distinguishing characters of the natural orders—*Labiatæ*, *Scrophulariaceæ*, and *Boraginaccæ*.

3. Name and give the meanings of the terms which are applied to describe the margins of leaves.

4. What is the difference between a rhizome and a soboles ? Give an example of each.

MATERIA MEDICA.

Time allowed—One Hour.

1. What is *Ergota B. P.* ? Describe it. What is the pharmacopœial test for its powder, and what does this test indicate the presence of ?

2. From what sources can beberine and berberine be prepared ?

3. Describe cochineal and its adulterations,

4. What are the botanical and geographical sources of the official and commercial kinos, and how would you distinguish them ?

JUNIOR BELL SCHOLARSHIP.

Time allowed—Three Hours.

LATIN.

1. Translate into English—Perfacile factu esse illis probat conata perficere, propterea quod ipse suæ civitatis imperium obtenturus esset : non esse dubium quin totius Galliae plurimum Helvetii possent : se suis copiis suoque exercitu illis regna conciliaturum confirmat. Hac oratione adducti inter se fidem et jusjurandum dant, et regno occupato per tres potentissimos ac firmissimos populos totius Galliae sese potiri posse sperat.

2. Parse the last twelve words of the preceding paragraph.

ARITHMETIC.

3. Multiply $\frac{8}{9}$, $\frac{16}{24}$, $\frac{27}{30}$, $\frac{45}{60}$ together.

4. Divide 31·5 by ·126 and 5·2 by ·32, and prove the correctness of each result by fractions.

5. The value of the paper required for papering a room, supposing it $\frac{3}{4}$ of a yard wide, and $4\frac{1}{2}d$. a yard, is £2 3*s*. $1\frac{1}{2}d$. ; what would it come to, if it were 2 feet wide and 4*d*. a yard ?

ENGLISH.

6. Write a few remarks upon the value or otherwise of competitive examinations.

CHEMISTRY.

Time allowed—One Hour.

1. Give the proportions of the principal constituents of the atmosphere, and explain the more important part they play in the economy of nature.

2. Explain what is meant when we say that chlorine is a monad, oxygen a dyad, nitrogen a triad, and carbon a tetrad.

3. What is the action of strong sulphuric acid on nitrate of potassium, and dilute sulphuric acid on ferrocyanide of potassium, when heat is applied ?

BOTANY.

Time allowed—One Hour.

1. Into what sub-classes is the class *Dicotyledones* divided, and what are the distinctive characters of each ?

2. Describe the leaves of *Digitalis purpurea*, *Verbascum thapsus*, *Uva-ursi*, and *Buxus semperrirens*.

3. Give the botanical names and the natural orders to which the following plants belong—black hellebore, white hellebore, common celandine, lesser celandine, common speedwell, woodruff, black bryony and white bryony.

MATERIA MEDICA.

Time allowed—One Hour.

1. What are the botanical and geographical sources of the following drugs ? Name the parts of the plants used

in medicine, and state how those that are not natural products are manufactured :

Guarana,
Camboge,
Cotton Wool,
Cowhage.
Huile de Cade,

2. What is the official process for making *Infusum Calumbæ?* Why is it so prepared, and how can it be improved?

3. Describe the decomposition which takes place in the manufacture of volatile oil of mustard.

The Inaugural Sessional Address.

The following Address to the Students about to commence their studies in the School of Pharmacy was then delivered by Mr. George Webb Sandford :—

Mr. President, Ladies, and Gentlemen,—

My colleagues in the Council of the Pharmaceutical Society at all times extend to me great indulgence and great favour—great indulgence in bearing with my many shortcomings ; great favour in thrusting honour upon me—sometimes honour which in my judgment should be given to others, especially when it involves a duty to be performed which would be better performed by others than by me.

During my long connection with the Council I have seldom had a higher honour conferred on me than in being entrusted to give a few words of welcome to the students who are this day entering on the course of technical instruction provided in this Institution by the Pharmaceutical Society.

Under protest I have accepted the trust, but I shall need the same indulgence from this meeting which I have told you I so uniformly receive in the Council, for the remarks I am about to offer will neither be made interesting by examples of the wonders of science, nor adorned by flashes of wisdom crystallized in the poetic language of gifted men.

It is my purpose rather in a very plain way to speak to the young students of the necessity of embracing the opportunities now within their reach of acquiring such knowledge as will enable them in after life to stand side by side with men of science—opportunities of mental culture which must assuredly give them a better position among their fellow men.

There is perhaps one circumstance connected with the opening session which seems to make it appropriate that an old member of Council should address you this evening, and I am therefore the more reconciled to taking on myself the duty.

The circumstance to which I allude is this epoch in our history when the Pharmaceutical Society ceases to have a *pecuniary* interest in the education of rising pharmacists.

To me this is an especially interesting circumstance. Some of you may remember that when my friend Mackay delivered his admirable address at the opening of the session, in 1871, he startled his audience by anticipating this change ; but though I had long contemplated this, and spoken of it as the right and proper course for the Society to take, I was was not sanguine enough to expect to see it accomplished so soon.

I describe this change as exclusively the relinquishment by the Society of *pecuniary* interest in education, I mean pecuniary benefit therefrom, and I cannot too strongly guard all who may feel anxiety on the subject against supposing for a moment that the change implies the relinquishment of any other interest.

I feel it the more necessary to do this, because I am sorry to find an adverse opinion has recently been expressed by one whose judgment deserves all consideration. The Ex-President of the Pharmaceutical Conference prognosticates that "*the recent change can only promote that dull, low mediocrity which above all things it should be our aim to avoid*" ; that instead of stimulating "*extra-academical teaching*," we shall put it beyond the power of others to compete with professors, who will be subsidized free tenants of the Society's premises. I must confess that the advantages given to our professors are at the outset diminished rather than increased, and as to the effect of their possessing any advantage over other teachers, it is but reasonable to suppose that circumstance would necessarily compel greater exertion on the part of "*extra-academical*" teachers to make their schools efficient and attractive.

Thirty years ago, when education was declared by the founders of this Society to be the only true foundation on which we could depend, no means of diffusing that education existed, save in the establishments of a few honourable exceptions to the then dark condition of British pharmacists. Apprentices were taken professedly for instruction "*in the arts and mysteries*" of the trade, but, practically, chemistry as a science, or even chemistry as applied to pharmacy, was never taught.

The education of a chemist and druggist was then virtually five years' apprenticeship in the country and three or four years' employment as an assistant in London.

I look back to this as my own experience, for I had become a member of the Pharmaceutical Society, being in business and fully occupied, before the School of Pharmacy existed. I look back and contrast my opportunities with those of the young friends whom it is my privilege to welcome here this evening.

To supply the deficiency then existing, the Society wisely employed the funds at its disposal to establish a public school, at which a knowledge of chemistry, pharmacy, botany, and materia medica might be acquired.

Education was not compulsory, and at the first awakening it could scarcely be expected that private teachers would risk their time and money to found schools at which it might be acquired. So the Society stepped in ; first, with lectures by the best men of the day—Pereira, Tod Thompson, and Fownes—to which students were admitted at an almost nominal fee, and afterwards with the School of Practical Chemistry.

A good criterion of the success of such an institution is to be found in the position taken by its pupils in after-life, and I am proud to look through the list of honourable men who have since issued from this school imbued with a love of science, advancing the credit of pharmacy throughout the length and breadth of the land, promoting the desire for, and carrying the means of education to all quarters of Great Britain—men who shine forth as bright examples to the youth of the present day, the brighter because education which is now compulsory was with them but voluntary.

Circumstances are altered now. The public expect to find intelligence in those to whom they entrust

matters affecting their health, nay even their lives; and the Legislature in a protecting spirit says,

"*It is expedient for the safety of the public that persons keeping open shop for the retailing, dispensing, or compounding of poisons, and persons known as chemists and druggists, should possess a competent practical knowledge, of their business, and to that end . . . . . should, before commencing such business, be duly examined as to their practical knowledge, etc., etc., etc.*"

There is a homely old saying that one man may take a horse to the water but a hundred cannot make him drink, and so it might have been said, prior to the passing of the Act of 1868, as to the acquisition of pharmaceutical knowledge. Not that the Society had any reason to complain of want of progress, even under the voluntary system; it was sufficient to provide for, promote, and ultimately obtain such compulsory enactments as now *compel* all to drink at the fountain of knowledge. I may perhaps be told that the compulsion does not go far enough; that it compels only the acquirement of as much knowledge as will enable a candidate to pass a short ordeal in the examiners' room. This may indeed to some extent be true. But where is the remedy, or rather where the supplementary force which is really and truly to advance pharmacy, and consequently pharmacists, to a proper position in this country?

That remedy has been pointed out by those good men whom I have mentioned, and now it lies with you young gentlemen who are entering this establishment to perfect the knowledge which I hope you commenced storing during your term of apprenticeship; when I say "*perfect*" your knowledge, I use that expression in a very limited sense, for I am sure the oldest and most accomplished pharmacist in this room will agree with me that in science a man's knowledge is never *perfect*, the earnest pursuit of it leads us on, *entices* us on, and convinces us day by day that we have yet more to learn.

It is said, "*Poets are born, not made;*" but it is not so of chemists. Careful reading, honest work, many failures must be the training of the successful student: the very failures are of infinite service if we seek for the "why and the wherefore" of those disappointments. The non-attainment of an expected result may sometimes lead to a most interesting discovery, and to an observant mind will be no discouragement though it may for the time perplex. In tracing the cause of present failure future success is rendered more certain and more gratifying.

I remember listening to the eloquent address given to the students in this room by my accomplished friend Mr. Brady, to whom I have already had occasion to allude, but less in accord than I now do, an address which was calculated to make all other men fearful in venturing on the task he so well performed on that evening, and if all the noble sentiments uttered by him were forgotten—which God forbid they should be—save one word, that word, that golden word,—"thorough"—would be worthy to be the motto both of students and teachers. Taking that as a motto none would rest content with that surface polishing of which we have heard so much of late under the designation of "cram,"—that little superficial teaching which may possibly carry a man through his examination, but which can never properly qualify him for the high and onerous duties he is about to undertake.

I told you, gentlemen, that the Society relinquished but one interest in this school in making the recent change; and I may tell you with equal confidence that their full determination is that the education imparted in it shall be *thorough*.

The known, and often published, opinion of our Professors on this point should at once be an assurance of this.

I even fear their continued assertion that they do not undertake to "*prepare* students for the examination," may be taken too literally and deter some young men from becoming their pupils, because undoubtedly it must be a great object with all who enter our business to be able to pass the examination.

I admire the honesty of the Professors who make this bold disclaimer, but I conceive it is not literally true. I venture, on the contrary, to assert that they do prepare candidates for the examination in the best possible way. What they really mean is that they do not help a candidate to *cheat* the examiners. In the School of Practical Chemistry, for example, I have heard of students—no, I will not so misapply the word *student*—but I have heard of young men endeavouring to select for themselves from the curriculum arranged by Professor Attfield, subjects on which they thought it most likely they would be examined. If they had previously mastered the elementary part of the course such a selection might be well enough, but what I understand the Professor to mean when he says he does *not prepare candidates for examination*, is simply that he does not consent to any such alteration of his curriculum unless he is fully satisfied that the applicant has mastered the rudiments, and for myself, as a member of Council, I may say that if I had thought otherwise the vote which I gave so heartily for his appointment would have been unhesitatingly withheld!

That you must pass the Minor examination is a great truth patent to all you who are now entering on this special part of your education; this which I may call the public part of your training.

That examination is the gate which will admit you, and without passing which you cannot be admitted to the roll of qualified practitioners of pharmacy. But remember I pray you that to get through the first gate should not be the *ultimate* object of your exertions; having succeeded in passing it you will indeed be safe so far as having secured the right to assume the title and practise the trade of a "chemist and druggist," but I trust there is not one whom I am now addressing who will rest content without passing the second gate, or Major examination, and obtaining for himself the diploma of a "pharmaceutical chemist."

I think I hear some one saying, "*What good? I only want the right to carry on my business.*"

The man who only wants that right is, I fear, one who would be content to be sufficiently "*coached*" up to cheat the examiners into the belief that he was a qualified man. He forgets that, as I said just now, the public expect to find intelligence in those who dispense their medicines. There is in store for him a *continual examination*, by his customers, the failing to pass which would be as humiliating as the failure to pass his examination in this house.

It cannot for one moment be disputed that year by year the public are becoming better acquainted with the relative value of the two titles. "Pharmaceutical Chemist," and "Chemist and Druggist."

This fact was very forcibly brought home to me on

one occasion when I was working hard to promote the passing of the Pharmacy Act. You know, of course, that it was deemed necessary to enfranchise these two classes which I have mentioned. Our trade is unfortunately but a small one, and there are many localities in which the population is so scanty, or the general health so good, that no great demand for physic rewards the chemist of the district.

I was calling on a Member of Parliament one morning and endeavouring to enlist his sympathy in our cause, when in reading the copy of the Bill I had put into his hand, he suddenly said :—

"*But what does this mean, I see you have two grades; two examinations!*" And when I told him why it had been deemed only just and necessary to make such a provision, he said, "*Oh, I entirely agree with you as to the necessity of enforcing education, but I don't like these two grades; I suppose you think London and large towns must have Pharmaceutical Chemists, and Chemists and Druggists will be good enough for the little places. I think our lives in the Country are as valuable as yours in London!*"

Although I might be able to convince my friend that the "Minor examination" would be such as would ensure sufficient technical knowledge in the man who passed it to make him a safe dispenser, I left him imbued with the idea that all dispensers should be Pharmaceutical Chemists. I give you this anecdote just to show the tendency of public opinion, and not to depreciate Chemists and Druggists, of whom we have doubtless many excellent specimens.

I might surely in urging you to the more extended prosecution of study, depend very much on the greater interest which it must give you in the every day occupation of your future lives. It is not given to all men to astonish the world by brilliant discoveries, but short of that, it must be admitted that the daily avocations of a Pharmaceutical Chemist afford a rich field for intelligent observation, a great opportunity for usefulness to our fellow-men. You cannot think too highly of this latter fact.

In entering the profession on which you are now starting you have before you a high and honourable occupation, in which it will be yours to administer to the necessities of mankind in a most important particular.

A dispenser of medicine is a member of the noble medical profession. Always remember, I pray you, that although members of that profession you must not account yourselves qualified to assume the position or to exercise the duties of its higher branches, or you will cease to acquit yourselves honourably in your department.

In the army there are generals, field-officers, captains, and subalterns, each with their appointed duties, and the success of a campaign depends on the concerted action of the different grades. So in the medical profession. It is for the physician to prescribe and the dispenser to obey his instructions. According to my judgment, the moment the dispenser attempts to reverse this order of things, and to usurp the province of the physician, he gets into mischief; he assumes a duty for which he is not qualified, to his own disgrace, to the public disadvantage, and manifestly to the disadvantage of his class. Nothing can be more certain than that it is of the utmost importance that the prescriber should have perfect confidence in the dispenser, that there should be a mutual good understanding between them, and it is to me equally certain that this confidence and this good understanding must be destroyed if the dispenser be not a man of intelligence, an honourable worker in his department, and careful not to outrage the discipline of the profession.

Possibly some of my older friends here may say, "*Why dwell so much on professional ethics, or rather, why lead these young students to imagine that they are entering a profession? — Chemists, after all, are but tradesmen!*" This may, perhaps, be said by some who in their vocation have achieved for themselves a better claim to be regarded as professional men than the generality of their brethren. I am not quite sure that our worthy President will not move a vote of censure on me for misleading rather than guiding the students of the session.

My young friends, I would by no means mislead you. Ours is indeed a trade, and if you lose sight of that fact, or try to obliterate it from your minds you will commit a grievous error. It happens that the occupation of a chemist has both a professional and a trading character, and while, on the one hand, we must endeavour to acquire such an amount of special education as will fit us for the more elevated part of our duties, we must, on the other, avoid being thrown off our balance by any false notion of dignity.

I was struck the other day by the remark of a man who had recently lowered himself, according to the judgment of some of his associates by the purchase of, and most devoted attention to, a retail trade. He said, "*I do not look to my occupation for dignity, I take my dignity to my occupation.*" And so you should carry to the counter that sound technical knowledge which you are about, I hope, to acquire here, applying it earnestly to the wants and welfare of your customers, and adding thereby dignity to the trade on which you have entered.

There is in trade itself nothing which is beneath the dignity of an educated man—nay! there is in our trade especially great scope for winning regard and esteem; it is only in descending to that which is dishonourable that a man becomes dishonoured. I know it is the belief of some that when you educate a man beyond a certain point you give him aspirations which cannot be satisfied in trading pursuits; that mental culture and manual labour do not associate. If that be true, it becomes a very serious question to whom we shall in future look for labour, now that mental culture for all is the universal cry.

The labour falling to our lot is skilled labour. Give an uneducated man a prescription to dispense in which the ingredients require to be put together in a certain order, and the mixture will probably be sent to the patient with masses of resin adhering to the sides of the bottle, or a powerful alkaloid precipitated. Let the same mixture be prepared by one who understands his business, and the result will be entirely different. The *unmixed mixture* might in some instances fail in doing the work desired by the prescriber, and in some even do mischief; but in any case such variations in the appearance of medicine destroy the confidence of your customers, militate against your individual success, and bring discredit on pharmacists as a class.

Gentlemen, I need say nothing to you who have to live by your trade of the mischief thus falling on you individually, but I should like to impress on you the high moral obligation of sustaining the credit of your order.

The better qualified you are by education to fulfil your duties, whether you call them professional or

trade duties, the more completely will you do this. The higher your capabilities, the more will that spirit of jealousy, which in years gone by kept "two of a trade" apart, disappear; the more knowledge you possess, the more anxious you will be to make that knowledge the common property of your class.

This has, I think, been proved by the gatherings of the Pharmaceutical Conference. Associating with your fellow students in the laboratory, the angles which are apt to protrude in isolated shops will wear down, and it will be to you not only a school of chemistry, but also a refining and elevating society. I have been naturally brought much in contact with the Professors, and it has been no small pleasure to me to hear them speak of their classes; of the marked intelligence and gentlemanly feeling pervading their pupils; you have heard pretty much the same from them this evening, but less in detail than it has reached me. I rejoice greatly in this, because although one has undoubted pride in pointing to brilliant examples, perhaps the greater and more abiding pleasure springs from a contemplation of the *general* advancement of the class to which we belong.

Various circumstances may have helped us on in this matter; there has indeed been progress in society generally, but I cannot help attributing our special improvement very much to the fact that of late years uneducated youths have been kept out of our business by the necessity of passing the Preliminary examination at the outset. I hope, even in my time, to see the day when no master will sign articles with an apprentice until he has given such evidence of early training.

This is indeed a matter of much greater importance than you may think. Once launched in the business as an apprentice, a youth has a duty to his master which must be performed, and if not well performed, the master's duty to his apprentice—*which I would most emphatically affirm to be no less binding*—will be the less likely to be liberally carried out. Thus the time at an apprentice's disposal for study, even under the most favourable circumstances must have a limit and will scarcely more than suffice for necessary technical study.

How then will he fare if during his term of pupilage he has to prepare for his Preliminary examination? He will be like the man who has to carry through life a dead weight of debt, always pressing him down, always debarring him from seizing opportunities at the right time.

But this is not all; good school training prepares the mind to receive impressions, to discriminate between them, and to utilize the information presented to it. The lad whose mind has not been so cultured is altogether at disadvantage when he enters on the true business of life and so, beyond the fact of having arrears of work to perform, is less able to perform well the proper work of the season.

My duty this evening is to speak to the students who are about to avail themselves of the opportunities offered by this institution; but I cannot deny myself the pleasure of reverting for a moment to those who have been introduced to us as the prizemen of the past session. They have been congratulated on their success by more able tongues than mine, but no one can more heartily bid them "God speed" on their future career than I do. Their names have been added to that list of worthies which adorns the calendar of the Pharmaceutical Society, and the very fact of their being so enrolled must ever be an incentive to them to press onward in the course they have so well begun. Every step in the right direction will advance them, and advance the body to which they belong, and I trust to see them in their turn taking that active share in the work of our Society which so many of the prize men of former years have already taken. To you of the future I would hold them up as encouraging examples. You who will be their successors in the lecture-room and laboratory must all strive to be their successors in the prize list, that those who are spared to come here twelve months hence to see the medals and certificates of the next session distributed may as heartily congratulate you. I say you must all strive; I know you cannot all win according to the common notion of winning; that if there be but one silver medal for competition in a class it is an impossibility for more than one man to take it, but if all the competitors cannot *win* all must *gain* by the process of striving.

On the motion of the Vice-President a vote of thanks was passed to Mr. Sandford, which he briefly acknowledged.

The VICE-PRESIDENT announced that the next evening meeting would take place on the 5th of November.

Parliamentary and Law Proceedings.

POISONING BY LIQUOR STRYCHNIÆ.

An inquest has been held in Belfast, on the body of a man named Thomas Shaw. From the evidence it appeared that the deceased had been in delicate health and had consulted Dr. M'Keown, who had prescribed liquor strychniæ in doses of seven drops. The wife of deceased deposed that on the day of his death he took a dose about two o'clock, immediately after his dinner, that she saw him drop the seven drops and that she counted the drops. A few minutes afterwards he gave a yell and jumped up, calling out "The medicine!" and asking for butter, of which he swallowed some, and he also drank three tumblerfuls of hot water, and vomited. Mr. Brady, surgeon, was called in but the man died shortly afterwards in a convulsive fit.

Mr. Brady deposed that he thought the symptoms of strychnine poison were present; also that the dose was a legitimate one for an ordinary case, but that he would not venture to give it to a man suffering from disease of the heart. He thought there was a proper interval between the morning and afternoon doses. Half a grain was the smallest dose of strychnine ever known to kill a person, and that would correspond with sixty minims of liquor strychniæ.

Dr. M'Keown described the circumstances under which he prescribed the solution, and said that he considered the medicine prescribed perfectly safe and would give it again for a similar case. He would not consider heart disease as contra-indicating strychnine. The deceased smoked and had tremor of the muscles and defective vision. He considered he laboured under dimness of vision from toxic causes. He had often prescribed strychnine, and seldom commenced with less than seven drops. One patient was taking twelve drops. He thought the symptoms were consistent with strychnine poisoning, but the dose ordered was totally inadequate to produce any such effects as those described. He had no doubt deceased had somehow taken a very large dose.

The jury returned the following verdict:—"That deceased came to his death from the effects of an overdose of strychnine; and, that the overdose of strychnine was taken through some mistake on the part of the said Thomas Shaw."

The foregoing is abstracted from a report in the *Ulster Examiner;* where a letter also appears written by Dr. M'Keown, stating that although there should only have been two doses, or fourteen drops, absent from the bottle, an accurate measurement in the presence of the jurors showed a deficiency of one hundred and twenty drops.

Alleged Case of Child Poisoning by Mistake at Leith.

On Saturday, September 27th, John Addinell, dispensing chemist, Leith, was apprehended in connection with a case of alleged child-poisoning which took place on the previous Tuesday. Lime water, ordered for the child, was sent for to Mr. Addinell's shop ; but there are said to be reasons for concluding that the medicine given was morphia and not lime water. At the *post-mortem* examination of the body, Drs. Henderson and Garland took possession of the child's stomach and other internal organs for analysis. Pending further inquiry, Mr. Addinell has been ordered to find bail to the extent of £50.—*Edinburgh Courant.*

BOOKS RECEIVED.

The Owen's College, Manchester, Calendar for the Session, 1873-74. From the College.

The Druggists' Stock and Price Book, comprising the Drugs, Sundries, and Proprietary Articles in General Use, with Ruled Columns for Stock-taking Purposes, and for recording the Cost and Retail Price of every Article kept in Stock. Arranged by Messrs. Frazer and Green. London: J. and A. Churchill. Glasgow: Frazer. 1873. From the Authors. Two sizes.

La Matiere Médicale chez les Chinois. Par M. le Docteur J. Léon Soubeiran et M. Dabry de Thiersant. Précédé d'un Rapport à l'Académie de Médicine de Paris par M. le Professeur Gubler. Paris: G. Masson. 1874. From the Authors.

Obituary.

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

On the 20th September, 1873, Dr. Julius Martiny, of Suhl. Julius Martiny had been an Honorary Member of the Pharmaceutical Society of Great Britain since 1856.

Dr. J. Evans, of Dawson Street, Dublin, died suddenly at Harrogate on the 15th, where he had gone for the benefit of his health. This well-known and respected citizen was the original partner in the firm known as Bewley and Evans. Having dissolved partnership, Dr. Evans at the time of his death had two establishments open in connection with his son. These establishments were conducted upon the most advanced principles, the late proprietor combining with his scientific knowledge a wonderful capacity for business. He was a Doctor of Medicine, and the originator of many well-known proprietary articles, of which the best known was his malt extract. He had issued a little work upon 'Recent Remedies in use in Medicine,' and was a member of the Pharmaceutical Conference. His remains were removed to Dublin and interred in the burying ground of the Society of Friends, of which body he was a member.

On the 8th September, at his residence, Willow Bank, Green Heys, Manchester, aged 68, Henry R. S. Jewsbury, formerly of the firm of Jewsbury and Bevan, Chemists, Manchester.

On the 6th September, 1873, Mr. Joseph Bettison, Pharmaceutical Chemist, of Chesterfield. Mr. Bettison had been connected with the Pharmaceutical Society since 1853.

On the 18th July, 1873, Mr. Charles Compton, Pharmaceutical Chemist, of Brewer Street, Golden Square, London. Mr. Compton was one of the Founders of the Pharmaceutical Society.

On the 7th April, 1873, Mr. George Rich, Chemist and Druggist, of Swinton, Yorkshire.

On the 26th September, 1873, Mr. Edward H. Crumpton, Chemist and Druggist, of Cornwall Road, Westbourne Park.

Notes and Queries.

[350.] DR. WILSON'S HAIR WASH.—In reply to *A. C.* I forward the following as the formula for Erasmus Wilson's Hair Wash. My authority is Wilson's 'Skin Diseases,' 5th edition, page 773 :—

Lotio Capillaria Stimulans.

℞	Olei Amygdalæ Dulcis	℥ j.
	Liquoris Ammoniæ Fortius . . .	℥ j.
	Spiritus Rosmarini	℥ iv.
	Aquæ Mellis.	℥ ij.

Misce, fiat lotio.

James R. Gardner.

[359.] STEEL OF ANTIMONY.—In reply to "*Nescius* :" — According to Quincy's 'Dispensatory' — "Steel of Antimony" is "Regulus Antimonii Martialis," and is directed in Gray's 'Supplement' to be prepared as follows :—Upon 1½ lbs. of small nails, heated to redness in a crucible, throw a mixture of 1 lb. of common antimony, 4 oz. nitre, and 2 oz. tartar ; melt and pour out ; separate the regulus and remelt three or four times, throwing 2 oz. of nitre upon it each time.—J. Tully, Jun.

[361]. ETHEREAL SOLUTION OF NITRATE OF SILVER.—Will you kindly favour me with the form for ethereal solution of nitrate of silver ?—W. Reeves.

[*** A solution of various strengths—5 gr. to 30 gr. or more in ℥ j—of nitrate of silver in Spt. Æther. Nitrosi, is used for the purpose of painting a greasy or perspiring cuticle. It has the advantage of giving a uniform coating where an aqueous solution would collect in globules on the surface.—Ed. Pharm. Journ.]

[362.] COCHINEAL COLOURING.—Can any correspondent give me a good form for solution of cochineal for colouring ?—E. Nicholson.

[363.] INDELIBLE MARKING INK.—Can any one give me a recipe for Indelible Marking Ink for Linen without Nitrate of Silver ?—G. L. N.

[364]. PERMANENT DEPILATORY.—Can any reader furnish me with a form for a *permanent* depilatory ? The arsenical preparation recommended in Beasley's 'Receipt Book' has been tried, but it is not permanent in its effects.—"*Granum.*"

The following journals have been received :—The 'British Medical Journal,' Sept. 27 ; the 'Medical Times and Gazette,' Sept. 27 ; the 'Lancet,' Sept. 27 ; the 'London Medical Record,' Sept. 27 ; 'Medical Press and Circular,' Sept. 27 ; 'Nature,' Sept. 27 ; 'Chemical News,' Sept. 27 ; 'Gardener's Chronicle,' Sept. 27 ; the 'Grocer,' Sept. 27 ; 'Journal of the Society of Arts,' Sept. 27 ; 'Grocery News,' Sept. 27 ; 'Produce Markets Review,' Sept. 27 ; 'Ulster Examiner,' Sept. 29 ; 'Leith Observer,' Sept. 29 ; 'Richmond (Va.) Daily Dispatch,' Sept. 17 and 18 ; 'Richmond (Va.) Engineer,' Sept. 17 and 18.

Correspondence.

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

Pareira Brava.

Sir,—The thanks of pharmacists are due to Mr. Hanbury for his able and interesting contributions to your pages.

A perusal of the two papers referred to brought to my recollection a circumstance that occurred during the present year.

A visitor to this place called with a prescription which he was desirous should be prepared with great accuracy, his physician having directed him to take it to a certain house at the West End, where it had already been dispensed more than once.

[Copy.]

℞ Decoct. Pareiræ,
Tritici repentis, āā . . . ℥iv.
M. Sum. ℥j bis in die.

Next day the gentleman called again, saying he "thought the medicine could not have been correctly dispensed, as it was bitter, whereas what he had before taken was void of taste and simply mucilaginous." I in reply said, "it ought to be bitter," and in corroboration produced Dr. Pereira and two other eminent authorities.

My customer wished for another bottle of the medicine, for the doctor's inspection, at the same time promising to let me know his decision. In a few days the gentleman called again, and informed me that the doctor had said, "Most likely the London chemists were right," thus implying that the suburban chemist was wrong. A protest against such a verdict would be useless, but in order to satisfy myself I obtained a sample of the drug from the house in question. It proved, as I expected, the spurious article so correctly figured by Mr. Hanbury.

I beg to enclose a portion of the said sample, also a specimen of the root employed by me in preparing the decoction.

The moral to be drawn from the case is not very obvious, but it would appear that a qualified medical practitioner is not averse to amusing his patient by dosing him with inert drugs (let us hope the case was not serious), or to sacrificing his reputation as an intelligent prescriber; but what could the *Lancet* not say of the arrogance of a chemist who dares to set his judgment against an M.D.? Surely "hanging" would be too good for *him*.

SIRIUS.

Richmond, S.W., September 9th, 1873.

Cocoa.

Sir,—I fully concur with the remarks in the article on "Cocoa," on p. 245 of the PHARMACEUTICAL JOURNAL. I am glad that the magistrate dismissed the summons in the suit there referred to, and that he did not regard soluble cocoa as an *adulterated* article. Now, as such articles as cocoa, mustard, etc., are generally sold by country chemists I, for one, should like to see some definition of the term "adulteration" by legislative enactment, for to my mind *prepared* mustard ought to be regarded as *unadulterated*, and even more so than *prepared* cocoa. On referring, however, to the case of a grocer at Sutton, Surrey, who was summoned and convicted on the 18th August (PHARMACEUTICAL JOURNAL, p. 176) for selling mustard alleged to be adulterated, I find that, according to the report of the evidence in the case, the article sold was of the very best quality used (double superfine), and I never heard, in about fifty years' experience, that the *genuine* mustard was approved of as a condiment, but merely as an external appliance. I do hope that something effective will be done, and that very soon, too, to save me and my brethren from such vexatious, troublesome, and personal public exhibitions for selling so simple a condiment as prepared mustard, an article which, according to an old established firm (Messrs. Keen and Co.), has been manufactured by them for upwards of 100 years. Why such and similar prepared articles should now be deemed adulterated I cannot understand. Should Messrs. Colman gain the suit in a superior court on the case granted to them by the magistrate, and I hope they will, it will not only give satisfaction to themselves, but also to the public generally.

According to the strict letter of the law my humble opinion is that even violet powder, granulated citrate of magnesia, and other preparations are cognizable under the Adulteration Act, they being sold by names that they in reality are not.

"FAIR PLAY."

Shoreham, 29th September, 1873.

Dispensing Misdemeanour.

Sir,—In the Hammersmith Police Court a few days since a medical gentleman, whose name did not "transpire," applied to Mr. Woolrych for a summons against some chemist, in or about Hammersmith, for incorrectly dispensing a prescription, the statement being that an expensive ingredient was left out and some other substituted, whereby some possible injury might result to the patient for whom the medicine was intended. So far the anonymous "medical gentleman" speaks according to his knowledge, but as he follows this with the remark that such is the *usual* practice of chemists, I venture to express an opinion that the "medical gentleman" is altogether wrong, and I think such an injurious accusation should not be allowed to go forth without the "flattest" of contradictions. I am speaking of course only of my own experience, but I feel sure I am also expressing the opinion of all conscientious chemists; moreover I have a business in the locality, and notwithstanding that I have, I believe, the confidence of my customers, I have been asked many times since if such has been my practice, *i.e.*, to omit expensive ingredients in a prescription.

It is, I suppose, too much to ask the chemist accused to explain the matter, as, right or wrong, the public are easily alarmed at any possible quibble about their prescriptions, but I *should* like to hear the other side as I feel convinced another light would be thrown on the matter.

SMILAX.

*** We have endeavoured to obtain some definite information respecting this case, but have not yet been successful in doing so.—ED. PHARM. JOURN.

"*Compositæ*."—(1) *Inula Conyza*. (2) *Athyrium filix-fœminea*. (3) Probably *Lastræa filix-mas*. It is necessary to send fronds of ferns entire and in a state of fructification.

S. C.—*Torilis Anthriscus*.

"*Labiatæ*."—We should think a licence would be necessary: but recommend you to apply to the Inland Revenue authorities at Somerset House.

G. (Bangor.)—(1) *Œnothera biennis*. (2) *Bidens cernua*. (3) *Bidens tripartita*. (4) *Helminthia echioides*. (5) *Lepidium ruderale*. (6) *Centaurea nigra*. (7) *Stachys palustris*. (8) *Polygonum lapathifolium*. (9) *Linaria minor*.

"*Pharmacien*."—(1) *Ballota nigra*. (2) *Lycopus Europæus*. (3) *Bidens cernua*. (4) *Calamintha clinopodium*. To ensure the proper naming of plants it is necessary that specimens in flower should be sent.

S. P. S.—(1) Yes. (2) All such works are necessarily expensive; but they may be consulted at the Library, 17, Bloomsbury Square, or a number of dried plants may be seen upon application to the Curator of the Museum. (3) We believe that a general knowledge of both is required.

G. K. (Bottisham).—(1) Iron pyrites, the staple material now used in the preparation of oil of vitriol. (2) Probably the precipitate is the sulphate of magnesia, thrown out of solution by the spirit. (3) See Attfield's 'Chemistry,' 4th edit., pp. 61 and 62.

F. W. Andrew.—No Universal Pharmacopœia has yet been published, the nearest approach to it being the collations of formulæ by Jourdan and Hager.

J. J. Harrison.—We believe that Messrs. McDougall claim to hold patents for various preparations of carbolic acid. For more definite information we should recommend you to apply to the Patent Office through an agent.

E. Smith.—We cannot undertake to recommend rival proprietary preparations.

"*Apprentice*."—See an article on the subject in the present series of the Journal, vol. ii., p. 531.

H. M. C.—You probably would obtain the formula by direct application to the prescribers.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Baldock, Hemmings, Rudd, Ekin, Barrett, Cottrill, F. W. Smith, Mason, Harper, Druce, Rowell, Kinninmont, Iverach, B. B., F. A., "Juvenis," "Ignoramus,"

ACTION OF WATER UPON THE RESINOID PRINCIPLE OF OPIUM.*

BY L. PÉRIER.

Soubeiran, in his *Traité de Pharmacie théorique et pratique*,† has pointed out that the proportion of water put into contact with crude opium exercises an influence upon the solution of the resinoid principle, oil, and narcotine, but that the resulting modifications of this action are little known. The author has found that at any rate the proportion of water employed plays an important part in the solution of extract of opium, as shown by the following experiments :—

(1) 120 grams of extract of opium was divided into two equal parts ; one half was treated with 120 grams of distilled water at 15° C., the other half, with 250 grams of water at the same temperature. At the end of six hours, assisted by agitation, solution was complete in both liquids, and they were filtered through paper. The first only left a few bubbles of blackish matter ; the second abandoned six grams of oleo-resin.

(2) The first solution was then evaporated to dryness and the product divided into two parts ; one was put into a small quantity of water (about twice its own weight), the other into 1000 grams. After twenty-four hours, the concentrated liquor was quite limpid and without deposit, but the dilute liquor had deposited a considerable residue.

(3) 30 grams of extract was dissolved in water, under the conditions prescribed in the Codex (ten times its weight of water at 15° C.). The solution was at first muddy, a black granular precipitate covered the bottom of the vessel ; but upon evaporation in a water-bath the extract again became homogeneous, and afterwards dissolved in 30 grams without any deposit. In its turn, this solution threw down a precipitate when double its own volume (60 grams) of water was added, and the precipitate was augmented commensurately with the addition of more water. Afterwards, concentration reproduced a normal extract, soluble without residue.

(4) The quantity of water employed gave rise to a regular progression in the phenomena of solution and precipitation. If, for example, five grams of extract of opium were put into ten grams of distilled water, the portion which was first dissolved left in suspension a granular deposit. In proportion as the liquid became saturated this deposit was effaced, until at last no more remained undissolved. The maroon black liquid, a layer of four centimetres of which was impermeable by sunlight, did not require filtering ; if it were sometimes scarcely clear yet it did not deposit. With five grams more water a turbidity was manifested which was not completely removed by shaking. At the maximum of 20 grams of water the deposit commenced ; towards 30 grams, and after standing for an hour, the deposit was nearly doubled ; at 50 grams (ten times the weight of the extract) it ceased, and the liquid was no longer troubled by fresh additions of water.

The whole of the resin however could not be removed by water from solutions of opium. Thirty grams of extract which no longer gave a precipitate upon the addition of water, yielded 2·5 grams of black resin when treated with ammonia. Although in this case the extract was the product of a fourth maceration, the phenomenon occurred, but in a less degree, under ordinary conditions.

It thus appears that the same matter will alternately pass through a filter without residue or leave an enormous residue, according as the quantity of water employed is small or large ; also that the precipitation ceases when the weight of the menstruum is about ten times greater than that of the substance. It is even possible to dissolve in a very concentrated cold solution a deposit that has not been obtained from it. Finally, that the heat of a water-bath will restore the homogeneity destroyed by an excess of water, an observation that is not in accord with what has been written by other authors. The constant results obtained during his experiments have induced M. Périer to formulate his conclusions as follows :—

(1) The quantity of distilled water at 15° C. in which extract of opium is dissolved has a direct and certain influence upon the partial elimination of the resinoid matter.

(2) Concentrated aqueous infusions of extract of opium do not give any notable precipitate, except with the lapse of time ; dilute solutions, where the weight of the menstruum exceeds twice that of the matter dissolved give as much more residue as the proportion of water is increased from two to ten.

(3) Water, in whatever quantity, does not precipitate the whole of the resinoid matter ; a certain portion yields only to ammonia.

(4) The residue of extract of opium treated with cold water re-dissolves in the concentrated mother solution, and heat, instead of aiding in the separation of the resin, oil and narcotine, reconstitutes the homogeneity of the extract.

* *Bulletin des Travaux de la Société de Pharmacie de Bordeaux*, xiii., 245.

† Fifth edit. (1857), i., 777 ; seventh edit. (1869), i., 851.

REACTION OF SUGAR AND SULPHURIC ACID WITH SOME ALKALOIDS.*

BY R. SCHNEIDER.

Having observed that morphia produces a beautiful blue coloration under the simultaneous influence of sugar and sulphuric acid, the author extended his investigation to other alkaloids.

Morphia.—When a drop of sulphuric acid is added to an intimate mixture of one part of morphia with six or eight parts of sugar, a very intense purple colour is produced, which after half-an-hour passes to violet, then to a blue-green, and finally to a dirty yellow. These changes of shade are due to absorption of moisture, for they may be induced instantaneously by the addition of a drop of water. This reaction is of great delicacy. To use it for the detection of morphia in a solution, a single drop should be taken and sugar added to it to saturation ; a drop of sulphuric acid is then placed by the side of it, and when the two drops are made to meet the coloration takes place.

Codeia.—With codeia also a purple is produced which passes to violet, and then to yellow-brown.

Narcotia and Narceia.—These substances, under the same conditions, do not give any very characteristic reaction ; they produce brownish colorations.

Quinia and its salts produce a brown colour. In the presence of water no coloration is produced, but there is simply an increase in the quinine fluorescence.

* *Journal de Pharmacie et de Chimie* [4] vol. xviii., p. 223, from the *Bull. Soc. Chim.*

Strychnia, *Brucia*, *Atropia*, *Colchicia*, and *Picrotoxia* give no characteristic reaction.

Aconitia.—When a drop of moderately concentrated solution of sugar is added to aconitia, and then a drop of sulphuric acid, a zone of a beautiful rose colour appears at the surface of separation, which passes rapidly to violet, then to brown. This is a valuable characteristic. It might, it is true, be confounded with codeia and morphia; but it differs from the latter in that chloroform or benzine removes it from an alkaline solution; from codeia by its dissolving in boiling water.

Delphinia gives a spot of yellow-brown, surrounded by a dirty green zone. Upon the addition of water the brown passes to green. This is a characteristic reaction.

THE SPONGE TRADE OF THE OTTOMAN ISLANDS.

From a short report which has just been issued on the trade and commerce of the Ottoman Islands in the Archipelago, for 1872, we glean some information with regard to the native trade in sponges. It appears that, with few exceptions, in which the owners of sponge-boats had capital, all the funds required for the equipment of these boats were furnished by native money-lenders, and that important foreign capital, especially British and French, has latterly been invested in diving apparatus since the introduction of this new mode of fishing for sponges in these islands. It is noticeable, too, that a large French firm, whose operations in this trade were on a very extensive scale, have of late somewhat reduced their trade, while, on the other hand, the use of British-made machines continues to increase; and it is mentioned that there is a decided preference on the part of the natives to work with British rather than with French diving apparatus. The whole of the machines now employed in the Ottoman Islands is upwards of a hundred. Owing to the depressed prices at which sponges have been sold during the last few years, and which have prevented divers from paying their debts to the native money-lenders, the latter, although in possession of bills for important sums of money, have not a sufficiency of cash to equip all the boats suitable for the sponge fishery. Notwithstanding these adverse circumstances, the quantity of sponges obtained of late has exceeded that of former years, in consequence of the more abundant crops and improved diving apparatus. At the Island of Halki, for instance, where ten years ago the produce in sponges was hardly £10,000 a-year, it amounts now, with the same number of boats, but working with diving apparatus, to nearly £20,000, thus showing a very important augmentation. It is mentioned, however, that the produce in sponges seems more than sufficient for the demand; and if all the available boats in these islands could procure the required money to enable them to go fishing, the extra quantities of sponges which would then encumber the markets would lower the price of the article to rates which would prove ruinous to the divers.

The average market prices of sponges for the present year are shown per oke (equal to $2\frac{3}{4}$ lbs.) in the subjoined table :—

Countries.	Fine.	Honey Combs.	Hard Brown.
Bengazi . . .	40/0	17/6	8/0
Mandruha . .	48/0 to 64/0	19/0 to 21/0	10/0 to 12/6
Syria	29/0 „ 32/0	11/0 „ 12/6	4/0 „ 5/0
Caramania . .	24/0 „ 32/0	9/6 „ 11/0	3/3 „ 4/0
Cyprus. . . .	—	11/0 „ 12/6	—
Crete	24/0 „ 32/0	11/0 „ 12/6	—
Rhodes and other Ottoman Isles	24/0 „ 32/0	8/0 „ 9/6	—
Greece. . . .	12/6 „ 16/0	6/3 „ 8/0	—

Bengazi and Mandruha sponges are not sold by weight, but by piece; for the sake of comparison, however, their prices are proportioned to okes. Bengazi fine sponges are exceedingly scarce.

The prices quoted in the foregoing table, although higher than those of the two preceding years, are still considered rather low, and Hellenic sponge-boats, which used to bring and sell their crops in the markets of the Sporades, now abstain from doing so. In fact, owing to the reduced prices offered in these islands for sponges, several of the most enterprizing native sponge-dealers decided, two years ago, instead of selling their sponges in the local market, to convey them to Europe, and retail them on their own account from place to place. There is not a single country—even Sweden and Norway—which these sponge-dealers have not visited, in order to sell their goods. A few of them journeyed even as far as America, while some settled in London, where their countrymen ultimately brought the quantities which they had not been able to dispose of in their peregrinations. These attempts having been so far successful, there has been of late a slight increase on past prices. It is stated that the value of sponges sent annually to Great Britain is no less than £70,000.

THE COMPOUNDS OF CANTHARIDIN.*

In a thesis presented at the University of Dorpat in 1865, C. Bluhm concluded from his researches that cantharidin existed in cantharides, partly in a free state and partly in a state of combination. The free portion he extracted by means of alcohol, ether, or chloroform. That in combination was found to be nearly insoluble in these solvents, and was obtained by the addition of sulphuric acid, or better still by boiling the cantharides with magnesia, so as to combine all the cantharidin with magnesia, and then setting the cantharidin free by sulphuric acid. The whole of the cantharidin could then be dissolved out by ether or chloroform. This he proved by several experiments.

Twenty grams of powdered cantharides were exhausted with boiling 92 per cent. alcohol, and the alcoholic solution reduced by distillation to one-tenth its original volume. This alcoholic extract gave an amount of cantharidin only 0·092 per cent. of the weight of the cantharides. But the powdered cantharides thus exhausted with alcohol, being afterwards boiled with calcined magnesia and water, then dried in a water-bath, and finally rubbed up in a mortar with ether and dilute sulphuric acid, yielded a further 0·122 per cent. of cantharidin. After this treatment, alcohol, ether, and chloroform failed to remove any further quantity of a vesicating compound, and upon evaporation gave no traces of the crystalline needles of cantharidin. The double operation therefore yielded 0·214 per cent. of cantharidin, under conditions which the author considered clearly proved that it existed in the cantharides in a partial state of combination. M. Bluhm supposes, without giving proofs, that the cantharidin which is not removed by alcohol from cantharides exists in the natural state in combination with magnesia.

Again the cantharides powder was mixed with one-third its weight of calcined magnesia, and a sufficiency of water, and boiled. It was then evaporated to dryness in a water-bath at 212° F. The dried mass, pulverized, and boiled with water, gave a brown extract having an alkaline reaction from which ether removed nothing perceptible. A fresh treatment of this extract with ether and dilute sulphuric acid yielded 0·0674 per cent. of cantharidin. The water therefore had not nearly dissolved the supposed magnesian compound. Afterwards, the cantharides powder treated directly with ether and dilute

* From an abstract by M. Méhu in the *Journ. Pharm. Chim.* [4], vol. xviii., p. 68.

sulphuric acid gave a fresh yield of cantharidin amounting to 0·2195 per cent. Altogether, therefore, it contained 0·2868 per cent. of cantharidin.

The compounds of pure cantharidin with magnesia, baryta, oxide of zinc, and the oxides of the alkaline metals were referred to by Bluhm in 1865. They have since been described by Dragendorff and Massing.

Cantharidate of Potassium.—This salt may be prepared by treating during several hours a gram of cantharidin, 0·5735 of pure caustic potash, and 80 c.c. of water, in a water-bath at 212° F. The operation must be continued until the complete solution of the cantharidin, which will require three or four hours. Alcohol does not answer for the purpose so well as water. The aqueous solution of cantharidate of potassium, evaporated in a water-bath, leaves a saline residue of radiating crystals, having a pearly lustre, but not having a clearly marked form. The salt is not hygroscopic. 100 parts of water at a temperature of 15° to 20° C. dissolve 4·13 parts; 100 parts of boiling water dissolve 8·87 parts; 100 parts of alcohol, sp. gr. 0·820, at 15° to 20° C. dissolve 0·03 part, whilst 100 parts of boiling alcohol of the same strength dissolve 0·92 part. Ether and chloroform dissolve only very small proportions. Its aqueous solution has an alkaline reaction.

A first analysis of cantharidate of potassium gave 61·70 per cent. of cantharidin, 31·66 per cent. of potash and 6·64 per cent. of water. The formula

$$\left.\begin{matrix} H \\ C_5H_6O \\ K \end{matrix}\right\} O_2$$

requires 63·55 per cent. of cantharidin, 30·61 per cent. of potash, and 5·84 per cent. of water. The formula

$$\left.\begin{matrix} H \\ C_5H_6O \\ K \end{matrix}\right\} O_2 + \tfrac{1}{2} H_2O$$

requires 60·05 per cent. of cantharidin, 28·92 per cent. of potash and 11·03 per cent. of water.

A second analysis gave (by decomposition with hydrochloric acid) cantharidin 59·95, potash 29·47, and water 10·58 per cent. A third gave catharidin 61·61, potash 30·49, and water 7·90 per cent.

A further analysis made upon 0·320 gram of cantharidate of potassium dried at 100° C. gave 0·1868 gram of cantharidin by hydrochloric acid. The aqueous liquor from which this precipitation had taken place, shaken twice with chloroform, gave upon evaporation of the latter 0·0195 gram of cantharidin. The potassium was estimated by means of perchloride of potassium. The result of this analysis was cantharidin 62·79 per cent., potash 30·22, and water 7 per cent.

The experimenter did not succeed in producing a cantharidate richer in base: alcohol removed the excess of potash and left a neutral cantharidate of potassium. Neither could an acid cantharidate of potassium be obtained.

The vesicating action of cantharidate of potassium is most energetic: 0·00034 gram of this salt dissolved in one hundred times as much water, applied to the skin upon a square centimetre of linen produced a very strong vesication; 0·00017 gram dissolved in two hundred times its weight of water applied in a similar manner produced a vesication very similar to that caused by a blistering plaster; 0·00011 gram dissolved in three hundred times its weight of water still produced upon the skin some small vesicles; 0·000088 gram dissolved in four hundred times its weight of water produced a strong redness without blisters; 0·00006 gram dissolved in five hundred times its weight of water no longer produced more than a slight redness.

It does not appear to be possible to heat cantharidate of potassium above 100° C. without undergoing a perceptible loss in weight; there is loss of cantharidin, especially in the presence of vapour of water.

Cantharidate of sodium.—This salt is prepared like that of potassium. It crystallizes confusedly, and is not hygroscopic. 100 parts of water at 15° to 20° C. dissolves 4·01 parts; the same weight of boiling water dissolves 6·22 parts. It is slightly soluble in alcohol and insoluble in ether and chloroform. Its aqueous solution has an alkaloid reaction. 0·3645 gram of the salt dried under the receiver of an air pump lost 0·0037 gram at 100° C., and 0·0063 gram at 110° C. Its analysis gave for 100 parts: cantharidin, 64·27; soda, 24·45; water, 11·27. The formula—

$$\left.\begin{matrix} H \\ C_5H_6O \\ Na \end{matrix}\right\} O_2 + \tfrac{1}{2} H_2O$$

corresponds to 66·66 per cent. of cantharidin, 21·09 of soda, and 12·24 of water.

Cantharidate of Lithium is prepared like the two preceding salts. 100 parts of water at 15° to 20° C. dissolves 3·8 parts; the same weight of boiling water dissolves 5·96 parts. Analysis gave—

	I.	II.
Cantharidin	81·76	82·00
Lithia	12·75	13·15
Water	5·50	4·85

Cantharidate of Barium is obtained by pouring iodide of barium into a solution of cantharidate of potassium. This salt is white, crystalline, nearly insoluble in cold water, alcohol, and ether. It contains in 100 parts 50·25 parts of cantharidin, 41·85 parts of baryta, and 7·9 parts of water.

Cantharidate of Strontium is prepared in the same manner by means of chloride of strontium and cantharidate of potassium. It is also nearly insoluble in water, alcohol, and ether. 100 parts of the salt contain 55·60 parts of cantharidin, 36 parts of strontia, and 8·4 parts of water.

Cantharidate of Calcium is obtained by mixing a solution of cantharidate of potassium with a solution of chloride of calcium. It resembles cantharidate of barium, takes a crystalline form, and resists well a rather high temperature. About 140° or 150° C. it commences to decompose, giving a slight sublimate of undecomposed cantharidin; on analysis 100 parts gave 66·75 parts of cantharidin, 20·725 parts of lime, and 12·525 parts of water. The formula—

$$\left.\begin{matrix} H_2 \\ (C_5H_6O)_2 \\ Ca_2 \end{matrix}\right\} O_4 + H_2O$$

requires 68·05 per cent. of cantharidin, 19·45 of lime and 12·50 of water.

Cantharidate of Magnesium is obtained directly by heating during several hours 1 gram of cantharidin and 0·25 gram of pure calcined magnesia, with 30 c.c. of water in a sealed glass vessel, at a temperature of 100° C. Gradually the greater part of the magnesia disappears, and is replaced by small crystalline masses. One part of the cantharidate is in solution, the other part is obtained by washings with distilled water. The filtered solution of cantharidate of magnesium gives upon evaporation long, pike-shaped, crystalline needles. 1·47 gram of the salt dried under the receiver of an air-pump lost 0·0014 at 100° C., and 0·002 gram at 110° C. This cantharidate dissolves more easily in cold water and cold alcohol than in those liquids when boiling. It is insoluble in ether and chloroform. 100 parts of water at 15° to 20° C. dissolve 0·24 and at 100° C. dissolve 0·02. The aqueous solution has an alkaline reaction, and its vesicating action is very energetic. The salt keeps well in the air, and is not decomposed by carbonic acid. It is precipitated by the alkaline carbonates, carbonate of magnesium, and an alkaline cantharidate being formed, sulphate of copper gives sulphate of magnesium and a green crystalline precipitate of cantharidate of copper. One hundred parts of cantharidate of magnesium gave upon analysis 67·2 parts of cantharidin, 15·10 of magnesia, and 17·7 of water. The formula—

$$\left.\begin{matrix} H_2 \\ (C_5H_6O)_2 \\ Mg_2 \end{matrix}\right\} O_4 + 2H_2O$$

requires 67·59 per cent. of cantharidin, 13·79 per cent. of magnesia, and 18·62 per cent. of water.

The *Cantharidate of Zinc* has much analogy with that of magnesium. 100 parts of water at 15° to 20° C. dissolve 0·41 and at 100° C. only 0·24 parts. 100 parts of alcohol at 15° to 20° C. dissolve 0·12, and at 100° C. no more than 0·04. Analysis gave in 100 parts 59·82 of cantharidin, 23·55 of oxide of zinc, and 16·63 of water. It is prepared by heating cantharidin with an excess of oxide of zinc and water, in a tube closed at both ends.

Cantharidate of Cadmium is obtained with difficulty by heating oxide of cadmium with cantharidin, the direct combination being nearly *nil* at the end of twenty-four hours, even when operating at the temperature of boiling water. By double decomposition iodide of cadmium and cantharidate of potash gave a cantharidate of cadmium with excess of base. The neutral salt was obtained with the neutral sulphate of cadmium and a completely neutral alkaline cantharidate. When a great excess of sulphate of cadmium was employed the precipitate contained free cantharidin. The analyses were not concordant; it appeared evident that the operation had not succeeded in isolating in a state of purity the neutral and the basic cantharidates of cadmium.

Masing and Dragendorff prepared and analysed a large number of other cantharidates, namely, those of glucinium, aluminium, cobalt, nickel, iron, chromium, copper, lead, mercury, silver, palladium, tin, and bismuth; they were generally obtained by double decomposition. These compounds were nearly insoluble in water, some of them were crystalline, others amorphous; but their investigation is very incomplete.

OPENING OF OWENS COLLEGE, MANCHESTER.

At noon on Tuesday last the academical session of Owens College was opened in the Chemical Theatre, in the presence of a large assemblage. The Duke of Devonshire presided.

His Grace, after officially pronouncing the opening of the building, said it afforded him the greatest satisfaction to offer his congratulations on the completion of the buildings. In the course of his remarks he said that the success of any institution depended in a very large measure on its local habitation, and on its adaptation to the work that has to be carried on within it. Amongst all the public buildings which adorn the streets of Manchester, or which minister to the various requirements of its vast population, there could be none of which we may more confidently anticipate an important influence on the future destinies of the community, or which will reflect greater credit upon the enlightened public spirit of Manchester and the district of which it is the centre. Though Owens College had now been somewhat more than twenty years in existence, and although its friends are entitled to view its present position with very great satisfaction, he was much mistaken if its further progress and development are not greatly promoted and accelerated now that it had come into possession of the ample accommodation which that building provided. It might, therefore, he thought, confidently be anticipated that that day would form a most memorable epoch in the history of Owens College. The work which originated in the late Mr. Owens' munificent bequest, was a work the magnitude of which had, perhaps, sometimes not been sufficiently appreciated. It was Mr. Owens' design to found a college in which instruction should be given in all the branches of knowledge which were taught at that time, or should thereafter be taught, in the English Universities. How that bequest had been utilized could now be seen. His Grace expressed his admiration of the wise and steady determination with which the principles of the College, as defined by its founder, had been steadily kept in view. But though much had been done much still remained to be achieved, yet he anticipated that the liberality and generosity of the public would supply the funds that would be required to complete the great work. His Grace concluded, amidst cheers, by formally declaring the building open.

Principal Greenwood then delivered an able address on the advantages and aims of the studies that will be pursued within the walls of the College.

Mr. T. Ashton, Chairman of the Owens College Extension Committee, said the duty that now devolved on him was a very simple one—namely, to hand over to the governors of the College the building which had been erected under the care of the Extension Committee and of himself as their chairman. It would have been a matter of great satisfaction to the committee if they could have delivered up the building in a more complete state, especially as regarded the outside, but he believed that they had succeeded so far in preparing the interior that the work of the session would begin on the morrow with no practical inconvenience to either professor or student. Every provision, both for student and professor, would be found most complete, and the students would have to inhabit certainly the most complete and the best set of academical buildings that had yet been raised in this country. It was impossible to speak too highly of the talent and ingenuity which the architect had shown in devising the means for the end, for the readiness with which he had made every provision for the requirements of a very exacting body of scientific professors, and for the unwearied assiduity and diligence which he had shown in carrying out the details of the building. On behalf of the Extension Committee he had to thank Mr. Waterhouse for the exhibition of other qualities, which had made working with him extremely pleasant to them. He hoped the meeting would warmly express to Mr. Waterhouse their thanks for the great labour he had bestowed on the building. He was afraid, however, that a very serious duty still remained to be performed. When the bills of that building were all paid he believed they would find an adverse balance on their books of about £20,000. He had to say, however, that since he entered that room the amount had been reduced by the very munificent donation of £1000 from Mr. H. B. Jackson, and also by a donation of £100 from the son of one of the oldest trustees, Mr. Fletcher. He would be extremely glad to receive a good many thousand pounds more. As they were aware, that building was only a part of a still greater scheme. When the Extension Committee was first appointed its members were thought to be rather too sanguine when they asked the public to find them £150,000; but the public had done that, and his colleagues and he were very much inclined to go to them again with very great confidence that they would get another £150,000. He believed that as the growing importance of the College was appreciated, and as the enormous advantages which it conferred on the district were more clearly seen, there would be no difficulty whatever. In fact, he was quite sure that if good work was done, and people saw that it was useful, there were plenty of men in the country who would take care that no institution was starved. He had the greatest confidence, though he might not live to see it, that there would be seen within the walls of Owens College, before thirty years had passed, from fifteen hundred to two thousand students. That was a number the district ought to send to enjoy the advantages of the high education Owens College afforded.

Professor Roscoe expressed the thanks of the teaching staff to Mr. Waterhouse, the architect, who briefly responded.

The Bishop of Manchester commented upon the supreme interest and importance in this vast community of the objects which the College had been established to promote.

The subsequent speakers were Professor Scott, of the Independent College, Sir J. Kay-Shuttleworth, Sir Benj. Brodie, Dean Lake, Mr. C. S. Roundell, Rev. W. Gaskell, and Dr. Stoner, of the London University.

The High Sheriff of the county moved, and the Earl of Ellesmere seconded, a vote of thanks to the President, which was carried with cheers, and the assembly separated.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 11, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

AMERICAN PHARMACEUTICAL ASSOCIATION.

IT will be seen from the report published at page 296 that the meeting of this body has passed off with its usual success, and that there is no abatement of the interest with which the annual gathering of our Transatlantic brethren is regarded. This year there have been all the customary features of attraction. In the first place there was a goodly array of papers, which, to judge from the titles, will furnish copious material for subsequent digestion. Then excursions, speech-making, and a ball contributed to the entertainment of the visitors and afforded opportunities for establishing friendships and mutual intercourse which cannot fail to be of benefit to the individuals concerned, as well as to the promotion of the art they practise.

At Richmond the municipal authorities appear to have been prominently associated with the local pharmacists in the endeavour to offer a hearty welcome to the members of the Association, and although it seems some apprehensions were entertained that a meeting in the South might prove premature at the present time, it is satisfactory to learn that everything went off with the greatest harmony and cordiality.

If it be permissible to institute any comparison between the American and British meetings which have but recently exchanged simultaneous friendly greetings, we would point to the number of papers brought forward at the former in response to queries propounded in order to stimulate original investigation as constituting a feature of the American meeting which we would do well to imitate here.

There is also another point in connection with the Richmond meeting which will interest many who have not yet attended a meeting of the British Pharmaceutical Conference, and that is the number of ladies who were present. The MAYOR took occasion to thank the members for their good taste in bringing with them the fair representatives of their art, adding that the ladies were never a drug in the market, and though he, as an old bachelor, might consider them a dose, he must admit that they were sugar-coated; certainly they were elixirs, and nobody would dare say they were unofficial.

AN EXPIRING SCHOOL OF PHARMACY.

AT the recent opening of the University of Durham College of Medicine, in Newcastle, the Council in their report drew attention to the means afforded by the College for tuition in practical pharmacy. They pointed out that a class for instruction in this branch of knowledge was founded a few years since, but that it had received only a limited attendance from the pharmacists of the town and neighbourhood for whose benefit it was intended. From the smallness of the class during the past year the Council had resolved that in future unless a sufficient number of names be entered for attendance no lectures should be given on this subject.

This announcement is but a sad repetition of the experience gained in Manchester when attempts were made to establish something like a School of Pharmacy in connection with OWENS College, and it indicates a state of things which requires serious consideration. Not long ago we had to refer to the astonishing fact that a talented practical pharmacist, in the position of lecturer on the subject he is so well able to teach, should have found himself addressing a class of *one only*, and it is with great regret that we learn this indifference on the part of those who should eagerly avail themselves of such opportunities is likely to add one more instance to the failures that have hitherto attended efforts to establish pharmaceutical education in the provinces.

CHINESE OPIUM TRADE.

WITH regard to the Chinese opium trade, it appears that the price of opium has not materially varied during the last few years, and a few dollars more or less, except in occasional instances, would represent the difference of one year over another. Taking, however, the quotations for the past few years, we find that in 1871 Patna opium was quoted at 610 dols. 24 c. per chest, and in 1872 at 652 dols. 21 c.; Benares, 1871, 588 dols. 20 c. per chest, 1872, 634 dols. 80 c.; Turkey, 1871, 609 dols. 86 c., 1872, 547 dols. 98 c. per chest. It will be perceived from these quotations that prices advanced somewhat during the past year, though not to any very material extent. Attention was called in China some few years ago to the alleged increase of native-grown opium, and fears were entertained that it would in time seriously affect the foreign. The result has shown that such anticipations were not altogether without justification. Large quantities of opium are produced in Szechuen and several other provinces, but the policy of the Chinese Government is to discourage the growth of the article, and even lately edicts have been published in the *Peking Gazette* denouncing it. Under any circumstances, it is confidently stated that the native can never compete with the foreign opium, as it lacks the strength and flavour of the latter, and is principally used for mix-

ing purposes by the very poor, who cannot afford to purchase the more expensive descriptions of the product. Again the opinion is expressed that the use and abuse of this drug are generally exaggerated. Estimating the total import into China at 12,800,000 lbs. during the year, surely that is not so gigantic an amount for a population numbering, more or less, about 400,000,000. The fact, indeed, appears that the use of opium in China is confined to narrower limits than is generally imagined, and excess in its consumption is the exception, not the rule. As regards the imports of opium into China during the past year we find that the import of all sorts—Patna, Benares, Malwa, Persian, and Turkey, amounted to 91,206 piculs, or 80,438 chests—equal in English weight to about 12,799,000 lbs. Of this quantity over 146,000lbs. passed the Canton Custom House last year. There is, however, a great deal more than this quantity brought into that province, being smuggled through Macao or the coast line, by which the tariff duty of 45 dols. a picul, and the war tax of 15 dols. a picul, are avoided. The imports, it may be mentioned, do not vary much, thus showing that the consumption of foreign opium does not increase to that alarming extent which the opponents of its use appear to think. We learn, however, from Hankow that amongst the articles which have decreased in import of late years opium figures prominently, and this is attributed to the growing tendency of the Chinese to use the native article, their preference for which is not wholly due to its greater cheapness. Taking into consideration the amount of extract obtainable from the drug, Malwa was very little dearer last year than the best native opium, the average price of Malwa being 460 taels per chest. A similar quantity of the best native opium would cost about 360 taels, but the former yields 80 per cent. of extract, while the latter yields only about 60 per cent. It is believed that the mildness of the native article is the principal cause of the growing preference for its use; and the Chinese say that it is much easier to give up temporarily, or to abandon altogether, the habit of smoking native than that of smoking foreign opium; upon somewhat the same principle, we suppose, that it is easier to relinquish the use of light wines than ardent spirits.

With regard to the growth of opium in the province of Szechuen, it is estimated that the net value of the article there produced is about 35,000,000 taels, although this amount must only be considered as approximative. There are in Chang King alone over 3000 opium smoking shops, which each pay a license of 300 cash per month to the local magistrate. The Chang King opium guild also pays a monthly likin duty of 2500 taels to the Provincial Government. A recent Imperial decree is said to have abolished this likin duty on native opium, the growth of which was to be strictly forbidden; but this decree perhaps may only concern these provinces where the poppy is so extensively cultivated as to leave no opportunity for the production of cereals. The *Peking Gazette* of the 17th December, 1872, contained an edict issued in consequence of a memorial addressed to the Throne by the Governor General of SHENSI and RANSUH, praying that the cultivation of the poppy might be prohibited. In this edict the memorialist is strictly enjoined to forbid poppy culture within his jurisdiction, as being contrary to law; and it further states that "should there be any among the people, greedy for gain, who secretly grow the plant, as soon as the shoots appear above ground, orders are to be issued for it to be pulled up to the last stalk." The edict concludes thus:—"The same strict prohibition applies to all the provinces, and all offenders will be punished, that the food of the people may not be interfered with." Although the prohibition of poppy culture by Imperial edicts has in former years been practically inoperative, there is reason to believe that the edict above referred to will prove more efficacious, for the orders given are more explicit and imperative.

The Acting-Commissioner of Customs of Newchang has also reported that a similar decree, directing the destruction of the poppy crop in the province in which that port is situated, and the adjacent districts of Mongolin, had in many places been carried into execution.

MESQUITE GUM.

A GUM known under this name in Texas, the produce of *Prosopis glandulosa*, Torr., and perhaps of some other species, has lately attracted some attention in America from the fact of its having been found to be almost identical with gum arabic, so that it has been used for medicinal and technical purposes, more especially in the preparation of mucilage gum-drops, jujube paste, etc. It is in Bexar County that the largest quantity is produced. The species most common in that locality grows to a height of from twenty to forty feet, forming a trunk of about eighteen inches diameter. The wood is very hard, close-grained, and durable, and is used as a furniture wood. The gum exudes from the stems and branches of the trees. During the past year as many as 12,000 pounds of the gum were gathered in Bexar County, and as many more between that and the coast. No gum is said to be gathered west of Bexar, and it is hardly known east of the Brazos.

WE learn from the *Garden* that a fine specimen of the camphor tree, about twenty-five feet high, is now growing in the open air in Mr. Fox's garden at Pengewick, Falmouth.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 253.)

The Composition of the Air of Sewers and Drains.

BY JOHN J. NICHOLSON, F.C.S.

It is only during the last few years that attention has been drawn to the agency of sewer gases in the production and transmission of typhoid fever and other epidemic diseases; consequently the nature of these gases and the composition of the air in the interior of the sewers have not often been subjected to any scientific examination.

Now that the subject has been brought more prominently before the public, these examinations will doubtless become more numerous; as from the variable nature of the compounds it will be only by tabulating and comparing a great number of analyses that any useful information can be obtained.

I offer this first experience of mine as an item of evidence on a subject that I consider of great importance, which will repay a more thorough investigation than it has yet received.

In 1871, Sunderland, in common with many other towns, suffered from a visitation of small pox, the severity of which was partly attributed to a want of ventilation in the sewers. In the same year, borrowing powers were applied for to extend the sewerage to the new parts of the town; in consequence of which application an official from the Local Government Board was sent down to make the necessary investigations.

This gentleman attached considerable importance to the aforesaid absence of ventilation, and made it an imperative condition that this state of things should be remedied, recommending several plans that were considered successful in other towns, but leaving it to the corporation to adopt what they thought best.

The ideas and method on which the Sunderland sewers had been constructed were directly opposite in principle to those now insisted on. According to the highest sanitary authorities of twenty years ago the sewerage system was perfect, every joint perfectly cemented, every outlet securely trapped, and every precaution taken, at a great expense, to keep the enemy underground; and all done by the express order of the then Local Government Board.

The Health Committee, in whose province this matter fell, before making such a complete reversal of all their arrangements, wished to ascertain the actual state of the air in the interior of the sewers, and employed me for that purpose. I made the examination at the end of September, 1871, obtaining the air by fixing a bell-mouthed pipe, of about ten inches' diameter, into the wall of one of the main sewers at its upper end, from this I carried up a small pipe into a temporary house erected near the spot, and drew the air out with an aspirator, taking care to have every joint air-tight, and to draw out a few thousand cubic inches every time, before commencing.

This sewer drains a considerable section of the town, and was selected for examination because it was considered more thoroughly trapped than any of the others, and has its outlet in the river, under water at all times except the low water of spring tides.

The average composition of the air in this sewer I found to be :—

Nitrogen.	Oxygen.	Carbonic Acid.	Sulphuretted Hydrogen.	Ammonia
81·1	18·4	0·5	traces.	traces.

Specific gravity 1001·5; greatest amount of pressure with advancing tide, one fifth of an inch on a fine water gauge representing $\frac{1}{100}$ of an ounce to the square inch of surface.

When these results were obtained, there were still wanting the means of comparison with other towns; the only information I could meet with on the subject consisted of two analyses kindly furnished me by Dr. Letheby, one made by himself in the London sewers, in 1858, and the other in the same year at Paris by M. Gaultier de Claubry. On comparing these, which I have arranged in a tabular form, I found that we were not in so good a condition as London in 1858, but very much better than Paris.

The amount of sulphuretted hydrogen and carbonic acid was much less than I expected to find, and I was rather surprised at the specific gravity being so low; all the writers that I have seen on the subject of sewer gas mention it as being a dense, heavy compound, that will almost fall through the air unaltered; but I have not before seen an actual estimation of its gravity.

With regard to the efficient ventilation of the sewers, I drew the following conclusions :—

1st. That we must not place too much reliance on the schemes proposed and plans adopted in other large towns, as we have absolutely no data at all as to the state of the sewer gases there, while we know there are many essential differences in the manufactures carried on, the position of the town, and the disposal of the sewage, all of which tend to prevent comparison between any two towns.

2nd. As we know that the gas will pass through the water traps into the houses, in a greater or less degree, our obvious principle of ventilation may be stated concisely. Make every possible communication between the sewers and the open air, and guard just as carefully every connection with the insides of houses. By numerous openings the little pressure there is will be removed, so that a less quantity will pass through the traps, while that will have been so diluted by the diffusion of air through the sewers as in a great measure to have lost its noxious effects.

3rd. There is not sufficient pressure in the sewers to force the gas to any great height in narrow tubes, so that the nearer the openings are to the ground the more readily will diffusion be carried on, and the more numerous the openings are the more will the gas be diluted both inside the sewers and when it issues out into the air.

The ventilation was carried out for the whole length of the sewer I had examined, by perforating the iron cover of each man hole with circular openings, while each flushing pipe and lamp hole on the smaller branches was covered with a grating instead of a solid piece of iron.

There was thus an opening obtained to the outer air at an average of every one hundred yards of the sewer and all its branches.

After this had been completed and in operation for some months, I made a further examination of the air at the same place in February, 1873, under as nearly as possible the same conditions of weather, when I found a change in the proportions of all the constituents; it now contained :—

Nitrogen.	Oxygen.	Carbonic Acid.	Sulphuretted Hydrogen.	Ammonia.
80·35	19·37	0·23	None.	0·05

Specific gravity, 998·75.

The proportion of oxygen was nearly one per cent. higher, representing an improvement of 37 per cent. on the analysis of 1871.

The carbonic acid was ·27 per cent. lower, showing an improvement of 54 per cent., and I was not able to obtain the slightest indication of the presence of sulphuretted hydrogen.

The greatest difference I found was an increase in the quantity of free ammonia, which could now be estimated easily, and the specific gravity was considerably lower,

owing no doubt to this larger proportion of ammonia and the reduction in the amount of carbonic acid.

From these data I arrived at the conclusion that a large body of air enters the sewer at the ventilators, and, becoming mixed with the gas that is formed there, dilutes it and renders it more rapidly diffusible at every opening.

	Nitrogen.	Oxygen.	Carbonic Acid.	Sulphuretted Hydrogen.	Ammonia.
Atmospheric Air ..	78·96	21·00	0·04	None	Traces
Sunderland, 1871..	81·1	18·4	0·5	Traces	Traces
Sunderland, 1873..	80·35	19·37	0·23	None	0·05
London, 1858.....	79·96	19·51	...	Traces	...
Paris, 1858	78·86	17·93	2·29	0·92	...

Mr. Howarth (Manchester) : I wish to ask Mr. Nicholson whether he thinks that long shafts are not effectual in the ventilation of sewers ?

Mr. Nicholson (Sunderland) : My experience shows that the nearer openings are to the ground the better the ventilation, and the higher the shafts are the more difficult it is to ventilate effectually, unless—which does not often happen—there be a pressure of gas sufficient to force it up to the top of the shafts.

Mr. Savage (Brighton): This subject is very important to us at Brighton, because for some years we have been draining into the sea, and my belief was that for all practical purposes the drainage was perfectly innocuous and effective. However, from what appeared in the medical publications, it was considered necessary to send the drainage over an extent of seven miles, and we have now sewers constructing that length, with only a fall of three feet in a mile. With reference to the subject of the paper, the course adopted in our main sewer is to have a supply of charcoal renewed from time to time at the man-holes, and then to have shafts erected here and there for the ventilation of the sewers. But notwithstanding all these precautions, some of which have not, however, been entirely carried out, a great nuisance still exists on account of the mode by which these gases—which are constantly escaping—get into inhabited houses. We had traps constructed, and made all sorts of arrangements, but no perfect mode was adopted for excluding these gases. The only course that now seems open to us, is to have independent shafts, continued to the top of the houses to carry off these noxious gases. I know of no other process likely to prove effectual, though the objection to that one is its expense.

Professor Attfield (referring to questions put by Mr. Howarth) : I believe a proposition has been made for ventilating sewers by using lamp posts as shafts, but it has not been acted upon, as there are several objections to its adoption. I should like to ask Mr. Nicholson whether he has made any experiment—any direct experiment—upon the organic gases of sewers and drains ? No doubt it is extremely valuable to have indirect evidence as to the condition of the air found in sewers and drains by estimating the amount of oxygen contained in that air ; but at the same time I think it is highly desirable that we should have some direct evidence on that point. I therefore wish to ask Mr. Nicholson, whether he has made any experiment of that kind, whether he has tried the effect of sewer gases on solutions of nitrate of silver, Nessler reagent, permanganate of potassium, or such bodies ?

Mr. Nicholson : I have not yet had an opportunity of making such experiments.

Mr. Martindale : If the theory be a true one that diseases such as typhus fever and small-pox are conveyed by germs, perhaps the use of cotton wool as a filtering medium might, if applied in this case, tend to show some deposit of organic matter valuable for analysis.

Mr. G. F. Schacht (Clifton) : The most promising method with which I am acquained is one that provides shafts containing not a few gas-jets, but a considerable body of fire. The effect of that arrangement would be at once to produce a current and to destroy the vitality of all germs which might be the vehicles of disease. That strikes me as by far the most useful plan that has yet been suggested. The differences in the inorganic constituents of the air hardly seem likely to produce any great difference in the healthfulness of a neighbourhood. It is to the organic contaminations we must give our attention, and their submission to the fiery ordeal I have just mentioned would, without doubt, deprive them of all power for mischief.

Mr. Bottle (Dover) : One plan is to pump the gases from the sewers, by using engine chimney shafts for that purpose wherever permission to do so can be obtained, in every case passing the sewer gas through the furnace. In towns like Bradford, where chimney shafts are as common as trees in the country, there should be no difficulty in getting manufacturers to allow the air of sewers to pass through their furnaces. That, I think, would have a beneficial effect.

Mr. Ekin (Bath) : There is no ventilating shaft like the kitchen chimney. Two or three years ago some gas tar was thrown down the outlets of a sewer in the lower parts of the town in which I reside, and in a very few minutes the smell of the tar was perceived in the houses in the upper parts of the town, at least half a mile away from the places where the gas tar was thrown in. The inhabitants at once sent complaints to the gas works, believing that the smell was due to an escape of gas. In another case too some impure and offensive carbolic acid was thrown down a drain by a friend of mine who did not know how to get rid of it in any other way. The people in the immediate neighbourhood on that occasion also sent word to the gas works complaining of an escape of gas. These instances give one an idea of the great pressure there must be in the sewers. I once ventilated a soil pipe in my own house by carrying an inch and a-half gas pipe from it to the top of the house above the chimneys. When the opening in the soil pipe was made you could hardly hold your hand over it, the pressure was so great. Water does not effectually keep out the gases, for after a time I have found that it becomes saturated, and the gases pass through, as may be proved by suspending over a trap a piece of blotting paper saturated with a lead salt.

Mr. Williams (London) : With regard to the gases passing through a layer of charcoal, is it not necessary that the charcoal should be kept damp ? If so, there is some difficulty in the use of charcoal even.

Mr. Stott (Halifax) : At the Halifax Union Workhouse, on account of the prevalence there of small-pox, we have adopted the plan of ventilating the shafts by passing them into a very high chimney, and the plan has proved so successful that the party who suggested it is about to patent it.

Mr. Kershaw (Southport) : In our district we have adopted these charcoal pans, and find that they are not effective.

Mr. Baldock (South Norwood) : There are several important points involved in Mr. Nicholson's paper. Some views that have been expressed by the author are in direct opposition to certain statements made by other writers on the subject, and notably by Dr. A. Carpenter, of Croydon, who published a series of letters on this subject in the *Times* about twelve months ago. Then, and also, I believe, at the present time, the practice was to run a small pipe up the side of the house. My own opinion is that the gases would not choose that circuitous mode of exit, because there must necessarily be considerable pressure in the sewers in order to carry off the gas in that way ; and that that pressure does not always exist is proved not only by Mr. Nicholson's statements, but also by an expedient adopted at Croydon known as the charcoal grating. From this it is argued that the pressure is

sometimes into the sewer, and not out of it, which state of things is known by the fact that the surface of the charcoal is occasionally covered with a light pulverulent dust. I think the fact is rather overlooked that many of the traps are dry, and unless there be a rainfall, they will readily admit gas under slight pressure when in close contiguity to the sewers.

Mr. SUMNER (Liverpool) : In confirmation of what has been stated by Mr. Ekin, I may say with regard to gases passing through traps, that at a very early period in the petroleum importation, a great quantity of petroleum was stored by the dock side at Liverpool, in the lower part of the town. An accident occurred in the carting of some of this petroleum, and some friends of mine living in the upper part of the town, three-quarters of a mile away, perceived the gas through the traps of their houses. My friends examined the traps and were satisfied they were full of water ; yet the smell of the petroleum was so perceptible that they had no difficulty in deciding where the escape came from. The best preventive of pressure from the main sewers, I have found, is a curved pipe, as large in diameter as your drain will admit, near its junction with the sewer.

Mr. BOTTLE (Dover) : With regard to the escape of gases from sewers, very much depends upon the direction of the wind. When blowing in a direction contrary to the fall of the main sewer, I have found that the pressure within the sewer, and consequently upon house traps, has been materially increased. I believe also that the dip of the ordinary house traps is not sufficient. Many of them do not dip more than one-eighth of an inch, and a small piece of house flannel, or other similar substance, acting as a syphon, rapidly empties them.

The PRESIDENT : The subject of ventilation, whether of sewers or dwelling-houses, is a large one, and people are apt to forget that arrangements in a particular form, though answering in some circumstances, may be of no use in others. I remember the case of a friend of mine who was at infinite pains to ventilate the sitting-rooms of his house, in order to get rid of the products of the combustion of gas. He attempted to show me how splendidly his plan worked, and how the heated air from the gas was carried off through the ventilator, by putting a candle to it, when the light was blown out by an *in*-draught. I suspect such cases are not uncommon. The alteration of external circumstances has a great deal to do with the result in matters of this character. Meteorologists know how exceedingly difficult it is to account for windage, even where obstructions to currents of air appear to be very trifling.

Mr. NICHOLSON, in reply, said : I have seen ventilation through fire tried in several instances, but I do not think the plan is practicable unless you have frequent centres of ventilation. It has been found that, when fires have been lighted at the bottom of the shafts, a pressure has been caused by which the water has been all drawn out of the traps in the immediate neighbourhood. The only remedy in my opinion is to have as many openings as possible into the open air, and as near the ground as possible.

The thanks of the members were then given to Mr. Nicholson for his paper.

Professor Attfield then read the following :—

PHARMACEUTICAL NOTES.

BY S. R. ATKINS.

The Preliminary Examination.

It is desirable that the certificates of the local examinations of the Universities of Oxford, Cambridge, and Durham, and also of the College of Preceptors, should take the place of our own Preliminary examination, the latter to be abolished.

The argument in favour of such a course may be briefly stated thus :—The design of such an examination is to test a liberal education. Such test would be more appropriately applied by a strictly educational authority—educational I mean in the *literary* rather than in the *technical* sense.

The advantages of such a change would be greater uniformity and accuracy of results, the avoidance of the very possibility of collusion on the part of the examined, or of negligence on the part of local secretaries.

And finally, the certainty of securing that which after much talking and writing we have at length obtained a consensus of opinion upon, namely, that this examination should be strictly *preliminary* to apprenticeship.

The Medical Profession.

The relations existing between medical men and pharmaceutists is a subject destined yet further to engage attention. And not being a matter for legislation, it is one pre-eminently in which a healthy public opinion can only be created by full and free discussion.

No one will dispute the assertion that it is highly desirable a kindly and confidential relationship should exist between the general practitioner and the dispensing chemist. That such a sentiment already largely exists we gladly admit, but chiefly confined to the large centres of population.

Nothing is more common in provincial towns than to find every member of the faculty dispensing his own medicines.

Compromise, in the shape of mutual surrender, is the only solution of the difficulty we can discover. Medical men should entrust to us their dispensing, we, *per contra*, guaranteeing not to poach on their special preserve in the shape of counter-prescribing.

Pharmaceutical Titles.

Ground for inquiry and amendment exists in this particular. The bare statement of the fact should suffice, that the men who entered the vineyard at the eleventh hour have well-nigh the same distinction as those who have borne the heat and burden of the day.

We know the difference in value between the terms "*Pharmaceutical Chemist*" and "*Member of the Pharmaceutical Society*"—the general public unhappily does not.

We most gladly welcome the late comers, and would as heartily have greeted them, had they arrived earlier. Still if pharmaceutical titles are of any practical use in so far as our constituencies are concerned let them distinguish and not confound things that differ.

The PRESIDENT : Each of these subjects is so wide that we might occupy a week in discussing it ; it is for you to say how far it is desirable for us to enter upon them now. We are however bound to send to Mr. Atkins the expression of our thanks. If any gentleman has any remarks to offer respecting the notes we shall be glad to hear him.

Mr. REYNOLDS (Leeds) : I have taken notes of two sentences, "the negligence of local secretaries" and "the possibility of collusion." The duties of local secretaries, —since one day in every quarter has now been fixed, when they must be shut up for three hours with the candidates,—are not specially desirable. In any case it is clear that these duties are important and must be thoroughly discharged. Before any doubts are cast upon the integrity with which local secretaries perform their functions good evidence should be offered. I believe that a much more definite system on the part of those who regulate that duty is needful ; for instance, no instructions now come down with the examination papers. The attention of the Board has been drawn to this matter : it is rather a serious point, for the examinations might become void through any irregularity of a deputy to whom an examination had been entrusted. It was desirable to take many precautions and to avail ourselves of the benefit of the experience of the universities. If, for instance, you are likely to have a larger number of candidates than the room ordinarily used can accommodate, so that the students shall have a sufficient space between each other, a larger room should be engaged.

Further, I think the holding of examinations in private houses should be discouraged. Some public place should be used for the purpose. I think I ought to say on behalf of the local secretaries that some improvements could be made on the present system.

Mr. SAVAGE (Brighton) : I concur in the desirableness of the local examination being conducted in large centres, but at the same time it must be borne in mind that the plan will be attended with expense to young men who can ill afford it. Not only this ; but these University Local Examinations occupy a week, whilst our present examinations occupy but three hours.

Mr. CARTEIGHE : I concur in the general spirit of Mr. Atkins' note. He certainly does treat the matter somewhat curtly ; but I concur in the view that it is desirable as soon as possible to pass over a purely elementary educational examination to an educating body, because I think it would be an immense advantage to the youths who are to be our future apprentices. It is true that the Society since the passing of the Pharmacy Act has decided, I was going to say condescended, to continue the Preliminary examinations in their present form or in some other form to be decided upon hereafter. I am not prepared to say that the examination is on the whole satisfactory either to the local secretaries, or to the examiners, or to the candidates themselves. I speak from some little experience when I assert this. I am not prepared to say that every local secretary, or indeed a large percentage do thoroughly understand the importance of their duty in this respect, on the other hand I am bound to admit that it is rather a serious matter to expect a local secretary to give half a day every quarter to the performance of work for which he does not receive any payment. —a work also which does not appear to carry with it any particular honour. All these are difficulties in carrying out the present system. I know that some local secretaries really object to this part of their duty—it would be invidious to say how many, but there is undoubted testimony to that effect. I would rather go upon the broad principles that examinations of this kind, which are not purely technical, should be conducted by a scholastic examining board. What I take Mr. Atkins to mean is that we should encourage a higher class of apprentices and that as long as we keep holding out a sort of intermediate examination, and one which is considered easier than we should wish it to be, so long are we staving off the time when we shall obtain a higher class of apprentices. It ought to be mentioned for the benefit of those likely to contemplate passing these examinations that the time will very shortly come when medical Latin will be excluded. The only justification of the present form of examination is that it has been found expedient. I protest, as a member of the Conference and as a member of the Society against the notion that it is the duty of the Society to conduct examinations which can be much better conducted by men specially trained for that purpose.

Mr. SMEETON (Leeds) : I am inclined to think that the final middle class examinations might be made useful if they could only have a reflex action on the middle class schools themselves. In many cases a boy of sixteen years is brought to us, who when asked if he has learned Latin will say "yes," and although even from a good school, or one that ought to be good from the charges made, you will find his knowledge, on being tested, to be mediocre. If it should become law to compel these schools to submit their students for examination, the difficulty would be surmounted.

Mr. SCHACHT (Clifton) : It must undoubtedly be admitted that one of the objects contemplated by the Pharmaceutical Society in planning the Preliminary examination was the gradual introduction of a better educated class of men into the ranks of pharmacy, and possibly as far as the examination itself is concerned, it might be more thoroughly conducted by some other bodies than by our own Board of Examiners. But this admission constitutes no argument for the abolition of our "Preliminary," for we have no power to compel a candidate for pharmacy to pass the College of Preceptors' examination, or any other than our own, and at last it comes to this—that we want to apply some test that shall exclude those whose previous training is insufficient to warrant the expectation that they will be able to pursue the studies connected with our calling, and this we must do ourselves through our own Board of Examiners. Moreover, by including these departments of knowledge with those that are more purely technical, I do not think the Board in any way risks its dignity. I may remind the meeting that the various departments of the medical profession conduct examinations of this kind. (A member : "Not by themselves.") Yes, by themselves. I am a registered apprentice of the Society of Apothecaries and when about to be apprenticed to my master, the late Mr. Savory, was taken to the Apothecaries' Hall, and required to pass an examination in Latin and arithmetic. I believe that many other bodies hold such examinations and I do not believe it is any disparagement for them to do so.

Mr. CARTEIGHE : The question is not one of dignity at all, but whether the men appointed by the Pharmaceutical Society are the best men for conducting the examination. With respect to Apothecaries' Hall the facts are as stated by Mr. Schacht, but as regards the College of Surgeons this part of their examination is conducted by the College of Preceptors.

Mr. MARTINDALE : I must confirm Mr. Carteighe as to the College of Surgeons' examination being now conducted by a separate examining body. That society formerly did conduct their own educational examination but they have now transferred that duty to the College of Preceptors. I might mention that if our Preliminary examination be abolished, unless very many more centres are selected for their examinations by other bodies, a hardship will be inflicted. On the other hand there is great objection sometimes on the part of apprentices to have the examination in the houses of competing chemists in the same town, and I have heard of cases in which rather than do so they would travel 100 miles.

Mr. COTTRILL (Shepton Mallet) : I think the clergyman of the parish might undertake an examination of this kind. The original intention was that the examination should be a preliminary one ; it was the case with myself nearly thirty years ago, but there has been a departure from this rule. I trust there will be a discontinuance of the advertising notices we now see in newspapers, to the effect that Mr. So-and-So has passed the Preliminary examination in pharmacy, he having been trained by the Rev. Mr. Bircher, or some other local celebrity. Such notices are disgusting when it is remembered that the examination is of such a slight character.

Mr. WILLIAMS : The question is, whether it would be better to have every young man come up to London for examination *in propriâ personâ*, or have written examination papers put before him under local secretaries. I think there would be a difficulty in accepting the examination of the universities or of the College of Preceptors, our Act of Parliament requiring the examination to be conducted by examiners appointed by the Pharmaceutical Society, and approved by the Privy Council.

Mr. CARTEIGHE : I wish to say a word in explanation. I never meant to imply that the examining board had ever refused to undertake the work entrusted to them, but only intended to convey my opinion that as a matter of expediency and for the good of the candidates themselves it is better that these examinations should be conducted by an independent scholastic board.

ABSENCE OF MORPHIA IN THE PETALS OF PAPAVER RHEAS.

BY PROFESSOR ATTFIELD.

Pereira, treating of the red poppy in his 'Elements of Materia Medica,' states, "It is not improbable that this plant [the whole plant] may contain *morphia* in very

minute quantity." And again, "It probably possesses a narcotic property in a very slight degree, but which is scarcely sensible in the ordinary doses in which this medicine is employed." Garrod, in his 'Essentials of Materia Medica,' says of red poppy petals, "They contain, in addition to the red colouring matter, minute traces of the peculiar constituents of opium." And Bentley, in his 'Manual of Botany' cites Chevallier in support of the opinion that the petal-juice contains morphia. These quotations suffice for showing that the well-known colouring agent, the juice of red poppy petals, is, to say the least, suspected to contain morphia, and, consequently, to be a weak, though no doubt very weak, narcotic. On the other hand Hesse, (*Amr. Pharm. Suppl.* 4, 50; *Amr. Pharm.* 140, 145; *Eng. Trans. Gmelin's Handbook of Chemistry*, vol. xviii., p. 206,) in a research on the red-poppy plant, so thorough as to yield him *rheadine*, a well marked crystalline alkaloid, seems to have detected no morphia. Filhol, however, found morphia in the *capsules* of *papaver rheas* (*N. T. Pharm.* 2, 150,) and Aubergier (*N. Amr. Chim. Phys.* 20, 303; also *Gmelin's Handbook*) is said to have obtained from the red poppy cultivated in Algeria opium containing 10 to 11 per cent. of morphia. These statements, however, still leave undecided the question of the presence or absence of morphia in the petals of the plant, the matter to which attention is invited in this note, and the only one having general pharmaceutical interest, inasmuch as the petals are the only part of the plant used in medicine.

In endeavouring to throw light on this subject it became obvious that no experiments could be deemed conclusive unless made on large quantities of material. I therefore worked on one pound of petals (about 6000 petals or 1500 flowers) in each analysis, and made three separate analyses by three different processes. I also assured myself by experiment that each process would isolate morphia if that alkaloid were present.

Experiment 1.—One pound of the petals was gently warmed with a quart of water acidulated by acetic acid. After digestion for two hours the liquid was separated from the solid portion, and the latter again similarly digested. The operation was once more repeated, and the three quantities of liquid mixed and treated as follows, the exhausted petals being thrown away. The liquid was evaporated over a water-bath, and when only two or three ounces remained acetate of lead added until a precipitate ceased to form. The precipitate *a* was separated and examined for meconic acid, or any acid having analogous reactions, while in the liquid *b* morphia was sought. The precipitate *a*—decomposed by sulphuretted hydrogen, the sulphide of lead removed by filtration, and the filtrate, after removal of sulphuretted hydrogen, tested with neutral perchloride of iron—gave no reaction for meconic acid. The liquid *b* was subjected to a current of sulphuretted hydrogen to remove lead, filtered, the clear filtrate evaporated to a small bulk, carbonate of potassium added in excess, and the mixture well shaken with about twice its bulk of a morphia solvent composed of ether and acetic ether in equal parts. A portion of the residue left by the evaporation of this ethereal solution to dryness giving no reaction of morphia, the bulk of the residue was submitted to processes of purification and again tested. Not the slightest evidence of the presence of morphia was obtained.

Experiment 2.—One pound of petals, within two hours of collection was digested in and exhausted by weak spirit of wine acidulated with acetic acid. A little tartaric acid was added to the tincture, and the latter evaporated to dryness at a low temperature, the residue exhausted by cold anhydrous alcohol, the alcohol removed by evaporation, a little water and some bicarbonate of potassium added to the residue, and the whole shaken with seven or eight times its volume of pure ether containing some acetic ether. The ethereal liquid evaporated gave a residue which neither before nor after subjection to purification afforded any evidence whatever of the presence of morphia.

Experiment 3.—The tincture from one pound of petals was slightly acidulated with hydrochloric acid, and evaporated to the consistence of syrup; the latter diluted with water, set aside for some hours, filtered, and solution of phospho-molybdic acid added, until a precipitate ceased to form; the precipitate washed with water containing phospho-molybdic and nitric acids, then caustic baryta added to neutralize acid and liberate alkaloid; excess of baryta removed by carbonic acid gas, and the whole evaporated to dryness over a water-bath; the residue digested in alcohol; the alcoholic liquid filtered and evaporated; the alcoholic residue faintly acidulated by sulphuric acid, dried, washed with pure ether; water and carbonate of potassium added; the mixture shaken with ether and acetic ether; the latter evaporated, and the residue tested with perchloride of iron, iodic acid, and other reagents for morphia. No reaction for morphia was obtained.

These experiments I offer as confirmatory evidence of the absence of morphia in red-poppy petals. If we admit, as I think we may, the presence of the alkaloid in other parts of *papaver rheas*, the experiments have physiological interest, and suggest (to some of our members in India and elsewhere) an examination of *papaver somniferum* with the view of ascertaining whether or not morphia is contained in the petals of white poppies specially grown for opium. The pharmaceutical interest of the matter has already been adverted to, but the experiments may have pharmaceutico-legal value in the event of some zealous dispenser of justice reading the Pharmacy Act as requiring syrup of red-poppy petals to be placed in the same category as syrup of white-poppy capsules.

The thanks of the meeting were given to Professor Attfield for his paper.

The next paper read was a

Note on the Hydration of Extracts.

BY CHARLES EKIN, F.C.S.

It has occurred to me that Wanklyn's method of limited oxidation by means of an alkaline solution of potassium permanganate might be applied with good results to the assay of such medicinal extracts as are dependent for their activity entirely, or for the most part, on certain alkaloids—all alkaloids yielding a certain portion of their nitrogen as ammonia. Also that it might be made available for the determination of the relative values of the first year's and second year's plant of hyoscyamus, about which a good deal has been taken for granted but nothing yet really proved. And again in the case of conium, to determine which has the greater activity, a tincture made from the fruit or from the leaves. Of course, the difficulty lies in the complete and easy separation of the vegetable proteides of the plant juices, but I am by no means sure that this is not a difficulty that can be overcome, although I regret I have not yet had time to go sufficiently into the subject so as to be able to lay results of any value before this meeting of the Conference. I have had, however, incidentally to determine the amount of water in various extracts, and have thus so far answered question 66 on the blue paper circulated by the Conference, viz., "Is it possible to assign a definite degree of hydration to medicinal extracts with a view to uniformity of strength?"

I believe it is quite possible to do so, certainly with some if not with all extracts.

I find that extracts of fair average consistence for pill making, when subjected to the heat of a water bath, in the cases of belladonna and hyoscyamus lose 20 per cent. of their weight, and in the case of conium, 25 per cent.

The plan I adopted was to spread the extract very thinly on a thin platinum capsule, and dry at a temperature of 212° until it ceased to lose weight. Various experiments with the same extract gave in this way very constant results. At first I operated on quantities of 10 grains at a time, but I found that several hours were then required for complete desiccation, whereas if only one or

two grains were used the time required was little more than half an-hour.

The consistence of extracts varies so much that it would seem advisable to define in the Pharmacopœia the amount of water each should contain, the amount to be determined as I have recommended. When once a standard has been set up there would be practically little difficulty to manufacturers, for I find after a few trials the eye can determine from the consistence of the extract, to less than 1 per cent., the amount of water present.

Mr. SCHACHT: I wish to ask Mr. Ekin whether he has satisfied himself that all the material he lost over that drying process was water.

Mr. EKIN: The question is one I am not surprised should be asked, and my reply is, that it is quite possible the loss of weight on drying may not be entirely due to loss of water, but may represent also an infinitesimal quantity of alkaloid. The estimation, if only approximate, is, however, practically sufficient. Everyone who has observed the varying consistence of extracts as sent out by different houses, at one time as thin as treacle, at another time of fair pillular consistence, must admit the desirability of having some standard to go by, even if it be only a rough one.

Mr. A. H. MASON (Liverpool): Mr. Ekin has alluded to a difference between the extract of hyoscyamus produce from different plants. For some little time past I have been in hopes of gaining information on this subject of hyoscyamus, but as yet have been unable to arrive at any definite results. It seems to me an important question whether the *biennial* plant of first year's or second year's growth should be used. Much larger quantities of the former are used by pharmacists in this country than the latter. The Pharmacopœia is rather indefinite on the point. But in Squire's 'Companion' it is very plainly described that the plant of second year's growth should be used. The question, therefore, is raised, what difference is there between the extract, tincture, etc., of the biennial hyoscyamus of the first year's growth and the same plant of the second year's? Mr. Stoddart * says the microspectroscope will immediately decide whether a tincture has been made from the *annual* or the biennial plant. Five dark bands are distinctly seen from biennial plant tincture which are not visible in that from the annual. It has occurred to me, while listening to Mr. Ekin's paper, whether it would be practicable to have all extracts in powder, provided the strength did not deteriorate; at all events, it would do away with the want of uniform consistency.

The PRESIDENT: There is a considerable difference between the annual hyoscyamus and the biennial plant, and the Pharmacopœia directs that we should only use the latter. I have myself cut one that was several feet high. It is altogether different from the annual plant. Mr. Stoddart's paper went to prove this difference between the two was due to the chlorophyll. But as we do not yet know enough of the value of chlorophyll there must be hesitation on our part in assigning any great amount of significance to that difference. I have read somewhere the suggestion that a portion, at least, of the active matter of our hyoscyamus is mixed up with the waxy chlorophyll. A suggestion has been made that the chlorophyll taken off should not be returned after evaporating for extract. It is evident, however, that if the chlorophyll does contain any alkaloid such a suggestion will fall to the ground. That, however, is a matter to which attention should be given by the microscopist and the chemist.

Mr. MASON: I did not intend to convey the impression that there was no difference between the annual and the biennial plant, but my remark had reference to the possible difference between the first year's growth and the second year's growth of the biennial hyoscyamus.

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* PHARM. JOURN., May 20th, 1871.

Mr. WILLIAMS: A paper has been published by Merck, in which the writer comes to the conclusion that the alkaloid is not crystalline but liquid; that it has a tobacco-like smell and other properties somewhat resembling conia. These statements require confirmation before they can be taken as proved.

Mr. Ekin having been thanked for his paper, the discussion concluded, and the Conference adjourned till Wednesday morning.

WEDNESDAY, *September* 17.

The Conference re-assembled this morning at 10 o'clock.

THE AMERICAN PHARMACEUTICAL ASSOCIATION.—FRATERNAL GREETING.

The PRESIDENT: The first business this morning, gentlemen, has reference to the telegram which was sent yesterday to our American brethren. Last evening we received a return message. It is to the following effect:—

The President of the American Pharmaceutical Association,
To the President of the British Pharmaceutical Conference.

We return your hearty fraternal greetings.

Another American subject was announced in a letter read yesterday from Mr. Bedford, on behalf of the Photographic Album Committee of the American Pharmaceutical Association. Mr. Bedford stated that the album presented to the Conference had been forwarded from the United States, and I have now to inform the Conference that it arrived last evening, and has been laid on the table for the inspection of members. The album had been conveyed to England by the kindness of Mr. Walter V. Morgan.

ABNORMAL DOSES.

The PRESIDENT: The next business is to consider the report of the committee on abnormal doses.

Mr. HAMPSON then read the report as follows:—

"That this Conference having duly considered proposals for the use of special signs to mark unusual doses on prescriptions, and the great advantages to be derived from them, considers that the bracketed initial letters of the prescriber's signature, written immediately after the unusual dose, is the best suited for the purpose.

"This Conference also respectfully urges upon medical men the importance of the prescriber's full name and address being written on *all* prescriptions, to facilitate communication between the prescriber and dispenser.

"This Conference likewise considers it desirable for the dispenser to retain all prescriptions in which initialled unusual doses are prescribed."

After reading the report, Mr. HAMPSON said: I do not think there can be any objection to the report I have just read, as it embodies all the important points which were under discussion yesterday. I beg to move that the report be received and adopted.

Mr. GREENISH seconded the motion, which was carried unanimously.

The resolution having been passed, a conversation took place as to the best mode of communicating it to members of the medical profession, the President suggesting that a copy might be presented to the members of the Medical Council, and to the presidents of each of the various medical societies.

Mr. CARTEIGHE said: I beg to move that a copy of the resolution be distributed among members of the medical profession at the discretion of the general secretaries.

Mr. GROVES: I really think it would be better to communicate, in the first instance, with the head of the medical profession—the Chairman of the Medical Council. This would save the great expense which the distribution of copies of the resolution must incur. Besides, I think it would have more weight if the copy of the resolution

were forwarded by the President of this Conference to the head of the medical profession, who would be the proper person to disseminate similar copies among his own brethren.

Mr. WILLIAMS: It is questionable whether it would be wise to adopt this step. The resolution will, of course, be published in the medical journals, but I think we shall be departing from our province as a conference if we take the course proposed.

Professor ATTFIELD: It will be quite open for the President of the Conference, I suppose, to send copies of this resolution in the way suggested, or the secretaries might forward them at his request; or some other course may be taken, so long as we give a formal tone to the whole matter. In addition, however, to such a mode of procedure, I presume there can be no objection to the President himself communicating with the presidents of the medical societies on the subject.

Mr. GROVES: My proposal was that the Chairman of the Medical Council should be communicated with.

Professor ATTFIELD: Why not the chairmen and the presidents of the leading medical societies?

Mr. SAVAGE: This is a matter of mere detail, which I think may properly be left in the hands of the Secretary.

With this understanding no resolution was passed.

FURTHER EXPERIMENTS ON NEPAUL ACONITE AND ON THE CHARACTERISTICS OF THE ACONITINES.

BY THOMAS B. GROVES.

The paper on Nepaul Aconite which I read before the meeting of the British Pharmaceutical Conference, at Liverpool, in 1870, has I find, not had the effect of converting continental pharmacists to the belief in two crystalline aconite alkaloids; one aconitine which I exhibited before the Conference at Nottingham, in 1866, when I read a paper entitled 'On Aconite,' and showed how I had extracted the crystalline alkaloid; the other pseudaconitine which I produced at the Liverpool meeting above referred to.

However my facts have not been altogether unsupported. Professor Flückiger, of Bern, writing to me (December 10, 1870), thanks me for the fine crystals of pseudaconitine I had sent him and states with what pleasure he had received them. The experiments he had made with them convinced him that they were truly crystals of pseudaconitine and nothing else, and that in the failure of the usual colour reactions it was best characterized by its ready crystallizability, its little solubility and the absence of bitterness; all which traits had been previously described by its discoverer, Von Schroff of Vienna.

Since then two able and exhaustive treatises on aconite have been published by French pharmacists, one in 1871, by M. Duquesnel of Paris, entitled 'On Crystallized Aconitine and the Preparations of Aconite,' the other in 1872, by M. Patrouillard of Gisors, 'On the Aconites and Aconitine.'

M. Duquesnel, in summing up the results of his research states that the activity of *Aconitum ferox* is due not to its containing a more energetic principle than aconitine, but to its containing a greater quantity of that principle, adding moreover that crystalline aconitine, with its ordinary form and properties had been obtained from that root. I am not sure however that my paper on Nepaul aconite had come under that gentleman's observation.

M. Patrouillard admits the distinction between the German or true aconitine, and the English or pseudaconitine, but endeavours to show that these substances are but more or less impure varieties of a single pure aconitine.

As this battle of the aconitines had been going on for at least twenty years, it was not to be expected that unanimity would at once be obtained. In fact I had foreseen that it would be necessary in order to produce conviction to be able to present to competent experimenters specimens of the different alkaloids for comparison. Accordingly soon after I had succeeded in obtaining pseudaconitine I sent to Messrs. Barron and Co. an order to supply me with fifty pounds of the same sample of Nepaul aconite root as they had previously sent me. I received answer to the effect that what they had purchased had become perfectly rotten, and that they were obliged to have it removed from their warehouse in consequence of its becoming heated.

However I managed to get some from another house (Messrs. Davy and Co.), and this was in excellent condition and presented precisely the same appearance as the roots I had before operated upon.

These I kept in a dry place until March of this year, when I thought I should have found time to work them up.

Mr. John Williams (Hopkin and Williams) very kindly consented to perform for me the preliminary operations which were unsuited to the arrangements of my small laboratory. The fifty pounds of roots, when dried and ground, were reduced to forty-eight pounds. The powder, packed into a percolator, was exhausted in the usual way with methylated spirits.* acidulated with hydrochloric acid in the proportion of two drachms to the gallon. The percolate was mixed with two or three pints of water and distilled to recover the spirit. The residue consisting of a highly coloured fluid with the resinous and oily matters of the root floating on its surface was sent to me. No sooner however had I received it than unforeseen circumstances compelled me to put it aside for a time, first taking the precaution to mix with it half-a-pint of ether, as a preservative. Six weeks latter, at the end of May, I found myself once more in a position to proceed with the work, which I attacked with fear and trembling, lest the long delay might have operated injuriously on the alkaloids.

The six pounds of Nepaul aconite I originally worked upon I had treated by what I may call the iodide of mercury process,† which, though well adapted to the treatment of so small a quantity, was thought too troublesome and expensive for the larger.

The process adopted was the following very simple one. A glass syphon having been inserted into the jar containing the mixed liquids, the lower portion was drawn off perfectly bright, leaving the resins, ether, etc., behind. These were sufficiently washed with water, and the clear fluid added to that removed by syphon. The acid liquid was next alkalized with excess of caustic ammonia, which precipitated an abundance of alkaloid, which by combination with the ether dissolved in the liquid became almost immediately imperceptible. It was, I imagine, diffused in oily transparent drops through the liquid. The alkaloids were now washed out by repeated agitation with ether, the same ether, occasionally reinforced, being used again and again, after having been washed with weak hydrochloric acid. The strong and acid solution of the alkaloids thus obtained was precipitated with excess of caustic ammonia, which produced a semi-solid magma, and from this the alkaloids were obtained in concentrated solution in ether by washing well with that fluid. The residual alkaline liquors, Nos. 1 and 2, were reserved for further observation, and the ethereal fluid, measuring about twenty-five ounces, set aside in a loosely-covered beaker to evaporate spontaneously. I will call this No. 3 for convenience of reference hereafter. I then left home for a holiday. Returning at the end of ten days I found that about two-thirds of the ether had evaporated, and, much to my chagrin, that no crystals had made their appearance. In my first experiment the pseudaconitine commenced to crystallize out half-an-hour after its solution was committed to the beaker; I began, therefore, to fear that the delay already referred to had been as prejudicial as I feared it might be. I nevertheless hoped that I might be

* A duty-free spirit, containing one measure of wood naphtha and nine measures of spirit of wine of not less than 50 per cent. over proof.

† M. Patrouillard supposes that I did not. He probably was misled by using instead of the original paper a translation of it that appeared in the *Bull. Pharm. de Bruxelles.*

mistaken, and that, after all the pseudaconitine had, owing to its less solubility in ether, been left behind, the more soluble aconitine only having passed into solution. I therefore returned to the residual liquors. No. 1 had not deposited a precipitate, No. 2 had thrown down a small quantity of white and partly crystalline substance. Both fluids tested with iodohydrargyrate of potassium showed abundant evidence of alkaloids in solution. The two liquids were therefore mixed, slightly acidulated with sulphuric acid, and precipitated with excess of iodohydrargyrate. The slightly cohering precipitate was washed with water by decantation and transferred to a capacious flask, where heated to about 200° it fused. When cold the water was poured from it, and methylated spirit being added the resinous-looking mass was dissolved by the aid of heat and decomposed, as I have before now explained, by the successive application of sulphuretted hydrogen and acetate of lead. The acid solution thus obtained was freed from excess of lead, evaporated to a small bulk (about eight ounces), water having first been added, precipitated with excess of caustic ammonia, and washed with ether.

This ethereal solution, after several days' evaporation, showed no disposition to crystallize, but deposited a small quantity of a brownish syrup soluble in ether. The remaining ether was therefore chased off by water-bath, at which temperature the residual alkaloid fused, and rectified spirit having been added, the liquid was again set aside to take its chance of crystallizing. This, however, it did not seem inclined to do, so after waiting several days it was exactly neutralized with dilute nitric acid and tried again and again ; but still no sign of crystallizing. I will call this No. 4.

By June 15th No. 1 had become of a syrupy consistence, and the only indication of crystallizing was one small rhombohedron that made its first appearance the day previous. It was then removed to a cool and dark cellar. When I visited it four days afterwards I found that its surface had become leathery, and that underneath, embedded in a dense syrup, were some five or six rhombohedra, and about the same number of spherical aggregations of slender crystals of another character.

The case not being yet hopeless, I determined on trying another solvent. As the mixed material contained not only alkaloids and ether, but also separated water, I chose absolute alcohol, which would reunite the whole. This was added in sufficient quantity, care being taken to avoid breaking up the crystals. Before I had completed washing out the beaker with the alcohol, I observed the solution becoming milky in appearance. Half-an-hour later it seemed decidedly granular, and on taking some to the microscope I was overjoyed to find the change was really due to rapid crystallization, the principal form being the familiar rhombohedron I was so anxious to obtain. In three hours more the fluid had become semi-solid, so that the basin could be inverted without spilling its contents. The mass was then broken up, thinned with rectified spirit, and set aside in order that the crystals might increase in size.

This capriciousness as to crystallizing I observed on several subsequent occasions.

After a few days the magma was thrown on to a cloth, drained, washed a little with spirit, and then carefully and very strongly expressed by a screw. A nearly white cake of crystals was thus obtained. The expressed mother liquor yielded subsequently second and third crops of crystals of the same character. All three crops were now dissolved in rectified spirit and recrystallized. In doing so it showed a great tendency to creep up the sides of the vessel and the crystals produced were very much smaller than those I had obtained in 1870. I attribute both this and the shyness of the alkaloid to crystallize from ethereal solution to the fact that the process adopted did not separate the alkaloids in that state of purity they are obtained in when the iodide of mercury process is followed.

In this way I obtained about one ounce and a half of pseudaconitine, a quantity amply sufficient I trust to convince all the doubters in Europe.

All the cloths, vessels and draining filters were now washed in dilute nitric acid, and to the filtered liquid was added the mother liquors of the pseudaconitine and the alkaloid No. 3. Exactly neutralized with the acid the solution was set aside to crystallize. More than once it was allowed to evaporate spontaneously to dryness, water being used sometimes, sometimes rectified spirit to redissolve it. It never showed the slightest tendency to crystallize.

It was therefore diluted with water to a moderate bulk and to it was added ammonia until its smell was plainly perceptible. The abundant precipitate thus obtained was collected on a cloth, washed a little, and pressed strongly. The cake when dried weighed about an ounce. I shall call it amorphous pseudaconitine.

In my previous experiments I found (see original paper on 'Nepaul Aconite') that 130 grs. of the amorphous substance obtained by evaporating the mother liquor of pseudaconitine, when dissolved in acidulated water, precipitated with ammonia, collected and dried, lost in these operations no less than 43 grains. This I suggested was caused mainly by the solubility of aconitine in water. I strongly suspected however that that was not the only cause of loss. Accordingly I determined on examining the mother liquor of amorphous pseudaconitine.

I found at once that though smelling perceptibly of ammonia it still contained an abundance of alkaloidal matter of some sort which was precipitable by adding a further and very large excess of caustic ammonia.

The mother liquor was therefore neutralized with hydrochloric acid and evaporated to about half a pint. This when cold was treated with a slight excess of ammonia which produced no permanent precipitate. A further addition of the strongest solution of ammonia was then added and an abundant precipitate obtained, which when washed a little and pressed had a semi-resinous appearance and appeared translucent at the edges of the cake.

The mother liquor of this still containing alkaloid precipitable by further addition of ammonia was well washed with ether. The ethereal fluid allowed to evaporate to a syrup showed no tendency to crystallize. It was then subjected to the heat of the water-bath which caused it when dry to fuse, and to it was added the cake before obtained. When the whole was in a state of clear fusion it was removed from the basin and allowed to cool in detached portions on a cold plate. It then had the appearance of resin, was brittle, and easily reduced to powder. It weighed about three drachms. I presume it is Hubschman's napellin, though it differs from it in some particulars. I may mention that it cannot be said to be slightly soluble in ether. Nor is its spirituous solution precipitated by the addition of ether.

The aconite alkaloids, upon some of the characteristics of which I shall now report, are crystallized aconitine and amorphous aconitine, derived from *Aconitum Napellus*, Morson's aconitine, pseudaconitine in crystals, amorphous pseudaconitine, and napellin derived from Nepaul aconite.

I say advisedly Nepaul aconite and not *Aconitum ferox*, leaving the moot question of origin an open one. M. Patrouillard has gone very fully into that question and has collected evidence sufficient to cast considerable doubt upon the original statement of Wallich that *Aconitum ferox* is the sole source of bikh. I must say however that having carefully examined 50 lbs. of the root spread out upon a floor, I could not detect any admixture. They appeared to be all derived from one species.

I will first take the *fusibility of the aconitines.*

Pure crystallized aconitine did not fuse or show sign of cohering when boiled in a test tube with water.

Crystallized nitrate of aconitine dissolved in a small quantity of water and precipitated with ammonia to a coagulum and then heated in a test tube to boiling did not fuse but became quite brittle.

Amorphous aconitine when treated as above behaved similarly.

Morson's aconitine (amorphous) when boiled with water in a test tube fused and stuck to the glass.

Crystallized pseudaconitine boiled with water did not fuse. Dissolved in dilute nitric acid, precipitated to a coagulum with ammonia and then heated to boiling, did not fuse but became aggregated and plastic when pressed with a glass rod, showing a tendency to fusion.

Amorphous pseudaconitine boiled with water fused and stuck to the side of the tube. When touched was sticky.

Napelline (?) is also readily fusible.

Heated destructively in the bottom of a test tube all these preparations gave off acid vapours of the same odour as the pyroligneous acid used for curing hams.

The vapour given off by quinia and strychnia under the same circumstances was alkaline.

The aconitines heated with hydrate of soda gave off ammonia. These reactions seem to indicate an extremely high molecular weight—the acids formed by rearrangement of the carbon, hydrogen, and oxygen being more than sufficient to neutralize the ammonia formed by help of the nitrogen.

Solubility in Ammoniacal Water of the Aconite Alkaloids.

The solution of ammonia I usually employ in my laboratory contains about 5 per cent. of the alkali. Of this solution I took one measure and diluted it with three measures of distilled water, forming the "stronger solution of ammonia;" the "weaker solution" was of half that strength.

The method adopted was the following. Half-a-grain of the alkaloid (air dried) was dissolved by the aid of one drop of dilute nitric acid in about a drachm of distilled water. The small beaker containing the solution, and a small pipette for dropping it was then balanced in the scale-pan. One hundred grain measures of the ammonia solution were then measured into a beaker of fitting size, and into it was dropped, by means of a pipette, the solution of the alkaloid until a slight permanent cloudiness was arrived at. The beaker containing the solution of alkaloid and the pipette was then taken back to the balance, and the loss it had sustained was noted. This was repeated so long as the solution permitted, and finally, the beaker and pipette having been carefully washed and dried, the weight of the residue that had not been used was ascertained. From data so arrived at I deduced the following numbers. I may, perhaps explain, to avoid misconception, that the water in which the alkaloid was dissolved was always added to the one hundred grain measures of the ammoniacal water before making the calculation. The nitrate of aconitine was employed without deducting anything for the nitric acid it contains. The salt being anhydrous the nitric acid was set against the hygroscopic water of the other samples. The method was found sufficiently accurate to enable one to draw a broad line of distinction between the several specimens.

One grain of alkaloid soluble in	Stronger ammonia water.	Weaker ammonia water.
Crystallized Nitrate of Aconitine .	520	589
Amorphous Aconitine	1005	860
Crystallized Pseudaconitine . . .	2674	2500
Amorphous Pseudaconitine . . .	1489	1372
Morson's Aconitine	881	684

It will be observed that crystallized aconitine is not only by far the most soluble of the series, but that it alone is more soluble in the stronger than in the weaker ammonia water.

That the amorphous aconitine approaches in character the pseudaconitines, being less soluble than aconitine, and more soluble in the weaker than in the stronger ammonia water.

The very much diminished solubility of crystallized pseudaconitine distinguishes it at once from the aconitines with which it has persistently been confounded. It is also slightly more soluble in the weaker than in the stronger ammonia water.

Morson's aconitine is reputed to be a hydrate containing 20 per cent. of water. Making allowance for this its solubility is almost precisely the same as that of amorphous aconitine of *Aconitum Napellus*. But then it is fusible at 212°, whereas my amorphous aconitine is not fusible at that temperature.

The action of heat on these ammoniacal solutions is equally characteristical.

Ammoniacal solution of *crystalline aconitine* became turbid on first application of heat, the turbidity increasing with the temperature. On arriving at the boiling point the alkaloid crystallized out in well-defined microscopic crystals.

Amorphous aconitine, similarly treated, became turbid on the first application of heat, the turbidity increasing with the temperature. On arriving at the boiling-point, however, the liquid became clear, and did not become again turbid on cooling. When on arriving at maximum turbidity the heat was withdrawn from the liquid, and it was allowed to stand in the cold for some hours, the turbidity was gradually dispersed and the liquid became clear.

Crystallized pseudaconitine, under the same circumstances, gave with heat a marked turbidity, which disappeared when the liquid arrived at the boiling point. If, however, the heat were removed at the maximum of turbidity and the liquid allowed to rest, on cooling the greater part of the alkaloid was deposited in crystalline tufts, only recognizable as such by means of a ¼-in. objective.

Amorphous pseudaconitine, treated in the same manner, passed through the series of changes, with this exception, that no precipitate, and consequently no crystals were obtainable.

A strong solution of *Napellin* alkalized with ammonia, when heated to near boiling, deposits a portion of the alkaloid in globular resinoid masses.

Morson's aconitine, so treated, gave at first a turbid fluid, which on arriving at the boiling point, became nearly transparent and ultimately completely so.

Crystallized aconitine was the only one of these alkaloids that deposited crystals on the slow evaporation of its ammoniacal solution.

The difference in the degree of permanence of these solutions was very marked.

Crystallized aconitine, after twenty hours, was much diminished in strength. Ten hours later the alkaloid had entirely disappeared. The test used to ascertain this was iodohydrargyrate of potassium applied to the solution slightly acidulated.

Amorphous aconitine was much more stable, the alkaloid had not entirely disappeared after sixty hours.

Crystallized pseudaconitine was even more disposed to permanency. A lapse of nearly a week showed it little diminished in strength.

Amorphous pseudacontine proved nearly as stable.

Morson's aconitine also was very slowly decomposed. It approached in permanence the pseudaconitines. In fact, I feel disposed to think that it is pseudaconitine, with its apparent solubility increased by a large admixture of napellin. That it contains the latter alkaloid is readily ascertained by adding ammonia in slight excess to its hydrochloric solution, filtering, and then adding to the filtrate a little of the strongest solution of ammonia. A second precipitate, having the properties of napellin, is the result.

Of Napellin, in weak alkaline solution, the official liquor potassæ being used instead of ammonia, one grain dissolved in 520 grain measures of the weaker, in 383 grain measures of the stronger. The limit of the reaction in these cases is the first appearance of opalescence, which is difficult to seize. If the alkaloid be added until a decided flocculence appears, this result appears somewhat unexpectedly after

about 200 grain measures, and the flocculi subsequently disappear. This solubility test therefore is not to be relied upon, nor is it needed. Were it desired to be ascertained either the sulphate or acetate should be used, from either of which combinations the napellin is removeable by ammonia. From the muriate it is not precipitable; nor from the nitrate when moderately diluted. Solution of potash does not appear to injuriously affect the alkaloid.

The colour reactions of these alkaloids may be dismissed in a word. There are "none." As for the phosphoric acid reaction producing a blue colour, I have never succeeded in obtaining it. It is probably due to some accidental impurity, and I believe Dr. Flückiger has arrived at the same conclusion.

All these alkaloids, when boiled with solution of ammonium chloride, liberate ammonia; that is especially the case with the pseudaconitines.

The crystalline salts of crystallizable aconitine are numerous. I prepared and exhibited at the Exhibition of 1862 the sulphate, nitrate, and muriate, as well as the pure alkaloid.

No crystalline salts of pseudaconitine have I been able to prepare. Their solubility, both in water and spirit, is too great. They arrive at the state of syrup, and pass from that to a transparent glass, which when it becomes absolutely dry, cracks up into scales, which might deceive the unwary. The deposit obtained by precipitating the spiritous solution with ether is not crystalline.

The same must be said of napellin.

The true figures of the aconitine salts would need a crystallographer to describe accurately. I will therefore not attempt it. The crystals of pseudaconitine are not for a moment to be confounded with those of aconitine. They are entirely dissimilar.

A good deal might be said on the subject of names. It seems to me probable that there are in truth two series of allied alkaloids—the one furnished by *Aconitum Napellus*, the other by *Aconitum ferox*, or some other Indian aconite. Each species seems to furnish its crystallized aconitine, its amorphous aconitine, its napellin. Should my supposition be correct it is obvious that the term napellin should be abandoned. Then again why should the alkaloids of the Indian aconite be stigmatized as pseud, or false? The prefix Ind. would be better, or if the name napellin be abandoned, nepallin might without danger of confusion be applied to pseudaconitin. To any one reading the treatise of M. Patrouillard, it must be evident that he has been misled by the similarity of the names.

As for attacking in detail the battalions of mistakes that have arisen from the feebly marked characteristics of these alkaloids and mainly from the difficulty or impossibility of getting them to assume a crystalline form, I must beg to be excused a labour that after all would, it seems to me, be profitless.

The purely chemical as well as the physiological relations of these alkaloids will have to be considered at a future time by competent experimenters.

The PRESIDENT: Year after year we have been indebted to Mr. Groves for his very valuable researches; and I feel sure I express the feeling of the Conference in tendering to him our acknowledgments for his continued observations on these aconitines. We hope yet to hear from him the results of further researches on the same subject. I fear but few of us are able to discuss this subject; but there may be some who wish to ask for further information, or to make remarks respecting the paper.

Mr. WILLIAMS: I can only express the strong admiration I feel for the important researches of Mr. Groves. This is a matter which has greatly interested me for many years—I may say for no less than twenty-five years. During this period I have more than once attempted to carry out a series of researches such as those in which Mr. Groves has succeeded; but I am sorry to say that my own researches have not been perfect enough for publication. In fact, the difficulty that has always occurred to me is this: If I ever made a series of experiments on aconitine I could not repeat the experiments with the same results. There was always a difference between the results of the second research and those of the first. I could never obtain the alkaloids in a perfectly definite state. The whole subject is one of great interest and importance, and I trust that it will be kept before us, and that these researches will be continued. They are not yet complete. Chemists have to determine what is the real atomic weight of the alkaloid aconitine, and also of the various kinds which Mr. Groves has clearly proved to exist. It is obvious that it would require some quantity of the alkaloids in order to get at anything like a proper and true result, and that it would be necessary to form salts, double salts, and even substitution compounds, before we could really say what the atomic weights really are. I can only repeat the expression of my strong feeling of gratitude, as well as admiration, for the success which has attended these most important researches instituted by Mr. Groves.

Mr. GROVES: So far as pseudaconitine is concerned, I could furnish an ounce-and-a-half—enough to poison the inhabitants of Weymouth twice over. That, I think, would be quite a sufficient quantity to work upon in settling the question as to the atomic weight. As regards crystallized nitrate of aconitine, I have about fifteen grains only, which is insufficient to determine its molecular constitution. I shall be glad to hand over samples of the pseudaconitine to members of the Conference, as I am desirous that the question should be thoroughly cleared up.

(*To be continued.*)

AMERICAN PHARMACEUTICAL ASSOCIATION.

The Twenty-First Annual Session of the American Pharmaceutical Association commenced at Richmond, Virginia, on Tuesday, September 16th, under the Presidency of Professor Albert E. Ebert, of Chicago. The meeting was held in the Virginia Opera House and there were present about one hundred members.

Professor Ebert, in opening the proceedings, alluded to the fact that the British Pharmaceutical Conference was at the same time meeting at Bradford, and the Austrian Apothecaries' Association at Vienna. He announced that he had received a message of greeting from the President of the former Society, to which he had telegraphed a suitable reply.

Mr. Keiley, mayor of Richmond, was introduced to the meeting, and in an eloquent speech welcomed the Association in the name of the citizens; after which fifty-one new members were proposed and elected.

Professor Procter presented a report from the Committee on the Editorship of the Report on the Progress of Pharmacy, recommending that an officer be appointed with the title of Reporter on the Progress of Pharmacy, and an annual salary of 250 dols. The committee nominated for the new office Professor C. Lewis Diehl, of Louisville. The report was adopted.

Mr. Thomas S. Wiegand read the report of the executive committee, giving an account of the business of the Association during the year and announcing the deaths of six active and three honorary members.

The President next read a long and interesting report reviewing the operations of the officers during the past year and making suggestions as to the best means for advancing the objects of the Association. This report was referred for publication.

The session was then adjourned until the next morning at nine o'clock.

On Wednesday morning, September 17, Professor Markoe, secretary of the nominating committee, submitted a report recommending the election of the following officers for the year 1873-74: *President*, John F. Hancock

(Baltimore). *Vice-Presidents*, William Saunders (London, Ont.), John T. Buck (Jackson, Miss.), Paul Balluff (New York). *Treasurer*, C. A. Tufts. *Permanent Secretary*, John M. Maisch (Philadelphia). *Executive Committee*, T. S. Wiegand, G. Lies, Charles L. Eberle, H. J. Meninger, and John M. Maisch. The report was adopted.

The President-Elect not being in the room at the time, the first Vice-President, Mr. William Saunders, of London, Ontario, was called to the chair. Afterwards Mr. Hancock was introduced and returned thanks for his election.

The Report of the Committee on Adulteration and Sophistication, written by Dr. Charles Rice, of New York, was afterwards read and adopted, as also was the Report of the Committee on the Progress of Pharmacy.

A letter from the retiring President, Professor Albert E. Ebert, of Chicago, enclosing a sum of five hundred dollars, was read. It expressed the writer's wish that the money should be properly invested by the executive committee and the annual interest therefrom appropriated for conferring a suitable prize for the best essay or written contribution containing an original investigation of a medicinal substance, or information respecting improved methods for the preparation of chemical or pharmaceutical products. A vote of thanks was presented to Professor Ebert for his gift and it was resolved that it should be accepted and called the "Ebert Fund," and the prize given from it should be called the "Ebert Prize."

Professor Diehl, in behalf of the committee on centennial celebration, presented a report detailing a full plan for a congress of pharmacists of all nations at Philadelphia during the centennial celebration, and recommending that the meeting of the Association in 1875 should be held in Boston, in order to have a large attendance of members, and to prepare for the centennial. The report was adopted.

The following papers were then read :—

On the Preparation of a Permanently Flexible Gelatine Plaster, prepared by some addition to the isinglass used, which will prevent the tendency of the plaster to curl and irritate the skin mechanically : By Henry F. Rittenhouse, of Philadelphia, in reply to Query 1.

On the Easiest Plan of Making "Sapo Viridis" vel "Sapo Mollis" from Olive Oil and Liq. Potassæ ; By P. Fred Lehlbach, of New York, in reply to Query 7.

Dr. Squibb read papers on Alcohol and Distilled Spirits, Rhubarb, and another on Physician's Pocket-cases.

Professor Markoe read the Report of the Committee on Pharmacopœia.

P. W. Bedford, of New York, read a paper in reply to Query 10, in which he showed that balsam of tolu cannot be rendered emulsionizable like copaiba.

On the Merit of Petroleum Benzine as a Solvent for the Extraction of Oleo-resinous Drugs like Buchu, Chenopodium, etc. : By Joseph P. Remington, of Philadelphia, in reply to Query 12.

On the Proportion of Sugar and Honey in the Officinal Process for Pil. Ferri Carbonatis : By Edward D. Chipman, of Philadelphia, in reply to Query 15.

On the Actual Value of Orange-coloured Window Glass as a means of Preventing the Chemical Action of Light on Volatile Oils : By William Procter, junr., of Philadelphia, in reply to Query 18.

On the Material and Workmanship of Cheap Ointment Boxes : By Mr. J. P. Remington, Professor Markoe and others, in reply to Query 20.

On the Correct Time to Collect the Leaves of Biennial Plants like Lobelia, Hyoscyamus, and Digitalis : By Professor J. M. Maisch, of Philadephia, in reply to Query 21.

On the Method of Preparing Cucumber Ointment : By William Procter, junr., of Philadelphia, in reply to Query 24.

On the Improvement of Graduated Measures by which Greater Uniformity can be Attained : By Dr. W. H. Pile, of Philadelphia, in reply to Query 26.

On Labelling Shop-furniture, Stock-bottles, and Vials, in view of permanence, regularity, and safety, and on a Label-case to faciltate the finding of the same : By George H. Schafer, Fort Madison, Iowa, in reply to Query 28.

Mr. George W. Kennedy, of Pottsville, Pennsylvania, read a paper on the Presence of Berberina in the Root of *Frazera Walteri*.

A letter from the Medical Society of Virginia was read, expressing sympathy with the objects of the Association.

At 7 p.m. the session was adjourned until Thursday morning.

In the basement of the building there was an exhibition of pharmaceutical objects. Amongst those which appeared to attract most attention were pyramids of morphine (valued at 1400 dollars) and quinine (valued at 500 dollars), exhibited by Power and Weightman of Philadelphia. There were also sugar-coated pills, "that children cry for, and would swallow by the dozen."

The third day's proceedings were commenced by the presentation of a report on the President's address, and Louisville, Kentucky, was fixed upon as the place, and the second Tuesday of September, 1874, as the time, for the next annual meeting of the Association. Mr. Emil Schafer, of Louisville, being elected local secretary.

In the course of the sitting Dr. Squibb stated that the time of the Association was usually greatly encroached upon by propositions on behalf of their hosts to participate in excursions, feasts, and other entertainments of the whole body. He thought a resolution should be passed declining all such for future meetings.

Professor Markoe thought that all discussion of this subject was time lost; that the majority of the Association always had been and always would be in favour of accepting whatever hospitalities might be offered. He would suggest that the subject be dropped. His suggestion was concurred in.

Prof. J. M. Maisch, of Philadelphia, submitted the report of the committee on legislation, showing that attempts to improve the pharmacy laws have been made in several States, and have generally proved beneficial and successful.

Professor Bedford submitted an elaborate and able report upon the condition of the drug market during the past year.

Prof. Ben. Lillard, of Nashville, Tennessee, read a paper on the subject of homœopathic pharmacy.

Dr. S. S. Garrigues, of Michigan, submitted samples of American gall-nuts from oak trees.

Dr. Squibb said that gall-nuts from the oak as well as from the sumac tree had been for many years used by Dr. Smith in the production of gallic acid.

Papers were also read by Dr. Squibb on a General Apparatus-stand, Upright Condenser, Pinch-cock, and Burette-stand, with illustrations, and on Ergot and its Preparations.

Professor William Procter, jun., of Philadelphia, read a paper on the constantly-recurring query of beginners, who are confused by the mass of books presented to them as the source of knowledge they need.

A paper on the Best Means of Protecting Sound Drugs from the Ravages of Insects, and on the Means of Destroying them when already in the Drugs, was presented by Professor William Saunders, of London, Ontario.

Henry J. Rose, of Toronto, Canada, read a paper on the Purity of Commercial Tartaric Acid, and the Normal Percentage of Moisture.

On motion, it was resolved that all incorporated pharmaceutical colleges that have not done so be requested to nominate members to be added to the Committee on Pharmacopœia.

After the appointment of committees, the Association adjourned until Friday.

Upon the adjournment of the Association, the members, accompanied by the Mayor, members of the City Council and the press, and other guests invited by the

druggists of the city, steamed down the river. As the boat neared Dutch Gap Canal, a handsome collation, spread under the auspices of the Reception Committee, was partaken of.

The time upon the return from Dutch Gap was mostly occupied by speeches, but an hour or more was spent in listening to some songs splendidly sung by a quartette of Richmond amateurs organized on the spot. The barge arrived at the wharf about half past eight o'clock in the evening, and the excursionists found omnibuses and carriages ready to take them to their hotels or homes. Not one incident occurred to mar the happiness of the occasion. Not a word was uttered that grated harshly upon either Northern or Southern ears, though the war was constantly talked about, as the boat passed by the battle-grounds of some of the greatest struggles of the late war.

The fourth day's proceedings were commenced by the Report of the Committee on the Exhibition, made through Dr. A. W. Miller, of Philadelphia.

Papers, in reply to queries, were read by J. F. Judge, of Cincinnati, Ohio; Dr. E. H. Squibb, Charles F. Fredighe, of Chicago; Professor Maisch; and B. F. Stacy, of Charlestown, Massachusetts; and a volunteer paper on Physicians and Apothecaries, by A. T. Moith, of Fishkill, New York, was read and referred.

Professor Diehl stated that the number of queries responded to, and the number of volunteer papers offered at the present session of the Association, was thirty-six. Professor Diehl also read a list of queries that had been accepted, to be replied to at the next meeting of the Association.

Professor Maisch stated that his attention had been called to the fraudulent substitution of muriate of cinchonia for sulphate of quinia. The fraud is principally practised upon the southern interior towns. The former is worth about fifty cents an ounce, and the latter about 2·50 dollars.

A vote was passed of hearty thanks to the pharmaceutists and citizens of Richmond for the cordiality with which the Association had been received on its first visit to the South. Thanks were also tendered to the Richmond press for their faithful reports of the proceedings, Dr. Squibb remarking, in reference to this point, that although reporting correctly the proceedings of the Association was a very difficult task, he had never during twenty years that he had attended the sessions of the Association, seen better or more accurate newspaper accounts of it published.

The Association then adjourned to meet at Louisville, Kentucky, on the Second Tuesday in September of next year.

Some of the members will go on excursions to Mount Vernon and the Greenbrier White Sulphur Springs.

Provincial Transactions.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

On September 15th a meeting was held for the purpose of making the necessary arrangements as to the classes for the winter session, and to fix a night for the election of the new Council. Mr. C. Hester (President) said he trusted that the members would make frequent and attentive visits to the classes, and this would benefit themselves and make the coming session equally successful with its predecessors.

The Secretary, Mr. G. C. Druce, announced donations of £1 from Mr. Abington, of Ringstead; some materia medica specimens from Messrs. Horners and Sons; and French prescriptions from Mr. Sandall. He moved that the PHARMACEUTICAL JOURNALS should be bound, and that Ganot's 'Physics' and Proctor's 'Pharmacy' be purchased.

After discussion, it was arranged that the classes should meet every Monday, Friday, and alternate Wednesday, from 8.30 to 10 p.m.

The Journals were ordered to be bound, and the meeting adjourned. On Wednesday the following Council was elected:—Mr. H. J. Masters, President; Mr. G. C. Druce, Secretary and Treasurer; Mr. O. Wallis, Mr. J. Moore.

On Friday a meeting was held, Mr. H. J. Masters in the chair, when the Secretary, after formal business, read a paper on the indigenous Ranunculaceæ—descriptive of their properties, uses, and peculiarities—illustrating his paper by dried specimens of the different plants mentioned.

Mr. Evans proposed a vote of thanks to Mr. Druce, which was seconded by Mr. Masters, and carried unanimously.

It is a source of pleasure to the Council that, except those who have not passed the Preliminary, all in the town have joined the Association.

ROCHDALE CHEMISTS' ASSOCIATION.

The committee of this association presented its first annual report on Wednesday, October 1st, 1873.

After congratulating the members on the satisfactory state of the association, both as regards the number of subscribers and the balance in the hands of the treasurer, it drew attention to the many questions which are likely to arise and demand attention and united action. It appealed to the younger members of the trade not to allow the valuable specimens of materia medica to remain unused.

With the election of officers for the ensuing session the proceedings terminated.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The first General Meeting of the Association for Session 1873-74 was held in Anderson's University, on Wednesday, October 1st, at 9 p.m. Mr. John Currie, President, in the chair.

The President gave a short address on education connected with the profession, touching upon the profession now as compared with what it was thirty years ago. He urged assistants and apprentices to be assiduous in their duties not only to their employers, but in connection with their studies. He was not in favour of evening classes, and thought that employers should be induced to allow their assistants to have an hour or two in the morning, as a man who had been ten or twelve hours at work was not in a fit state for study. Some conversation as to the formation of a library afterwards took place. Several new members were elected, and the meeting dissolved.

Notes and Queries.

[355]. LIME JUICE AND GLYCERINE.—I think *X. Y. Z.* will find this a very good form for a preparation that will not separate upon standing:—

℞	Sol. Boracis	(℈ j to ℥ j) ℥ iv. ℥ vj.
	Ol. Amygd. Dulc.	℥ xxvj.
	Liq. Potassæ	℥ iij.
	Ess. Limonis	℥ j.
	Ol. Citronell.	♏ xx.

Place the Sol. Boracis in a Qt. Bl., then add gradually the Ol. Amygd., next the Liq. Potassæ, and lastly the perfume, taking care to shake well after each addition.—W. W.

Correspondence.

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

Local Secretaries and the Preliminary Examinations.

Sir,—I am spending the morning, as Local Secretary, in charge of students undergoing the Preliminary examination. The opportunity of quietly reading your report of the last meeting of Council is therefore welcome, and its discussions possess more than ordinary interest for myself and those Local Secretaries who are called upon by the Society to serve it in this way. Perhaps it is a little depressing to read in a public print that the Board of Examiners, on whose behalf we are acting, regard such service with a feeling very different from favourable appreciation, and that we are taking part in doing what is much worse than nothing. It may also seem a trifle unkind that our obscurity should be so publicly paraded, as it was, by a distinguished Councillor, who spoke of the "Local Secretaries, the great mass of whom were totally unknown to all the members of the Council. There might be one here and there who was known, but he should like to have the whole list of names read, and see how much the Council really knew of the great majority of them."

But the energetic policy of some members of the Council dispels any sentimental feeling, and the attempt to settle the matter by writing *sus : per coll :* over the list of Local Secretaries suggests that a trial should precede and not follow the verdict.

I have hitherto avoided entering into any public correspondence upon the proposal to abolish local centres for the Preliminary examinations after December 31st, 1874. It seemed preferable to communicate to the Board of Examiners my opinions as to improvements in the system of conducting the examinations, and I did this some months since. But as the matter has been pressed forward to the administrative stage, public discussion is forced upon us. Upon one point there must be no misunderstanding. As to the *integrity and absolute identity of conditions of examination*, the advocates of provincial centres are not a whit behind the most ardent centralist. Besides sharing every consideration influencing their opponents as members of the Society, their personal honour is at stake. Any suggestion that the bodies whose certificates are received in lieu of examination have taken the work out of our hands, or will speedily do so, is quite futile. To prove this, it is only necessary to observe how small a percentage of candidates enter by this gate. Local centres of examination have become incorporated in the system of modern education, and their convenience and equity are too well understood to permit them to be lightly abolished. That which has been practised for many years by the three English Universities and the Science and Art Department, and applied to a score of subjects of various grades, is not to be denied to chemists and druggists, or at least not on the present imputed ground of the impossibility of getting assessors possessed of common sense and common honesty. The Incorporated Law Society regularly holds one of its examinations in certain provincial centres, a fact less widely known than those referred to above.

It is to be remembered that before the Pharmacy Act of 1868 was obtained, the Society was committed to the favourable regard of provincial centres for the higher examinations, although it was well known how carefully such a scheme must be drawn. Surely the possession of power will not now justify it in disregard of all individual convenience about the Preliminary examinations.

But one cannot avoid asking oneself whether a serious question of privilege has not arisen, and who are the bold men who would set their wishes against all provincial feeling.

Two or three London members have committed themselves to this sweeping proposal, but no country representative has been found to defend it; on the contrary, the representatives of popular opinion have condemned it unhesitatingly. Has the courtesy of consultation with any country members of the Society been shown? So far as it is known, it certainly has not. We must take the proposal as being serious enough, and recognize the fact that two opposite ideas have met, and that one of them will have to give way. These are the rival ideas of bureaucratic centralization on the one hand, and that of local responsibility and decentralization on the other hand. The system of local centres of examination has not been found perfect—granted—therefore sweep it away! Precisely the same reason exists for destroying the municipal institutions of England, which in spite of much bungling serve the country better than many a centralized department, and without a tithe of its jobbery.

It is perhaps as well that the question is to be referred to a conference between the General Purposes Committee and a deputation from the Board of Examiners, although the more logical position was taken by the large minority who refused to recognize a *primâ facie* case for the action proposed.

But let the Board of Examiners be boldly told that it cannot maintain the somewhat irresponsible position of prompting members of Council to such motions. Let it be told that it has set up a system of examination which is perfectly free from suspicion when in the hands of many other bodies of men, but from their lax want of direction, and apparently from ignorance of men and things as found in the provinces, this system, as applied to chemists and druggists, has been faulty. How can charges of "neglecting candidates to serve customers" be brought against secretaries who conduct the examinations in public rooms, as is the case in our chief towns? Who is to blame for irregularities when the examination questions have for a long while been sent without any scrap of directions as to the mode of conducting the examination? Whose business is it to lay down clear and definite rules as to the necessary arrangements—the room, the space between candidates, and, above all, to decide what towns should become recognized centres? Why should not the Board appoint one or two assessors to visit, without previous notice, any examination in progress? That grouping of the smaller towns around centres is reasonable would be granted by nearly all, and although the Board would find a little trouble in such mapping out, this would soon be accomplished. Finally, let the Board be told that the record is changed, and that it is not now in the position of accuser, but stands at the bar of public opinion, charged with responsibility for any irregularities that have happened, and that if it longer fails to reform these, it will lay itself open to the further charge of permitting their existence in order that they may serve as arguments for demolishing the present system.

But one thing is *not* a matter for reference to a committee, like questions of detail, and that is the great principle of centralization or the opposite. The Society itself will take care of great principles, and a matter involving the privileges of four-fifths of its members would be a very intelligible one upon which to take their opinion at an election of Council. There is little doubt that the result would confirm the wisdom of the Society's founders, when they established the Pharmaceutical Society—not of a single city, however important, but—of Great Britain.

Rich. Reynolds.

Leeds Chemists' Association Library,
Church Institute, October 6th, 1873.

Unusual Doses in Prescriptions.

Sir,—There appears to be a general consent upon two points in connection with the late inquest at Ramsgate, viz. :—

1st. That Mr. Fisher was right in refusing to dispense an extreme dose without express assurance of the prescriber's intention.

2nd. That it would be for the convenience of prescribers, dispensers, and patients, if there was some recognized mode by which prescribers might indicate a conscious purpose when extreme doses are ordered.

But it seems to be almost tacitly admitted that if *the prescriber's intention* has been sufficiently ascertained nothing remains for the dispenser but the duty of implicit obedience—an admission most injurious to the self-respect of our calling; and one of your correspondents quotes a

prescription* as only requiring to be thus authenticated to ensure its being dispensed as a matter of course. I can only say that I should refuse to dispense it, even if it were authenticated by the corporate seal of the College of Physicians, for I know of no ethics which permits a man to shift the responsibility of his acts upon another, and I acknowledge no etiquette which compels me to become consciously party to homicide.

I think there has been some little confusion manifested in the correspondence which has been going on as to the proper province of technical or professional etiquette on the one hand, and moral responsibility on the other; and it is to protest against the exaltation of artificial ethics above the solemn obligations of the decalogue that I trouble you with these observations.

Dr. Collis Browne is reported to have given ink to some extreme opinions upon this subject. If this is the gentleman known as manufacturer of chlorodyne, he is probably too much absorbed in pharmaceutical operations to incur much risk from being taken at his word in respect of the "strict obedience of physicians' orders"; but I will tell him what happened years ago to a physician who was no wiser than himself, within a mile of the spot where I now write.

The doctor roughly chid a chemist for some departure from the letter of his prescription, and refused to accept the explanation that it was done to carry out his supposed intention. He was indiscreet enough to say that it was the chemist's business to fulfil his directions, right or wrong, and that the responsibility of error rested with him alone. Some time after, the doctor prescribed in error a poisonous dose of corrosive sublimate.† The chemist knew it to be a poisonous dose, but he supplied it on the doctor's responsibility, sending him, however, a note to that effect. The note came to hand too late, the medicine was swallowed, and the patient died.

Now, it does not concern us greatly to know what Dr. Collis Browne might say to this, but it might concern us very nearly to know what a coroner's jury would say; whether they would ascribe the manslaughter which was undoubtedly committed to the doctor or the chemist. Probably the ends of justice would be met by hanging both.

RICHARD W. GILES.

Sir,—In reference to the case of Mr. Fisher, of Ramsgate, allow me to say that a similar case came under my notice some time since, in which a medical man of this town prescribed for a patient suffering from *delirium tremens* as under:—

℞

Tinct. Digital . . . . ℥j
Aq. Menth. pip. ad. . . ℥ij

M. Half to be taken at once and the remainder in four hours if he does not sleep.

I ascertained that this quantity was intended and the prescription was of course dispensed.

As an instance of the *in*fallibility of medical men I may mention the following:—

℞

Hyd. Bichlorid. . . gr. vj

Ft. pulv. statim sumend.

I need scarcely say that my pen passed through the "Bi" and the prescription was dispensed without a remark to the patient.

Cheltenham, Sept. 7th, 1873. X. Y. Z.

*** We would suggest that in any future discussion of the subject of unusual doses in prescriptions, the principle recommended at the Conference meeting should be adopted, and that it should be dealt with as an abstract question, without reference to any past occurrences affecting individuals.—ED. PH. JOURN.

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* ℞

Ext. Belladonn. . . . . gr. 80
Aquæ . . . . . 4 oz.
A table-spoonful three times a day.

—PH. JOURN., p. 200.

N.B.—I have known half a grain (single dose) produce alarming poisoning symptoms.—R. W. G.

† See similar case quoted, PH. JOURN., p. 199.

ALLEGED DISPENSING MISDEMEANOUR.

Sir,—Few things are more easy than for an individual "whose name does not transpire," to appear before a magistrate, and bring a wholesale charge either of criminal carelessness or of wanton wickedness against a single person or an entire body of professional men. Such a case occurred the other day before Mr. Woolrych, when a "medical gentleman," in the garb of the anonymous, brought a charge against a chemist, practising at Hammersmith, of substituting a deleterious drug not mentioned in the prescription for a drug of a harmless kind that was mentioned, and adding, as a matter of course, "*that it was the practice of chemists, when they had not the expensive articles required, to use other things in their place.*"

With regard to the first part of the indictment, I have only to suggest that the unfortunate "chemist" labouring under it, should, if he is in a position to do so, come forward and discarding the anonymous, give the lie direct to his accuser. I can scarcely imagine an individual, and a member of a liberal profession, calmly resting under so cruel a calumny, and not coming forward to avenge himself of the insult.

With regard to the latter portion of the charge (the words in italics), it appears to me that the Pharmaceutical Society is bound in the interests of its multitudinous members, for the sake of the honour due to its professions, and, more than all, on behalf of the public, whose protector it assumes itself to be, to demand the name of that "Medical Gentleman" who, under the guise of an anonymous accuser, has dared to come forward, and in a court of justice has brought so sweeping and cruel a libel against a class of men who, one and all, are totally incapable of resorting to the shameful practice he has so recklessly imputed to them.

I say it advisedly, that the "chemist" who could resort to such a practice, would be scouted from the profession, of that fact the "Medical Gentleman" is no doubt perfectly aware.

Let, then, the Society obtain and publish the name of this anonymous accuser, and let it be held up to scorn and reprobation, and, if possible, let its unenviable possessor be brought under the condign punishment of the law.

JAMES A. PROVOST.

94, *Terminus Road, Eastbourne,*
2nd October, 1873.

*** We have received from the medical man concerned in the case referred to in the foregoing a letter in which he gives an account of the circumstances which induced him to make application to the police-court magistrate. Unfortunately, we cannot from want of space publish his letter this week, but will do so in our next issue.—ED. PH. JOURN.

"*Iris.*"—(1) *Eupatorium cannabinum.* (2) *Inula dysenterica.* (3) Probably *Daucus Carota.* All Umbelliferous plants should have fruit and leaf on the specimens sent. (4) *Centaurea nigra.* (5) *Calamintha officinalis.* (6) Bentley's Handbook of the British Flora: Illustrated.

Mr. Alexander Kinninmont is thanked for his communication.

"*Juvenis*" (Newton,)—See Mr. D. Hanbury's Paper on Pareira Brava, *ante*, pp. 81, 102.

F. A.—Rub the oxide of zinc with the glycerine, adding gradually the oil, afterwards the water, and lastly, the spirit of rosemary. The oil should be free from rancidity, else the danger you mention will be greater.

G.—The plant is probably *Allium vineale;* but it is impossible to say with certainty without seeing the flower.

B. B.—(1) The name you mention is not on the Register of Pharmaceutical Chemists, nor on that of Chemists and Druggists. (2) In our opinion we should say there is no right to trade as indicated by your enclosure. (3) You should communicate with the Registrar on the subject.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Ralph Robinson, J. G. Iverach, A. Kinninmont, Jno. Griffith, Weaver and Moore, J. R. Jackson, J. Barker, Judson and Son, J. Horncastle, J. S. Culverwell, J. Leigh, J. E. Roberts, R. H. Rowell, F. W. Smith, J. F. Barrett, J. F. Armstrong, W. C. White, J. A. Clarke, W. L. Howie, J. S. Leigh, W. G. Taplin, Professor W. C. Williamson, Professor A. F. Marreco, Dr. Scoffern, Dr. J. M. Crombie, Mrs. L. Stocks, the Editor of the *Garden*, Dr. W. H. Griffiths.

CHINESE RHUBARB.

The following notes on Chinese Rhubarb are from a recent report on the trade of Hankow. The writer first refers to the paragraph in Colonel Yule's 'History of Marco Polo's Travels,' where it is said that "over all the mountains of this province"—meaning Tangut, the modern Kansuh—"rhubarb is found in great abundance, and thither merchants come to buy it, and carry it thence all over the world." The best rhubarb it appears is still produced in Kansuh, but one of the principal marts for the sale of the drug is Sanyüan, in Shensi, in which province also rhubarb is grown to a considerable extent. The cultivation in both provinces has, however, been seriously affected by the Mohammedan rebellion. Much of the rhubarb which comes hither is from Szechuan. It is generally of very common quality, and is quoted in the market at from 5 to 8 taels per picul; the kind known as Shensi being usually quoted at from 15 to 50 taels. A Chinese informant says that the moist heat of the province of Szechuan is injurious to the preparation of the root. In both provinces—Kansuh and Szechuan—the rhubarb is grown in mountainous districts. The plants, when grown, are cut down and thrown in heaps, they are then taken to the farmer's house, where the roots are pared or scraped. In Kansuh, the roots are then tied together and hung up from poles covered with matting, but in Szechuan the roots are obliged to be dried in the sun, and, as a consequence, they are not, like those of Kansuh, of firm substance throughout. The following information on the quality and prices of the different kinds of Chinese rhubarb was furnished by a Hankow merchant :—

1. Province of Kansuh, Sining; average of value, say 80 taels.
2. Same province, Liang-chow, very nearly as good; 75 taels.
3. Szechuan, Mien-chow, 30 per cent. worse; 55 taels.
4. Kansuh, Kiaichow, 50 per cent. worse.
5. Kansuh and north-west border of Szechuan, 60 per cent. worse; if well made, 40 taels; if common, 20 taels.
6. Szechuan, Kuan Hien, 60 per cent. worse; better quality, 30 taels; common, 20 taels.
7. The very common, at 5 to 8 taels per picul, comes, as has been said, from Szechuan.

Rhubarb does not come to Hankow from Sining and Liang-chow at present. Very little comes from Mien-chow; the other districts supply the requirements of the market.

The value of the rhubarb exported in 1872 was about £20,600; namely, Shensi, 2267 piculs, value 61,931 taels, and Szechuan, 899 piculs, with a value of 6048 taels.

THE ANNUAL SUPPER OF THE MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION.

At the conclusion of the annual meeting of the above Society (see p. 305) those present adjourned to the Blackfriars Hotel, where about forty members and friends sat down to supper. After the removal of the cloth the usual loyal toasts were proposed by the chairman, Mr. Brown, and drunk with becoming loyalty.

Mr. G. S. Woolley then proposed, "The Pharmaceutical Society of Great Britain." He alluded to the early days of the Society,—to the efforts of many distinguished men, especially Jacob Bell, "of glorious memory," to induce the trade to unite for purposes of education and in the endeavour to raise their calling above the level of a merely commercial occupation. This union being effected and efforts in the direction of improved education continued, the result was the incorporation of the Society by Royal Charter; the completion of the splendid building, now the home of the Society, with every means and appliance at command for the education of those able and willing to avail themselves of them; and finally the Pharmacy Act of 1868, which although not perfect, still owed its many advantages and the smallness of the number of its defects to the untiring energy and devotion of the President and Council who were at that time at the head of affairs at Bloomsbury Square. To this union of the leading men in the trade pharmacists owed the position held to-day—a position immensely above that held thirty years ago, and standing firmly upon it as they did, it depended solely on their own exertions whether or not they proved themselves worthy of a still higher place amongst the educated professions.

Mr. W. S. Brown in responding said: I presume that as by the favour of my fellow-members of the Pharmaceutical Society I hold a position on the Council of that body I am called on to reply to this toast rather than our esteemed friend Mr. Wilkinson, the Local Secretary. Mr. Woolley has referred in feeling and appropriate terms to the honoured names of many of the founders and early friends of the Pharmaceutical Society. Thirty years since, when an attempt at legislative interference with our privileges called together a meeting in London, the wise judgment of some, and foremost the late Jacob Bell, saw that after accomplishing the first object of their association the opportunity to initiate a movement of a more enduring character presented itself, and they laid the foundation on which has arisen the noble institution which is, and ought to be, a gratification to the whole body of chemists in the kingdom. All honour to those who thus laboured, and the results of whose efforts we are reaping in improved position and in the development of education. The Pharmaceutical Society has some of its early friends still in its ranks, and many good and true men have risen up and are now connected with it. We look with satisfaction to the central institution, with its excellent equipment for teaching, and hope that our provincial Association may keep pace with the growing importance of the public requirements. The Pharmaceutical Society has a high duty to perform, and its recognition by the State and its increasing influence throughout this and other countries promises a bright future. The approval and cordial co-operation of the members must ever strengthen and sustain the governing body; and the good wishes of this assembly, as expressed in the toast, I have much pleasure, speaking on behalf of my fellow-members, and in the name of our much respected President, in gratefully acknowledging.

Mr. J. T. Slugg, in proposing "The Medical Profession," said he was glad to know that they were honoured by the presence of several members of that profession. This was an indication of two things; first, of the estimation in which they held that profession, or they would not have invited them; secondly, of the estimation in which the profession held pharmacists, or they would not have accepted the invitation. He ever regarded the medical profession as a very high and a very holy one. It had been said that in the world were two large heaps, one of misery and one of happiness; and it was every man's duty to diminish the heap of misery and augment the amount of happiness. Now the sole occupation of a medical man was to do this. Hence, he said, it was a high and a holy calling. Having resided in Manchester for nearly forty-five years, he was sufficiently acquainted with its medical men, past and present, to be able to say that in no provincial centre did the members of that profession devote themselves to their duties with greater zeal or ability than in Manchester. He had pleasure in proposing the toast of "The Medical Profession," coupled with the names of Dr. John Tatham, Medical Officer of Health for Salford, and of Dr. Brierly.

Dr. Tatham expressed the pleasure it gave him to be

present, and thanked the company for the hearty reception they had given to the toast.

Dr. Brierly also responded.

Mr. J. Blyton proposed "Success to the Manchester Chemists and Druggists' Association." He said that he felt quite unable to do justice to a toast of so much importance as that which the President had entrusted to him. Fortunately, it was a toast in which they were all interested, and it would not require any words of his to commend it to the cordial acceptance of that meeting. Their presence there, and the heartiness of their proceedings, showed the interest they felt in the success of this energetic and prosperous Association. He had been familiar with chemists' associations in various parts of the country for twenty-five years, but they were often societies established principally for *trade* purposes—such as regulating prices, the hours of closing, and other matters of interest to the trade. They owed it to the enlightened public spirit of the Manchester Chemists' Association, led by their excellent President, Mr. Brown, to have marked a great advance upon this old purpose of a chemists' association. The Manchester Society was organized and kept up principally as "a school of pharmacy," and its object was to teach the young men and apprentices the scientific part of their business—an advantage which he hoped the rising generation of chemists and druggists in the neighbourhood would continue to avail themselves of. He felt that not only Lancashire but the whole country ought to be proud of this Association, for the worthy aims and noble purposes it had set before it. Mr. Woolley had given them an interesting account of the rise and progress of the Pharmaceutical Society's School in London. Although this local Association was not officially connected with the parent society, he felt that it ought almost to be ranked with it, or at any rate be looked upon as an important adjunct to it. Its objects were the same, viz., to provide a sound technical education for the rising generation of pharmacists, and to send forth into the world a body of men in every way qualified for the high and responsible duties that they might be called upon to perform, in the laboratory as well as in the shop. He felt that an association with such aims deserved success, and he had great pleasure in proposing the toast "Success to the Manchester Chemists and Druggists' Association."

Mr. W. Wilkinson (Vice-President) responded. He said he did not anticipate being called upon to reply to this toast, and felt quite unable to do justice to the subject. He had always taken great interest in the prosperity of the Association, and was glad to think that it was in a fairly satisfactory condition, and was to a great extent fulfilling the object for which it was established, namely, that of helping apprentices and assistants to acquire the knowledge required to pass the Pharmaceutical Examinations. He thought he might say that the classes had been most successful. He wished the same could be said of the monthly meetings, and of the interest the employers took in the Society. Like many similar associations, they started with a goodly number of members, and a considerable amount of enthusiasm, but in a year or two subscriptions began to fall off; some could not, or would not, attend the meetings, and therefore declined to renew their subscriptions; some did not see what they got for their money; others did not see the good of the Society; and all sorts of reasons were given to avoid paying the subscription. Now he thought this arose from a mistaken notion as to the objects and purpose of the Association. He took it that the Association was *not* formed for their personal benefit, or for anything that they were to get by it, but to supply the means whereby their assistants and apprentices might acquire the knowledge to enable them to pass the examinations required by law. He believed every one would admit that it is the duty of those who take apprentices to teach them what is needed, or at any rate, see that they are taught. Now, for many reasons, very few of them were able to do this themselves, and he thought it the interest as well as the duty of every one who had an apprentice to support an Association which did for him what he could not do, or do so well, himself. The report told them that they had that year spent £20 more than their income, and though they had a balance in hand from previous years that would soon be exhausted unless some of their old friends renewed their subscriptions or new members joined. The principal part of the work devolved on a few members, but it could not be carried on without funds, and those who gave their time to the affairs of the institution should not be expected to find *all* the money too.

Mr. Siebold, in proposing "The British Pharmaceutical Conference," said he could not but think it unfortunate that so important a toast as that of the British Pharmaceutical Conference had not been entrusted to a better speaker than himself, but if they would kindly pardon his shortcomings he would withdraw the word "unfortunate" and say that he was most happy to propose it, and that of all the toasts that had been drunk that night it was precisely the one he should have selected if he had had the choice. They were well aware that the great object of the Conference was the advancement of pharmacy, by stimulating its members, and through them, the members of the whole profession, to scientific activity. It had not been aided in its educational efforts by Acts of Parliament or compulsory measures of any kind, and its influence might therefore not have been so widely felt as that of the Pharmaceutical Society, but it had told, and was telling with ever-increasing effect, on those who have a genuine desire for knowledge for its own sake, and who require but a good example to rouse their own energy. If they bore in mind the amount of useful work already done, and how the number of members had increased from 21 to 2000 within ten years, they could not resist the conviction that the British Pharmaceutical Conference would exercise an important and most beneficial influence on the future of pharmacy. Nothing was so sure to raise pharmacists from their present position to a higher rank in its social scale as their more general participation in scientific pursuits. Original research must not be looked upon as the calling of a gifted few, but as the duty of everybody who had it in his power to contribute a share, however small it might be, to the great store of knowledge; and should their efforts not be successful they would at least be conscious of having honestly striven to serve a noble cause. He need not remind gentlemen of the encouraging and stimulating effect which the yearly meetings of the Conference must have upon its present and future members. Pharmacy would ultimately, and let them hope before very long, attain that high and honourable position which it so justly deserved, and he felt sure that that result will be greatly due to the efforts of the body whose health he then had the honour of proposing. He had the utmost pleasure in coupling with the toast the name of Mr. Benger, one of the general secretaries of the Conference.

Mr. Benger, in responding, briefly referred to the history and aims of the Conference. Alluding to the recent meeting at Bradford, he said that in spite of the efforts of hotel proprietors to keep people away, it had been a decided success, regarded either from a social or scientific point of view. The hospitality of local members had been unbounded. No one present would be surprised to hear that amongst the most important papers read at the meeting were the contributions of Mr. Louis Siebold, a gentleman whose services in connection with the Manchester School of Pharmacy had been inestimable. The work of the Conference was of course on a comparatively humble scale, but it was a cheering thought, as Herbert Spencer had said, that, throughout the universe, the grandest results had been brought about by the slow accumulation of minute actions. This should encourage all to feel that however little they could do, that little was worth the doing.

"The Manchester Chemists' Assistants' Association" was proposed by Mr. Hermann Woolley, and replied to by Mr. Lane. "The Visitors" and other toasts followed, and a very agreeable evening was spent.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 18, 1873.

Communications for this Journal, and books for review, etc.' should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ALLEGED DISPENSING MISDEMEANOUR.

THE letter which we publish this week in reference to the case of incorrect dispensing reported in several of the daily papers a fortnight since, and commented upon by two correspondents in this Journal, will serve to give some idea of the facts of the case. As the statement is *ex parte*, we purposely abstain from giving the name of the druggist implicated, especially since there seems to be a prospect of further legal action in the matter. It will not, however, be out of place to express our satisfaction at Dr. SCOFFERN'S disclaimer of that general condemnation of the practice of dispensing druggists which was attributed to him in several newspaper reports of his application to the Hammersmith Police Magistrate. He could scarcely have done otherwise than disclaim a statement so unfounded and slanderous, but, without attempting to enter into the merits of the case one way or the other, we cannot avoid thinking that when the report appeared in the papers Dr. SCOFFERN might reasonably have taken some pains to contradict it at once. His explanation of the apparently anonymous application to the police magistrate is certainly feasible, but when he saw himself made the authority for such a grave accusation of a respectable body of men, the least he could have done would have been to correct the error of the reporters. In that respect, however, his sense of justice has been but tardily exercised, and it was not apparently until the *Daily Telegraph* criticised the "occult" medical gentleman that he was moved to offer any explanation of his part in the affair.

Our contemporary, the *Daily Telegraph*, has earned the thanks of the trade by the manner in which it has come forward to defend them from the imputation of tampering with prescriptions entrusted to their care. It is satisfactory to find a general paper appreciating the qualifications and trustworthiness of druggists, and it is encouraging to find such a public recognition of their services as is shown by the sensible and well-timed remarks of our contemporary.

As regards the mitigated form of Dr. SCOFFERN'S accusation, that it is the practice of certain druggists to substitute one ingredient for another in dispensing prescriptions, or leaving it out wholly when the thing prescribed is a little expensive or out of the way, we must, with all due respect to Dr. SCOFFERN, confess to some considerable incredulity as to this being really the case. But we are as certain that the commission of such a misdemeanour would be most stringently condemned by the great majority of the trade, as we are that no respectable member of our body would in the slightest degree lay himself open to the charge of having committed such a breach of faith.

FLOWERING OF JALAP PLANTS IN FRANCE.

IN a recent number of the *Revue Scientifique*, Professor BAILLON states that there has been an abundant flowering of the jalap plants growing in the garden of the Faculty of Medicine at Paris. Both jalap and scammony have frequently been cultivated in botanic gardens, but have rarely flowered. The present occurrence has allowed of the verification of the fact that the jalap plant belongs to a species of the genus *Exogonium*, for its corollas are remarkable for a limb perpendicular to the axis of a very long and narrow tube, and its anthers are exserted. Professor BAILLON considers that the specific name should be *E. jalappa;* because the plant was first designated under the name *Ipomœa jalappa*, by the American botanist NUTTALL, whilst the epithet, "*purga*," now generally employed, was later by several months. It should be remembered, however, that the plant differs entirely from the *Convolvulus jalappa*, which does not produce the true tubercular jalap used in medicine, but an enormous root, not employed in Europe, and much less active.

The tubercles of the true jalap grown at Paris have been well developed, having attained the size of a small turnip. It has thus been possible to trace their growth, and to ascertain their true origin. They are produced upon subterranean roots in the form of slender cords that very much resemble the so-called roots of couch-grass. Here and there the subterranean axes develop for their nourishment adventitious roots which descend vertically into the soil. Some of these roots remain slender and cylindrical, and seem to be only organs of absorption. Others gradually increase in size and become napiform; their upper portions become reservoirs of juices, and are gorged, amongst other things, with the purgative resinous principles.

APPOINTMENTS UNDER THE ADULTERATION ACT.

THE following further appointments of analysts under the provisions of the Adulteration Act have been announced:—As Medical Officer of Health, and also to act as Public Analyst for the Port and Borough of Sunderland, Dr. HENRY JOHN YELD, at a salary of £500 per annum. At Leicester, Mr. YOUNG, Pharmaceutical Chemist, has been appointed public analyst for the borough, it being understood that at the next Quarter Sessions he will be appointed to the same office for the county also, at a joint salary of £100 per annum, to which the county will contribute £60, and the borough £40. In London, Mr. SEPTIMUS PIESSE has been appointed public analyst for the Strand district.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

October 10*th*, 1873.

Present—Messrs. Allchin, Barnes, Bottle, Carteighe, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, and Umney.

Dr. Greenhow was also present on behalf of the Privy Council.

MODIFIED.

Twenty-three candidates were examined. *Sixteen* failed. The following *seven* passed, and were declared duly qualified to be registered as Chemists and Druggists :—

Gibson, George Henry.....Brigg.
Hardcastle, Alfred Wright .....Birmingham.
Macdonald, John .....Ellesmere.
Miller, Thomas .....Leicester.
Watts, Edward .....Saffron Walden.
Wavell, William John .....Brighton.
Wright, John Walter .....Stockport.

PRELIMINARY.

The undermentioned certificates were received in lieu of this examination :—

Certificate of the University of London.

Stacey, Henry George .....London.

Certificates of the University of Cambridge.

Cottman, Frederick .....Salisbury.
Jerrett, Samuel Ernest.....Devonport.

Certificate of the University of Oxford.

Walgate, Septimus .....Hull.

Certificate of the University of Edinburgh.

Pattinson, Joseph.....Carlisle.

Certificates of the College of Preceptors.

Harston, John Frederick.....Lincoln.
Jones, Nathaniel S. .....Fulham.

Certificates of the Royal College of Surgeons.

Alden, Ebenezer Wenham .....London.
Gallatly, George Frederick .....Chertsey.

Certificate of the Faculty of Physicians and Surgeons in Glasgow.

Tichborne, Charles Robert Clarke...Dublin.

PRELIMINARY.

The undermentioned certificates were accepted by the Board in Edinburgh in lieu of the Society's Examination :—

Certificate of the Royal College of Physicians and Surgeons in Edinburgh.

Haycroft, Henry Robert Howell...Glasgow.

Certificate of the University of Edinburgh.

Tweedie, John Jackson .....Carriden Bo'ness.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

ANNUAL MEETING, SESSION 1872–73.

The Annual Meeting (twenty-fourth session) was held at the Royal Institution, September 25th, 1873. The President, Mr. E. Davies, F.C.S., in the chair.

In the absence of the Secretary, the Chairman read the annual report:—

"*Report of the Twenty-Fourth Session of the Liverpool Chemists' Association.*

"At the close of the twenty-fourth session of the Liverpool Chemists' Association, your Council present their annual report of the state of the Association in the various branches of its active life. Though perhaps not marked by much progress the session has not been one of retrogression, and your Council trust that it may only indicate a resting place from which with renewed energy the Association may advance in the path of usefulness so long trodden by it.

"During the session twelve members and six associates have been elected, and after deducting nine names which by death, removal, or other causes have been struck off the roll, the number at present on the books is 14 honorary members, 119 members, 21 associates. The evenings of our ordinary meetings have been well filled up ; papers of interest have been read, and discussion has been more animated than formerly. One important subject, namely, Pharmaceutical Education, occupied two evenings.

"A recommendation from one of the meetings, that your Council would take active steps to bring about early closing, was carefully considered by them. It was resolved by a considerable majority that whilst your Council sympathized most heartily with the desire that earlier closing should be practised, they did not think that such active interference came within the province of the Association. They trust that their endeavours to keep free from trenching on matters not distinctly included in the aims of the Association will meet with the approval of the members.

"During the session the experiment of having a box for the reception of questions has been fairly tried, and has been successful in eliciting from members much information which might not otherwise have been brought forward. It bids fair to be a most useful addition to our educational machinery.

"The chemistry class was conducted as usual during the winter. A botany class could not be formed, as a sufficient number of members did not come forward. Arrangements have been made for a chemistry class during the coming session, particulars of which have been forwarded to all the members.

"Your Council would call the attention of the younger members who are contemplating entering into the practical working of pharmacy that changes of considerable importance have been made in the bye-laws of the Pharmaceutical Society, especially in Section 10, Clause 16, to which the following addition has been made :—'After the 31st day of December, 1874, no person shall be admitted to the Major or the Minor examination who shall not have attained the full age of twenty-one years, and after the 31st day of December, 1876, no person shall be allowed to pass the Major or the Minor examination unless he shall satisfy the examiners that for three years he has been registered and employed as an apprentice or student, or has otherwise for three years been practically engaged in the translation and dispensing of prescriptions.'

"The Minor examination in chemistry will be made more stringent by requiring a knowledge of qualitative analysis and chemical physics, and your Council urge students to at once avail themselves of opportunities for practical work which alone can give information of value in these departments.

"The Library and Museum do not present any changes calling for notice. The Library has been fairly used by the members both for borrowing and reference. A large number of periodicals have been bound, and thus presented in a more accessible form. In accordance with an invitation from the Pharmaceutical Conference your Council appointed Messrs. Shaw, Sumner, and Mason as delegates, all of whom attended the meetings.

"Messrs. Davies, Murphy, Sharp, and Symes retire from the Council by rotation, but are eligible for re-election.

"Your Treasurer will present a Report of the Finances of the Association, which shows a credit balance of £6 2*s*. 7*d*."

The Treasurer read the financial report :—

THE LIVERPOOL CHEMISTS' ASSOCIATION, IN ACCOUNT WITH JOHN SHAW, TREASURER.

Cash Received.

	£	s.	d.
Balance from 1872	11	4	7
84 Members' Subscriptions	41	15	0
9 ,, Arrears	4	10	0
11 Associates' Subscriptions	2	15	0
Microscope Fees	0	4	0
Library Fines	0	2	6
	£60	11	1

Cash Paid.

	£	s.	d.
Rent	10	10	0
Tea, Coffee, and Attendance	8	19	4
Insurance	1	0	0
Books, Periodicals, etc....	9	4	3
Printing and Stationery	11	5	6
Directing and Delivering Circulars...	7	4	5
Collectors' Commission	1	17	0
Librarian	4	0	0
Secretary's Expenses	0	8	0
Balance	6	2	7
	£60	11	1

Examined and found correct, Sept. 25th, 1873,

R. SUMNER,
JAMES T. ARMSTRONG, } Auditors.

Mr. Sumner moved: "That the Report, as read, be adopted, and, together with the Transactions of the General Meetings, the Laws and Bye-Laws, the Catalogue of Books in the Library, and the List of Members, be printed and circulated among the members."

Mr. Armstrong seconded the resolution, which was carried unanimously.

The next proceeding of the meeting was the election of four members of the Council in the place of Messrs. Symes, Davies, Sharp, and Murphy, who retired by rotation. All the retiring members were re-elected except Mr. Murphy, whose place was filled up by Mr. Armstrong.

The following resolution was then moved by Mr. Parkinson: "That the best thanks of this meeting be given to the donors to the Library and Museum, and to the authors of papers during the past session."

The motion was seconded by Mr. Rigby, and passed.

Mr. Williams moved: "That the best thanks of this meeting be given to the Officers and Council for their services during the past session."

Mr. Robinson seconded the motion. Carried *nem. con.*

Mr. Davies, the President, and Mr. Shaw, the Treasurer, then thanked the meeting for the manner in which it had acknowledged their services.

The Society had the pleasure of the presence of an honorary member, who had, in days gone by, worked as hard as any for the welfare of the Society, viz., Dr. Edwards, of Montreal; he was welcomed by the meeting. Dr. Edwards then rose and thanked the members for their welcome, saying he had always the welfare of the Liverpool Chemists' Association at heart, and hoped that the present session might be as useful a one as any the Association ever had.

The meeting then separated.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

The Fifth Annual Meeting was held in the Rooms of the Association on Friday evening, Oct. 3rd, 1873, Mr. W. S. Brown, President, in the chair.

The Secretary, Mr. F. Baden Benger, read the following Annual Report, and the Treasurer, Mr. G. S. Woolley, the Statement of Accounts:—

"*Fifth Annual Report of the Manchester Chemists and Druggists' Association and School of Pharmacy.*

"In presenting their Fifth Annual Report, your Council are glad to express satisfaction on some points in the condition of the Association, and notably on the success which attended the courses of lectures delivered by Mr. Siebold.

"One of the primary objects of your Association, and one ever kept prominently in view by your Council, has been to provide in this district opportunities for education in the higher branches of pharmaceutical science. During five years efforts to establish a School of Pharmacy have been renewed; sometimes with cheering results, but often in the face of evident coolness and indifference on the part of those for whose benefit these efforts have been made. Last session, however, three courses of lectures were given for the first time in your own rooms, and were attended by large and diligent classes. Thirty-six students attended the Chemistry course; thirty-one the Materia Medica course; and twenty-nine that on Botany; amounting to a total of ninety-six entries, and Mr Siebold's report, published at the end of April, was of a most satisfactory character.

"Encouraged by these hopeful signs, and feeling assured that they are serving the best interests of the younger members of the trade by again securing the services of Mr. Siebold, your Council have arranged for the delivery of three courses of lectures by this gentleman during the coming session. Particulars of these have been forwarded to every chemist and druggist whose name appears in the Manchester Directory; and through the courtesy of the respective editors of the *Pharmaceutical Journal* and the *Chemist and Druggist*, the announcement has received full publicity.

"Four lectures and papers were given by members at the Ordinary Monthly Meetings: 1st. On the Tests for the Alkalies, by Mr. Pidd; 2nd. On our Planet: its Weight, Size, Shape, Past History, and Present Condition, by Mr. J. T. Slugg, F.R.A.S.; 3rd. On Pharmaceutical Education, by Mr. Louis Siebold; 4th. On Telegraphs, by Mr. F. Baden Benger. The attendance at these meetings was fairly good. It has been gratifying to see so many associates present and interested in the proceedings. The merely nominal annual subscription of 2*s.* 6*d.* places the advantages of associateship—viz., the use of the reading-room, library, and museum, within the reach of all. The rooms have been open every evening from seven till ten o'clock, except Saturdays and Sundays, but as some persons find this time inconvenient to leave business, facilities have been afforded to students to visit the rooms at any other hour of the day by applying to the Secretary for the keys.

"The extended knowledge of these privileges has resulted in a considerable increase in the list of associates, but as this class is essentially a migratory one, it is most desirable that members of the trade should feel it their duty to inform their assistants and apprentices of the existence of the Association, and the Secretary will at all times be glad to give information to new comers. The enlarged and continued support of members is, however, urgently needed. The present income of the Association is insufficient to cover the ordinary working expenses, and entirely inadequate to warrant the Council in carrying out their original intention of adding a laboratory to the School of Pharmacy, or to enable them to extend the usefulness of the Association in any of the many directions which suggest themselves. The direct advantage of membership should be apparent to all engaged in the trade in this district, and it is remarkable that so little public spirit should be evinced in the support of an Association the objects of which cannot but be approved by all.

"The following donations have been received during the year:—The PHARMACEUTICAL JOURNAL, weekly, from the Society; 'The Year Book of Pharmacy for 1872,' from the British Pharmaceutical Conference, and a number of valuable specimens of Materia Medica from Messrs. Hodgkinson, Stead, and Treacher. Some important additions have been made to the Library by purchase, and the reading-room has been supplied with several medical, chemical, and other scientific periodicals as published.

"By the death of Mr. Halliday, the Association has

lost an active member of the Council, and a contributor to the monthly meetings."

THE TREASURER IN ACCOUNT WITH THE MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION.

Receipts.

1872.		£	s.	d.
Oct.	To Cash in hand	2	16	0
,,	in Bank	38	9	5
,,	80 Members	40	0	0
,,	90 Associates	11	2	0
,,	Lecture Fees	50	3	9
,,	Bank Interest	2	5	6
		£144	16	8

Disbursements.

1872-3.	£	s.	d.
By Cash for Stationery, Stamps, Printing, and Advertising	18	9	0
,, Rent of Rooms, Gas, and Rates	31	0	0
,, Porter for taking charge of Rooms	13	0	0
,, Furniture	8	8	6
,, Mr. Siebold, for Lectures	50	0	0
,, Sundry Expenses	3	2	3
,, Balance in hand	8	17	0
,, ,, in Bank	11	19	11
	£144	16	8

The balance sheet of the Library Fund showed an expenditure of £9 10*s.*, and a balance in bank of £15 11*s.* 5*d.*

The Chairman, in moving the adoption of the report and financial statement, said that at the last annual meeting he expressed the hope that, seeing they then had got their new rooms, and great pains had been taken by the Council in effecting the necessary arrangements, he should be able to congratulate them at their next meeting on having a very large increase in the number of members. He was very sorry that he could not do that, but at the same time he must express his gratification that they had been able to hold their own. It could not be too often impressed upon members of the trade that it was only by joining such an association that they could assist in making those educational arrangements which were necessary for the advancement of the younger members of the trade. He earnestly hoped that members of the trade would see their way clear to join the Association. There was no direct profit accruing from membership ; the sole object of the Association was the advancement of education, and it deserved greater support than was at present received.

Mr. Marsden seconded the adoption of the report, which was unanimously carried.

Votes of thanks were passed to the retiring officers, and the following gentlemen were elected for the ensuing year :—President—Mr. W. S. Brown ; Vice-Presidents—Mr. J. T. Slugg, F.R.A.S., and Mr. W. Wilkinson ; Treasurer—Mr. G. S. Woolley ; Hon. Sec.—Mr. F. Baden Benger ; Council—Messrs. Barnaby (Oxford Street), Blain (Bolton), Bostock (Ashton), Botham (Higher Broughton), Hargraves (Oldham), Hughes (Victoria Street), Kay (Stockport), Mumbray (Broughton), Payne (Piccadilly), Robinson (Pendleton), Hermann Woolley (Market Street), J. Waterhouse (Ashton).

HALIFAX CHEMISTS AND DRUGGISTS' ASSOCIATION.

The Annual Meeting of the above was held at the Old Cock Hotel, on the evening of October 9th, 1873, under the presidency of Mr. Jessop. Having partaken of the good things provided by the host, the business of the meeting commenced by the election of the officers for the next twelve months, viz., Mr. Jessop, President ; Messrs. Shott and Hebden, Vice-Presidents ; Mr. Brierly, Treasurer ; and Mr. Brook, Honorary Secretary ; with Messrs. Dyer, Farr, Shaw, Pollard, and Wood, as the Committee. The report of the Honorary Secretary alluded to the opposition of the Society against Sir John Lubbock's Shop Hours Regulation Bill ; the formation of a small library of books of reference for the use of the members ; the reduction of the freight of drugs from London by the railway companies ; and a general annual holiday for the trade at Midsummer.

Mr. Hebden proposed the "Pharmaceutical Society." Mr. Stott, in replying to the toast, said that he gloried in the fact that he was one of the founders, being connected with it from the very first, and although some might consider it to have been rather too selfish and grasping, yet he considered its tendency had been to exalt the status of the trade and promote the cause of education. It was in vain the physician prescribed for his patient unless he be properly supported by the druggist.

The other toasts comprised, "Town and Trade of Halifax," "Kindred Trade Societies," and the "President and the Officers of the Association." A hearty vote of thanks to the Chairman brought a cheerful and harmonious evening to a conclusion.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The first meeting of the session was held at the Museum and Library, Queen's Road, on Friday, October 10th. The President, Mr. G. F. Schacht, delivered the following inaugural address :—

ADDRESS TO THE MEMBERS AND ASSOCIATES OF THE BRISTOL PHARMACEUTICAL ASSOCIATION. SESSION 1873-74.

BY THE PRESIDENT, MR. G. F. SCHACHT.

Ladies and gentlemen,—

I must ask all visitors who are honouring the Bristol Pharmaceutical Association with their presence to-night to be good enough to remember that my duty, as President for the year, is to address the members and associates of our Society ; and I must beg them, if my remarks at times present a somewhat over-technical aspect, to bear with them generously.

Physic, I am aware, is not usually supposed to be a very cheerful thing to contemplate ; but it is (to use a homely phrase) our "bread-and-butter," and "we do not quarrel with it." But we think it both pleasant and useful now and then to spread a little jam or ginger, or other delicacy over the plain every-day dish, and the present occasion is by some regarded as one of those supreme moments.

Of course, all who have come with much expectation of enjoyment will be disappointed, for sweets and spices enter but to a small extent into the composition of the organization that has now to address you ; but (if I may venture to quote a great man on a small occasion) "such as I have I give," and must hope, at any rate, to escape the charge of having bored you.

I should like, then, gentlemen, in commencing my first duty for the year, to make one personal observation and to be forgiven. It is that I highly appreciate the honour of being elected the President of this Association. I should have been quite content to have continued to serve as joint honorary secretary with my friend Mr. Pitman, but as my colleagues on the Council appeared to think that my time had come to occupy this more ornamental post, I hesitated but little to accept it, hoping, by a ready compliance, to furnish an argument that might have weight with others when my term of office shall have expired ; for I know well that the Association includes amongst its members many who will make most excellent presidents, and I sincerely hope we may all live to enjoy the full advantage which their occupation of this chair will necessarily bring.

It is the duty of each one of us, as it appears to me, cheerfully to assist in upholding an association whose prime object is "the promotion of scientific pharmacy," and to be ready for this high end, to serve either in the ranks or in office, according to the exigencies of the moment.

I rejoice in the thought that this feeling pervades the whole body of the Council, and that the pharmacists of Bristol generally desire, with more or less zeal, to co-operate for the furtherance of our good cause.

These considerations entitle me to think that at the

commencement of our session, 1873-74, we are in as fair a position for doing good work as at any period of our history.

And in what direction shall we look this time next year for the evidence of good work having been done? Principally, I think, in this—to the numbers of students that have attended our courses of instruction, and to the signs of benefit thereby acquired. And if this conviction constrains me to address the chief part of my remarks to the younger portion of my audience, I hope their seniors will not think I am heedlessly neglecting other important matters.

For instance, I do not attempt to give you, as some may have expected that I should, a statement of the present outlook of pharmacy, or even a *résumé* of its last year's history—for these matters have been so recently undertaken and so exceedingly well done by my friend Mr. Brady in his presidential address to the British Pharmaceutical Conference, that my efforts would necessarily be but a feeble echo of his, and would result in a simple waste of your time;—and again, during our recent canvas of the trade so much cordiality and good feeling was manifested by our *members*, that with this expression of grateful acknowledgment I prefer to leave *them* to their own excellent devices;—and I elect to address the bulk of my remarks to our *associates* and other junior candidates for pharmacy.

It is perhaps a little dangerous to say anything that may even appear unduly to exalt in our young friends the idea of their especial importance in this world or in our Society—youth is sufficiently prone to conceit without any such assistance—but I must trust to their good sense in the present case not to pervert my confidence, because I wish them to know that but for them and our interest in their professional wants, this Society would most probably not exist. A few other topics in which we are professionally interested may occasionally present themselves for discussion, but the creation and development of the taste for science amongst our assistants and apprentices, and the provision of opportunities for its systematic culture constitutes the real object of our work and is the process, I had almost said the only process, by which we hope in any appreciable degree to achieve the progress of scientific pharmacy.

We can do but little to change the fully formed man, but we may hope to do something with the forming pharmacist. Social change is, in its very nature, gradual and slow. One fancies that it well nigh requires the passing away of a generation for each step. The child is father of the man. What he is at the beginning he pretty much remains to the end of his career. What you, young men, make yourselves now in the time of your pupilage, that you will make pharmacy when your day of action arrives.

And in passing I would say for your encouragement, that in my opinion you may in that day compel a more correct public recognition of its just claims. I say its *just* claims, nothing more and nothing less than its due, that is, what you make it to deserve. Depend upon it (and this observation is by no means new) the world estimates a man very much at his own valuation, not perhaps at what he sometimes *says* he is worth but at what he shows that he *knows* he is worth. If the so-called pharmacist is willing to comport himself as a mere huckster, to descend to the dishonest or semi-honest tricks of low-trading, to treat his fellow-labourers in pharmacy with systematic suspicion; if, in fine, he declines to manifest respect either for himself or for his class, how can he possibly expect the public to do so! But on the other hand, if his rule be scrupulous honesty and intelligent work at his own home and, as a necessary result, the assumption of the same rule at his neighbour's, who amongst the public would dare to doubt him! It is because I believe that examples of the former class are becoming rarer and rarer that I am hopeful for our future. I feel persuaded that our business is much more intelligently and much more honestly done than it was some years ago, and I am equally sure that the disposition to regard the neighbour chemist rather as a fellow-labourer than as a rival is more and more upon the increase.

If I am right these are pleasanter greetings for you young men than were those that met some of us at the commencement of our career, and I would have you appreciate them at their full value. If the difference is in any way due to the efforts of those that have preceded you, I am sure that all the show of gratitude they ask at your hands is, that you accept the benefit frankly and turn your improved opportunities to the best account.

I said that the creation and development of a taste for science amongst our juniors, and the provision of opportunities for its culture, constituted the chief object of our association, and I must now remind you that, prompted by that doctrine, we have to the present time provided those opportunities mainly in two directions—systematic courses of lectures on botany, chemistry, and materia medica—and occasional lectures in this room on some subject of general science.

There seems to be little occasion to urge any abstract arguments in favour of the benefits that attach to systematic teaching in the form of regular courses of lectures. These are almost universally admitted; and I can honestly assert that the teaching we are fortunately able to offer you is very good. You may search all England through and you will find it a difficult matter to discover three better teachers than Mr. Coomber, Mr. Leipner, and Mr. Stoddart; and I am quite sure that with common industry you may attain such proficiency in the three sciences as will enable you not only to pass your examinations with credit, but also to gain a hearty love for those sciences for the rest of your lives.

I hope therefore I may assume that we are agreed as to the usefulness of these courses of lectures, and that a good many of you will attend them during the coming session.

The other process, however, by which we attempt to create and cultivate this taste for science—I mean the provision of *occasional* lectures in this room—does not apparently command such universal approval. It is sometimes questioned, both by lecturers and students, whether much good results from isolated discourses.

The difference in the two cases appears to consist chiefly in the fact that whereas in the former the lessons, being offered in a continuous and consecutive order, the various phenomena are presented in a way that enables the mind of the hearer to appreciate them with the least possible effort of his own—in the latter it becomes necessary for the hearer himself to assign the place in his intellectual system wherein to stow away the fresh goods. This is not always the easiest thing in the world to do, and its difficulty is in proportion to the unpreparedness of the individual mind for such a duty.

I ventured upon an occasion somewhat similar to the present to urge upon all pharmaceutical students the usefulness of preliminary mathematical training in the after acquisition of scientific knowledge. I now repeat the opinion that the more our knowledge is stored upon the basis of real method, the more is it likely to become so much part of ourselves as to be available for our own and others' good, and that to be altogether without mental method would merely illustrate mental chaos.

Upon this point however I do not now wish to enlarge, but I desire to suggest an idea which if you will thoroughly take it to your minds and nurse it kindly might for ever redeem the isolated lecture from the charge of uselessness.

It is the idea that no phenomenon of nature can pos sibly stand alone.

Every natural phenomenon consists of matter under the influence of force. One cannot conceive of force but as having an accession or a subsidence—a coming, a doing, or a going; in other words, every phenomenon must have a history, it must be connected with antecedent and subsequent operations from which it cannot be philosophically

dissociated, and which we may be sure are as worthy of thought and study as that which appeared for the moment to be the central object in the field of view.

But more than this, not only is every phenomenon of nature related to its immediate before and after, but also to a group of operations of which it is perhaps one out of many illustrations.

It is this latter half of the idea to which I especially wish to draw your attention, for, if I am not much mistaken, it lies very near the root of that which leads to discovery in science, and to so-called creation in art.

Let me try and illustrate my meaning.

If an intensely heated non-volatile body be brought into a dark room it will emit what is called white light. If this be analysed by a prism it will appear as an uninterrupted band of various colours, known as the spectrum. In its constant place between the red and the blue will appear the yellow portion of the light. Now, if between the ignited body and the prism we contrive to interpose a quantity of the vapour of the metal sodium, the spectrum is no longer a continuous band of varied colour, but in the place normally occupied by the yellow colour we now have no light at all; on the contrary, a dark band appears. The sodium vapour, though transparent to all the other colours, is opaque to yellow. On the other hand, let the sodium itself be heated in the absence of other light until its vapour becomes intensely luminous, and the only colour it will then emit is this very yellow which it refused to let pass in the previous part of the experiment.

Again, a moderately heated body, placed at one end of a tube and a delicate thermometer at the other, the tube being filled with dry air, it is found that the heat radiates through the air to the thermometer with but little loss. If carbonic acid gas be substituted for the air, much more heat disappears, if olefiant gas be used, still more. Now for the converse. If a mass of air be heated it radiates but little; if carbonic acid gas be heated it radiates much more; olefiant gas still more.

Once again. If I stand by a pianoforte and with my voice or other instrument sound a certain note, say C, I find I have immediately set vibrating all the C strings in the piano. If I were to arrange a screen of C strings before me, and run my voice up the scale of G, you on the other side of the screen would hear G A B—D E ♮F G, but the C would be stopped; strike those strings and C only would be heard.

Now, here we have three phenomena which might be very correctly assigned to three distinct departments of physics—to light, to heat, and to acoustics. Yet who can contemplate them for one moment in juxtaposition without detecting their close parallelism, and at once yielding to the suggestion that they may be but modified manifestations of the same fundamental operation? Viewed by the light of this suggestion, the parallelism appears still more complete.

That vibrations through some conveying medium accompany the phenomena of sound is not a difficult idea to realize. Our eyes can see these vibrations in the strings of sounding musical instruments, and our very skins can feel the vibrations in the air produced by the deep notes of an organ. It is tolerably easy, therefore, to comprehend the explanation that when the vibrations that accompany the sound of my voice reach the screen, these C strings take up and absorb all those waves that produce C sounds, and commence corresponding (though, perhaps, inaudible) vibrations, whilst the other waves that do not coincide with the C waves are allowed to pass.

Now, see how beautifully these same explanations fit the corresponding phenomena of heat and light. The heated body, like the sounding voice, produces vibrations in the surrounding media, a mixed series of waves of different heights, and, so to speak, of different musical pitch. Of these a screen of carbonic acid gas absorbs those with which its own molecules can be set vibrating and lets the others pass.

Once more, the incandescent glowing substance that I first imagined, from the impulse of its own internal molecular vibrations, evokes in the surrounding ether vibrations and waves of all varieties of intensity that produce impressions not only of heat but of light also. Certain of these waves produce red light, others yellow, others blue. The interposition of the screen of sodium vapour arrests and absorbs the vibrations that convey the yellow light and lets the others pass.

This sifting, as it were, of the vibrations and waves produces, in the one case, silence; in the second, cold; and in the third, darkness.

You see then, I hope, that these three phenomena, though very different in their sensible manifestations, are closely related in the probable intrinsic nature of the processes by which they exist, and this observation once made suggests many trains of thought. One of the first would probably lie in the direction of inquiry as to what other *already observed* facts might, with similar liberty of variation, be grouped with them as owning a kindred origin, and soon perhaps would follow the attempt to find in some special department of natural operations, phenomena *not yet observed* but deemed probable from the knowledge of corresponding manifestations in other departments.

Am I imagining a case? By no means; I am simply telling the history of every science, and pointing to one of the chief agencies in scientific progress.

The highest minds amongst us revel in these suggestive parallelisms, and the grand generalizations and orderings of an otherwise chaotic mass of facts that characterize modern science are the natural issues of this happy intercourse.

Let me remind you yet once again of the oft-told tale of Sir Isaac Newton and the falling apple. Many, many times must this phenomenon have happened before eyes that could see yet saw not—let us even say, before eyes that saw, yet saw not all. Let us willingly admit that many open, thoughtful minds lived before Newton, and read the lesson according to their lights. A falling apple had doubtless given the cue to many a moralist and to many a preacher, as he taught gravely and wisely how the time of fairest show and seeming bloom may be but the message of a fall, and how this fate must come to all who hang alone upon material support. This is something of what I meant in saying that much of what was called creation in art might find its secret in a keen appreciation of parallelisms and similitudes in nature. How easy to believe that the poet had some such fact before him when he wrote—

> "This is the state of man: To-day he puts forth
> The tender leaves of hopes, to-morrow blossoms,
> And bears his blushing honours thick upon him:
> The third day comes a frost, a killing frost;
> And,—when he thinks, good easy man, full surely
> His greatness is a ripening,—nips his root,
> And then he falls . . . . ."

These and many other reflections, noble and ignoble, may, I say, have been suggested by this home-side incident, but it was reserved for the splendidly-trained genius of Newton to take from it the hint that led to the grandest generalization of the facts of which it was a trifling illustration that the world has ever seen.

I cannot, I trust, be wrong, then, in submitting this idea for your careful consideration, and in urging upon you this thoughtful, reasoning, scientific method of receiving everything. It has been aptly said that talking of science is not necessarily scientific talk, so let me add—listening to science is not the same as scientific listening. The one may be what we all agree in designating waste of time, the other is what we hope you will give to all the teaching we can offer you. Again, it has been said—and I find myself often quoting these clever words—"the eye sees only that which it brings with it the power of seeing." You and I must cultivate this open scientific vision that takes in all, and takes it in aright, and then every phenomenon, though apparently isolated, from the falling of an apple to the appearing of a new world, will bring to us a valuable lesson.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 296.)

ERRATUM.—Through an accident, the paragraph on p. 292 representing Mr. Brady's remarks respecting hyoscyamus was passed without correction. It should read as follows:—

The PRESIDENT said: I do not think that it is generally understood how great a difference there is between the annual and biennial varieties of *Hyoscyamus niger*. In its second year the latter is a large ornamental plant from three to five feet high. In reply to the suggestion that has been made that the chlorophyll, which is separated at an early stage in making the extract, should be rejected, I should just like to say that it is possible that a portion at least of the active matter is associated with it. Mr. Stoddart's researches showed clearly that the absorbtion bands of the tinctures of the annual and biennial plants are quite distinct, and it is at least a collateral fact that chlorophyll under different circumstances gives two or more distinct spectra; and this is a subject still under investigation. Until we are sure that the waxy chlorophyll does not retain any part of the hyoscyamine the present process for making extract may be regarded as a good one in principle.

A NEW TEST FOR MORPHIA.

BY LOUIS SIEBOLD.

In conducting a series of experiments on organic alkaloids, I discovered a new test for morphia, which greatly exceeds in delicacy the tests hitherto known for that substance. If it is to be applied for the detection of opium in food, the contents of stomachs, etc., in poisoning cases, it is of course necessary to separate the alkaloid from the other substances in the usual manner. The test is then performed in the following way:—

Heat the substance which is believed to be, or to contain, morphia, gently with a few drops of pure sulphuric acid, add a very small quantity of pure perchlorate of potassium. The liquid immediately surrounding the perchlorate will at once assume a deep brown colour, which will soon spread and extend over the greater part of the acid. Warming increases the delicacy of the test. 0·0001 gramme of morphia can be distinctly recognized in this way and no other alkaloid is acted upon in a similar way by the substances named. It is indispensable however for the success of the experiment that the perchlorate of potassium be absolutely free from chlorate; if it is not, it must be heated with successive portions of pure hydrochloric acid until the latter remains colourless and ceases to give off chlorine. After removing the HCl completely by washing with water, the perchlorate must be dried at 212°, and it is then ready for use. I feel justified in strongly recommending this test to the attention of the chemical profession.

[Some time after I had forwarded the above report to the Secretary of the Conference, another equally delicate new test for morphia was published by Mr. R. Schneider. One drop of pure sulphuric acid is placed on a porcelain slab, and a mixture of one part of morphia and six parts of sugar added; the mixture will at once assume a purplish red colour, which remains unaltered for some time. Codeine and aconitine, if treated in the same way, produce a similar reaction.]

Professor ATTFIELD: I am glad Mr. Siebold has called attention to the use of perchlorate of potassium as an oxidizing agent. The colour it gives with alkaloids differs from the colour obtained with some other oxidizing agents; and as it is not a very common chemical in laboratories generally, I think it is as well that attention should be drawn to the fact set forth in the paper we have heard, not only for its own sake, but because it suggests that many new tests might probably be found, if gentlemen would endeavour to ascertain the reactions of perchlorate of potassium mixed with acid on the large number of alkaloids and other organic principles.

Mr. GROVES: With regard to the detection of minute quantities of poison, say in the stomach of animals, for my own part, I certainly should feel some hesitation in giving decided evidence as to its presence unless a physiological as well as a chemical test were applied.

NEW DERIVATIVES FROM MORPHINE AND CODEINE.

BY C. R. A. WRIGHT, D.SC.

Lecturer on Chemistry in St. Mary's Hospital Medical School.

Since the last meeting of the Conference the following additional results have been obtained, partially in conjunction with Mr. E. L. Mayer, of Glasgow.

By acting on morphine with sulphuric acid diluted with its own bulk of water at 100°, two polymerides are formed, corresponding in physical properties with the tricodeine and tetracodeine obtainable from codeine by similar treatment, and described in last year's paper; these are hence termed *trimorphine* and *tetramorphine* respectively; *dimorphine* does not appear to be obtainable in this way, although dicodeine is plentifully obtained from codeine thus. The physical characters of the four series of polymerides may be thus summarized:—

Mono- series (ordinary bases, not polymerized).—Bases crystalline. Salts, crystalline.

Di- series (polymerized bases).—Bases amorphous. Salts, crystalline.

Tri- series (polymerized bases).—Bases amorphous, and soluble in ether. Salts, amorphous.

Tetra- series (polymerized bases).—Bases amorphous, and insoluble in ether. Salts, amorphous.

On account of these physical properties, the bases hitherto designated as "apomorphine," "deoxymorphine," and "deoxycodeine," are regarded as belonging to the di- series.

Trimorphine and tetramorphine differ much from morphine in physiological action; the former produces excitement and salivation, but no vomiting; the latter is a more powerful emetic even than "apomorphine." Not being crystalline, its salts do not form quite as elegant a preparation as "apomorphine hydrochloride"; they can be administered readily by hypodermic injection, or internally as a pill or otherwise.

The substance described as "sulpho-morphide," by Arppe, and by Laurent and Gerhardt, and viewed by the latter as a kind of amide, is found to be only the sulphate of tetramorphine.

Hydrochloric acid has no action on tetramorphine, in which respect it resembles tetracodeine; trimorphine, on the other hand, gives rise to a chlorinated derivative, containing two proportions of hydrochloric acid to three of morphine; this reaction, therefore, confirms the formula attributed to trimorphine, *i.e.*, proves that it is the *treble* polymeride. Tricodeine is acted on by hydrochloric acid differently, the elements of water being removed and a non-chlorinated base resulting.

Tricodeine, $\overline{C}_3 = 6H_2O + (\overline{C}_3 - 6H_2O)$.

Trimorphine, $\overline{M}_3 + 2HCl = 2H_2O + (\overline{M}_3 + 2HCl - 2H_2O)$.

The action of hydrochloric acid on morphine appears to give rise, firstly, to chlorinated bases derived from non-polymerized morphine, thus: a mixture of $(\overline{M} + HCl)$, $(\overline{M} + HCl - H_2O)$, and $(\overline{M} + 2HCl - 2H_2O)$ is produced: and secondly, to "apomorphine" and a chlorinated tetra base $(\overline{M}_4 + 2HCl)$ produced by the further alteration of these first-formed substances.

Similarly, the first action of hydrochloric acid on codeine gives rise to bases—$(\overline{C} + HCl)$ and $(\overline{C} + 2HCl - 2H_2O)$; this latter is the "chloro-codide" of Matthiessen

and the author; as its formation is preceded by the production of ($\overline{C}$ + HCl), and as it yields ordinary codeine (not polymerized) by the action of water, it results firstly that the chlorinated bases produced by the first action of hydrochloric acid on codeine (and hence on morphine) belong to the *mono-* series of derivatives; and, secondly, that codeine is represented by the formula $\overline{C} = C_{36}H_{42}N_2O_6$, and not by the half of this formula, as supposed at the commencement of these researches (and hence that morphine $\overline{M} = C_{34}H_{38}N_2O_6$, and not $C_{17}H_{19}NO_3$).

In just the same way, the first action of hydrobromic acid on codeine gives rise to ($\overline{C}$ + HBr), "bromocodide" or ($\overline{C}$ + 2 HBr—2 H_2O) being subsequently formed.

The further action of hydrobromic acid on bromocodide has been formerly shown to be different from that of hydrochloric acid on morphine, described above; at 140°-150°, in sealed tubes, the action of hydrochloric acid on chlorocodide was found by Matthiessen and the author to be different again, "apomorphine" (identical with that from morphine) being produced, together with methyl chloride. At 100°, however, a different reaction takes place, methyl chloride is formed and water eliminated, but instead of "apomorphine," a base where the elements of water are less completely eliminated is produced. This base is, like "apomorphine" (tetrapodimorphine), a member of the di- series, and resembles "apomorphine" greatly; its physiological action, however, is much less energetic, and its composition is expressed by the formula ($\overline{M}_2$—2 H_2O), "apomorphine" being ($\overline{M}_2$—4H_2O), it may hence be conveniently termed *diapodimorphine*.

Simultaneously with diapodimorphine, a base isomeric therewith, but belonging to the tetra- series, is produced; the composition of this being (M_4—4H_2O), it may conveniently be termed *tetrapotetramorphine*.

A comparison of the physiological action of the various "apo" derivatives of di- and tetramorphine leads to the singular result that the emetic action of the derivative is the more marked in the di- series, the more the elements of water are subtracted, whilst in the tetra- series the emetic action becomes less and less the more water is abstracted, thus:—

Di- Series.

Name of Base	Relation to Morphine.	Physiological Action.	Observer.
Dimorphine (hypothetical)	$\overline{M}_2$	?	?
Diapodimorphine ...	$\overline{M}_2$—2H_2O...	Produces profuse salivation but no vomiting (cats).....	Dr. J. G. Blackley.
Tetrapodimorphine (apomorphine) ...	$\overline{M}_2$—4 H_2O...	Moderately powerful emetic (cats). Very powerful emetic (man)	Drs. Gee and Stocker.

Tetra- Series.

Tetramorphine ...	$\overline{M}_4$	Very powerful emetic (cats) .	Dr. Stocker.
Diapotetramorphine	$\overline{M}_4$—2 H_2O ..	Powerful emetic (cats and dogs)	Dr. Stocker.
Tetrapotetramorphine ...	$\overline{M}_4$—4 H_2O ..	Produces profuse salivation but no vomiting (cats).....	Dr. Blackley.
Octapo tetramorphine ...	$\overline{M}_4$—8 H_2O ..	Produces neither salivation nor vomiting (cats)	Dr. Blackley.

The last mentioned base, *Octapotetramorphine*, is obtainable as the end product of the action of zinc chloride and hydrochloric acid on morphine at 180°, at lower temperatures, or with a shorter time of exposure, treatment with zinc chloride forms "apomorphine," the base ($\overline{M}$ + HCl—H_2O) belonging to the mono- series, or a tetrabase ($\overline{M_4}$ + HCl—4 H_2O) according to circumstances.

The derivatives of the mono-, di-, tri-, and tetra- series of polymerides appears to be sharply distinguished from one another in their physical characters, and, in many instances, by their physiological actions; in chemical reactions no less difference appears to exist. Thus, when a derivative of dimorphine (diapodimorphine, tetradimorphine, or "deoxymorphine") is dissolved in excess of caustic potash and the solution exposed to the air, a liquid is obtained which, on supersaturation with an acid and agitation with ether, communicates a magnificent purple tint to the ether. The colouring matter thus produced has been isolated and examined; it is an indigo-blue powder, exhibiting traces of crystalline structure; in alkalies it dissolves with a bright green colour; in water containing ammoniacal salts, with a pure blue tint; in ether, benzene, chloroform, alcohol, and bisulphide of carbon, it dissolves, forming liquids of tints varying from violet-blue to magenta-purple; the tint is different with each solvent, even when the same quantity of material is dissolved to the same bulk. On analysis, the substance gives numbers agreeing with the formula $C_{40}H_{34}N_2O_7$.

Neither mono-, tri-, nor tetra- derivatives of morphine are capable of yielding this substance by this treatment (if perfectly free from di- derivatives, a point difficult to ensure).

Again, if monomorphine derivatives (hydrochlorides) be heated to 150°-180°, they swell up and partially decompose; the residue, when distilled with potash, yields methylamine and *pyridine*; when tetra- derivatives are treated in the same way, *methylamine* only seems to result, whilst a di- derivative, "apomorphine," when treated thus, gives rise to *no volatile base at all*. The nitrogen, therefore, would seem to be differently related to the other elements present in these different series of polymerides.

The numerous derivatives of codeine and morphine (upwards of 40 in number) obtained during the last few years may, with only one or two inconsiderable exceptions, be included in one or other of the formulæ—

$$(\overline{C} \pm Hp)x + m\,HX—nH_2O.$$

$$(\overline{M} \pm Hp)x + m\,HX—nH_2O.$$

Where p has values varying from 0 to 8.

Where x = 1, 2, 3, or 4, forming the mono-, di-, tri-, and tetra- series respectively.

Where m varies from 0 to 4.

Where n varies from 0 to 12.

And where X denotes either Cl, Br, or I.

Tables illustrating the compositions of these derivatives, formulated and arranged on this principle, are given in the *Journal of the Chemical Society*, 1873, p. 228, and the *Chemical News*, xxvii., p. 287, or in the *Berichte der Deut. Chem. Ges.*, v., p. 1111, and vi., p. 268.

The author again desires to express his obligations to Messrs. Macfarlan and Co., of Edinburgh, for their great kindness and liberality in presenting him with the alkaloids necessary for these researches.

The PRESIDENT: There are probably few present to whom the whole, at any rate, of Dr. Wright's paper is quite intelligible; but there can be but one opinion as to the value of such researches as those he has for so many years been engaged upon both in their chemical and physiological aspects.

The President called upon Mr. Williams.

Mr. WILLIAMS: The subject is so overwhelming in its character, that I feel sure you will pardon me if I do not now attempt to deal with it. Its wide character may at once be understood by the simple statement that there are upwards of forty derivatives from morphia and codeia, and that the whole question is still in a complicated state. It is possible to condense the molecule of morphia, and also of codeia, even twice or three times, and you may thus obtain an infinite variety of products. The researches of Dr. Wright are most interesting and elaborate, and how he finds time to perform so many analyses and so many experiments is most surprising, knowing as we do that he has the labours of a professorship and other important duties to discharge. For his great industry and its successful fruits, I think pharmacy and chemistry generally are deeply indebted to Dr. Wright.

Professor ATTFIELD: I think that Dr. Wright has set all gentlemen engaged in chemical researches a most excellent example. As a rule, when chemists discover from time to time new substances, the matter rests there, so far as any physiological action of the substances is concerned. Then some wonderful combinations are produced by therapeutists, but the chemical interest in them being very small those researches excite little interest among chemists. Now Dr. Wright, though only a chemist I believe, is not content in giving us the results of his researches, which are of a purely chemical character, but he has enabled us by various means to judge of the physiological action of the substances discovered, a service which seems to me to be of the greatest value both to the medical profession and to pharmacy.

Mr. SIEBOLD: The difference in the physiological action of the various derivatives of morphia, as explained to us by Dr. Wright, is so remarkable as to demand further inquiry, especially on the part of medical practitioners. I believe the physiological action and chemical nature of alkaloids generally, and their derivatives, are little understood; and I am, therefore, all the more glad to see that they have been made the subject of such excellent research on the part of Mr. Groves and Dr. Wright, as shown by the results they have placed before the Conference to-day. It is to be hoped that these researches will be continued not only by the same gentlemen, but also by other chemists and pharmacists to whom they have set such a good example. I have very little doubt but that at the end of the second decade of the British Pharmaceutical Conference we shall be discussing organic alkaloids made artificially from inorganic constituents.

ON THE ESSENTIAL OIL OF ORANGE (PORTUGAL).

BY C. R. A. WRIGHT, D.SC. (LOND.),

Lecturer on Chemistry in St. Mary's Hospital Medical School.

A brief preliminary notice on this subject by the author and Mr. C. H. Piesse was read before the Conference two years ago; since then a large number of experiments have been made, of which the following is a synopsis:—

Proximate Constituents.—The great majority of the oil (97·2 per cent.) distils below 180°; a small quantity of an oxidized constituent boiling near 220° is contained, possessing the composition $C_{10}H_{16}O$; and a non-volatile soft resin is also contained giving numbers on analysis agreeing with the empirical formula $C_{20}H_{30}O_3$, together with another oxidized substance of high boiling point, a portion distilling at 240°-250°, agreeing with the empirical formula $C_{40}H_{64}O_5$.

The oxidized constituent $C_{10}H_{16}O$ is possessed of the property of becoming altered by heat forming an isomeric liquid of higher boiling point, and finally becoming a non-volatile resin, no change in its composition being thereby produced: in this respect it resembles an analogous (or identical ?) substance contained in oil of nutmegs.

The portion boiling below 180° yields, on distillation over sodium, a hydrocarbon, $C_{10}H_{16}$, boiling constantly at 178°, and apparently consisting of one homogeneous substance, no trace of cymene being apparently present. Many other natural terpenes (*e.g.*, the terpene of turpentine oil and that of nutmeg oil) are not pure terpenes, having been found to contain cymene, $C_{10}H_{14}$, as well as a $C_{10}H_{16}$ hydrocarbon.

When two equivalents of bromine are cautiously added to the terpene of orange oil (*hesperidene*) combination takes place with evolution of heat; the product breaks up on distillation, forming hydrobromic acid and cymene, thus—

$$C_{10}H_{16}Br_2 = 2\,HBr + C_{10}H_{14}.$$

The cymene thus formed is identical with that contained in cummin oil and with that obtainable from camphor, yielding on oxidation terephthalic acid and acetic acids without admixture with isophthalic acid or higher homologues of acetic acid; the original hydrocarbon, *hesperidene*, when similarly oxidized, gives acetic acid, but no trace of terephthalic acid.

If the oxidation be not carried to its limit, the action of chromic acid on hesperidene gives rise to a small quantity of a substance, $C_{10}H_{16}O$, which resembles in all respects save odour the body of that composition contained in the original oil; probably therefore that body is formed by the spontaneous oxidation of the hydrocarbon; or possibly the hydrocarbon is produced by the natural deoxidation of this oxidized substance.

Action of Nitric Acid on Hesperidene.—This action is very energetic, the resulting substances being carbon dioxide and nitrous red fumes, oxalic acid and a new body, *hesperisic acid*, being formed: this hesperisic acid forms a lead salt insoluble in water, and a calcium salt soluble in water and precipitated by alcohol from aqueous solution; its barium salt is soluble in water. The acid is obtained by treating the purified calcium salt with sulphuric acid and ether; on evaporation of the ether the acid is left as a honey-like mass which gradually becomes crystalline. It is hexabasic and has the composition $C_{20}H_{26}O_{17}$, $2H_2O$, the $2H_2O$ being lost at 100°.

Action of Hydriodic Acid on Hesperidene.—Hydriodic acid combines with hesperidene, forming a liquid compound partially decomposed by distillation. Attempts to synthesise an acid containing eleven proportions of carbon by acting on this hydriodide with cyanide of silver, etc., met with little success: it was also found impracticable to add hydrogen on to hesperidene by the joint action of phosphorus and hydriodic acid, a polymeride boiling about 250° being the sole product.

Professor Attfield also read a paper which had been prepared by Dr. Wright, "On the Essential Oil of Nutmegs," as follows:—

ON THE ESSENTIAL OIL OF NUTMEGS.

BY C. R. A. WRIGHT., D.SC. (LOND.),

Lecturer on Chemistry in St. Mary's Hospital Medical School.

Proximate Constituents.—Pure nutmeg oil was found to contain about 2 per cent. of a non-volatile soft resin, agreeing with the empirical formula, $C_{40}H_{56}O_5$; substances distilling at 260°-280°, and 280°-290°, having compositions approximating to $(C_{10}H_{13}O)n$; an oxidized constituent (the myristicol of Gladstone) boiling near 212°, but altering by the action of heat in the same way as the constituent $C_{10}H_{16}O$ contained in orange oil (Gladstone attributed to this substance the formula $C_{10}H_{14}O$, but the analytical numbers agree better with $C_{10}H_{16}O$, a formula shown to be correct by the decompositions of the sub-

stance); and a mixture of at least two hydrocarbons, one a terpene, boiling at 163°, the other ordinary cymene. This last was extracted by treating the mixture of hydrocarbons with sulphuric acid, whereby the terpene became resinized. On distillation with water, cymene passed over unaltered: when purified this was found to be identical with all the other known varieties of cymene.

By the same process cymene has been extracted from ordinary oil of turpentine, which is thus shown to be a mixture and not a single body.

Decompositions of Myristicol.—When heated with zinc chloride, myristicol partly splits up into water and cymene, thus—

$$C_{10}H_{16}O = H_2O + C_{10}H_{14}.$$

A portion, however, becomes converted into a non-volatile resin, of composition intermediate between cymene and myristicol, thus—

$$2n\ (C_{10}H_{16}O) = n\ H_2O + (C_{20}H_{30}O)_n.$$

When treated with phosphorus pentachloride myristicol gives rise to a chlorinated product, $C_{10}H_{15}Cl$, formed thus—

$$C_{10}H_{16}O + PCl_5 = POCl_3 + HCl + C_{10}H_{15}Cl.$$

On heating, this chlorinated product splits up into hydrochloric acid and cymene. Thus—

$$C_{10}H_{15}Cl = HCl + C_{10}H_{14}.$$

The cymene thus produced from myristicol by these two reactions is in each case identical with the cymene produced from other known sources.

Oxidation products of Nutmeg Hydrocarbons.—Fractional distillation does not completely separate the cymene naturally present from the terpene contained in nutmeg oil, even when carried on over sodium for six weeks, hence the oxidation products of cymene (viz. toluic and terephthalic acids) are mixed with those of the terpene.

Chromic acid gives rise to acetic acid and a constituent, $C_{10}H_{16}O$, much resembling myristicol, and boiling at about the same temperature; probably this is identical with myristicol, as the only difference lies in the odour. Ordinary terephthalic acid is also found in small quantity (from the cymene present).

Nitric acid gives rise to carbonic and oxalic acids, and also to a peculiar acid, *myristisic acid*, much resembling hesperisic acid, obtained similarly from hesperidene; in addition, ordinary toluic acid, and also terephthalic acid, is found in small quantity (from the cymene present). Myristisic acid is hexabasic, and is expressed by the formula $C_{20}H_{26}O_{16}$, $2\ H_2O$, the $2\,H_2O$ being lost at 100°. It much resembles hesperisic acid, from which it only differs by one proportion of oxygen, hesperisic acid being $C_{20}H_{26}O_{17}$, $2\ H_2O$.

Production of Cymene from Nutmeg Terpene.—By adding two equivalents of bromine to the nutmeg terpene, combination takes place; the resulting dibromide splits up on heating into cymene and hydrobromic acid, just as hesperidene dibromide does. The resulting cymene constitutes about 55 per cent. of the hydrocarbon taken (about 10 to 12 per cent. of cymene being originally contained as such); the rest becomes converted into a resinous substance. This cymene is identical with all the other known forms of that body.

When the action of heat on the dibromides of turpentine (Oppenheim), nutmeg terpene, and hesperidene, are compared with the boiling points of the three hydrocarbons (160°, 163°-164°, and 178° respectively) it is noticeable that the first-mentioned terpene yields little cymene by heat alone; the second about half its weight, and the third nearly the theoretical quantity. It is also noticeable that hesperidene evolves much less heat on combination with a given weight of bromine than the nutmeg terpene, the same being true for the resinizing action of sulphuric acid; it hence appears probable that the boiling points and other physical properties of isomeric bodies and their chemical properties are inter-connected in this way, that the body of highest boiling-point is produced by the expenditure of the greatest amount of force in performing the combination of the constituent elements, and consequently possesses the least amount of what may be termed "intrinsic chemical energy." It is proposed to examine questions of this kind experimentally; but the practical difficulties in the way are in many cases very great.

A hearty vote of thanks was accorded to Dr. Wright for his researches.

Report on the Purity of Commercial Specimens of Officinal Acids.

BY LOUIS SIEBOLD.

The title of this paper shows that I wish to deal, not with the crude acids of commerce, but with those products which are sold *as pure* for dispensing and analytical purposes. That these so-called pure acids are in many cases far from pure is a fact well known to every chemist who takes the trouble of testing the chemicals supplied to him. To dwell upon the impurities contained in such acids, the means of detecting and removing the same, and the best methods of preparing acids of perfect purity, is the object of this paper.

Hydrochloric Acid.—If this acid is prepared in strict accordance with the pharmacopœia process and from perfectly pure materials, it will always be obtained free from sulphuric acid, sulphurous acid, arsenic, iron and free chlorine which are the main impurities found in the commercial article. If the sulphuric acid used contains arsenic, the hydrochloric acid made from it will of course contain the same impurity; if oxides of nitrogen are present in the former, free chlorine will inevitably occur in the latter, whilst organic matter either in the H_2SO_4 or in the NaCl generally cause the formation of a little sulphurous acid. I need hardly remind you that free chlorine and sulphurous acid destroy one another, and that for this reason they can never occur together. There appears to be hardly any difficulty in obtaining from wholesale dealers and manufacturers hydrochloric acid quite free from sulphuric acid, from sulphurous acid and also from appreciable quantities of iron (very small traces of iron can be detected in nearly every sample), but arsenic and free chlorine are very frequently found in acids sold as pure; and as arsenic is undoubtedly a most objectionable impurity, however small its quantity may be, it should be carefully searched for, and if found, the acid containing it should be rejected as unfit for dispensing and even more so for analytical operations where its use might lead to very serious mistakes. Boiling a little of the acid with a piece of *pure* copper foil is a very convenient test and is therefore generally resorted to, but it is not delicate enough for the detection of very small traces of arsenic. I have often been unable to detect it in hydrochloric acid by the copper test when a careful examination with sulphuretted hydrogen proved its presence most unmistakably.

It does not, however, suffice to add a solution of H_2S, but the gas must be conducted through the acid until the latter is completely saturated with it. After twelve hours' standing the precipitate which will in any case be formed must be filtered, washed, dried, and fused with carbonate and nitrate of sodium; the fused mass dissolved in water, filtered, mixed with pure nitric acid in excess, boiled and then tested with ammonia and nitrate of silver or with sulphuretted hydrogen. It is impossible to judge of the absence of arsenic from the light colour of the precipitate. By the method just described, arsenic will be found in many samples of hydrochloric acid which, if tested according to the directions of the pharmacopœia, would seem to be quite pure.

Sulphurous acid is readily detected by the pharmacopœia test, or by iodized starch, the colour of which would be destroyed by the least trace of H_2SO_3. For detecting free chlorine, solution of indigo appears to me preferable to a mixture of iodide of potassium and starch, as the formation of blue iodide of starch might be caused by per-

chloride of iron which is often present in hydrochloric acid, and which might thus be mistaken for chlorine.

On the strength of numerous experiments which I have made I can recommend the two following methods as the best for preparing perfectly pure hydrochloric acid from the crude commercial article. The first of the two methods yields an acid of low specific gravity (1·120 to 1·125) which though very suitable for analytical purposes, does not come up to the pharmacopœia standard of strength. By the second method which was proposed by A. Bettendorff about two years ago, and which I cannot recommend too strongly, a pure acid of 1·16 sp. gr. can be produced with very little trouble indeed.

1st method.—Dilute the crude acid with sufficient water to reduce the specific gravity to about 1·12; saturate it with sulphuretted hydrogen gas, allow to stand for fully twelve hours, decant the clear liquid from the precipitate, drive off the sulphuretted hydrogen by heat and distil after adding a little chloride of sodium.

The sulphuretted hydrogen removes not only the arsenic, but likewise the free chlorine or the sulphurous acid, whichever of the two may be present.

2nd method.—Mix the crude acid whose specific gravity should be between 1·16 and 1·18 (not lower than 1·16) with a small quantity of a solution of stannous chloride in hydrochloric acid of the same strength and allow to stand for twenty-four hours. Any arsenic present will thus be precipitated in the shape of a brown powder (which consists of metallic arsenic with a variable amount of tin). Sulphurous acid if present produces a precipitate of stannous sulphide and is therefore removed along with the arsenic. The filtered acid now only requires to be distilled from a little chloride of sodium, as in the previous process. But as hydrochloric acid of so high a specific gravity parts with a great deal of hydrochloric acid gas on boiling, it is necessary to place a little water into the receiver for its absorption. This method also removes free chlorine if present.

About four years ago a new method of making pure hydrochloric acid from the commercial was published by P. W. Hofmann. According to this one volume of crude hydrochloric acid is to be mixed gradually with $3\frac{1}{2}$ volumes of strong sulphuric acid in a tubulated retort, and the HCl gas disengaged by the heat produced by the addition of each successive quantity of H_2SO_4 is to be conducted through distilled water in the usual way. Fresenius has proved this method to be quite useless, as neither arsenic nor chlorine can be removed by the same.

In reference to the above method of purifying with stannous chloride, I wish to add that I only recommend it for removing, but not so much for detecting arsenic, as the presence of H_2SO_3 in the hydrochloric acid might lead an inexperienced worker into errors.

Sulphuric Acid.—The chief impurities for which this substance must be tested before it should be used for medicinal or analytical purposes are arsenic, lead, and oxides of nitrogen. Arsenic is best detected by Marsh's test, lead by sulphuretted hydrogen, and oxides of nitrogen by ferrous sulphate. An acid free from arsenic and nitrogen oxides, but containing lead, calcium, iron, etc., may be easily purified by distillation, but if the first-named impurities are present mere distillation will not suffice. In that case it is necessary to mix one volume of the acid with six or seven volumes of water, and to saturate the mixture with H_2S. After forty-eight hours the clear acid is decanted from the precipitated sulphides of lead and arsenic, evaporated in a retort until fumes of H_2SO_4 escape and then distilled. What passes over first is too weak, and is rejected until an acid of 1·84 sp. gr. distils, when the receiver is changed. To assure a quiet boiling of the acid, and thus to prevent the cracking of the retort, it is extremely useful to conduct a slow current of air, by means of an aspirator, through the acid during distillation. Though sulphuric acid purchased as pure from the most respectable houses is sometimes found to contain impurities, this is by no means the case to the same extent as it is with hydrochloric acid, which it is almost impossible to purchase in a state of absolute purity, whilst there is not much difficulty in obtaining a supply of perfectly pure sulphuric acid.

Nitric Acid.—This preparation can be obtained in a state of the utmost attainable purity by distilling commercial acid of 1·42 sp. gr., and of good quality, with a little absolutely pure nitrate of potassium, from a glass retort. What passes over first must be rejected, until an acid distils which, if diluted with water, forms a perfectly clear mixture with solution of nitrate of silver, remaining clear, too, after standing for ten minutes. Not less than two drachms of the acid should be subjected to this test. When thus quite free from every trace of HCl, the receiver is changed, and the distillation carried on until only about one-eighth of the original bulk remains in the retort. If carried on still further the purity of the product would be endangered, as traces of sulphuric acid might pass over with the nitric. Another method of purifying nitric acid consists in removing the HCl by the addition of solution of nitrate of silver to the somewhat diluted acid, decanting from the precipitate and distilling the clear acid with a little perfectly pure nitrate of potassium, until about seven-eighths have passed over. The method is good but is only applicable for preparing an acid of low specific gravity (1·25).

The first method, I feel sure, is the best of all that can be recommended for preparing pure nitric acid of the pharmacopœia strength, and as it presents no difficulties whatever it is, I believe, the one generally applied. The fact, therefore, that it is almost impossible to obtain perfectly pure nitric acid by purchase seems all the more surprising. It is easy enough to get it free from solid impurities, as mere distillation is sure to remove these; nor is there any great difficulty in procuring it free from HCl, but H_2SO_4 is always present, no matter from whom it has been obtained. Many samples of nitric acid sold as perfectly pure may be quite good enough for medicinal use, but the trace of H_2SO_4 present is always a source of annoyance in medical laboratories where the acid is required for accurate scientific investigations. Whoever requires this preparation absolutely free from H_2SO_4 is obliged to make it for his own use. To detect very small quantities of this impurity in nitric acid, the application of the pharmacopœia test, consisting in the addition of a solution of barium chloride to the diluted acid, is altogether insufficient. About four ounces of the acid to be tested must be evaporated on a water bath until a few drops only are left; the residue is then mixed with a little distilled water and a few drops of solution of chloride of barium. A precipitate will thus be obtained from any commercial specimen of pure acid. If nitric acid containing small traces of H_2SO_4, which do not show on the mere addition of a solution of $BaCl_2$, is neutralized or nearly neutralized with pure carbonate of sodium (quite free from sulphate), the mixture will then turn cloudy on the addition of a solution of a barium salt. It is on this account that the presence of even very small traces of H_2SO_4 is often very annoying to the analyst. The reason that manufacturers do not succeed in producing nitric acid of perfect purity by the method described is that they do not reject enough of the acid passing over at the beginning, and that they carry on the distillation too far towards the end, and, finally, that they use impure nitrate of potassium. Howard's pure nitrate of potassium, generally considered as a very pure preparation, still contains appreciable quantities of chloride, which must be removed by recrystallization (stirring the solution well during crystallization, so as to prevent the formation of large crystals) before it can be used for the manufacture of pure nitric acid.

Hydrocyanic acid.—In a preparation like this, the strength must of course be a far more important feature than the purity. The traces of sulphuric acid frequently present seem to me very little, if at all, objectionable in a preparation, the medicinal dose of which is so very small, and which, moreover, is not required in a perfect state of

purity for scientific purposes. But the great disparity in the strength of different specimens of this acid is most objectionable and serious, considering its powerful nature. The pharmacopœia requires it to contain 2 per cent. of the anhydrous acid HCN, but my experience tells me that the hydrocyanic acid used for dispensing in druggists' shops varies from two to about a quarter of a per cent., and even less. I know of cases in which 2 drachms and half an ounce of the acid labelled Acidum hydrocyanicum PB. have been given to dogs without bringing on the least indisposition. The reason of this is, that the preparation is kept in bottles, the stoppers of which do not fit tightly, so that HCN is continually escaping, and can be distinctly noticed by smell without moving the stopper. This is the case with nearly all the common 1 and 2 oz. stoppered blue glass bottles in which the acid is generally kept by retail chemists. How very necessary it is to keep it in bottles with well fitting ground stoppers, and tied over with bladder or gutta percha tissue, and how very great a change it undergoes even in a short time, may be seen from the following:—I purchased a 2 oz. bottle of the pharmacopœia acid, freshly made, from a very respectable wholesale house, and at once estimated its strength by volumetric analysis. It contained 1·6 instead of 2 per cent. It was kept in the same bottle without being tied over, and the escape between stopper and neck was noticeable at some distance. After twenty-four hours it contained 1·2, after two days hardly one per cent., and after a month it contained only traces of HCN. This explains the great disparity in the effect upon animals produced by samples of the acid procured from different retail establishments. Chemists should therefore either prepare their own hydrocyanic acid, or, at any rate, they ought to test its strength by volumetric analysis or by ponderal analysis with nitrate of silver (taking the specific gravity is altogether insufficient); they should keep it carefully closed, and examine its strength again from time to time, as this preparation may lose in strength however well it is kept.

In performing the volumetric test, it is important that not more solution of caustic soda should be used than is necessary to produce a distinct alkaline reaction, as any large excess would lead to an inaccurate result, too much of the solution of $AgNO_3$ being then required for the formation of a permanent precipitate.

Not desiring to give this report any undue length, I reserve the consideration of phosphoric acid, sulphurous acid, and acetic acid for a future occasion.

Mr. Hasselby (Goole): I should like to ask whether it is possible to substitute a definite salt, such as the crystallized cyanide of potassium, for an equivalent quantity of hydrocyanic acid. The solution of one would be as valuable as the solution of the other. I too have noticed a depreciation in strength when acids are kept in stoppered bottles; and it has more than once occurred to me whether some of those members of the Conference who have sufficient knowledge of chemical and medical practice could not find a definite salt as a substitute for a preparation so indefinite as the hydrocyanic acid of commerce is.

Mr. Moss: I can confirm what Mr. Siebold says regarding the difficulty of obtaining nitric acid free from traces of sulphuric acid. I had occasion, some little time ago, to use such nitric acid for oxidizing purposes, and was quite unable to obtain it, though I applied to one of the first houses in London. I was not able to detect sulphuric acid by the ordinary Pharmacopœia test, but found it without any difficulty by the method of evaporating a quantity, diluting, and adding a solution of barium salt.

The President: The suggestion with regard to the use of cyanide of potassium is too important to be overlooked. Some years ago cyanide of potassium was sent out in bottles labelled with a formula for the preparation of hydrocyanic acid by the addition of tartaric acid to its solution.

Mr. Groves: A physician, of Weymouth, was in the habit of ordering cyanide of potassium in this manner. On one occasion he ordered half-grain doses. I remarked that it was a dangerous dose. His reply was that he had prescribed it before. Upon inquiry I found out that the stuff really used was the common fused cyanide. The use of a salt so deliquescent and easily alterable as cyanide of potassium is not, in my opinion, to be recommended. The cyanide of zinc, on the other hand, is perfectly stable, readily yields up its hydrocyanic acid to the acid juices of the stomach or to dilute mineral acids, and is, I think, deserving of attention, if not to a place in the next Pharmacopœia.

Mr. Williams: Pure crystallized cyanide of potassium is much more permanent than Mr. Groves seems to think. It is somewhat deliquescent, and should be kept in a well-stoppered bottle. The use of cyanide of potassium is a very old idea, but I believe has been nearly given up by medical men. At first sight, it appears a very feasible plan. By adding an equivalent of tartaric acid a bitartrate of potassium is formed and a solution of hydrocyanic acid is obtained. While I am speaking I should like to allude to the question of arsenic. A process lately recommended for detecting arsenic is by means of hypophosphite of potassium. I have found that a slight addition of hypophosphite of potash or soda to hydrochloric acid containing arsenic, and then boiling, gives a brown colour, the arsenic being, in fact, reduced to a metallic state. The author of this test recommends that we should take advantage of it to produce pure hydrochloric acid by using the hypophosphite and then distilling the acid. He says that by adopting that method we can obtain a perfectly pure acid, and, for my part, I think that is not an unlikely result. I can corroborate the statement made with respect to the difficulty of separating sulphuric acid entirely from nitric acid; I have found great difficulty in doing it completely. Mr. Siebold seems to speak of it as being a comparatively easy process. So it is, if the distillation is conducted on a very small scale, and very slowly, but if the distillation is conducted at a comparatively rapid rate—a rate at which the manufacture of it must proceed in order to make any quantity, I think it will be found that some sulphuric acid nearly always passes over. I have found it so myself, and I should be glad if a mode could be devised of separating entirely sulphuric from nitric acid.

Mr. Siebold: The complete separation of sulphuric acid from nitric acid is not difficult with an acid of high specific gravity (say 1·4), the boiling-point of which is very high. At that temperature, if the distillation is carried on too far, or if too little KNO_3 is used, some traces of sulphuric acid invariably pass over; but if we are satisfied with an acid of lower specific gravity suitable for most analytical purposes (say 1·25 or thereabouts), then we can always succeed in producing a nitric acid perfectly free from sulphuric acid. I succeeded in preparing it in either way, but I have not succeeded in obtaining it of higher specific gravity than 1·42. As to removing arsenic from hydrochloric acid, I think you will find that hypophosphite is not so suitable as stannous chloride. This will remove every trace of the arsenic from the acid, and as a test for arsenic it is a very delicate one. With respect to hydrocyanic acid, an extremely diluted acid keeps much better than a strong one. For this reason hydrocyanic acid is rarely used in Germany. Aqua laurocerasi is used instead of it. If you examine this preparation from time to time, you will find that the strength of it hardly varies at all. It seems to be a pretty constant preparation, but we should take care that we get the right thing. A great deal of aqua laurocerasi sold to us is made from essential oil of bitter almonds with magnesia in the manner so well known to us, therefore we should test this article in any circumstances; but in repeating the test from time to time you will find that the aqua laurocerasi changes very little indeed, the extent of the change being nothing as compared to those of the changes which take place in the stronger acid.

Mr. F. M. Rimmington (Bradford) : I have observed that the bottle itself is frequently the cause of the decomposition of the acid. If the glass contains an excess of alkali it is sure to destroy the acid in a short time. I have made it a practice to test the bottles before filling them. In this way I wash carefully with distilled water, put them to dry on a sand bath, or hot plate, in order to ascertain whether there is any portion of salt left on the side of the bottle. Or you may test them with test paper if more convenient to adopt that method. If they show any alkalinity it is sure to destroy the acid.

Mr. Williams : I should like to mention one thing with respect to the hydrocyanic acid, and that is the advisability of adding a mineral acid. For it is impossible that hydrocyanic can be kept when absolutely pure for any length of time. It is essential that a mineral acid should be added to the pure hydrocyanic acid. I have pointed this out on a former occasion to Dr. Redwood and other gentlemen who have to do with producing the British Pharmacopœia ; and I strongly urge that a quantity of hydrochloric acid, equal to the quantity of hydrocyanic acid present, should be ordered to be added, to preserve the hydrocyanic acid. I think you may safely add two per cent. of hydrochloric acid to two per cent. of hydrocyanic acid solution. In this way the acid can be preserved much longer than in any other way.

Professor Attfield : In reading the paper I noticed that Mr. Siebold quarrelled with an old favourite of mine, namely, the copper test for arsenic. It is so extremely convenient to use copper to get out arsenicum when organic matter is present, that one does not like to give it up because it is supposed to be a little less delicate than the others. I myself think that it is not inferior in delicacy to any of the tests, and that the reason why analysts sometimes fail with the test in endeavouring to detect very small quantities may be found in the fact that they use the ordinary test-tube in heating the strip of copper. Even in the hands of a student, I have found that if a fair piece of copper be heated for a considerable time with the acid liquid, and if, after boiling, washing, and drying, it be cut into strips and placed in a test-tube, narrow on the whole, but at the bottom of which there is a considerable sized globe or bulb, then the whole of the bulb heated in the flame, and the test-tube held almost horizontally the arsenic will crystallize in the narrow part of the tube in a pretty little ring.

Mr. Groves : I think the plan I practise is more simple than that. I put the copper into the bottom of one test-tube, and then drop another closely fitting tube into the first one, I then place a little water in the second one, and, upon heating it, the arsenious acid is deposited on the bottom of the cold tube in a beautiful bloom. I have succeeded in obtaining arsenic thus with the third of a drop of liquor arsenicalis B. P., and verifying it by the usual tests.

Mr. Siebold : I quite agree that the copper test is exceedingly handy, and, if carefully performed, very delicate ; but I am convinced in my own mind that, for the detection of very small traces of arsenic in so-called pure hydrochloric acid, it is inferior to the test I have mentioned. Traces of arsenic which escape observation by the most careful application of the copper test may be detected in the manner described, as may be seen by mixing impure HCl with ten or twenty times its volume of perfectly pure acid, and submitting this mixture to the two tests.

Mr. Siebold having been thanked for his communication, the Conference then adjourned for luncheon.

Upon re-assembling the first paper read was on

Alchemy, and Its Bearings on Pharmacy.

BY W. D. SAVAGE.

Dr. Johnson calls alchemy "the more sublime and occult part of chemistry, which proposes for its object the transmutation of metals and other important operations." Shakspeare, in 'Julius Cæsar,' alludes to alchemy ; and in 'King John' he says :—

> "To solemnize this day, the glorious sun
> Stays in his course, and plays the *alchemist ;*
> Turning, with splendour of his precious eye,
> The meagre cloddy earth to glittering gold."

Our friend Professor Attfield tells us at the time the name was given it had little more for its object than the transmutation of the baser metals into gold. Whatever may have been the original object, there can be no doubt, in the efforts used to ascertain the combination of the metals, that the experience thus acquired tended to promote the science of chemistry, which we are told by modern lexicographers, "Is the science which determines the constitution of bodies, and investigates the laws which regulate the combination and mutual action of their elements" ; let us then briefly consider some of the circumstances which have contributed to the building up our present pre-eminent position. Alchemy was not always followed by its professors with the purest motives ; it has been designated as "An art without art, originating in falsehood, and proceeding through labour to beggary" ; still we have much in the dark and mysterious gropings of the ancient philosophers to be grateful for, in aiding to develop practical chemistry.

The origin of alchemy is somewhat doubtful, for whilst some contend that it was known to the priests of the Egyptians, others again, with some reason, affirm that it was unknown till about the eleventh century, supporting their views by reference to Herodotus and Pliny, who they say were not likely to overlook so important a matter, if it had been known to the Egyptians. It would appear that the first Greek or Roman writer that refers to the subject is Suidas (in his Lexicon occurs *Chemia*, the conversion of silver and gold), but Dr. Thompson says that if the art of *making silver and gold* implies alchemy (or al-chemia), the chemistry of chemistries, it originated with the Arabians when they began to turn their attention to medicine. In the Book of Exodus, we are told that Moses caused the molten calf to be burnt in the fire, ground into powder, and strewed upon the water, and the Israelites made to swallow it ; if this was effected by chemical agency, we are not aware of the means ; it is not likely that they knew anything about the perchloride, but rather that a miracle was performed to impress the astonished multitude. We must, however, pass over much that is interesting, and come to consider *alchemy* as illustrated by the erratic Paracelsus, a native of Zurich, and born in 1493. His father was a physician, and instructed him in *alchemy*, *astrology*, and *medicine*. With a large amount of knowledge and experience he combined an inordinate amount of self-esteem. He is said to have been the first who ever held a Professorship of Chemistry in Europe, having been elected, in 1527, to the Professor's Chair at Basle ; but he was so conceited that he burnt with great solemnity the writings of Galen and Avicenna because they did not agree with his views, and it was no wonder that they did not, when he publicly declared that if God would not impart the secrets of physic, it was not only allowable, but even justifiable, to consult the devil. He was a dissipated wandering empiric, who professed to have a panacea which was capable of curing all diseases in an instant, and even of prolonging life to an indefinite length. Alas ! for the fallibility of human nature,—a few hours' illness terminated his life, when but forty-eight years old, at Salzburg, in Bavaria. Chemistry does not seem to owe so much to him as to the influence which he had on others. He did not scruple to denounce the schools and systems of others, whilst he had no well-arranged plan of his own. We are told that he adopted the *three elements*, of Basil Valentine, of *salt*, *sulphur*, and *mercury*. With respect to mercury, he was the first to administer it internally, and gained some celebrity by curing syphilis with it. About the same time (1540), a a physician of Paris (Antoine Lecoque) acquired con-

siderable reputation by curing the same complaint by the administration of gold, but in what form is not mentioned. It is curious to observe the union which existed betwixt the early chemist and the physician, and how often this combination forwarded the usefulness of both. However, this connection has not always been productive of good, for the early chemists were too much disposed to attribute the source of all disease to the presence of some hostile acid or alkali, or some deranged condition in the chemical composition of the fluid or solid parts; so they conceived all remedies must act by producing chemical changes in the body. On this hypothesis, a fever which raged at Leyden, in 1699, was treated by absorbents and testaceous medicines, to counteract the pernicious influence, as they thought, of some prevailing acid. The consequences proved most serious, as two-thirds of the population of the city found an untimely grave.

The Arabs seem to have been the great promoters of the school of poly-pharmacy. The '*Summa Perfectionis*' of Gebir, in the eighth century, the earliest work on chemistry, is said to be such a strange production that Dr. Johnson believes the word *gibberish* to be derived from the name of the author. These gropings in the dark, however, to discover the means of attaining perpetual youth and boundless wealth by the philosopher's stone, have not been unattended with advantage to science, although it seems a mystery, viewed in the light of modern knowledge, how two such opposite results could be obtained. The assimilation of gold by the precipitate from mercury, or, as it was termed, the "*Mercurius precipitatus per se*," was sufficient to impose on the credulous. This, I say, after all is not so wonderful, but the *perpetual youth* anticipated from the discovery is not so easily explained, unless indeed that wealth, being all-powerful, was used metaphorically to imply freedom from care and, as a sequence, longevity. Alchemists believed the metals were composed of sulphur and mercury, the differences in their properties resulting from the differences of the degrees of combination—gold, for instance, was formed of pure mercury, united with a small quantity of sulphur, also very pure; copper was formed of mercury and sulphur of almost equal proportions, and so on; but the sulphur and mercury, mentioned by the alchemists as performing such an important part in metallic combinations, were not always the common articles known by these names now. The *Mercurius* represents the metallic element, cause of ductility and brightness of metals, whilst *Sulphur* represents the combustible element, then known as "Phlogiston." The problem, therefore, was to change the proportion of the elements—acquired only by much experience and careful manipulation—so as to effect the respective changes, and as the mass of the people knew nothing of the simplest results of chemical combination, they were easily imposed on. An instance of this kind is related of one Bragadino (*alias* Count Manugnaro), who assured his dupes that by travelling much in the East he had become initiated into the secrets of alchemy; his public exhibitions *seemed* to justify his pretensions, and when his patrons failed to produce the same results it was their bungling,—for had he not *publicly* shown them *what* could be done? His secret was simply the employment of an amalgam of mercury and gold. His acquisition of wealth gave him a position which proved his downfall, for in 1590 he exhibited before the Court at Munich, when his cheat was detected, and he was hung. Previous to this he had gone about Germany with two immense black dogs, proclaiming that Satan himself was subservient to his power. Another class of empirics may be mentioned —those who secreted gold-dust in charcoal and disguised it by amalgamation with silver and other metals. Some few years ago we had analagous cases of imposition practised in London and many of the large towns, by pretending to extract payable quantities of gin from bread. In Brighton a large concern was started, expensive machinery erected, and the products of distillation carefully stored, but the yield of spirit was so little that it would not pay. It was generally believed that the experiments showing favourable results were effected by the fuel being first impregdnated *with spirit*. Scientific roguery was not confined to our ancestors—every day reveals some new scheme of modern alchemy, requiring neither the exhibition of the crucibles with false bottoms nor *golden coloured* metals to obtain dupes.

But recurring back to our history, Roger Bacon claims a prominent place as a philosophical alchemist. He was a native of Somerset, born in the year 1214. He became a Cordelier Friar,—pursued his studies as privately as possible; notwithstanding, he was accused of magic and suffered ten years' imprisonment. He is said to have written nine works on chemistry and alchemy, but the only printed one, Dr. Jebb states, was the 'Speculum Alchemiæ.' It is said that he invented gunpowder; this has been doubted. At any rate, his description of thunder and lightning—produced from a mixture of sulphur, nitre, and charcoal—would lead one to believe that its composition was known to him, and to a certain extent its effects; but he very judiciously says—you must know the method of mixing them! The next name suggested in the order of succession is Raymond Tully, a friend and scholar of Bacon's, born in Majorca in 1235. He it was who introduced those hieroglyphical figures or symbols which are so strangely, and, in most cases, inappropriately used to ornament the globes in our shop windows. Tully (according to Gmelin) was acquainted with carbonate of potash, for we are told he *distilled* cream of tartar, burnt the residue, and obtained a deliquescent salt. He was acquainted with nitric acid, which he produced from saltpetre and green vitriol. He mentions its power of dissolving mercury and other metals. His aqua regia was made by adding sal ammoniac, or common salt, to nitric acid, and he was aware of its power to dissolve gold. Spirit of wine was known to him as aqua vitæ ardens, and he knew how to make it stronger by using dry carbonate of potash, and that he could prepare vegetable tinctures from it; he also mentions alum from Rocca, marcasite (bismuth), white and red precipitate of mercury. He first obtained oil of rosemary from the plant by distillation. He made a lute with flour mixed with white of egg and spread on linen, and although the writings of Raymond Tully are mixed up with a good deal of jargon, yet in considering the progress of chemistry five centuries ago, much merit is due to the efforts of this wonderful man.

Arnoldus de Villa Nova, a native of a village of Provence, is said to be the author of a work entitled "Rosarium" intended as a complete work of alchemy of the time. Like most of those who preceded him he considered *mercury* was the constituent of metals. He professed a knowledge of the "philosopher's stone." Gold and gold water were in his opinion the most precious of medicines. He employed mercury in medicine, and prepared a mixture of oil of turpentine, oil of rosemary, and spirit which afterwards became famous as "Hungary water." His distillations were made in glazed earthen vessels with a glass top and helm.

In the middle ages alchemy became a favourite pursuit in many European countries. Edwards I. and III. were believers in it; indeed in the reign of the last-named monarch a proclamation was issued for the apprehension of two famous men who knew how to make silver by the art of alchemy, and who "may be profitable to us and our kingdom."

Basil Valentine, a Benedictine monk of Erford in Saxony, born in 1394, was a distinguished alchemist, and the first to suggest the method of preparing antimony, and his experiments with it on his brother monks resulted in his killing several and injuring others. The everlasting pill of the ancients consisted of *metallic* antimony, which, Dr. Paris says, being slightly soluble in the gastric juice, was supposed to exert the property of purging as often as it was swallowed. Strange theory! Just imagine *one* pill for the repeated use of a whole family for their

lives; can modern homœopathy boast of anything equal to this?

Valentine has the credit of discovering the volatile alkali and its preparation from sal ammoniac. He used the mineral acids as solvents and noticed the production of ether from alcohol. He is said to have given iron as a tonic, and a fixed alkali made from vine twigs cut in the beginning of March, for the cure of gout and gravel. He thought the metals were compounds of *salt*, *sulphur*, and *mercury*, and that the philosopher's stone was composed of the same ingredients; that a great similarity existed in the mode of purifying gold and curing the diseases of men, and that antimony answers best for both. He was acquainted with arsenic, knew many of its properties, and mentions a red compound which it forms with sulphur. Zinc and bismuth were known to him, and he was aware that manganese was employed to render glass colourless. Many of the preparations of mercury, such as the nitrate, bichloride, and red oxide were known to him. He also was acquainted with acetate of lead as saccharum saturni.

A subject of such vast importance, extending as it does over centuries, cannot possibly be compressed in the small space allotted to me. I must therefore content myself with a summary, applying in the best way I can its bearing on pharmacy, although its natural affinity is chemistry. In taking a retrospective view of Paracelsus and his doings, we cannot help observing a large amount of mysticism and error mixed with truth. For instance, he says the fundamental force of a thing is a *star*, and defines alchemy as the art of drawing out the *stars* of metals. According to Dr. Thompson he had two *laudanums*; one was red oxide of mercury and the other consisted of 1 oz. chloride of antimony, 1 oz. hepatic aloes, ½ oz. rose water, 3 oz. saffron, and ℥ ij ambergris, mixed together; and in one case it is related that three drops effected a cure, and in another, three pills killed the patient. As to what menstruum was used to make either of the above into drops we are left in ignorance. His elixir of life was said to be a solution of common salt. He had a strange conception that a power which he calls *archæus* (nature) presided over the chemical operations of the stomach, separating poisons from nutritive food. That *tartar* is the principle of all the maladies proceeding from a thickening of the humours, the rigidity of the solids or the accumulation of earthy matter, so that medical men are enjoined to discover the *tartar* before they try to explain the affections. As *tartar* is deposited at the bottom of the wine cask, so in the living body is it deposited on the teeth. When we employ vegetable substances for the cure of diseases we are to consider their harmony with the constellations. The doctrine of signatures, as it was called, supplied another means of knowing how far the nature of the disease was indicated by colour of the remedy—thus, saffron and turmeric were good for jaundice, and in the animal kingdom the lizard is said to have the colour of malignant ulcers and carbuncles, and therefore a suitable remedy. Polygonum persicaria (dead or spotted arsmart) was an infallible remedy against all the effects of magic. However, with all his strange conceptions, Paracelsus was a great reformer, and representing *chemistry* as he did, an indispensable art in the preparation of medicines, he effected great good by getting rid of the objectionable, and in many cases, disgusting decoctions and syrups, by substituting *tinctures*, *essences*, and extracts, and it is said that he was the first to introduce *tin* as a remedy for worms; mercury, arsenic, zinc, and bismuth were known and used by him, and as sulphate of potash is called by Oswald Crollins, of Hesse, *specificum purgans paracelsi*, we may infer that he was in the habit of using it.

Crollius added some valuable remedies. The binoxide of mercury he calls *arcanium corallinum*; the chloride of silver was *Luna Cornea*, and calomel he called *Mercurius dulcis*. Passing over many names more or less important in the history of alchemy, we must not omit, however, altogether *John Baptist Van Helmont*, a physician and chemist of Brussels, who was distinguished by alternately adopting and rejecting the art of magic, as practised by the Jesuits, the doctrine of the Stoics, the sacred books of mysticism, etc. An accident, we are told, induced him to devote his attention to the practice of medicine, and its reformation. Happening to take up the glove of a young lady who was suffering from the disease, he caught the *itch*, and the Galenists whom he consulted, according to their usual practice, assigned the cause as combustion of bile and the saline state of the phlegm, and after reducing him to great weakness by a course of purgatives, without effecting a cure, he determined to study medicine for himself, and he took the degree of M.D. (1599), travelled through France and Italy, and we are told performed many cures by the way. It is foreign to our purpose to follow him in all his curious proceedings. He tells us the *Archæus* of Paracelsus draws all the corpuscles of matter to the aid of fermentation, that *water* is the true principle of everything which exists; and he illustrates this by drying 200 lbs. of earth and planting in it a willow weighing 5 lbs. The earth and plant were kept moist with rain-water, and at the end of five years, notwithstanding the earthen pot in which the willow was planted was covered with a perforated tin plate to keep out the decayed leaves of autumn, the willow weighed 169 lbs. 3 oz. The earth having been again dried, was found to have lost but 2 oz. of its original weight, so that 164 lbs. of wood, bark, and root was produced from water alone (air?) But we must pass over much that is interesting, and briefly refer to some of the things more immediately connected with ourselves. Van Helmont knew the properties of carbonic acid gas under the name of *gas sylvestre*. Sal ammoniac, he says, may be distilled alone, and so may aqua fortis, but if mixed together so much *gas sylvestre* escapes as to burst the vessels, unless it has a means of escape. He was evidently aware of the evolution of gas in mixing the solution of carbonates and metals in acid, but he was unable, as we are, to collect and distinguish the kind of gas. It is said that he swallowed some henbane; that in two hours he had the most disagreeable sensation in his stomach, and having no longer the free use of his mental faculties, he believed the seat of the understanding to be in the stomach, of volition in the heart, and of memory in the brain. He seems to have known the gastric juice, which he calls an acid liquor for dissolving the food, but under the mysterious influence of the Archæus. The *tartar* so vaguely described by Paracelsus is much more clearly defined by Van Helmont, who says it is a crystallized salt, but he retains his belief in the mythical *Archæus*, when he says mercurials, antimonials, opium, and wine are agreeable to it in a state of delirium from fever. His mercurius diaphoreticus is supposed to have been calomel; his *golden sulphur* would appear to be sulphurated antimony; and his antimonium diaphoreticum seems analogous to our P. Antimonalis, but not so pure. Opium he used as a *fortifying* and *calming* medicine. Whatever that may mean (seeing that he considered it to contain an acid salt and a bitter oil) may be guessed rather than defined.

I might enumerate many other distinguished names who have contributed more or less to the alchemists' creed, but enough has been said to connect the ancient professor of alchemy with the modern chemist, and the efforts of both to promote pharmacy; and whatever may have been the motives of those who early practised the art, much valuable information has been elicited. We may smile at their processes. Perhaps our successors may smile at our *allotropic* and *molecular* theories. One thing is quite certain, that we are not behind the alchemists in our efforts to *procure gold*; indeed we go far beyond them, for we try to convert not simply the inferior metals, but *everything* into gold. We may wonder at men being foolish enough *to pay* for a knowledge of a secret which, did the owners possess, would render future efforts unnecessary. Are we much wiser in this age of enlightenment? Does not the promised 50 per cent. of the underground never-ending calling up capital of the Borough Mining Company

suggest something like it? But I will conclude with one of Æsop's fables. A certain man bequeathed to his sons a treasure which was buried in his vineyard. They dug and dug, but no treasure could they find. There was, however, a treasure in store, for the future crops revealed the wisdom of their father; and it is just this that the alchemists did for us.

Mr. GROVES: Having devoted my attention in some degree to archæology I have not forgotten to study the archæology of chemistry, and I have consequently read many of the ancient chemical works to which Mr. Savage has referred in the course of his paper. In one, of which Glauber was the author, it is asserted that there is an intimate connection between the metals and the stars, and now we have some reason to believe that the metallic veins in the earth were produced probably by electrical currents, and that those currents were induced by the action of the stars and chiefly by that of our great star the sun. It just occurs to me to suggest that the gold of the golden calf which Moses caused to be burnt and ground to powder, referred to by Mr. Savage, must have been Mosaic gold!!

Mr. HAMPSON: The alchemists used saffron. We use that article also, but I think it might be usefully expunged from our pharmacopœia as a relic of alchemy.

A vote of thanks to Mr. Savage for his paper was passed.

(To be continued.)

Parliamentary and Law Proceedings.

ADULTERATION OF MILK.

At the Glasgow Central Police Court on September 30th, Alexandri Russeli was charged with having sold a quantity of milk, the same having been mixed with water. After evidence had been taken as to the purchase—

Dr. Thorpe, Professor of Chemistry in Anderson's University and City Analyst, deposed: I remember a sample of milk being brought to me by the sanitary inspector and the preceding witnesses on 9th September. I took a portion of the milk and analysed it, and on the 12th ult. gave the following certificate:—"Found that the sweet milk which I received on the 9th of this month was mixed with water to the extent of 10·6 per cent. The cream was only 5·6 per cent." I thought a portion of the cream must have been removed, it was so low. I have seen a poorer sample of milk. The water had been added after it came from the cow. I have the means of ascertaining that by determining the soluble matter the milk contains.

Cross-examined by Mr. Lang: Could you, by any analysis whatever, tell when the water had been put into the milk?—No. Supposing that the milk comes from the Mearns, passes into the hands of the wholesale dealers in Glasgow, then into the hands of retail dealers, and you find water mixed with the milk in the hands of the retail dealers, can you tell whether the water was put in in the Mearns, at the wholesale dealers', or at the retail dealers'?—No. I am not aware of any possibility of telling. Milks vary a little as they come from cows. The component parts of milk are fats, sugar, salts, and water. The water in different samples of milk varies. I determine the addition of water in two ways; in the first place, from the specific gravity of the milk, and in the next from the total solid matter which it contains. Average milk contains about 12½ per cent. of solid matter. It is never less than 11½ per cent., and very seldom less than 12. In this particular quantity of milk I found the total solid matter was 10·4 per cent. The average amount of cream in Glasgow milk is about 8½ per cent. I have determined this point by examination of upwards of 200 samples of the milk sold in Glasgow, collected by myself and my assistants. This particular sample of milk had 5·6 per cent. of cream. By the two methods I make out that the added water is 10·6 per cent. I examined a sample of milk handed to me by Mr. Cossar on the 29th September, and gave him a report to the effect that the specific gravity was 1032 before creaming, and 1033 after creaming; that the cream was 6¼ per cent.; that the total amount of fat and cheese-forming matter, sugar, and salts was 11·92 per cent. Then I say:—"These results appear to show that this milk is free from any sensible amount of added water—that skimmed milk is present, but in inconsiderable quantity." The specific gravity of defendant's milk was 1030 before the creaming, after creaming 1031. The amount of cream was 5·6 per cent., and the amount of solid matter 10·4. There are various modes of testing milk. One method extensively used, especially in France, consists in determining the opalescence of the milk—that is to say, one looks through a disc of milk and determines how far one can push a tube containing milk before the object becomes opaque. Of course one can see further through thin milk than through thick. Another test consists in a full analysis of the milk, determining it into its several constituents. In this case I did not have a full analysis, nor did I determine the opalescence.

The Procurator-Fiscal: Would a full analysis of the milk have given you any other result, so far as the presence of water is concerned?—No. The French method is seldom used, because its results are not considered reliable.

The evidence for the prosecution having been closed, an application was made on behalf of the defendant that the remainder of the milk should be placed in the hands of another chemist for analysis, and after some discussion it was agreed that it should be sent to Dr. Thomas Anderson, Professor of Chemistry in the University of Glasgow. An application was then made on behalf of Dr. Thorpe that a portion of the milk should be obtained from Dr. Anderson on the seal being broken, that it might be placed in the hands of another chemist for analysis. This gave rise to a long wrangle. On the one hand, it was contended that the case for the prosecution being closed, it would not be allowable for the procurator-fiscal to produce additional evidence, and that therefore there would be no utility in the third analysis to check Professor Anderson. On the other hand, it was urged that as no objection was raised as to Dr. Thorpe's analysis while the evidence was being given, the defendant was not entitled to a fresh analysis, or if this were granted, that the prosecution was entitled to offer rebutting evidence in the event of Professor Anderson's report being contradictory to Dr. Thorpe's. To this latter view the presiding baillie appeared to incline, but there does not seem to have been any definite order made other than that the sample of milk preserved should be sent to Dr. Anderson for analysis. The case was adjourned to the 14th inst.

Two other similar cases were heard, in each of which there was a conviction, and the mitigated penalty of 10*s.* was imposed.—*From the Glasgow Herald.*

POISONING BY CREOSOTE.

On Thursday, October 2nd, an inquest was held at the General Hospital, Belfast, before Dr. Dill, Borough Coroner, on the body of a child named Hugh M'Neill, who was poisoned by drinking a quantity of creosote on the 28th September last.

Rose M'Lean deposed that deceased was about three years old, and on the day above stated was heard screaming, and was found in bed with a bottle in his hand which had recently contained creosote. Some water was applied to the child's lips and throat, which were severely burned by the creosote, and he was immediately removed to the General Hospital. The creosote was used by a man who lodged in the house who suffered from toothache. The bottle was produced, and bore no label.

James M'Lean said he found a label under the bed, and on it was printed "Creosote; from Moorhead and Company, 202 and 204, North Street," "Poison" not marked on the label.

The jurors at this stage of the proceedings were desirous of seeing the Act of Parliament regulating the sale of medicines, drugs, poisons, etc.

It was found that creosote was not included in the list of poisons specified in the Act 33 and 34 Vic., cap. 26, section 1.

The evidence of the house-surgeon went to prove that the child was admitted into the hospital on the 28th of September last, labouring under symptoms of irritant poison, his lips, mouth, and throat being badly burned, and died from its effects four days afterwards, and that the said poison was creosote. The child had taken a large quantity, and his suffering was intense.

The jury returned the following verdict :—"That the said Hugh M'Neill, in the General Hospital, in the Borough of Belfast, on the 2nd day of October, 1873, came to his death by accidentally imbibing a quantity of creosote, which was incautiously laid in his way, on the 28th September, 1873 ; and the jurors do further say that it would be highly advisable (having regard to the medical evidence disclosed at this inquest) that owing to the frequency in which creosote was used by the general public it should in future be labelled 'Poison,' and that means should be used to have it placed on the list of poisons included in the Act of Parliament, 33 and 34 Vic., cap. 26, section 1 ; and the jurors do further wish to urge upon the press the necessity of making known to the public the facts as unfolded at this inquiry—viz., that creosote is an irritant poison, and should be used with extreme caution." —*The Belfast Northern Whig.*

Obituary.

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

On the 18th August, Mr. Morgan Jones, Chemist and Druggist, of Swansea.

———

On the 3rd October, 1873, Mr. Richard Finden Jones, Chemist and Druggist, of High Street, Oxford.

Notes and Queries.

[362.] COCHINEAL COLOURING.—In reply to E. Nicholson, I beg to say that if the following be carefully manipulated with the best and pure articles, it is excellent :

Take of	Cochineal (the best quality),	
	Salts Tartar,	
	Cream Tartar,	
	Alum	āā 1 oz.
	Distilled Water. . . .	8 oz.
	White Sugar.	4 oz.

Boil the cochineal (powdered) and salts tartar in the water in a large vessel ; then add the cream tartar and alum (powdered fine) and strain through muslin. Afterwards filter and make up to 8 oz. Add the sugar, and dissolve by means of gentle heat. Some use S.V.R. (℥ ss. to ℥ j) instead of sugar, but I much prefer sugar.—J. B.

The following journals have been received :—The 'British Medical Journal,' Oct. 11 ; the 'Medical Times and Gazette,' Oct. 11 ; the 'Lancet,' Oct. 11 ; the 'London Medical Record,' Oct. 11 ; 'Medical Press and Circular,' Oct. 11 ; 'Nature,' Oct. 11 ; 'Chemical News,' Oct. 11 ; 'Gardeners' Chronicle,' Oct. 11 ; the 'Grocer,' Oct. 11 ; 'Journal of the Society of Arts,' Oct. 11 ; 'Grocery News,' Oct. 11 ; 'Produce Markets Review,' Oct. 11 ; 'British Journal of Dental Science,' for October ; 'Journal de Pharmacie et de Chemie,' for October ; 'Moniteur Scientifique-Quesneville,' for October ; 'Scientific American,' Oct. 11 : 'L'Union Pharmaceutique,' for September ; 'Repertoire de Pharmacie.' Oct. 10 ; 'Practitioner,' for October ; 'Journal of Applied Science,' for October ; 'Educational Times,' for October ; 'Zeitschrift des allg. österreich. Apotheker-Vereins,' Sept. 20 ; 'The Planters' Gazette and Commercial News.'

Correspondence.

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

The Preliminary and Prize Examinations of the Pharmaceutical Society.

Sir,—It is with considerable regret that I find the mode of conducting some of the examinations of our Society (notably the Preliminary and sundry prize examinations) has been made a subject of discussion at the Council table. Had it rested there I should have consulted some of my late colleagues in preference to stating my views through the medium of the Journal, but seeing that some members of the Pharmaceutical Conference have, as it were, made stock of the question, and publicly opened the case, any reticence upon my part is not required ; as an ex-member of the Board of Examiners my experience may be worth something, and being unattached I may write if possible with more than my usual independence. Without any desire to find fault with individual opinions, I may be permitted to state what I believe to be just and desirable. There are three definite opinions which have been expressed as to the future of these examinations—1st. That they should be conducted in London or Edinburgh ; 2nd. That the Preliminary should be turned over to almost any legally qualified examining board rather than our own ; 3rd. That they should still be conducted by ourselves. To this last opinion, as I have ever done, I still adhere. I will in the first place endeavour to show that my opinion is in accordance with the Charter and Act, and then having stated the principal objections of those who are of a contrary opinion, will attempt to refute them. I believe that in accordance with the intention and spirit of the Charter and Act it is the duty of the Society to examine all who present themselves, or perhaps in plainer terms, that candidates can demand to be examined by the examiners appointed by the Society and not to be sent about to other institutions—see line 205 etc., of the Charter of Incorporation, clause viii. of the Pharmacy Act, 1862, and clause vi. of the Act, 1868. Thus much for what I deem to have been originally the spirit and intention of the law. It is also clear that the Council of the Society can alter any bye-law for the appointment of Professors or others as examiners, and may make such regulations as to time or place or otherwise as may be considered convenient or desirable. Now this convenience applies as well to the examinee as the examiner. When the examinations were voluntary every reasonable facility was afforded the candidates. Why not so now? The candidates for the Preliminary have the option (let it remain optional) of passing (in lieu of our own) the Local Examinations of the Universities of Oxford, Cambridge or Durham, the examinations of the College of Preceptors, or those of any legally constituted examining body previously approved by the Council, *provided Latin and Arithmetic be included in the subjects.* Still the candidates prefer coming to their own in spite of the large percentage of failures and the sometimes assertion that the examination is too stiff (occasionally that it is not stiff enough). The reasons advanced by those who desire a change are—1st. That the Preliminary would be better performed by a scholastic examining board. 2nd. That sufficient attention has not been given by those appointed to superintend the writing of the answers. 3rd. That the candidates assist each other. To the first I simply say, knowing how much or how little is required, if, out of the twelve or fourteen gentlemen constituting the Board of Examiners, some cannot be found conscientiously and satistactorily to perform that duty, I weep. To the second I do not, and I never did, believe in the wilful negligence of the Local Secretaries. Occasionally an unavoidable irregularity has occurred, but it has been stated somewhat in extenuation that the printed regulations for the guidance of the superintendent have not been always enclosed with the questions. Here, then, are two possible sources of error which are easily remedied, and do not prove the system bad ; it is only irregularity on the part of those entrusted with certain duties. It cannot be expected that the members of the Board of Examiners will undertake to see mere office work done, whether in Bloomsbury Square or elsewhere, and is it to be supposed that such irregularities never happen to other examining

boards of even longer standing? As I stated at the annual meeting, the remedy for such would be to arrange for the writing of answers to take place at different large towns throughout the country, the most convenient for candidates from the smaller places to attend. Besides the Local Secretary, let one other gentleman be appointed, so that in the event of one being unable to superintend, the other might still be available. If necessary, hire a room for the occasion, and if required, pay the superintendent. Like other things which have been said and written, I cannot bring myself to credit that gentlemen are not to be found willing and able to devote three or four hours once in three months for the benefit of their Society and the convenience of the rising generation of pharmacists. Do any think this a hardship? If so, let them remember how many days, and sometimes a portion of the night, Members of Council and others devote to the service of the Society, and for honour and conscience' sake as their recompense. For the third reason, that candidates assist each other, the little knowledge I possess of human nature, as exhibited at competitive examinations for prizes, forbids my acquiescence upon such occasions to the statement made. At the Preliminary such might be attempted, but I think the percentage of failures is sufficient to prove that little comes of it beyond the blind leading the blind. That a great similarity in the words employed and the answers given by candidates in the same town should tend to the opinion that they had copied from each other is reasonable, but I have generally yielded to the more charitable construction, that they have been coached by the same person. It would be decidedly hard upon the present race of pupils or students to compel all to come to London or Edinburgh, or to send them to pass the Preliminary at particular Local Examinations only. Some of my fellow-workers seem to ignore one grave and serious fact, that dispensing chemists, and those intending to become such, are not as a rule rich men, and that every extra expense is a pull, often borne with patience, but not lovingly. It is possible to expect too much education, and to carry it to such an extent as to extinguish the really useful assistant. Judging from a mercantile or trading point of view, I have known the trade for many years, and I see a scarcity of good useful assistants, and those who were co-assistants with myself know it but with increased expenditure and a large diminution of profit. But to return to the Preliminary, there is yet another point from which it may be viewed. A fee of five guineas, as the matter now stands, covers the Preliminary and the Minor. By sending the candidates away from the Society the trouble and the expense of the Preliminary would be removed from the Society and transferred to the candidate. The gentlemen who form the Council cannot, I am confident, have considered the question from this aspect, and I sincerely hope that no Council of a wealthy Society like the Pharmaceutical will ever sanction such a step.

In concluding my remarks, let me add that I have neither seen nor heard sufficient reason for accusing ourselves and the continued thirst for changing our arrangements. A misty dream, picturing the Council applying to the Local Government Board or the Committee of Council on Education, has once or twice disturbed my peaceful repose. May it never be realized, at least in my day!

A. F. Haselden.

18, *Conduit Street*, 13*th Oct.*, 1873.

The Alleged Dispensing Misdemeanour.

Sir,—Relative to the late case of wrongly dispensing a prescription, concerning which a letter appeared in your last week's number, followed by an editorial postscript to the effect that you had in vain endeavoured to find out particulars, I feel constrained to write to you as a matter of public duty, and also to make an explanation.

Having no desire to make a police court subservient to my own publicity, I, in asking for a summons, simply handed my card to the magistrate. As little did I wish to indicate unnecessarily the name of the dispenser who so grossly violated his duty.

This reticence has been misinterpreted. On the one hand a morning newspaper has called me, in a leading article, "the occult" medical gentleman. On the other, a number of conscientious dispensers are pressing on me the need of exculpating them.

Allow me to state that if the Editor of the *Telegraph* had (as was only just to have done) published a letter of full explanation, in reply to his leader, all would have been cleared up. In that letter explanation was made that my practice is wholly conducted by way of prescriptions dispensed at chemists and druggists, hence I could not, and did not, state "that chemists and druggists were in the habit," etc. What I said was that *certain* chemists and druggists were in the habit of substituting one ingredient for another, or leaving it out wholly, when the thing prescribed was a little expensive or a little out of the way.

My prescription was as follows *verbatim et literatim* :—

℞ Syr. papav. alb. . . ℥ ij.
Calcis sulphitis . . gr. xx.
Pulv. tragac. co. . . gr. xv.

Aq. anethi ad ℥ iss. M. ft. mist. quarum capt. coch. min. j post singulas sedes liquidas, vel omnis 2^{s} horis.

The sulphite of lime had been wholly omitted, and lime water substituted—lime water to a child, very delicate, æt. 8 mo., and voiding blood! My little patient is dead. She had been attended by the delinquent for a fortnight anterior to my being called in. What he might have administered I do not know, but I do know he had scarified her gums most cruelly. *I* would not have done it at all.

Permit me to add that this occurrence will originate a civil action against Mr. ——, and, to subscribe myself

Your obedient Servant,

J. Scoffern, M.B., Lond.,

Formerly Professor of Forensic Medicine and Chemistry at the Aldersgate College of Medicine.

Upper Westbourne Park, October 5.

Remuneration of Chemists.

Sir,—A few days ago the following prescription was left here to be dispensed :—

℞

Chloroform		℥ v.
Ti. Opii		ss.
Ol. Olivæ		ij.
Lin. Saponis	ad	℥ ij.

M. ft. Lin.

The price charged was 1*s.* 3*d.*, which we at the time considered low; you may feel assured that when the gentleman called for it we were somewhat surprised when he informed us that he could get it made up for 1*s.* by a house of position and repute not many miles from Oxford Circus. We are of course aware that they have co-operative societies, medical halls, etc., to compete with; but still at the same time I think we ought to be fairly remunerated for our labours, as they entail more than any other class of tradesmen—care, expense, and trouble—and, in order to show our independency and dislike against such a degrading system of cheapness, our prices should be accordingly. There is no doubt but what they do us great harm in sundry articles, such as patent medicines, etc. It therefore behoves our Society, in order not to deprive poor chemists of their legitimate trade, to keep a sharp look out, and try to put down as much as lies in their power all that which interferes with the chemist's welfare.

Sensitive.

520, *Oxford Street, London, Oct. 7th*, 1873.

"Cappa" and "An Inquirer."—The preliminary portion of the operation should be conducted at the ordinary temperature of the atmosphere.

M.P.S.—A table of official tests for impurities in preparations of the British Pharmacopœia will be found in the Appendix to Attfield's 'Manual of Chemistry.'

J.H.—The following is Fehling's formula for preparing the cupric solution, as given in his paper on the "Determination of Sugar by Sulphate of Copper" (see Pharm. Journ., 1st series, vol. ix., p. 419):—"40 grams of pure crystallized sulphate of copper are dissolved in about 160 grams of water, and this solution is gradually added to a solution of 160 grams of neutral tartrate of potash dissolved in a small quantity of water, mixed with from 600 to 700 grams of caustic soda lye of 1·12 specific weight; I then dilute the whole to 1154 4 cubic centimetres at 15° C."

Communications, Letters, etc., have been received from Messrs. Lasham, Provost, Abraham, Tuson, "One who has Known the Drug Trade more than Thirty Years," C. S.

GLYCERATE OF SUCRATE OF LIME AND ITS EMPLOYMENT IN THE PREPARATION OF CHALK LINIMENT.*

BY M. LATOUR.

A recent explosion at Mont Valérien, the victims of which were treated in the military hospital of Saint-Martin, where the author is pharmacien principal, gave him an opportunity on a large scale of profiting by a rapid method of preparing an oleo-calcareous liniment, which he has practised for some time with satisfactory results. It is specially when it is necessary to prepare such a compound quickly and in considerable quantities that he considers the process presents real advantages. The new ingredients also that he introduces give to the compound special qualities, which he thinks would render it suitable for employment in a great number of cases,—such as severe burns, erythema, erysipelas, variolic eruptions, chilblains, etc.—where the skin is the seat of more or less inflammatory symptoms.

At first, M. Latour employed the solution of sucrate of lime ; but in order to avoid the formation of carbonate of lime through the absorption of carbonic acid from the air, he tried the addition of glycerine. This led him to study the solubility of sucrate of lime in glycerine, and finally to construct a formula representing nearly the limit of this solubility and furnishing a dense product of constant composition, to which he has given the name of saturated glycerate of sucrate of lime. This, in a certain state of dilution, he uses to prepare his new chalk liniment.

Solubility of Sucrate of Lime in Glycerine.—Sucrate of lime is very soluble in glycerine and the addition of water and heat hastens the solution. The temperature may be raised to the boiling point without fear of the coagulation of the monobasic sucrate of lime, which is prevented by the glycerine. The following two experiments had for their object to compare the solubility of sucrate of lime in water and in glycerine, separately :—

(*a.*) Fifty grams of dry sucrate of lime, in fine powder, were treated with 100 grams of distilled water, at from 75° to 80° C., the liquor filtered, and the proportion of lime determined by an alkalimetric operation. Ten grams of the solution gave 0·4958 gram of lime corresponding to 3·646 grams of sucrate of lime. The solution was coagulated by heat.

(*b.*) One hundred grams of dry sucrate of lime, in fine powder, were treated with a mixture of equal parts of water and glycerine (100 grams of each), at a temperature of 75° C., and the liquor filtered. The filtration was slow. An alkalimetric estimation showed that 10 grams of liquor contained 0·5161 gram of lime, corresponding to 3·756 grams of dry sucrate of lime. In this case heat did not cause the monobasic sucrate of lime to coagulate.

In comparing these results it must be admitted that the solubility of sucrate of lime is nearly equal in water and in glycerine. The slight difference is due to a peculiarity that is worth mentioning. During the evaporation of the sucrate of lime to obtain that compound in a dry state there is formed a small quantity of carbonate of lime. If the sucrate be treated with water traces only of the carbonate formed go into solution, whilst in the mixture of water and glycerine the whole is dissolved. In fact, if a few drops of hydrochloric acid be added to each of such solutions there is a notable disengagement of carbonic acid from the glycerate, but only a very feeble one from the aqueous solution. This would explain the slight difference in the two experiments.

Saturated Glycerate of Sucrate of Lime.—Without having recourse to the use of dry sucrate of lime, and in order to shorten the operation, a nearly saturated solution of sucrate of lime may be obtained by adopting the following formula :—

Slacked Lime	200 grams.
Powdered Sugar	400 „
Water	2 kilograms.
Glycerine	400 grams.

Mix the sugar and lime thoroughly in a mortar ; add the water in small portions, so as to obtain a clear pulp without lumps. Put the mixture into a stoppered flask. After contact for twenty-four hours, filter, and add the glycerine to the solution, then evaporate until it is reduced to one litre. It is essential not to add the glycerine until after the filtration of the solution of sucrate of lime, or the filtration will be retarded.

The glycerate of sucrate of lime thus prepared has a density of 1·280 at 15° C. It is not coagulated by boiling ; but coagulation takes place if it be diluted with four times its volume of water. It contains, by volume, in 100 cubic centigrams, 7·716 grams of lime, corresponding to 56·55 grams of dry sucrate of lime ; by weight in 100 grams, 6·720 grams of lime, corresponding to 49·42 grams of dry sucrate.

Applied to the skin, this glycerate of sucrate of lime forms a kind of varnish, which under the influence of transpiration is detached in the form of lumps ; upon inflamed surfaces it produces a feeling of coolness and comfort. More decided drying qualities may be imparted to it by dissolving in it, with heat, about 3 per cent. of gelatine.

Dilute Glycerate of Sucrate of Lime.—Preparation of Chalk Liniment.—For the preparation of chalk liniment with the glycerate of sucrate of lime it is preferable to use a dilute solution, such as exists before the mixture is concentrated, as directed in a preceding paragraph. It then has a density of 1·144 at 15° C., and contains, by volume, in 100 cubic centigrams, 3·512 grams of lime, corresponding to 26·05 grams of dry sucrate of lime ; by weight, in 100 grams, 3·289 grams of lime, corresponding to 24·19 grams of dry sucrate.

The formula for the liniment of the glycerate of sucrate of lime is as follows :—

Ground Nut Oil	200 grams.
Dilute Glycerate of Sucrate of Lime.	100 „

Mix in a vessel having a large mouth.

By substituting oil of sweet almonds, a mixture is obtained that is a little less solid. In certain cases, where it is desired to combat the odour which is given off from the profuse suppuration of severe and extensive burns, the simple oil may be replaced by camphorated oil.

Dr. Lagarde, who used this preparation in the treatment of the soldiers injured in the before-mentioned explosion, reports that it fulfils the principal requisites sought for in application to burns ; that it efficaciously protects the injured surface from contact with the air, does not adhere to the wound, diminishes the pain, modifies the suppuration, and hastens and controls the cicatrization. It is easily used, and may be renewed without causing pain to the patient. Dr. Muller has also used the liniment in the same hospital, in cases of erysipelas of the face.

* *Répertoire de Pharmacie* [N.S.], vol. i, p. 557.

NOTE ON LIATRIS ODORATISSIMA.

BY JOHN R. JACKSON, A.L.S.,

Curator of the Kew Museums.

Under the name of wild vanilla the leaves of *Liatris odoratissima*, Willd., are sometimes used in North America as a substitute for true vanilla. The plant belongs to the Compositæ and grows to a height of three or four feet with an erect annual stem, terminated by a corymb of beautiful purple flowers; the odour of the leaves is very perceptible when bruised, and this odour has been referred to the presence of the principle coumarin. It is said that many of the flavouring fruit essences, perfumes, etc., are produced in America from the leaves of this plant, and they have also been occasionally employed to give a pleasant fragrance to tobacco and cigars. This application has been largely extended of late, and the leaves are brought to market in small bales. They are mostly selected from the lower part of the plant, and are about six inches long by three broad. The smaller and less perfect leaves are used for fillers of cigars, while the large and sound ones are used for wrappers.

The plant is said to be very abundant in Florida, and it has been suggested that if it were submitted to cultivation and the stalk cut back so as to induce the development of large leaves it might be improved in quality and value. The flavour that these leaves impart to tobacco is approved of by many persons and it has the advantage of having no deleterious properties. Another use to which the leaves are put is for the purpose of protecting woollen cloths from the attacks of moths. Other species of *Liatris*, such as *L. scariosa*, *L. squarrosa*, and *L. spicata* are considered to have medicinal properties; the former is employed in making a gargle for sore throats, also in gonorrhœa, and it has a reputation for the cure of snake bites. The root of *L. squarrosa* is acrid and pungent, and yields a balsamic substance in alcohol. *L. spicata* is called button snakeroot and has some reputation as a stimulant, diuretic and expectorant. It is used in the form of a tincture or decoction made from the root.

THE OLEO-RESIN OF THE SUNFLOWER.

(*Helianthus annuus.*)*

BY M. CHARDON.

Among the known oleo-resins, the turpentines, properly so called, appear to form a group specially characteristic of some genera of Coniferæ. It is easy, however, to connect with them a product yielded by the flower of a plant far removed from the conifers, namely, the *Helianthus annuus*, so well known under the name of the sunflower. Whether this product is peculiar to the plant grown in Algeria, where the author has observed it, or whether it is developed in the plant when grown in any other climate, he is unable yet to determine, but in all those which he has found in Algiers and its neighbourhood he has been able to verify the following facts.

As soon as the capitulum of the sunflower is laid bare by the opening of the foliaceous involucre, before even the florets have given to the flower all its splendour by their expansion, transparent and colourless drops appear on the extremities of the projecting paleæ or bracts. These are more abundant in proportion as the growth of the stalk is more vigorous, which excludes the idea of their origin in a diseased state of the plant. In proportion as the florets expand the production seems to disappear.

This substance has been collected, and, upon examination, presented the following characters:—Its consistence was semi-liquid and pitchy; its odour much resembled that of the product of *Pinus maritima*, with which it might easily be confounded. Although that which was collected contained animal and vegetable *débris*, it was perfectly transparent. Its burning and aromatic taste was persistent because of its insolubility, and was not at all sweet. It did not reduce Fehling's liquor when heated with it, and when exposed to the air in a thin layer it dried on the surface, and ceased to adhere to the fingers after two or three days. Heated carefully by itself, it gave off an essential oil, its odour was increased, and the residue was a hard matter, brittle when cold, which could be compared better to nothing than to colophony. In boiling water also it hardened and left a white opaque resin. Its solubility in alcohol was complete.

It would be certainly interesting to know more of this substance, but the small quantity collected would not enable the author to carry his investigation further. The observations were made upon a score of plants, some of which, from want of water, were sickly and yielded nothing to the collection, although the production of the substance in them was quite visible.

* Read before the Société d'Emulation pour les Sciences Pharmaceutiques (*Répertoire de Pharmacie* [N.S.], vol, i., p. 537).

THE ESTIMATION OF PHOSPHORUS IN FATTY MIXTURES.*

In order to separate phosphorus from articles of food, vomits, and other matters containing fatty substances, in such a state of purity that it may be unfailingly recognized by characteristic properties, and produced in court as evidence, D. A. von Bastelaer gives a process already found of advantage in several judicial inquiries, which is based essentially on the solubility of phosphorus in ether, and its almost perfect indifference towards solution of ammonia if in contact with it for only a short time. If the substance from which phosphorus is to be separated is not fluid, *e. g.*, phosphor paste, it is first reduced by addition of water to the condition of a sufficiently thin pap, in order that it may be thoroughly mixed with ether by agitating for some seconds. Not only the weight of the original substance taken, but also that of the added water is noted. After the reduction, about 100 grams, or any other suitable weighed quantity of the fluid mass is taken, mixed with as much ether, and left in contact therewith in the cold for four or five hours, during which period the mixture is to be violently shaken at frequent intervals. The ether being now decanted, is replaced with an equal quantity of fresh ether, and these operations are repeated about three times. The united ethereal liquids, protected from dust, are allowed to evaporate spontaneously at 15°-20°C in a shallow dish. At this point some water is added, that the phosphorus may be protected from the action of the air after evaporation of the ether. If what remains after removal of the ether be gently warmed to 50°-60°C, the phosphorus unites itself with a portion of the fat, forming a fluid globular mass under the water, whilst the remainder of the matter taken up by ether rises to the surface as a thin film. The globule containing phosphorus is now treated with about 10 to 15 grams of strong aqueous ammonia in a small flask and violently agitated. This treatment is repeated a few times. Lastly, if the adhering ammonia be removed by washing first with water acidulated with sulphuric acid, and then with pure water, the phosphorus remains behind, certainly somewhat soft in consistence, but otherwise exhibiting all the physical and chemical properties which characterize it. It may be brought in a little glass tube and handed to the judge as *corpus delicti*.

* *N. Jahr. f. Pharm.*

The Pharmaceutical Journal.

SATURDAY, OCTOBER 25, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

CINCHONA CULTIVATION.

THE prevailing scarcity of quinine and the consequent high price that it now commands will be sufficiently familiar to pharmacists to invest with more than ordinary interest any fresh information respecting the various attempts that have been made to promote the cultivation of cinchona, and thus provide a more abundant supply of the raw material from which that invaluable drug is obtained.

As our readers are aware, one of the places where cinchona cultivation has been established is Java, and the Dutch Government has devoted considerable attention to this enterprise. By the courtesy of Mr. HOWARD we are enabled to place before our readers some account of the results obtained in the latest examination of the barks from these plantations, and it will be satisfactory to learn that there are evident signs of progress. We learn from Dr. HASSKARL'S late report that the plantations in Java have been considerably extended, nearly 30,000 young trees having been planted out during the second quarter of this year, making a total of 1,800,252 plants. The weather has also been exceedingly favourable to the growth of the cinchonas, and as much as 7000 kilos of bark has been prepared for delivery.

As regards the yield of these barks in alkaloid the results are also very good, some samples of calisaya bark yielding as much as 10 and 11 per cent. of quinine, while many others yield from 4 to 6 per cent. of that alkaloid. This fully justifies the opinion expressed some months since by Mr. HOWARD that the main object of the introduction of cinchona cultivation into Java, viz., the obtaining a rich source of quinine, has not failed.*

In other respects Dr. HASSKARL'S report, which we regret being unable to publish *in extenso* this week, confirms what has been previously said on the subject. It is worth, however, noticing that the calisaya yielding the very high percentage of quinine differs from the typical calisaya of WEDDELL in its small white flowers and very small capsules.

Another feature of note is the comparative scarcity of quinidine in the barks of calisaya, consistently with the remark of Mr. HOWARD in the article already referred to. In the red barks analysed by Dr. HASSKARL there was an extraordinary preponderance of cinchonidine, and the total of alkaloids in those barks exceeded that in almost all the other kinds of bark.

It has been shown that in all probability it was cinchonidine that cured the COUNTESS OF CHINCHON, and hence it is no wonder that when bark alone was given, the red bark should, if it contained a large amount of this alkaloid, have obtained such renown in the hands of Dr. SYDENHAM and subsequent practioners, until the worthless bark of Mutis was introduced to baffle their skill.*

Among other points of interest in the report here referred to we learn that a number of samples of Java bark have been sent to the chemists attached to the Cinchona plantations in British India for comparative examination, and we trust there may soon be from our own colonies as gratifying accounts of the progress of Cinchona cultivation as those we are receiving from Java.

* See PHARM. JOURN., No. 159, pp. 21 to 25.

FLOWERING OF THE SCAMMONY PLANT.

SCAMMONY (*Convolvulus Scammonia*) sown in the garden of the Faculty of Medicine in Paris a year since has germinated, and passed through a relatively mild winter in the open ground, this season has been covered with flowers. By its leaves and its corollas of a creamy-white colour, with five pale, dingy rose bands on the outside, it recalls the appearance of *Convolvulus arvensis*. The anthers are remarkable for the rapidity with which, at the moment of opening, they turn outwards their lines of dehiscence, which are primitively introrse. The flowers are at the end of a rather long peduncle, and are sometimes solitary, and sometimes disposed in few-flowered cymes.

AT a *soirée* lately given at Blackheath by the Council of the West Kent Natural History, Microscopical, and Photographic Society, the President, in the name of the Council and members, presented to the hon. secretary, Mr. E. CLIFT, pharmaceutical chemist, of Lewisham, a set of elegant mantel ornaments, consisting of clock and pair of vases. The clock bears the following inscription :—

"Presented to Edward Clift, Esq., by the members of the West Kent Natural History, Microscopical, and Photographic Society, in recognition of his able and courteous discharge of the duties of Honorary Secretary during a period of Fourteen Years.

"J. JENNER WEIR, President.

"*Blackheath 13th May*, 1873."

THE *Times*' correspondent at Naples writes that the dry weather has much damaged the yield of oil both in quantity and quality. In that neighbourhood the olives have fallen from the trees as dried, hard berries, and the few that remain are being shaken or beaten down before the rain comes. The consequence is that oil has risen to fabulous prices, and those who have stored it are making little fortunes.

DR. J. E. DE VRIJ, who is so well known by his labours in connection with the chemistry of cinchona bark and its alkaloids, has been elected a Foreign Correspondent of the French Academy of Medicine.

* See Howard's 'Neuva Quinologia,' sub. C. magnifolia, p. 7.

Transactions of the Pharmaceutical Society.

SPECIAL MEETING OF THE COUNCIL.

Wednesday, October 22nd, 1876.

MR. THOMAS HYDE HILLS, PRESIDENT.
MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Betty, Robbins, Sandford, Sutton, Urwick, and Williams.

This Special Meeting of the Council was held for the purpose of reading a third time the proposed new Bye-law, previous to submitting it to a Special General Meeting of the Society.

The PRESIDENT moved that the proposed new Bye-law be read a third time.

The motion was seconded by the Vice-President, and carried unanimously.

The proposed new Bye-law was accordingly read a third time.

THE JUNIOR BELL SCHOLARSHIP.

The PRESIDENT announced that Mr. E. J. Thring had written to resign the Junior Bell Scholarship, as he found himself unable to take advantage of it, his employer declining to release him from the remaining portion of his apprenticeship term.

Mr. WILLIAMS said he had made inquiries and found that Mr. Thring had accepted the scholarship under some misapprehension, thinking that he might be allowed to attend the lectures, etc., on two mornings a week, or something of that sort. Mr. Williams and the Secretary had called on Mr. Thring's employer to see if he could be induced to relinquish his claim on the young man's services, but that gentleman stated that he was not able to do so. They were therefore obliged to advise Mr. Thring to resign, which he had accordingly done. Mr. Williams suggested that it would be well if in future care were taken to ascertain that the candidates for the Bell Scholarship thoroughly understood the conditions before competing.

The SECRETARY said a similar difficulty occurred last year in the case of Mr. Plowman, but that gentleman's employer after some persuasion was prevailed upon to set him at liberty three months before the expiration of his time.

Mr. WILLIAMS remarked that next year Mr. Thring would be ineligible to compete for the Junior Scholarship, as he would be over age, and as this was likely to occur very often, most young men being apprenticed for a term expiring at their twenty first birthday, there seemed a little hardship in the present regulations which might require reconsideration.

The SECRETARY stated that in accordance with instructions he had written to Mr. A. P. Luff, the candidate next on the list, to inquire if he would be prepared to take advantage of the scholarship, and had received an affirmative reply, both from Mr. Luff and his father, the latter stating that he was quite willing that his son should devote the whole of his time to study.

It was moved by Mr. WILLIAMS :—

"That the Junior Bell Scholarship for the Session 1873-4 be awarded to Arthur Pearson Luff, the present holder, Edmund John Henry Thring, having resigned the Scholarship through inability to avail himself of it."

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

APPOINTMENT OF AN EXAMINER.

The SECRETARY read a letter from the Privy Council approving the appointment of Mr. Octavius Corder, of Norwich, as a member of the Board of Examiners for England and Wales.

INSURANCE OF THE SOCIETY'S PLATE GLASS.

On the motion of Mr. WILLIAMS, it was resolved to insure the plate glass belonging to the Society, both in the windows and in the glass cases in the Museums, in the National Plate Glass Assurance Company.

The Council then adjourned until after the Special General Meeting had been held, the report of which appears below.

On reassembling, the Secretary drew the attention of the Council to that portion of the letter from the Privy Council of July 31st which suggested the desirability of requiring an interval of three years to elapse between the passing of the Preliminary examination and that of the Major or Minor.

The SOLICITOR stated that in his opinion the Society would hardly be warranted in making such a regulation, looking to the provisions of the Pharmacy Act.

After some conversation a draft letter was settled for transmission to the Privy Council, to accompany the new Bye-Law when submitted.

CONVERSAZIONE AT SHEFFIELD.

In accordance with the request of Mr. Radley, of Sheffield, permission was granted to lend certain specimens from the museum for exhibition at the Conversazione of the Pharmaceutical and Chemical Association, at Sheffield on Friday.

SPECIAL GENERAL MEETING.

A Special General Meeting of the Members of the Pharmaceutical Society was held on Wednesday, October 22nd, 1873, at twelve o'clock, at 17, Bloomsbury Square, Mr. Thomas Hyde Hills, President, in the chair. The attendance was very limited.

The SECRETARY having read the notice convening the meeting,

The PRESIDENT stated that the Privy Council having objected to the new Bye-law, sec. 10, clause 6, as formerly approved by the Society, the one now submitted had been prepared. It had been read at three Council meetings, and in accordance with the rules, he would now move that the General Meeting approve and confirm the new Bye-law.

The clause referred to and the proposed new clause are as follows :—

PRESENT.	PROPOSED.
SECTION 10.	
Clause 6.	*Clause* 6.
After the first day of January, 1871, no person shall be appointed an examiner who at the time of appointment is, or who during one year prior to the time of appointment has been, a Member of the Council, other than the President or Vice-President; and the election of any examiner to be a Member of the Council shall vacate his appointment as an examiner.	No person shall be appointed an examiner who at the time of appointment is, or who during one year prior to the time of appointment has been, a Member of the Council; and the election of any examiner to be a Member of the Council shall vacate his appointment as an examiner.

The VICE-PRESIDENT having seconded the motion,

Mr. MEE inquired what was the object of the new Bye-law, the necessity for which he could not understand.

Mr. SANDFORD and the SOLICITOR explained the necessity of framing the new Bye-law, in order to meet the views of the Privy Council.

Mr. MEE still protested that he could not see the need of the Bye-law, the matter being, in his opinion, quite clear before. He must therefore oppose it.

The PRESIDENT appealed to Mr. Mee to allow the motion to pass unanimously, as it was simply intended to put an ambiguous point beyond all doubt.

The motion was then put and carried with one dissentient, and the proceedings terminated.

EXAMINATIONS IN EDINBURGH.

October 14th, 15th, and 16th, 1873.

Present—

(14th.) Messrs. Ainslie, Buchanan, Gilmour, Kemp, Kinninmont, Noble, Tait, and Young.

(15th.) Messrs. Buchanan, Gilmour, Kemp, Kinninmont, Noble, and Young.

(16th.) Messrs. Ainslie, Buchanan, Gilmour, Kemp, Kinninmont, and Young.

Professor Maclagan was present each day on behalf of the Privy Council.

MAJOR EXAMINATION.

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

Modlen, Robert.....Edinburgh.

MINOR EXAMINATION.

Thirty-one candidates were examined. *Ten* failed. The following *twenty-one* passed, and were declared to be duly qualified to be registered as Chemists and Druggists :—

*Brown, John Macdonald.....Dunfermline.
*Grant, Donald .....Elgin.
*Robinson, George Carr.....Edinburgh.
McNaught, Andrew.....Belfast.
White, Thomas Lee .....Edinburgh.
Clark, William Inglis .....Edinburgh.
Riach, Charles Beverley .....Aberdeen.
Lambie, Hugh .....Glasgow.
Lawler, Hugh .....Edinburgh.
Attwood, Henry Ernest .....Edinburgh.
Buchanan, David .....Arnprior by Stirling.
Equal. Fraser, Andrew .....Aberdeen.
Equal. Hunter, John Carswell .....Glasgow.
Clark, William Coltart.....Dalbeattie.
Brown, George .....Edinburgh.
Donald, David .....Perth.
Steele, John Cockburn.....Greenock.
Anderson, David Smith .....Musselburgh.
Campbell, Colin .....Dumbarton.
Frater, Mark W. .....Morpeth.
Forewell, Henry .....Edinburgh.

The above names are arranged in order of merit.

MODIFIED EXAMINATION.

Six candidates were examined. *Two* failed. The following *four* passed, and were declared to be duly qualified to be registered as Chemists and Druggists :—

Kitchen, James.....Glasgow.
Marshall, John .....London.
Milburn, Walter Edwin .....Tollerton.
Wallace, William .....Glasgow.

EXAMINATIONS IN LONDON.

October 15th, 16th, 23rd, and 24th, 1873.

Present on the 15th and 16th—Messrs. Allchin, Barnes, Bottle, Carteighe, Corder, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, and Umney.

Present on the 22nd and 23rd—Messrs. Allchin, Barnes, Carteighe, Corder, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Southall, and Umney.

Dr. Greenhow was present on the 15th, on behalf of the Privy Council.

MAJOR EXAMINATION.

Six candidates were examined. *Four* failed. The following *two* passed, and were declared duly qualified to be registered as Pharmaceutical Chemists :—

Leake, Thomas Whaplate .....London.
Harrison, William Hopper .....Barnstaple.

* Passed with Honours.

MINOR EXAMINATION.

Ninety-nine candidates were examined. *Fifty-six* failed. The following *forty-three* passed, and were declared duly qualified to be registered as Chemists and Druggists :—

*Hearne, Frederick .....Strood.
*Holt, George Alfred .....Douglas.
Equal. *Bibbings, John Henry .....Exeter.
Equal. *Carlton, Arthur .....Horncastle.
*Harding, William .....Bristol.
Brown, Robinson .....Stockton-on-Tees.
Fuller, Thomas.....Fallowfield.
Equal. Read, William .....Havant.
Equal. Savage, John Welch .....Wells.
Equal. Row, George Commins .....Braintree.
Equal. Wills, George Sampson Val. ...Hay.
Moore, John Ernest.....Southampton.
Baxter, John Newsome .....Rotherham.
Ingham, Thomas Whittaker ...Rawtenstall.
Huggett, Sydney .....Lancaster.
Chamberlain, Arthur Garratt...Leicester.
Style, John William.....London.
Equal. Rogers, William Sexton .....Southsea.
Equal. Symonds, Henry .....Norwich.
Lewis, Edward Prosser .....Tenby.
Simpson, Allwood.....Stalybridge.
Equal. Fiddick, Thomas .....Camborne.
Equal. Leslie, John Morison .....Port Elizabeth.
Peacock, Percy .....Chelsea.
Kirkby, Robert .....Ulverston.
Welcher, Robert Mitchell .....Chatteris.
Smith, Charles .....Sleaford.
Pidgeon, Joshua David .....Brighton.
Robinson, Stanley.....Stalybridge.
Equal. Equal. Hilton, Howard Christopher ...Whitefield.
Equal. Equal. Reeve, Thomas Lewis .....Hastings.
Equal. Appleton, Thomas Alfred .....West Brompton.
Equal. Booth, George Samuel.....Heckmondwike.
Equal. Southwell, John William.....Scarborough.
Chapman, Joseph John .....Chertsey.
Equal. Kershaw, Edward.....Manchester.
Equal. Soutter, David .....Grimsby.
Lathbury, Charles John .....Worcester.
Somers, Robert Walter.....Guildford.
Carson, Robert .....Manchester.
Equal. Holyoake, Francis.....Wandsworth Road.
Equal. Myott, Frederick .....Oldham.
Lee, William Walter .....Wandsworth.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

The following is the result of the examination held on the 6th instant :—

England and Wales.

Two hundred and eighty-six candidates presented themselves for examination, of whom *one hundred and fifty-seven* failed. The following *one hundred and twenty-nine* passed, and have been duly registered as Apprentices or Students :—

FIRST DIVISION.

Equal. Greenleaf, Alfred William .....Ipswich.
Equal. Sangster, John Graham .....Southsea.
Roe, Robert .....Lancaster.
Equal. Osmond, John Hooper .....Heywood.
Equal. Wallis, George .....Ryde.
Payne, John Woollard.....Liverpool.
Walsh, Peter Henry.....Blackburn.
Equal. Thompson, Arthur .....Buxton.
Equal. White, William Thomas .....London.
Equal. Wise, Joseph Norman .....Carlisle.

* Passed with Honours.

Equal. Clower, John.....Nottingham.
Equal. Leivers, George Edward .....Eastwood.
Equal. Needham, Francis David .....Dublin.
Equal. Pollard, George Frederick .....Burnley.
Equal. Cornish, James Mitchell .....Penzance.
Equal. Kent, Edward ... .London.
Dusting, Abraham Tong .....Penzance.
Equal. Alcock, Frank Harris .....Burslem.
Equal. Broadbent, John .....Stretford.
Equal. Bromley, Eugene Frank ....Woolwich.
Equal. Chotin, Victor Frederick.....Guernsey.
Equal. Morton, Henry .....London.
Equal. Taberham, Frederic William ...Wells.

SECOND DIVISION.

Collis, Arthur Frederick .....Cheadle.
Equal. Barfoot, John Richard Doughty. Chesterfield.
Equal. Parkes, Harry Charles.....Fareham.
Equal. Williams, Thomas Henry .....Plymouth.
Cox, John Henry .....Kingston.
Equal. Edmondson, William ... .Morecambe.
Equal. Hurst, Walter ..... Manchester.
Equal. Lingwood, Edgar Henry .....Colchester.
Equal. Vaughan, Sidney Herbert ..... London.
Equal. Jackson, William .....Bridgend.
Equal. Jones, Charles .....Ashton-under-Lyne.
Equal. Roberts, George Constable .....London.
Equal. Temple, Frederick Staveley.....Hull.
Humphreys, Arthur .....Nottingham.
Equal. Horton, Thomas .....Peterborough.
Equal. Nelson, Harry .....York.
Equal. White, Woolmer Rudolph Donati...Landport.
Hay, Richard Mayman .....York.
Equal. Marsh, Gideon William Barker. Dover.
Equal. Powell, Walter .....Clevedon.
Equal. Stevenson, David Archibald ...Chertsey.
Clayton, Christopher.....Market Rasen.
Browne, Frank S.....Norwich.
Equal. Buckley, James Julian .....Eastbourne.
Equal. Kent, George Dugan .....Landport.
Equal. Welford, Richard .....Blackburn.
Richardson, Peter George .....Conndon.
Equal. Jones, Edmund.....Hanley.
Equal. Little, Charles Arthur.....Manchester.
Equal. Winch, John Miller .....Colchester.
Equal. Equal. Cant, Hemington .....London.
Equal. Equal. French, Montague Robert .....Gosport.
Equal. Equal. Higginbottom, Walter Harold ..York.
Equal. Palmer, George Smith .....Lincoln.
Equal. Stahr, Victor Emanuel.....London.
Equal. Fry, Samuel .....Bishop's Waltham.
Equal. Page, Robert Steele .....London.
Equal. Pratt, Edward Jonathan .....Great Yarmouth.
Equal. Watson, Joseph Edmund.....Bristol.
Kelly, Francis Charles .....Great Yarmouth.
Equal. Equal. Griffiths, William .....Neath.
Equal. Equal. Wright, John Charles .....Wolverhampton.
Equal. Cowan, Richard Hamilton .....Southsea.
Equal. Harding, Christmas .....Denbigh.
Equal. Nowell, Barnes .. ..London.
Davidge, Henry Ernest Frederick...Lynn.
Smale, John Edward .....Landport.
Equal. Heaton, Wilmer Everard.....Colne.
Equal. Hoyle, Richard Ashworth .....Rawtenstall.
Equal. Hucklebridge, Philip .....London.
Equal. Pell, John .....Market Harborough.
Equal. Wyborn, Edward .....Reading.
Patterson, James .....Landport.
Equal. Cooper, Herbert .....Rye.
Equal. Gimblett, William Henry .....Swansea.
Equal. Haden, Walter Edward .....Lichfield.
Equal. Urwick, Charles .....London.
Equal. Beesley, John .....Liverpool.
Equal. Harmer, James Dorkin .....Kingston-on-Thames.
Equal. Wilks, Charles Frederick.....York.
Allkins, Walter .....Tamworth.
Baxter, John .....Manchester.
Blayney, John Hartley.....York.
Bowman, Samuel .....Durham.
Bright, Frederick ..... Taunton.
Christopherson, Cornell .....Ipswich.
Cridland, Francis Ed. John.....Devizes.
Crompton, John Clayton .....Manchester.
Curnby, George .....Loddon.
Déqué, Laurent Joseph .....Derby.
FitzGerald, John Anthony .....London.
Fowler, George .....London.
Fowler, William .....Sunderland.
Greaves, Edward Harrison .....Bristol.
Greenough, Hugh Fairhurst ...Manchester.
Griffith, Philip .....Weston-super-Mare.
Hallas, David William .....Manchester.
Harrison, John William .....Leeds.
Hayton, Peter Bamlett .....Leeds.
Holway, John M.....Swansea.
Hope, Arthur Peach.....Uppingham.
Hughes, William David .....Liverpool.
Equal. Jones, Charles William .....Manchester.
Equal. Jones, Hugh .....Abergele.
Equal. Lickiss, Charles.....York.
Equal. Lomas, James Wright .....Sunderland.
Equal. Lugg, James Harvey .....Penzance.
Equal. Matthews, Walter Thomas .....Bristol.
Equal. Mewburn, Ernest Rutter.....Ilkley.
Equal. Mitchell, George .....London.
Equal. Niblett, Frederick John .....Stroud.
Equal. Palmer, Edwin Thomas ..... Hammersmith.
Equal. Poock, Joseph Thomas.....Weston-super-Mare.
Equal. Reed, Walter Sherwood .....Sunderland.
Equal. Reeves, Alfred .....London.
Equal. Ridley, Edward Henry.....Manchester.
Equal. Tadd, James .....Polruan.
Equal. Tapson, Alfred Edward .....Bristol.
Equal. Thompson, William .....Bradford.
Equal. Waite, James .....Bolton.
Equal. Walker, Frederick William.....Halifax.
Equal. Warburton, William.....Haslingden.
Equal. Ward, Smith.....Batley Carr.
Equal. Wardale, Herbert Faulkner.....Hull.
Equal. Wilkins, Edward .....Reading.
Equal. Williams, Frederick Lloyd .....Llandovery.

SCOTLAND.

Twenty-five candidates presented themselves for examination; of these *seven* failed. The following *eighteen* passed, and have been duly registered :—

FIRST DIVISION.

McVean, John Duncan .....Stirling.
Currie, Alexander.....Portsoy.
Mitchell, Andrew.....St. Andrews.
Reid, William .....Aberdeen.

SECOND DIVISION.

Ramsay, David R. .....Dundee.
Equal. Jack, William .....Lochgilphead.
Equal. Turnbull, Edward Hardy.....Edinburgh.
Curle, David .....Partick.
Raffan, John .....Portsoy.
McDonald, Donald Fraser .....Edinburgh.
Henry, Claude F. .....Edinburgh.
Frater, J. Irvine .. ..Aberdeen.
Smith, William.....Chester.
Gamley, David .....Edinburgh.
MacPherson, Colin Allen .....Edinburgh.
Swan, William Duncan .....Stirling.
Alexander, Alexander .....Aberdeen.
Ligertwood, Charles Riddel.....Aberdeen.

ADDENDUM.—In the list published on p. 304 the following should have appeared among the *Certificates of the College of Preceptors*, received in lieu of the Preliminary examination :—

Beck, Albert Neve .....St. Leonard's.

The following is a list of the Towns at which the Examinations were held, with the numbers of Candidates annexed :—

ENGLAND AND WALES.

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Altrincham	1		1	Ipswich	4	2	2
Andover	1		1	Lancaster	1	1	
Ashton-under-Lyne	2	1	1	Leamington	2		2
Barnsley	2		2	Leeds	4	2	2
Barnstaple	2		2	Leek	1	1	
Bedford	1		1	Lincoln	2	2	
Belper	1		1	Liverpool	14	3	11
Berwick	1		1	London	48	20	28
Birkenhead	1		1	Loughborough	1		1
Birmingham	4	1	3	Louth	2		2
Blackburn	5	4	1	Manchester	21	11	10
Bradford	6	3	3	Neath	1	1	
Bristol	7	5	2	Newport, I. W.	1		1
Burnley	2	1	1	Newport, Mon.	3		3
Burslem	1	1		Norwich	5	3	2
Buxton	1	1		Nottingham	4	3	1
Cambridge	3		3	Oldham	1		1
Cardiff	2	1	1	Penrith	1		1
Cardigan	1		1	Penzance	4	3	1
Carlisle	4	1	3	Peterborough	2	1	1
Carmarthen	3	1	2	Plymouth	2	1	1
Chesterfield	1	1		Poole	1		1
Cockermouth	1		1	Portsmouth	10	9	1
Colchester	3	2	1	Preston	3	1	2
Coventry	3	1	2	Reading	2	2	
Deal	1		1	Retford	1		1
Denbigh	4	2	2	Rochdale	1	1	
Derby	1	1		Runcorn	1		1
Devizes	1	1		Rye	2	1	1
Dewsbury	1	1		St. Austell	1	1	
Diss	1		1	Scarborough	1		1
Doncaster	2		2	Sheffield	1		1
Dover	1	1		Shrewsbury	1		1
Dublin	1	1		South Shields	4		4
Dudley	2		2	Southampton	1	1	
Durham	2	2		Stamford	4	1	3
Eastbourne	1	1		Stockport	1		1
Fareham	1	1		Stroud	2	1	1
Flint	2		2	Sunderland	3	3	
Grimsby	2		2	Swansea	3	2	1
Guernsey	1	1		Tamworth	1		1
Hanley	2	1	1	Taunton	2	1	1
Hartlepool	1		1	Tunbridge Wells	1		1
Hereford	1		1	Wakefield	2		2
Horsham	1		1	Walsall	1	1	
Huddersfield	1		1	Warwick	1		1
Hull	2	2		Weston-Super-Mare	3	2	1
Huntingdon	1		1	Wolverhampton	2	1	1
Kendal	1		1	Yarmouth	3	2	1
Knutsford	1		1	York	8	6	2
King's Lynn	1		1				

SCOTLAND.

Aberdeen	6	4	2	Glasgow	3	1	2
Banff	2	2		Lochgilphead	1	1	
Dumfries	1	1		St. Andrew's	1	1	
Dundee	1	1		Stirling	1	1	
Edinburgh	9	6	3				

The questions for examination were as follows :—

Time allowed: Three hours.

LATIN.

Translate into English two of the following sentences :—

1. Quod improviso unum pagum adortus esset, quum hi qui flumen transissent suis auxilium ferre non possent, ne ob eam rem aut suæ magno opere virtuti tribueret aut ipsos despiceret : se ita a patribus majoribusque suis didicisse ut magis virtute quam dolo contenderent aut insidiis niterentur.

2. Hi neque vultum fingere neque interdum lacrimas tenere poterant : abditi in tabernaculis aut suum fatum querebantur, aut cum familiaribus suis commune periculum miserabantur.

3. Detur imprimis uncia una et interpositis tribus vel quatuor horis, cochleare exhibeatur si fuerit opus, et post duas alias horas repetatur dosis, si alvus antea non moveatur.

4. Coque simul lento igne, assidue movens, donec Oleum et Oxidum in Emplastri liquefacti crassitudinem coeant. Oportebit autem paululum Aquæ ferventis adjicere, si ea fere omnis, quæ in principio adhibita est, ante finem coctionis fuerit absumpta.

5. State the comparative and superlative degrees of the following adjectives—malus, multus, nequam, superus.

6. Decline "vis" and "domus."

7. Parse "Dulce et decorum est pro patriâ mori."

ARITHMETIC.

8. From $64\frac{1}{4}$ take $\frac{2}{3}$ of $\frac{3}{4}$.

9. Divide ·00281 by 1·405, by 1405, and by ·001405, proving the truth of each result by fractions.

10. One year being equivalent to 365 days and 6 hours, find how many seconds there are in 27 years and 245 days.

11. Find the value of 3 tons, 0 cwt., 3 qrs., 26 lbs. of sugar at £1 4*s.* 6*d.* per cwt.

12. If 20 men can perform a piece of work in 12 days, how many men will accomplish another piece of work which is six times as great in a tenth part of the time ?

ENGLISH.

13. Parse the following :—

"On either side the river lie
Long fields of barley and of rye."

14. Write from fifteen to twenty lines on *one* only of the following subjects :—

Music.
Diligence.
Railways.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The first general meeting of the twenty-fifth session was held at the Royal Institution, Colquitt Street, on the 9th October last, the president, Dr. Charles Symes, in the chair.

The Secretary announced that the following gentlemen had been elected officers for the present session, viz. :— President, Dr. Charles Symes ; Vice-President, Mr. Alfred H. Mason, F.C.S. ; Honorary Treasurer, Mr. John Shaw ; Honorary Secretary, Mr. Jas. F. Armstrong, 17, The Willows ; Council, Messrs. E. Davies, F.C.S., J. Abraham, Charles Jones, Joseph Hallawell, A. Redford, Charles Sharp, R. Sumner, and Alfred E. Tanner.

Messrs. R. Mumford, John Alexander, George G. Halliburton and Dr. Cook were elected members.

Mr. E. Davies, F.C.S. exhibited specimens of the different sorts of new burners as invented and sold by Mr. R. Wallace, Manchester, and gave a full description of the different ways of using them. The burners are made with one to twenty-four flames, and give a temperature of 3000° F., and will melt almost any metal.

After some discussion on the source, and the best means of obtaining oil of rhodium, the president, Dr. Symes, delivered the following—

INAUGURAL SESSIONAL ADDRESS.

"It has pleased your Council to appoint me a position in your midst which I have with some reluctance accepted,

and that for the following reasons:—Firstly, my personal inability to fill the office in the very perfect manner in which it has been done by your late president. The amount of ability which he has displayed; the happy combination of firmness in holding to points he felt to be right, with the kind and courteous manner to those who differed from him in opinion, has engendered a good feeling toward him from all, and an indebtedness which it will be difficult to repay.

"Secondly, my business being situate somewhat distant from our sphere of operations and requiring much personal attention, there will be a difficulty in placing so large an amount of time at your disposal as has been done by Mr. Davies, who has always been on the spot to lend a willing ear and give his sound advice. And thirdly, that the reins of an association like this involves a responsibility for which I feel myself quite unequal; but then I know I shall have your help and guidance, and if we are all moved by a spirit of progress and endeavour to keep pace with the times, relying on the active co-operation of our Council and Secretary, together with that of the members of the Association, we may be sure that we shall have as profitable a session as ever we have had.

"I should indeed be sorry to see this Association mixed up with trade disputes, or working for the interests of any party; but we might go too far in ignoring the legitimate claims of trade. Science will fare but badly at our hands if our business is not well cared for; our daily wants are a stern reality, and it is but a poor philosophy that does not teach a man first to provide these.

"The Pharmaceutical Society is a kind of Pharmaceutical Parliament, and there are many trade questions which it would be impolitic for such a body to take cognizance of; if we were just the Liverpool *branch* of that Society our sphere of operations in this direction would be equally circumscribed, but as we happen to be an independent body we must strike out for ourselves a line of conduct suited to meet the requirements of the chemists and druggists of Liverpool and its vicinity. When challenged with the questions, What good is there to be got at the meetings of the Association? or, What good does it do? we must be prepared to point to some real and substantial good, to show that the time spent here is not spent in vain.

"We find other associations dealing with trade questions which promote the interest of pharmacy, and prospering; most of you have seen the Midland Counties' price list issued by that Association—the Manchester list also.

"Do you think there would be anything discreditable to this Association in calling a general meeting to consider the desirability of curtailing our hours of business? I will not press this point too closely, as it has already been dealt with and, to my regret, dismissed, but anyone who gives the matter a moment's thought must see that as a large number of chemists do not close their places of business till we close our proceedings they cannot possibly attend, and that if we value our numerical strength it is incumbent on us to take the initiative in promoting early closing.

"And now I must say a word to those who hold themselves aloof, and regard us only with dissatisfaction.

"To the student I would say—We cannot possibly provide you a royal road to a knowledge of your business, or to passing your examinations; these have to be arrived at by study,—yes, just what you are pleased to call *dry* study,—and there is no substantial substitute. You are called to a somewhat higher standard of qualification than formerly, but scarcely commensurate with the requirements of the age, and you have every facility afforded you for acquiring that necessary knowledge.

"This Association and its school of pharmacy are amongst them—do you duly seek the advantages it offers?

"To the man of business I would say—We cannot come into your pharmacy and arrange your stock, post your books, or provide you with good customers; but we can offer you facilities for keeping up your knowledge of pharmaceutical progress; we can offer you interchange of opinion on matters in which we are mutually interested, and by your assistance can demonstrate the truth of the proverb "unity is strength"; our united efforts could overcome many difficulties and anomalies which frequently occur in our daily vocation. To the public who do not understand the nature of the difficulties we have to contend with, these anomalies must often appear ridiculous. Instances are familiar to us all.

"It certainly would be a discredit, collectively and individually, to the chemists of this neighbourhood if we had no association. Surely pharmacy has not reached so low a level here as to have no honest pride in such a matter! The pride I would ask is not that of a penurious descendant of ancient nobility, but that of emulation, which will not allow us to be in the rear; a jealousy, not of a neighbour who happens to be doing better than ourselves, but for the cause of pharmacy, its advancement, its social and intellectual position.

"Our business is often spoken of as intermediate between a trade and a profession, I would rather say it is a blending of the two. In the manufacture of our finer chemical and pharmaceutical preparations, in testing the purity of those purchased, in analysis and in dispensing, as much knowledge and skill, of its kind, is required as in any of the learned professions; in selling an ordinary retail article we are strictly tradesmen. It is clear, however, that pharmacy, in its present acceptation of the term, was not practised in the days of Æsop. In his fable of the "Besieged Town," he tell us that each tradesman thought no other calling like his own, winding up by the currier declaring "there is nothing like leather." How rarely do we hear a pharmacist declare "there is nothing like physic!"

"As a rule, we feel our sphere of operations very circumscribed; the profits of the largest establishments form no very handsome income as compensation for the care, attention, and responsibility involved in conducting them.

"I confess to having felt this as strongly as anyone could possibly do, but let us hope that there is something that can be looked on as making up this deficiency in pecuniary compensation.

"Do you think that one per cent. of the medical men in this country ever get compensated in a pecuniary sense for their services? I do not; they need no eulogium from me—'*Virtus per se splendet semper.*'

"What higher or nobler aim can a man have than the alleviation of human suffering? What could induce a medical man to go through a single year's active practice, unless he felt his life of labour to be one of love? Called from his warm bed on a cold winter's night, it might be to visit the haunts of wretchedness, or the mansion of the great, but what to witness? Not mirth, but sadness; not pleasure, but pain. To cool the fevered brow, to soothe the agony of the sick or dying. This is indeed a sacred office, and he who faithfully discharges its duties can look with confidence for a higher than his pecuniary compensation. Now the calling of a pharmacist is closely allied to that of the medical man, and to the full extent to which he participates in these offices of kindness will he participate in the never-failing reward.

"Toward the close of last session the U.S. Pharmacopœia was published, a book of considerable interest to the British pharmacist. Two series of papers on it have already been published in the PHARMACEUTICAL JOURNAL, and although somewhat elaborate, they are by no means exhaustive; many practical hints are entirely overlooked. Several of its improved preparations appear well worthy our attention. Its liq. ferri citratis would be a decided improvement on our scales, which make a very unsatisfactory mixture, being usually but partially soluble; its infusions of cinchona with the addition of aromatic sulphuric acid necessarily contain a larger amount of alkaloids than our simple infusion. They might merit a place beside, although not as substitutes for it, ammonia being often

prescribed with infusion of bark in this country. The method of preparing vin. ant. tart. by first dissolving the salt in a little boiling water, economizes time and produces quite as good an article. The linimentum cantharidis prepared by digesting the powdered flies in ol. terebinth. is doubtless an excellent rubifacient. I will not, however, occupy your time with further details, as I trust during this session we shall have at least one paper on the work.

"It is probable that in the early part of 1874 an appendix to the B. P. will be published. I think this is a step in the right direction. New drugs, chemicals, and preparations are constantly being brought under the notice of the medical profession, and by them are prescribed syrups, tinctures, liquors, etc., which, if dispensed at half-a-dozen pharmacies, might have nearly as many strengths. Ten years is too long for such a chaos to accumulate without any attempt at reducing it to order. An appendix is the proper thing to accomplish this. Many of the preparations it is intended to introduce have already been brought before your notice.

"Important changes have recently been made in the bye-laws of the Pharmaceutical Society and in the School of Pharmacy. These have been published and freely discussed in the PHARMACEUTICAL JOURNAL and *Chemist and Druggist*. Time alone can prove whether the results will be as satisfactory as the promoters of the changes anticipate, but when we see a new bye-law created to deal deadly blows at what has been called 'cram,' and a change in the school which has every appearance of fostering the intended victim, we might be pardoned for wondering whether these gentlemen are not attempting to blow hot and cold with the same mouth.

"And now I must bring this short address to a close. Thanking you for your kind attention, let me again ask you to put forth your energies to make this session a successful one—let us feel at its close that we have done something for the advancement of pharmacy."

A cordial vote of thanks was proposed by Mr. Sumner and seconded by Mr. Sharp, who said he was quite sure, from his experience of the Liverpool Chemists' Association, that it was quite equal to any emergency that would ever take place.

The President then made some more remarks in reference to his paper, after which the meeting separated.

LEEDS CHEMISTS' ASSOCIATION.

The annual meeting of the Society was held in the Clergy Room of the Church Institute, on Wednesday, October 15th, 1873. The President, Mr. E. Brown, in the chair.

The minutes of the last meeting having been read and confirmed, the following gentlemen were unanimously elected members and associates:—

Member, Mr. Thomas Iredale, North Street.

Associates, Messrs. E. A. Barber, B. Parker, Worfolk, E. A. Hanson, Thomas Wallas, and I. Laycock.

The Hon. Secretary (Mr. J. W. Longley) then read the

REPORT.

"In presenting this, the Eleventh Annual Report of the Leeds Chemists' Association, your Committee have great pleasure in congratulating its members on the state of the Association, both numerically and financially, and though they must confess to some amount of disappointment at the comparatively small numbers who attend the meetings and lectures the Committee hope that the great advantages they offer will induce a better attendance at lectures, and an increase of its members. That the meetings are so poorly attended is to be deplored, seeing that *one* of the objects of the Association is 'for the better scientific education of assistants and apprentices.' The number of members at present is 34, being a decrease of one from last year, and the number of associates is 47, being an increase of 11, showing an increase in the annual subscriptions of 17*s.* 6*d.*

"Your Committee have pleasure in stating that there is at present a balance in favour of the Association in the Treasurer's hands of £14, and in the Secretary's hands of £1 0*s.* 10½*d.*

"Your Committee have to announce that they have accepted the resignation of Mr. E. Yewdall as Hon. Sec., he having held that post since its foundation, during which time he has faithfully discharged the duties imposed upon him with an amount of zeal and energy deserving of the highest commendation. Your Committee feel that they cannot adequately express the valued importance of the services rendered by Mr. Yewdall to the Association.

"Some interesting papers have been read during the year, and your Committee tender their thanks to those gentlemen who have assisted the Association with their instructive papers:—'Some Leeds Worthies in Science,' by Mr. R. Reynolds, F.C.S.; 'The Chemistry of a Piece of Coal,' by Dr. Parkinson, Bradford; 'Bone, its Functions in the Animal System, and Uses in the Arts and Agriculture,' illustrated by experiments, by Mr. Thos. Fairley, F.C.S.; 'Mineralogy and Crystallography,' illustrated by numerous beautiful specimens, by Mr. O. Pegler, Associate of the Royal School of Mines; 'British and American Pharmaceutical Notes,' by Mr. E. Brown; 'Our Society,' by Mr. E. Yewdall.

"Four members of the Committee attended the British Pharmaceutical Conference at Bradford, in September last, as delegates from our Association.

"The following books have been added to the library: Fownes' 'Manual of Chemistry,' latest edition; Fresenius' 'Qualitative Analysis,'; 'Supplement to Watts' Chemistry'; Ten Vols. of the 'Journal of the Chemical Society'; the 'Pharmacopœia Germanica'; 'Transactions of the American Pharmaceutical Association'; Proctor's 'Lectures on Practical Pharmacy.' The 'Year Book of Pharmacy' has been presented to the Association as a donation to the library from the committee of the Pharmaceutical Conference. Cases for reading PHARMACEUTICAL JOURNAL, *Chemist and Druggist*, and other periodicals, have been added.

"Not having had a librarian for some time who could give the measure of attention required to the library, a very accurate statement cannot be rendered. However it may be interesting to members and associates to know that there are at present on the shelves of the library about 220 volumes; that upwards of 120 volumes have been out on loan during the year, and in addition to the periodicals taken in by the Association, many new books have been added, a list of which has been read.

"Seven students from our Association attended Mr. Abbott's class on botany, and six presented themselves for the examination of the Science and Art Department. One obtained 1st class certificate, three 2nd class, and two failed.

"Fourteen chemist's apprentices and assistants have attended Mr. Ward's class on chemistry, during the last year, seven of whom passed the examination of the Science and Art Department, two in the advanced, and five in the elementary stage in inorganic chemistry, and two in the elementary stage, organic chemistry. The attendance of the students and their application to study was, on the whole, highly satisfactory. Your Committee have great pleasure in announcing that they have made arrangements with Mr. Abbott to give a course of lectures on Materia Medica, which will comprise twenty-four lectures, and will be illustrated by diagrams and specimens. An examination will take place at the close of the course, and two or three prizes will be awarded. An arrangement has also been entered into with Mr. Louis Siebold, Manchester, who has kindly consented to give a lecture on 'Fermentation.'

"Your Committee have to announce that they have engaged the room next to the library as a lecture-room, so that no inconvenience may be caused to the members and associates who wish to use the library on lecture nights.

"Your Committee earnestly request the associates to make every endeavour to attend Mr. Abbott's class, as

well as those given by Mr. Ward, at the Mechanics' Institute, in connection with our Association, on Chemistry, and also request the members to use their influence with those who are at present non-attendants, urging them to join, and respectfully point out the difficulty of upholding such an Association as ours without the aid of its members and associates."

Proposed by Mr. T. B. Stead, and seconded by Mr. F. Reynolds, that the report be adopted. Carried unanimously.

Proposed by Mr. E. Yewdall, and seconded by Mr. Stead, that a vote of thanks be presented to Mr. C. Pierson for his diligence in collecting the subscriptions without remuneration. Carried unanimously.

Mr. E. Brown announced that a sub-committee had been formed to inquire into the desirability of engaging rooms at the Trevelyan Hotel, for the usual social gathering, to be held next month, and he had pleasure in announcing that the inquiry was satisfactory.

It was moved by Mr. E. Yewdall, and seconded by Mr. T. B. Stead, that Mr. J. Day be requested to give his paper on "Percolation" during the present session. Carried unanimously.

The following gentlemen were then elected officers for the coming year :—

President, Mr. F. Reynolds ; Vice-President, Mr. S. Taylor; Honorary Secretary, Mr. J. W. Longley; Librarian, Mr. T. Wilson; Sub-Librarian, Mr. E. O. Brown ; Curator, Mr. Payne. Committee—Messrs. T. B. Stead, E. Brown, E. Yewdall, Richard Reynolds, William Ward, and William Smeeton.

In vacating the chair, Mr. Brown gave a brief review of the progress of pharmacy during the past year, touching lightly upon the Bill for the storing of poisons, the fire at Chicago, and the many deaths of celebrated characters that have taken place.

Mr. Reynolds, on taking the chair, remarked on the reluctance he had to take office, believing that there were many more qualified than himself to take the post ; at the same time he was not insensible to the honour conferred upon him, and would at all times endeavour to do his best for the Association. He was sorry to see such a small attendance at the meetings and lectures, and thought that one means of inducing associates to join would be for them to follow the example of the Tyne Chemists' Assistants' Association, for the reading of papers, etc. The first duty he had to do gave him considerable pleasure, namely, to move that a vote of thanks be given to the retiring officers.

It was moved by Mr. Stead, that a vote of thanks be given to Mr. Brown and Mr. E. Yewdall, the retiring officers. It gave him great pleasure to do so, because of the untiring energy displayed by Mr. Brown during the last two years. Of Mr. Yewdall's services he could not speak too highly, and felt great regret at his resignation. He was sorry to see such small attendances at lectures and meetings of the associates, because he agreed with the remark of Mr. Longley that the Association was one for their good ; but he knew that in a large town like Leeds there were so many attractions, that it was with difficulty the young men could be persuaded to join. After a few words of good advice to the associates, the resolution was seconded by Mr. Pierson, and carried unanimously.

Mr. Brown briefly returned thanks, and referred to the able manner in which Mr. Longley had devoted his time and energy to his new duties since Mr. Yewdall resigned.

Mr. E. Yewdall, in returning thanks, said, that although he had resigned, he should still take great interest in the society.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

The Council of the Northampton Pharmaceutical Association have issued the following report for the year ending September 30th, 1873.

"The Council have much pleasure in placing before the members the report of their second year's progress, feeling sure that they will view with gratification the success that has been attained at such a moderate expenditure. Classes in botany, chemistry, materia medica, pharmacy, and prescriptions, have been conducted through the winter session with the usual large attendance—averaging ten at each class—great interest being shown in the various subjects, as may be seen from the fact that *four* members passed the Minor, and *five* the Preliminary examination during the year.

"The examinations, which had been conducted by Messrs. Maxwell and Sandall, and for which prizes were offered, acted as a great stimulus to attendance and study ; and though but few assistants competed, yet the experiment was sufficiently successful to warrant the Council in repeating it.

"The Association has been benefited by several donations during the year, and Siebold's herbarium and a fume cupboard of a novel construction have been added to the rooms.

"The botanical ramble to Castle Ashby and Olney was a remarkable success, and, with the two visits to P. Jeyes, Esq., formed pleasant episodes in their course of study.

"At the request of the Council the class conductors have formed a programme of classes for the ensuing session. The Council trust that their trouble may be rewarded by the punctual attendance and close attention of the members.

"During the year the rooms will be open every night for study. In May, examinations in the various subjects will be held.

"The Council thank most sincerely Mr. Barry for his services as Local Secretary to the Pharmaceutical Society ; Mr. Jeyes, for the continued use of the room ; Messrs. Sandall and Maxwell, for acting as Examiners ; Mr. Abington, of Ringstead, for his donation, and the other friends who have so kindly rendered assistance.

"The members' subscriptions this year have covered the expenses of the Association, thus redeeming the promise made last year by the Council of being *self-supporting*.

"Finally, the Council, in returning thanks to the members for electing them, declare that no exertion on their part shall be wanting to prove that the confidence reposed in them has not been misplaced."

RECEIPTS.

	£	s.	d.
Balance	3	9	7½
26 Members' Subscriptions	6	10	0
8 ,, ,, to Chemistry	0	16	0
Interest	0	1	3½
Donation (Mr. Abington)	1	0	0
	£11	16	11

EXPENDITURE.

	£	s.	d.
Fume Cupboard	1	0	0
Siebold's Herbarium	1	10	3
Chemicals, etc.	1	6	10
Gas, Coal, etc.	1	7	2
Books, Stationery, etc.	1	14	8
Balance in hand	4	18	0
	£11	16	11

A programme of meetings of classes, extending to the end of April, 1874, has also been issued.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 318.)

NOTES ON THE PRESENCE OF BROMINE, IODINE, AND SILVER, IN SEA WATER.

BY GEORGE ALEXANDER KEYWORTH.

Some years since the writer carried on a long series of experiments in the endeavour to separate these substances

from sea water without heat. Silver was first sought for, which is believed to exist as chloride. Its presence has long been inferred from the alleged increase in silver acquired by the copper sheathing of vessels after long voyages. Although distributed through the ocean with extreme tenuity, the calculated aggregate in such a volume as a cubic mile is very large.

Professor Faraday privately expressed an opinion that the silver might be found by means of the electric battery, and suggested a weak continuous current with platinum electrodes. Various forms were employed, and in one case the battery was in action during four months : among other products iodine as iodide of starch * was obtained, but results were always negative as regards silver. Reminded of the axiom, that when the same result can be gained by chemical or by electrical action, the former is preferable; sulphuretted hydrogen was passed through several gallons of filtered sea water, and then allowed to stand during some months. The precipitate was extremely small and consisted of sulphur. Silver has however been obtained by means of sulphuretted hydrogen, albumen, and heat from a large quantity of sea water, concentrated by evaporation. The sulphide of silver becomes entangled in the coagulated albumen, and the metal can be separated by cupellation. Mr. Steel of Gravesend advertised some time since in the *Graphic* for assistance in carrying out his patent for collecting silver from the sea by means of apparatus to be employed by sailors, with results expected to be lucrative. Inquiry has not elicited anything as to this process.

The search for silver led to experiments for detecting iodine with more success, inasmuch, as the starch reaction was in one instance obtained. It was found necessary to separate the large proportion of lime present in sea water by means of oxalate of ammonia, and to remove also the sulphates by means of baryta water. The addition of chlorine water and hyponitrous acid then set free the iodine, which presented the characteristic reaction with starch. To succeed, however, the process requires extreme delicacy and many precautions. Bromine, however, can be readily obtained, even from so small a quantity as a fluid ounce of sea water. It is best to employ oxalate of ammonia and baryta water as before. On adding a few drops, first of chlorine water, and then of hyponitrous acid, the yellowish tinge is apparent, and the bromine can be readily separated by shaking the phial with a small quantity of sulphide of carbon, which falls down of a fine orange colour. The bromine can then be removed by means of caustic potash in the usual manner.

I would venture to suggest, for the consideration of the committee, that one or more of the above substances so existing, might be profitably taken up by a member, and thoroughly worked out at the cost of some portion of the "Bell and Hills Fund." My own hands are full, but I should be very pleased to give such an investigator any details I may possess (besides those embodied in the paper), and to send him any amount of the raw material.

The thanks of the Conference were awarded to the author for his notes.

On the Examination of Tea for the Detection of Adulteration.

BY ALFRED H. ALLEN, F.C.S.

In my capacity of public analyst (under the Adulteration Act) for the Borough of Sheffield, a considerable number of teas have come under my notice, the majority of specimens having been brought by the tea-dealers themselves as a security against selling tea which if analysed by me officially might be condemned as adulterated.

Like some kindred questions which have lately been prominently before most of us, the examination of tea for certain additions has not yet become sufficiently a matter of routine, each analyst following his own methods, which in many cases have but little system, and thus in one or two notable instances lately, chemists have been found making irreconcilable statements as to the absence or presence of certain adulterants. The only work which professes to deal with the detection of the adulterations of tea is that of Dr. Hassall; but his directions, though somewhat elaborate, are not very definite, and he does not seem to have made any analysis of genuine tea himself. In fact the analyses we have of tea are by no means numerous, and some are so old that they may well be viewed with suspicion.

My object in examining the subject has been more to work out a technical method of testing teas for adultera tion than to establish the actual composition of genuine tea. I have therefore adopted those methods which I have found to give me pretty constant results with the same tea or other genuine samples and have paid less attention to ascertaining facts which, though interesting in themselves, have seemed to have no direct bearing on the question at issue.

The three principal constitutents of tea are tannin, gum, and woody fibre, with smaller quantities of some albumenoid body, theine (the active principle), colouring matters, chlorophyll, essential oil, etc. The proportions of these found by different analysts vary very much, the difference evidently depending on the methods of determination employed.

The estimations of tannin seemed to present the greatest variations, and in many cases were manifestly wrong. Thus, Hassall directs the analyst to exhaust a weighed quantity of the dried tea with hot water (of which about a quart is to be used), and to dry and weigh the residue, which he calls "woody fibre." The infusion is to be evaporated to a small bulk and treated with alcohol, which precipitates the gum, and subtracting the weight of this and the weight of "woody fibre" from the quantity taken, he arrives at the percentage of tannin. This estimation of such an important constituent "by difference" is very objectionable and is doubtless the cause of Frank and Phillips finding upwards of 40 per cent. of tannin in black tea. It is true that Dr. Hassall gives an alternative process by evaporating the alcoholic solution to dryness, which if carried out would probably make the percentage of tannin higher still from its oxidation. But Dr. Hassall also suggests that the tannin should be precipitated from the liquid by a solution of gelatin, and the precipitate weighed, 100 grains being said to equal 40 of tannin. This process again is very unreliable, owing to the large and variable quantity of colouring matter which is carried down by the precipitate of leather. But a modification of this process, in which a volumetric solution of gelatin is used, has given me very concordant and reliable results and has made the determination of the tannin in tea an operation of a rapid and tolerably simple character.

The use of a standard solution of gelatin for the determination of the strength of tannin matters is nothing new, but I believe I am the first to employ the process in the examination of tea.

A short description of the details of the method may be found serviceable and will enable other chemists to obtain results which will bear comparison with those obtained by me when working with genuine teas.

Twenty grains of tea are weighed out and boiled in a flask for half an hour with three or four ounces of distilled water.

The solution is drained off from the leaves, which are boiled again with a little hot water which is added to the main solution, and, after cooling, the whole is made up to a measured quantity. One-tenth of this liquid (= 2 grains of tea) is taken out with a pipette and placed in a beaker with an equal bulk of water, and a standard solution of gelatin is added to it by about five grains at a time with repeated stirring. A precipitate of tannate of gelatin is produced, and when the process is successful it readily sett allowing the operator to judge of the

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* Colourless iodide of starch was produced in this case.

progress of the operation. When the precipitation is judged to be approaching a termination, a small quantity of the liquid is filtered into a test tube and tested with a small quantity of the gelatin solution. If a further precipitation occurs the test portion is returned to the bulk, and a further quantity of gelatin added. Another test portion is taken and tested as before, and if no further turbidity occurs, a further small portion of the filtered liquid is tested with tannin solution to make sure that the process has not been carried too far. The end of the precipitation being reached, the volume of gelatin solution is noted, and the process is repeated on half of the original tea solution (= 10 grains of tea), the preliminary test enabling the operator to add nearly the required amount of gelatin solution at once, but otherwise the process is conducted as before, except that further dilution of the liquid is unnecessary. If desired the process can be repeated on the remaining portion (= 8 grains) of the tea solution. With a little practice the end of the reaction is readily hit, but it is always well to repeat the estimation on the remaining quantity of the solution.

I believe my estimations of tannin in tea, made by the above process, are right within half of a per cent.

The standard gelatin solution is made by dissolving 40 grains of Nelson's gelatin in 7000 fl. grains (16 oz.) of distilled water, and adding 15 grains of powdered alum (which greatly facilitates the subsidence of the precipitate of leather). The strength of the gelatin solution is ascertained by dissolving five grains of pure tannin in about six ounces of water, and proceeding as with the tea. It does not keep well, so must be reset every few days, or a fresh solution prepared.

By using the above process, I have found in genuine black tea of rather more than average quality, 12·5 per cent. of tannin ; and in green tea about 19·0 per cent.

These numbers present a close agreement with those in the old analyses of Mulder, which I consider the most accurate and complete analyses of tea extant.

According to Frank and Phillips, black tea contains a little over 40 per cent. of tannin. The origin of this mistake is apparent when we add to the tannin found by Mulder, the "extractive matter."

Thus in Mulder's analysis we find :—

	Green (Hyson).		Black (Congou).	
Tannin	17·80		12·88	
Extractive . . .	22·30	40·10	19·88	44·24
„ dark coloured			1·48	

	Frank.	Phillips.
Tannin in unused Black Tea .	40·6	42·5

I consider the estimation of the tannin of the first importance, for if it reaches the normal amount all question of adulteration by exhausted leaves is at an end, and foreign leaves are very unlikely to be present. The only fallacy in such a conclusion would be caused by an admixture of catechu or sloe leaves.

The next point of importance is the percentage of "woody fibre," as it is called by some analysts, and here again I am disposed to think that Mulder's analysis is the only accurate one, as far as a determination of real cellulose is concerned.

He found "vegetable fibre" to the extent of 17·08 per cent. in green tea, and 28·32 in black tea. Frank states the "woody fibre" in black tea at 44·8, and Phillips at 46·8. Peligot found the exhausted leaves in undried green tea came to 43 per cent. of the original weight, and in black tea to 49 per cent.

I have estimated what I hesitate to call "woody fibre," containing as it does much colouring and albumenoid matter, by boiling genuine undried tea of commerce in hot water as long as the water becomes coloured. The solution was strained off, and the exhausted leaves dried.

The "insoluble matter" thus obtained varied from 50·5 to 51·2 per cent. in green teas, and from 58·7 to 60·8 per cent. in black teas. It will thus be seen that the insoluble matter is tolerably constant in amount, and, when largely in excess of the average, an admixture of exhausted or foreign leaves is extremely probable.

The gum I have estimated in two ways. One method is to exhaust the tea with boiling alcohol (methylated spirit will do), re-dry and weigh the residue, and boil with water, and weigh the dried leaves again. The difference between the two weighings, representing the matter insoluble in spirit but soluble in hot water, has been assumed to be gum. I have not found the method very satisfactory, and have now abandoned it for the following :—The solution of the tea in hot water, which was strained away from the insoluble matter is evaporated to a syrup, treated with (re-distilled) methylated spirits, the precipitate of gum washed with spirits, dried and weighed.

The percentage of gum, insoluble matter, and tannin in any sample of tea, considered carefully, will enable the analyst to form a very accurate opinion as to the presence or absence of exhausted leaves, etc.

Analysed by the above described method, a sample of very superior black tea gave the following results, which I have placed in juxtaposition with the numbers obtained after some of the same sample had been infused in the usual manner in the tea-pot,* and the leaves re-dried.

	Original Tea.	Exhausted Tea.
Moisture	9.2	11·1
Insoluble Matter	58·7	87·5
Gum	10·5	3·8
Tannin (by Gelatin) . . .	15·2	3·3

From this it will be seen that infusion in the tea-pot results in the increase of the insoluble matter by nearly 30 per cent., while the gum and tannin are much reduced in amount.

Generally, the exhausted leaves are redried, and made up with gum, which dressing gives them a peculiar glossy appearance, and is detected by excess of gum on analysis.

An inspection of the table on p. 333 shows that genuine green teas are richer in tannin than black teas in about the proportion of 2 to 3. This is no doubt due to the partial oxidation and destruction of the tannin, during the process of fermentation to which black tea is subjected during the process of manufacture. Whether the acknowledged superior strength of green tea is due to the larger percentage of tannin present in it I am not prepared to say. The determinations of theine I have made do not account for the difference, and most analysts have found more theine in black than in green tea. The infusion of green tea is not nearly so strong in colour as that of black tea, though it is half as strong again in tannin, so that the depth of colour cannot be regarded as a proof of strength, though so considered generally. If a solution of carbonate of sodium be added to a weak infusion of tea (strained away from the leaves) a considerable darkening is observed, though certainly the infusion can become no stronger. Thoroughly exhausted tea leaves yield a brown liquid when treated with carbonate of sodium solution. These facts quite explain why careful housewives have a fancy for putting soda in the tea pot, the infusion becoming sensibly darker by the addition, to say nothing of the extra colouring matter extracted from the leaves. Apart from its softening effect on the water (the advantage of which I think is doubtful) there can be no good reason for its addition.

The sample marked No. 5 in the table was evidently a made up article, having a glossy appearance and disagreeable taste. The analysis clearly showed the cause of these characters.

No. 6 consisted largely of tea stalks, but I did not feel justified in reporting it as adulterated, as they are readily perceptible to anyone, and that the purchaser would not

* The exhaustion was not carried to excess, no second quantity of water being used.

TABLE SHOWING THE COMPOSITION OF GENUINE AND ADULTERATED TEAS.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8.	No. 9.	No. 10.	No. 11.	Nos. 12 and 13.	
	Genuine Black. Ning Chow Oolong Congou. Very strong.	*Genuine Black.* Mixed Moning Souchong and Kaisow. Very fair average.	*Genuine Green.* Mixed Young Hyson and Gunpowder.	*Exhausted Black.* By one infusion of No. 1 in teapot.	*Adulterated Black.* Labelled "Assam Pekoe."	*Stalks of Black Tea present in large proportion.*	*Adulterated Black.*	*Adulterated Green.*	*Inferior Green.*	*Genuine Green.* High priced Hyson.	*Sloe Leaves.* Picked early in September and dried in an oven.	*Black.* Labelled "Rough flavoured, thick, sappy Moning Congou, at 2*s.*"	
												Main portion, 95 per cent. of whole.	5 per cent. picked out by glossy appearance.
Moisture. Lost by drying at 212° F. ..	9·2	8·0	5·1	11·1	...	...	...	...	...	6·6	6·4	8·6	"Lie Tea."
Insoluble Matter. Left after repeated boiling with water	58·7	60·8	50·5	87·5	56·5	59·8	62·5	57·2	52·0	51·25	55·9	57·8	49·5
Gum. By treating the evaporated aqueous solution with alcohol ...	10·5	12·5	10·1	3·8	16·0	...	3·7	7·7	9·0	12·4	8·9	5·2	5·0
Tannin. By standard gelatine solution ...	15·2	12·5	19·2	3·3	6·7	3·8	7·7	5·8	12·7	18·8	16·0	4·7	20·0
Theine... ...	...	1·41 1·48											
Colours and Facings ...	...	...	...	...	Looked Glossy.	...	...	Colour'd with much Prussian blue, etc.	Strongly faced with French chalk and a little Prussian blue, etc.				
Conclusions ...	...	...	...	...	Reported as containing exhausted leaves re-dried and made up with gum.	...	Reported as containing exhausted leaves re-dried and made up without gum.	Reported as containing exhausted leaves, strongly coloured by Prussian blue, etc.		This presents almost the same composition as No. 3, which was obtained from an entirely different source.	Presents a close resemblance to inferior green tea in every respect.	Contained sulphate of iron and foreign and probably exhausted leaves, besides the additional impurities picked out and examined separately.	Contained catechu, starch, magnesia, metallic iron, graphite, sand, etc.

pay so much for tea containing them, and no one would expect to make very strong tea from such a specimen. No. 7 had a peculiar redried appearance, without any gloss on it. The analysis resulted as was expected.

No. 11 shows the close resemblance in composition between sloe leaves and tea, but of course no theine would have been found in the sloe.

The samples No. 12 and No. 13 were bought in consequence of a bill appearing in the grocer's shop-window recommending everyone to "try our rough-flavoured, thick, sappy, moning congou at 2*s.* per lb., equal to 2*s.* 6*d.* tea sold everywhere." On asking for the rough flavoured congou mentioned in the window bill, the tea was taken from a canister but "a good pinch" from somewhere else was added to it. This addition was very different in appearance from the rest of the tea, and thus was readily separated again from the main bulk of the sample, of which it constituted about five per cent. The picked out portion was then analysed separately as No. 13, the result obtained showing it to be a fair specimen of "Lie Tea" made up of catechu, starch, sand, metallic iron, graphite, magnesia, etc.

In the recognition of foreign leaves chemistry cannot be expected to play a very active part, but we must rely on botany and the microscope. The presence of foreign leaves was distinctly recognized in sample 12, and they were strongly suspected to be present in Nos. 5 and 9.

I may suggest the distillation of an evaporated extract with a mixture of sulphuric acid and manganese dioxide as a possible means of detecting foreign leaves in tea. Treated with such an oxidizing mixture, coffee, tea Paraguay tea, holly, and the cinchona plants give volatile

yellow quinovic acid, a highly characteristic body. The sloe, cherry laurel, peach, plum, etc., will yield hydride of benzoyl (oil of bitter almonds). The willow and poplar will yield salicylous acid. I propose to ascertain how far these reactions can be depended on when the leaves are in admixture with tea.

In the methods I have used for detecting facing and colouring there is not much that is new.

On treating the tea with warm water the colours and facings come off, and on straining off the leaves and leaving the liquid at rest they gradually settle to the bottom. If Prussian blue or indigo be present, the sediment has a bluish or greenish colour, and the tests for these pigments must be tried accordingly. Magnesia is often present, both in the free state and as insoluble silicate (steatite). This latter facing I have found lately on several occasions on green teas of peculiarly smooth appearance and slippery feel. It was detected by treating the sediment with hot hydrochloric acid, and then with solution of caustic soda. The residue was ignited and fused with alkaline carbonate, the fused product dissolved in acid, evaporated to dryness, redissolved in weak acid, the solution treated with ammonia and oxalate of ammonium, the precipitate filtered off and the clear liquid tested for magnesium in the usual way by phosphate of sodium, when an abundant precipitate was obtained, proving the presence of magnesium as silicate.

I have taken considerable trouble to devise a rapid and simple process for the estimation of the amount of theine in tea, but have not succeeded as fully as I had hoped, and my experiments in this direction have come to a close since I became convinced that the determination would be valueless for the purpose of detecting adulteration. I have estimated the theine by Peligot's and Stenhouse's processes, and have also used the following method, which would, I think, be the best process when estimations are really desired :—

200 grains of the powdered tea are placed in an apparatus, in which they can be subjected to the action of hot commercial benzol, which becomes coloured of a deep greenish-brown. Arrangements are made for condensing the vapours, and causing the liquid to flow through the tea repeatedly as long as it becomes coloured. By this process of condensation, two ounces of benzol are amply sufficient for the extraction of 200 grains of tea, and nearly the whole of this is regained on distillation. When cold, the benzol is filtered, distilled off by a steam heat, and the residue extracted by boiling water, the solution filtered, and the clear liquid evaporated to dryness on the water bath, and the residue of impure theine weighed. To purify the theine, it is redissolved in hot water, treated with a small quantity of acetate of lead, filtered, the clear liquid treated with sulphuretted hydrogen, the black precipitate of sulphide of lead filtered off, the solution of theine once more evaporated to dryness, and the theine weighed. I have not found it possible to omit the purification, as a variable quantity of colouring matter, etc., is found in the impure product, and thus its weight is not to be depended on.

In conclusion I desire to express my high opinion of the skill and perseverance shown by Mr. Joseph Stapleton, who has assisted me most ably throughout the above experiments.

Mr. Greenish : I think that the method mentioned by Mr. Allen may be a very excellent one for the detection of the presence of exhausted leaves, but I doubt whether it will show when tea has been mixed with very old leaves. There are first, second, and probably later pickings of tea, and if as possibly may be the case, the later—and inferior—pickings contain a larger proportion of tannin, that fact would interfere materially with the results obtained. I have paid a good deal of attention to tea, and I must say that I think it is absolutely necessary that after pouring water over the leaves, they should be separated and examined individually. It is somewhat unfortunate that all the leaves are usually broken up. You do not get the points of the leaves, but find them scattered here and there. The botanical character however can be easily ascertained. There is something very characteristic about the serration and the venation of tea-leaves, the serration only coming half-way down the leaf and the primary venation stopping short of the edge of the leaf, or rather turning off and leaving a distinct space between it and the edge of the leaf. At the apex of the leaf there is a notch instead of a point. [A figure of the tea-leaf, in illustration of these botanical characters was drawn on the black-board by the speaker.] It is very important that these botanical characteristics should be kept clearly before the mind of the person who is examining tea suspected of being adulterated. I have never yet met with a sample of green tea which has not been "faced," usually with a mixture of Prussian blue, turmeric, and china clay. This may generally be seen by the naked eye. When small quantities of the tea are placed in water the "facing" comes to the top of the water ; then if it be floated on a slide and examined with a microscope its various ingredients may be easily detected. Again, if the under cuticle of the leaf be separated, the characteristic distinct space between the two cells of the stomata will be at once perceived. If these tests be applied we can at once determine whether the sample contains foreign leaves. It is important to bear in mind that the Assam tea leaf has its margin biserrate.

Mr. Williams : If hydrate of lime were employed the theine would be produced white and pure at once.

Mr. Allen : I fully admit that microscopic examination of tea will show more clearly than the tests I propose the presence of foreign leaves in tea, but all I proposed to do was to show the actual value of the tea. I do not understand how tannin can accumulate in old tea-leaves. We know that the difference between green and black tea is owing to the latter undergoing a kind of fermentation before it is dried, by which a portion of the tannin is destroyed, and the determinations of tannin I have made bear this out. I should therefore have thought that the older the leaves were the less tannin they would have contained. In some specimens of green tea I have found Prussian blue, china clay, and even French chalk. I have found green tea free from colour, but that was when I was supplied with it specially by a dealer for comparison with other teas. I am quite aware that some adulterations of teas can be easily ascertained by the use of the microscope, but being a chemist I always prefer, where I can, to detect the adulteration by chemical means.

Mr. Greenish : I have always made use of the microscope in examining teas, and I have not been fortunate enough to meet with a single specimen of unfaced green tea. If warm water be poured upon a small quantity of green tea a sort of scum will rise to the surface of the water in which Prussian blue, turmeric, and china clay can easily be detected by the microscope.

Mr. Allen having been thanked for his communication the Secretary read the following paper :—

Contributions to the History of Potable Waters. No. II.

BY M. M. PATTISON MUIR, F.R.S.E.

In a paper read before the Glasgow Philosophical Society in April 1872, I gave a few measurements of the solvent action of various saline solutions upon lead. That the presence of nitrates powerfully influences this action was there distinctly shown.

It is generally supposed that water supplied for domestic purposes, after remaining some time in a cistern in any way connected with, or situated near to the drains which remove the sewage matter of the house, is more hurtful than that water which comes directly from the main pipe. In addition to other obnoxious constituents, water stored in a leaden cistern situated as above described might be

supposed to contain an amount of nitrates which would cause it to exert a marked solvent action on the lead.

In a comparison of cistern water with water supplied from the main, there are three questions which present themselves.

1. Does the cistern water contain a relatively large amount of nitrogenous organic matter?

2. Is the amount of nitrates and nitrites in the cistern water great as compared with the other water? And,

3. If these substances are present in large amounts does their presence influence the solvent action of the water on the leaden cistern?

1. 500 c.c. of water taken from the supply pipe of a dwelling house, all the water in which came through an ordinary leaden cistern situated in the bath room, was distilled after the addition of about one gram pure sodium carbonate; no estimable amount of ammonia was found in the distillate.

500 c.c. of water from the main pipe similarly treated also gave a negative result.

After the addition of about 20 c.c. alkaline permanganate solution, and further distillation, the ammonia in the distillate of No. 1. water was equal to ·07 milligrams per litre or ·07 parts in one million of water.

In the case of the water from the main the ammonia, after the same treatment, was equal to ·08 parts in one million of water.

2. 500 c.c. of the cistern water was evaporated to a very small bulk, a fragment of freshly ignited lime having been previously added. The liquid was filtered and the nitrogen existing therein as nitrates and nitrites estimated by Thorpe's method, which consists in evolving the nitrogen as ammonia by the action of zinc coated with a deposit of spongy copper at a boiling heat. (*Chem. Soc. Journ.* June, 1873.)

In the distillate ammonia was estimated by the addition of Nessler's reagent. It was shown that the amount of ammonia corresponded with that contained in 21·4 c.c. of a standard ammonium chloride solution, each c.c. of which contained ·025 m.gm. of ammonia. The amount of ammonia was therefore equal to ·535 m.gm. which corresponds to ·44 m.gm. of nitrogen. There are therefore ·44 parts per million of nitrogen existing as nitrates and nitrites in this water.

500 c.c. of the water supplied directly from the main pipe, after similar treatment, yielded a distillate in which the amount of ammonia was the same as that contained in 12·7 c.c. of the standard solution, that is, it was equal to ·317 m.gm. This calculated to nitrogen gives ·26 parts per million of water.

3. 300 c.c. of the cistern water was evaporated to the volume of 50 c.c., and the lead estimated, by comparing the depth of colour consequent upon the addition of a measured volume of sulphuretted hydrogen water with that produced, under similar conditions, in an equal volume of pure water to which a known amount of lead in solution had been added.

The standard lead solution contained ·1 gram of lead per litre; 1 c.c. was therefore equal to ·1 m.gm. of lead. The depth of colour produced on addition of sulphuretted hydrogen water to a volume of pure water to which ·7 c.c. of this solution had been added was equal to that produced in the same volume of the water under examination. The lead contained in the 300 c.c. of the water was therefore ·07 m.gm., which is equivalent to ·23 parts per million.

The water from the main, treated as above described, was found to contain ·20 parts of lead per million of water.

These results seem to me to lead to the following conclusions:—

1. The nitrogenous organic matter liable to undergo putrefactive changes is very nearly equal in the two waters. In neither is this amount at all large.

2. There is a very marked difference between the amounts of nitrogen existing as nitrates and nitrites, the proportion being as 1 is to 1·7.

This, taken in conjunction with the fact that the albumenoid ammonia is almost the same in each case, tends to show that the water has really been contaminated with sewage matter, or with gases arising from such matter, but that when the water has found its way through the pipes of the house this nitrogenous matter has for the most part been oxidized.

The evil is, therefore, not so bad as if the added nitrogenous matter remained in that state in which it is most ready to undergo rapid change. Although the nitrates have increased in quantity, yet there is not such an amount of these salts present as would lead one to suppose that the water has undergone any excessive sewage contamination. These results, nevertheless, point very clearly to the fact that the cistern water is less pure than that supplied from the main, and, in our limited knowledge of the action of dissolved organic matter upon the organism it would be unwise to say that no bad effects are likely to follow the continued use of such water. Nor can we foretell what condition of affairs might be brought about in such a water during the prevalence of an epidemic disease. Would it be unscientific to suppose that the disease germs would be more readily carried by a water, a large part of the oxygen of which is occupied in doing work in decomposing nitrogenous matter, than by a water, the greater part of whose oxygen is directly available for the purposes of oxidation?

3. Although water No. 1 contains such a relatively large amount of nitrates yet the amount of lead held in solution by it is scarcely, if at all, larger than that contained in water No. 2.

This may, in all probability, be accounted for by the fact that house cisterns are generally very far from clean; the lead is almost invariably protected either by a coating of an insoluble lead salt or by a deposit of some other matter upon it. And even if the lead were bright and clean, the water contains salts whose action retards the solvent influence of the nitrates present; a very small proportion of carbonates being sufficient (as is shown in the paper referred to) to materially hinder this action.

Organic matter of some kind may also accumulate in the cistern, and the action of the water on the lead be thereby hindered. The influence of organic matter in this respect remains as yet however to be examined, no definite measurements having been made.

This subject, viz., the influence which the means of supply exerts on potable waters, is one requiring a great deal of examination. I can only offer these remarks and measurements as a small contribution towards its solution.

Anderson's University, Glasgow,
September 12th, 1873.

The thanks of the meeting were voted to Mr. Muir for his paper.

Mr. MATTHEWS: My experiments on this subject lead me to believe that the action referred to in the paper just read was due to nitrites rather than to nitrates, and we know that *quasi*-free nitrous acid under certain circumstances by continuous operation will go on dissolving the metal, and that this action goes on even with ice water.

Professor ATTFIELD: If I understand Mr. Muir's paper rightly he has found an extraordinary amount of nitrogen in the form of nitrates and nitrites in cistern water as compared with water taken from the main, the figures being ·44 per million of nitrogen in cistern water as against ·26 per million in water from the main. I think that the water in the cistern which he examined must have absorbed a most unusually large amount of nitrogenous organic matter in the form of sewer-gas to produce such an increase in the nitrates. The statement appears to be of an alarming character, and a considerable number of experiments should be made before such a result could be relied upon as typical.

An Improved Preparation of Kino.

BY GEORGE ELLINOR.

The tincture of kino of the Pharmacopœia is so unstable that it is very little used.

Kino possessing advantages over most of the astringents, having a peculiar action on the mucous membrane of the intestinal canal, it is desirous to have a solution of the drug in a stable form, and miscible with water in any proportion.

In the liquor kino concent. or fortior I now exhibit this is fully accomplished.

This liquor kino fortior, diluted with water to form the relative strength of the tincture, will be found most efficacious and reliable.

Liquor kino concent. or fortior is prepared in the following manner, viz. :—

Kino	℥ j
Glycerine	℥ ij
Water to	℥ iv

Rub together in a mortar the kino, glycerine, and ℥ j of the water, until dissolved, then make up to f ℥ iv by the addition of water.

To the liquor kino fort. one volume by measure mixed with four volumes of water will thus form the liq. kino corresponding with the strength of the tincture relatively, but really stronger, the whole of the kino being dissolved, and this is entirely soluble in water.

I prefer making the liquor kino in the concentrated form because from it can be so readily prepared the representative of the Pharmacopœia.

The whole of the kino is dissolved; the sand and other earthy matter is thrown down after standing a week or so.

I believe this preparation to be very efficacious, and adapted to mixture of chalk, and all diarrhœa mixtures, and with a great amount of saving in the expense of rectified spirit, the cost being less than 6*d.* per Oj. of the preparation as compared with the price of the tincture.

I think it may take a place with the glycerates of the Pharmacopœia.

As far as I have been able to determine, it is far preferable to the tincture in its action and stability.

The President: It was suggested long ago in America that a glycerine solution of kino might be used advantageously, but there are very strong objections to using glycerine with astringents.

Mr. Williams: Is the specimen of the solution produced liable to pectize by keeping?

Mr. Greenish: We ought to be very careful before we venture to suggest any alteration in the method of making tinctures laid down in the Pharmacopœia. I make tincture of kino by percolation which never gelatinizes, even though kept for a considerable time.

Mr. Groves: The pectization of kino depends greatly upon the age of the substance; fresh kino does not pectize, whilst that which is two or three years old probably will do so.

The President: Just to bear out what I stated a moment ago, I may say that I know of one case in which three hundred grains of perchloride of iron dissolved in pure glycerine were swallowed by mistake without any ill effect, whilst a very much smaller quantity dissolved in water must have caused serious results. Again, I know several instances in which medical men have been disappointed in obtaining the full astringent effect they expected from glycerinum acidi tannici, when a strong aqueous solution has answered admirably. Glycerine, I am certain, has a powerful action in weakening the effect of astringents, and its indiscriminate use in pharmacy is much to be deprecated.

Mr. Martindale: I wish to point out that what is called Botany Bay kino is more likely to pectize than the pure Indian kino.

(To be continued.)

Parliamentary and Law Proceedings.

Poisoning by Morphia.

On Thursday, October 16, an inquest was held in Carlisle before the city coroner (Dr. Elliot) respecting the death of Mrs. McLeod, wife of Dr. McLeod, who had been resident in the city during the last few months. The first evidence given was that of servants, who deposed that deceased and her husband had appeared to live together on very affectionate terms. In consequence of one of the children suffering from an attack of typhus fever Mrs. McLeod's rest had been much interfered with.

William Ruston, chemist's assistant with Mr. Joe Todd, deposed: I remember supplying some medicine on Saturday last to 22, Chiswick Street. I supplied a prescription sent by Dr. McLeod, containing chalk mixture, and a plaster as well. I should think it was for an adult, owing to the dose. I have not the prescription with me. I do not think there was any laudanum or solution of morphia in it. Yesterday or the day before I supplied Dr. McLeod with 20 grains of muriate of morphia.—Dr. McLeod (interrupting): No, no, 10 grains; the bottle would not hold more than 10 grains. [The bottle was produced, and Dr. McLaren said at the present time it contained 3 grains.—The Coroner emptied the bottle, and asked if Dr. McLaren would go to the druggist's and get 10 grains into it, and the jury could then see how much it could hold.]—Witness continued: I served it to Dr. McLeod personally. I have no doubt about the bottle. I remember it, and said it was hardly safe with the old label on, and proposed to put a new one on. Dr. McLeod objected, and said the old label had better remain. Dr. McLeod has been in the habit of getting medicine at our shop; but it was in small quantities. I am not aware that he ever got any muriate of morphia before. Had no note in the books of the things he had got, and I can just now remember nothing. [At this stage Dr. McLaren returned with the bottle, apparently at first sight about three-quarters full of morphia.—The Coroner (to witness): It would not contain as much again?—Witness: I would like to shake it before I say that. Witness then shook the bottle well, and the result was that the powder settled down, so as to take up about half of the bottle.—The Coroner: There is no doubt about it. It could contain as much again.—A Juryman: Will Dr. McLaren tell us how much he has got put up in the bottle now?—The Coroner: We will get that afterwards.]—Witness: Dr. McLeod paid 8*d.* for the morphia, and that was the price of 20 grains.—The Coroner: (to witness): You can form a fairly accurate idea of quantities?—Witness: Yes.—How much morphia do you think that bottle (referring to the phial Dr. McLeod had taken to the druggist's) contains at the present moment?—About 10 or 12 grains.—That is when the bottle is well shaken. Did you shake it when you sold the 20 grains to Dr. McLeod?—Yes, and the bottle was quite full.—That bottle was full up to the brim?—Yes, it was.

Dr. Robert Walker deposed that about 7 o'clock on the previous evening Dr. McLeod had requested him to call and see his wife. He found her lying upon the hearth-rug in the drawing room quite insensible. She had the appearance of morphia poisoning, and Dr. McLeod told him voluntarily she had been taking morphia. He used the stomach pump, and tried various methods of rousing her, but without success, and she died about a quarter before ten. When Dr. McLaren came they tried an injection of atropine into the veins, but he thought she was dead then. Dr. McLeod told him that the morphia was taken to get her to sleep, as she had had none for some nights.—A Juryman: Did Dr. McLeod tell you how much she took?—He said all in the bottle, except what was left in it, and he thought the bottle contained ten grains.—A Juryman: That was tantamount to saying she had taken seven grains.—Dr. Walker: But he said she did not get it altogether. He said he

first gave her a grain, and then as it seemed to take no effect another grain, and so on every half-hour.—When did Dr. McLeod say he gave the first grain?—About four o'clock, and he continued with half-hourly doses up to seven o'clock.—A Juryman: Then according to the chemist's evidence, who said the bottle contained 20 grains, he had given her 17 grains of morphia in three hours.—A Juryman: You are not at present prepared to say the cause of death?—Poisoning from morphia, I think there is little doubt.—Dr. McLeod: Did deceased ever change colour when you were there?—Occasionally. Had you any hope of restoring her?—Yes. I thought when the colour came back she might possibly recover.—Supposing a person were to take 8 grains of morphia, after a dose of that sort would colour return?—I should think it might under artificial breathing.—Is it not a rule in practice that the extent of doses is to be measured by the effect produced; that you are justified in repeating the dose until an effect is made?—Dr. Walker: If you have first waited for the effect to be established.—Was half an hour sufficient to produce an effect with morphia?—Sometimes it does not produce an effect for some hours.—What is the shortest time in which it might produce its effects?—In a quarter of an hour.—A Juryman: Was Dr. McLeod perfectly sober all the time?—Yes, I think he was.

Dr. Roderick McLaren, Honorary Surgeon of Carlisle Dispensary, said: At twenty minutes to nine last night I was called to 22, Chiswick Street. I went, and found Mrs. McLeod lying in the lobby. Dr. Walker was keeping up artificial respiration, assisted by Dr. McLeod. Mrs. McLeod was quite insensible, breathing only at intervals. Dr. McLeod showed me this bottle, and said he had given Mrs. McLeod the whole of the 10 grains of morphia, except what was left in the bottle. I went to get an instrument for injecting atropine. When I came back Mrs. McLeod's colour looked a little better; but by the time the instrument was ready she had given over breathing naturally. Dr. Walker opened her vein and injected a little atropine. We kept up artificial respiration a little longer; but Mrs. McLeod never breathed again, and grew gradually cold. Dr. McLeod subsequently stated that he weighed the first grain of morphia; and he said the reason why morphia was given was that Mrs. McLeod had had no sleep for three nights. The other doses, he said, he gave in quantities, judging from the first grain. There were nearly three grains left in the bottle. I weighed it afterwards. Mrs. McLeod died about a quarter to ten.—A Juryman: How much morphia does that bottle that you took to the druggist's now contain?—It contains 20 grains.—Juryman: It is now half full; the chemist said he sold it full; therefore he must have given Dr. McLeod 40 grains.—Another Juryman: Then Mrs. McLeod has got 37 grains of morphia. Have you any doubt as to the cause of her death?—There is no doubt it was poisoning by morphia.—A Juryman: We should require a *post-mortem* examination.—The Coroner: it would be as well.—Juryman: I noticed there was a black eye on the corpse. What s the cause of that?—I did not notice it, but it could be produced by slapping with towels.

Dr. McLeod: May I speak?

The Coroner: There is no necessity for you to speak.

Dr. McLeod: I am unable to say how much morphia I gave her. I cannot say how much I gave, because I did not intend to stop till I had produced an effect.

A Juryman: I would advise you not to make this statement to the jury about giving the poison in that reckless way.

Dr. McLeod: I gave it upon a fixed principle. Not to stop till I made an effect.

The Coroner: I would advise you not to say too much, and so have anything you have said converted at another time into a meaning you did not intend.

Dr. McLeod continued, despite the coroner's expostulations, to say he had no idea how much he gave. He gave it in a wineglass, and some of it might have been lost. He wished to impress upon the jury that although so much was in the bottle originally, and so much remained now, it was not certain that deceased took the whole of the difference.

A Juryman: You must have made a mistake when you told the jury you only bought 10 grains.

Dr. McLeod: Yes, certainly. I asked for 10 grains.

The Coroner said he thought it right to remark that Dr. McLeod had called upon him that morning, and given him the same frank and open account of the transaction he had given to the other doctors.

Dr. McLeod: I have been advised not to speak, but I have nothing to keep back. Everyone says that what I say may be misrepresented; but I think the more I say the more light will be thrown upon the matter. I am anxious to be asked questions as I say there is nothing to be kept back. I suppose I have committed an error. I was too presumptuous, too confident in my own knowledge. I should not have felt so much confidence in the matter. There can be no doubt deceased was poisoned by an overdose of morphia; but whatever the consequence may be I would rather speak out.

It was then resolved to adjourn till Thursday, Oct. 24, it being understood that a *post mortem* examination would be held in the meantime.—*From the Carlisle Patriot.*

Prosecutions under the Adulteration Act.

Alleged presence of iron and sand in tea.

At the Dale Street Police Court, Liverpool, on Wednesday, October 8, before Mr. Raffles, James Pegram, grocer, was summoned under the provisions of the Adulteration Act, for having sold, as unadulterated, a parcel of tea which, on examination by the borough analyst, proved to be adulterated with metallic iron.

Evidence having been given as to the purchase at the defendant's shop of two ounces of caper tea, for which 3*d.* was paid, which tea was afterwards handed to the analyst,

Dr. Campbell Brown, the borough analyst, said he analysed the sample of the tea referred to, and had granted a certificate to the effect that it was adulterated with metallic iron. In his opinion, and speaking from the result of his analysis, he believed that the pellets of iron and particles of sand and stone which were found rolled up in the leaves of the tea would increase the weight of the tea to such an extent that customers would be defrauded of $1\frac{1}{2}d.$ in every sixteen ounces.

Mr. Raffles: Would the particles of iron and stone be injurious to health?

Dr. Brown said the larger pieces would, but, in point of fact, they would not be swallowed, as they would in almost every case remain at the bottom of the teapot. He believed that these particles were rolled up in the leaves by the original manufacturers. They had the appearance of having been done when the tea was made. He burnt the tea and applied a magnet to the ashes, when particles adhered to it. The use of the magnet was known to the trade, and any grocer who took the trouble might ascertain the presence of the particles. [Dr. Brown produced a magnet, and showed that the pellets adhered to it.]

Mr. Baxter submitted, on behalf of the defendant, that the prosecution had failed to make out a case, inasmuch as tea was neither a drug nor an article of food, but tea-leaves. To be food, it must be something of which a man partakes.

Mr. Raffles overruled the objection, and refused to grant a case upon the point.

Mr. Baxter then proposed to put in a report by Professor Murphy upon an analysis of the same tea, in which it was stated that the tea was not adulterated. This, as well as a proposition that Professor Murphy should give personal evidence in contradiction to Dr. Brown, Mr. Raffles refused to allow, on the ground that the same sample of tea was not analysed. Mr. Baxter urged that if an analyst called by a defendant were not

heard, the borough analyst became sole dictator as to what was and what was not adulterated.

Mr. Raffles said it was quite open for the person charged to go with the nuisance officer to the analyst and see whether the article he sold was adulterated or not. It appeared to him beyond all question that the tea produced in court was adulterated.

Mr. Baxter: Mr. Murphy says that what Dr. Brown says is iron is not iron.

Mr. Raffles said he would hear Mr. Murphy on that point.

Professor Murphy said he did find magnetic matter in the tea, but the weight of it did not average one-thousandth part of the tea.

Mr. Raffles said he was satisfied that the tea was adulterated, and imposed a fine of £5 and costs.

Intimation of an appeal against this decision was given.

The following is said to be a copy of the report which Mr. Baxter wished to read :—

"'*Scented Caper*' *Tea.*

"Dear Sir,—This is to certify that I have made as careful and complete a microscopical and chemical examination and analysis of the sample of 'scented caper' tea which you left with me yesterday evening as the time would permit.

"My microscopic examination revealed that this sample is composed of tea leaves, and that there is no admixture of other leaves than those of the tea plant in it; that there is only a very small proportion of dust in the sample, and that this dust is the matter of the tea leaves, and produced by the abrasion of the leaves themselves.

"My chemical analysis gave me the following results:—Extract normally astringent and indicative of this kind of tea. Disintegrated portion or dust contained a few magnetic particles, but quite inappreciable when viewed as an adulterant. Total mineral matters in the tea, 6·404 per cent., composed of

"Micaceous clay and sand . . .	0·574	per cent.
"Phosphate of lime, containing a mere trace of iron.	2·973	"
"Alkaline and earthy salts . . .	2·857	"
	6·404	

"The amount and quality of the preceding minerals are those natural to the leaves of the tea plant.

"From the preceding data I conclude that this sample of tea is pure and free from adulteration. The few particles of magnetic matter detected do not form the one-thousandth part of the weight of the sample, and therefore cannot be justly be viewed as an adulteration, but rather in the light of a mere accidental matter."—*From the Liverpool Daily Post.*

On Wednesday, Oct. 15, at the same court, Frederick Chambers, grocer, 66, Vauxhall Road, Liverpool, was summoned for selling, as unadulterated, a quantity of tea which was adulterated. Mr. Atkinson, deputy borough solicitor, appeared to support the information, and Mr. Bremner defended.

Inspector Fitzpatrick, an officer of the Health Committee, proved having purchased at the defendant's shop, on the 25th of September, two ounces of caper tea (at 2*s.* 8*d.* per lb.), which he submitted to Dr. Brown, the public analyst.

Dr. Brown said he analysed the tea in question, and found it was adulterated to the extent of six per cent. with particles of iron, small stones, and sand, which were rolled up inside the leaves of the tea. He was of opinion that the tea had been adulterated by the Chinese dealer, and not since it had arrived in this country.

Mr. Bremner said he did not intend to dispute the facts, nor was he going to contest for a moment the opinion of the analyst. He relied not only upon the words of the Statute, but the expression of opinion given by Dr. Brown with reference to the tea having been adulterated in China. In the first place, he contended that according to the wording of the Act there must be some knowledge of the adulteration on the part of the defendant.

Mr. Raffles: But you know I am told to construe it differently. That was the question which was before the Court of Queen's Bench.

Mr. Bremner said, that under those circumstances, it would be necessary for every person who sold any article that could possibly be adulterated to employ an analyst to test his goods before he submitted them to the public.

Mr. Raffles: Don't you think it would be desirable for grocers to have some means of testing the articles they sell? I don't see how they can escape the Act unless they do so.

Mr. Bremner said he had seen a letter in the *Times*, which suggested a way of getting out of the difficulty. The writer of this letter thought grocers might place upon their packets of mustard, and other articles which it was necessary to mix with various ingredients, small labels stating that they were so mixed.

Mr. Raffles: But what would you say of this tea?

Mr. Bremner said the label might be to the effect that the grocer did not offer the tea as being perfectly pure and unadulterated.

Mr. Raffles said that was hardly analogous to the case of the mustard, because here was some tea which was mixed with some nasty substance.

Mr. Bremner said that, with the interpretation Mr. Raffles was bound to give to the law, the only protection grocers and others could possibly have would be by putting out placards stating that they did not profess to sell unadulterated tea.

Mr. Raffles: But that won't do.

Mr. Atkinson: Well, if you say "this is a mixture of iron-filings and tea leaves" it might do.

Mr. Bremner said there must be something done; this sort of thing could not last.

Mr. Raffles said it seemed to him that it would be an easy matter to detect the presence of the iron.

The cases of George Rufus Bailey, 148, Vauxhall Road, and Richard Beckett (Messrs. Southward and Beckett), 211, Vauxhall Road, were also taken. In the first of these cases the tea was adulterated to the extent of 10 per cent., or so much as to make a difference of $3\frac{1}{4}d.$ in the pound; and in the second the adulteration was to the extent of from 4 to 6 per cent.

While these cases were before the court,

Mr. Bremner asked Dr. Brown if he had ever anlaysed any caper tea that was not adulterated; and also if iron was not indigenous to the plant.

Dr. Brown replied that he had analysed several samples of caper tea since he came to Liverpool, which were free from adulteration. The tea that came from British India he had found entirely free from adulteration. There was a small quantity of phosphate of iron in the tea plant naturally, but nothing of the description of iron filings, stones, and sand, which had been used to adulterate it.

In each of the three cases, a fine of £5 and costs (including the analyst's fee) was imposed.—*From the Liverpool Daily Albion.*

ALLEGED ADULTERATION OF MILK.

The case against Alexander Russell, charged at the Central Police Court, Glasgow, with selling adulterated milk, which was adjourned on the application of the defendant to allow of an analysis of the reserved portion of the purchased milk being made by Professor Anderson (see *ante*, p. 318), was resumed on the 14th Oct.

James Anderson, Professor of Chemistry in the University of Glasgow, produced the following report, dated 11th October :—"I have carefully examined a sample of milk sent to me by Mr. P. T. Young, contained in a bottle sealed 'K. M'L.' with the seals unbroken. The sample was sour and curdled, and I have therefore thought

it right to make a complete analysis, which showed it to contain—water 89·95, butter 3·13, sugar 3·42, casein 2·88, ash 0·62—total solids, 10·05. From the results, I have no hesitation in saying that the milk has been watered to some extent. As to the exact quantity of water which has been added, it is somewhat difficult to give a precise opinion, because I have of course no information as to the composition which this milk had as it came from the cow, and no fixed standard has been laid down up to which genuine milk must come. If, however, we assume that milk may contain no more than 11·5 per cent. of solids and still be genuine, then the amount of water added in this case must have slightly exceeded 10 per cent. This, of course, proceeds on the view of the case most favourable to the accused, for it assumes that the original milk was of the lowest possible quality. If we supposed it to have contained 12·5 per cent. of solids, which is a moderate average, the quantity of water added must have been at least 22 per cent.; while if the original milk happened to exceed the average in quality the quantity of water may have been considerably larger. There can be no doubt that the minimum quantity of water added in this case must have been 10 per cent., and that it may be, and probably was, considerably more."

In examination he said: The specific gravity of ordinary milk varies from 1030 to 1040; but I could not give the specific gravity of this milk. To do that I must have had it almost direct from the cow. When water is added to milk it mixes uniformly. That 89·95 per cent includes the watery substance as well as the added water. I can make no distinction between the water which has been added and the water naturally present. The 10 per cent. of solid matters which are present in the milk is just as I found it when it came into my hands. I have formed an opinion in regard to the water which is naturally present in milk. Of course, if I had had a specimen of the original milk as it came from the cow I should have made my comparison between the analysis of that and the analysis I got of the other; but in the absence of that I am obliged to consider what in all probability was the composition of the original milk. I think the solids there are much lower than they are in ordinary milk. There ought at least to be 11½ per cent. of solids, while there is only about 10; therefore, I infer from this that the 11½ originally present in the milk must have been reduced by the addition of water to 10. I make my calculation from that. The solid matters vary in different milks. I have myself analysed genuine milk containing as much as 17 per cent. of solids. That was milk of extraordinary high quality, such as we cannot expect to get in general. It was milk from a cow kept by a family for their own private use, and fed altogether irrespective of cost. We cannot get that in ordinary milk. I should say, from my own analysis, the lowest quantity of solid matter in genuine milk was about 12½. I have seen it as low as 12, but I have never seen it under that. My experience is not so extensive a one as that of a city analyst.

On behalf of the defendant, evidence was given that the milk was sold in the state in which it was received from the wholesale dealer. The wholesale dealer, on his part, deposed that no water was added to the milk by him, but that he had had analysed a sample of milk taken from one of the wooden butts in which it was received by railway from the farmer, and the analyst reported that it then contained 15 per cent. of added water.

After consultation between the baillies and the assessors, Mr. Baillie Craig said there was no doubt as to the milk being adulterated, but judgment would be postponed in order to give an opportunity for consideration whether defendant sold it knowing it to be adulterated.

Another case was heard in which skimmed milk had been added to sweet milk, and, notwithstanding it was urged that this did not come within the terms of the Act, which says "mixed with any other substance," the defendant was convicted, and a fine of two guineas was imposed.

Correspondence.

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

The Preliminary Examination.

Sir,—I was very glad to see that Mr. Reynolds had taken up the question of local Preliminary examinations; it was quite time for some one to do so, if we intended to keep our privileges, and no one could have been found better qualified for the task.

The previous attempt to abolish the local examinations and transfer them to London or Edinburgh, on the ground that they were not satisfactorily conducted, having been taken very quietly by the parties most immediately concerned, it seems to have been thought that a renewed effort might be more successful. This time, however, we must make it very clearly understood that we will neither have our sons and apprentices dragged to London or Edinburgh for their Preliminary, nor be compelled to pay the fees of another examining body in addition to our own. If the present mode of conducting this examination in the provinces is not satisfactory, let it be made so or some other be devised. I do not suppose any local secretary is especially anxious for its continuance, seeing that it causes a considerable amount of trouble and inconvenience to a good many of them, for which they receive no acknowledgment whatever, not even thanks, but on the contrary are told at every opportunity that their duties are performed in a very unsatisfactory manner. This has been repeated so often, and by persons in authority, that I should like some proof of it, for I am very sceptical on the point. Some time ago great lamentation was made because there were so many failures, but since then the proportion has rather increased than otherwise; and that supervision can hardly be considered very ineffective which results in about 40 per cent. of failures.

I believe all these complaints have arisen from the fact that there has been a great deal of foolish tattle on the part of some of the candidates as to what has passed in the examination rooms, and that it has been considerably magnified in the repetition. Much has been said about the prompting and assistance the candidates give to each other when the superintendent is out of the room, or engaged with a book, or in writing, and it seems to be supposed in some quarters that one half of the candidates who pass do so by this means. Such a notion is ridiculous. That the candidates do sometimes give each other hints when they get the opportunity I do not doubt in the least, but that it materially assists them I entirely deny, and I do not hesitate to assert that if a candidate is not pretty nearly able to pass without assistance of that nature, all the prompting he could get would not enable him to pull through. Nay, I will go further, and say that if a candidate is not pretty well prepared he might have a translation of Cæsar, a Latin grammar, an English grammar, and an arithmetic to help him, and still not be able to pass. In the first place, if he did not know the first book of Cæsar pretty well by heart, I defy him to pick out the particular sentences given in the questions, and unless he had studied his Latin and English grammar and arithmetic well, he would have the same difficulty with the other questions, and would spend so much time in finding the answers that the greater part of the three hours would be gone before he began to write; and as regards being assisted by his fellow candidates, it takes one who is well prepared nearly all his time to write his own answers, and he has not much time to assist his neighbours.

On referring to the lists for April and July last I find that the percentage of failures was 45½ and 43½ respectively. I submit that fact to the members of the Society as our reply to the charges brought against us.

W. Wilkinson.

263, *Cheetham Hill, Manchester, Oct. 20th*, 1873.

Sir,—It is with feelings of some reluctance that I take up my pen to write down a few ideas upon the subject of the Preliminary examinations, since they materially differ from those expressed by a gentleman for whose opinion I have a great respect generally; but I think Mr. Haselden for once so clearly in the wrong that I cannot forbear from offering a

few remarks in refutation of his arguments published in last week's number of the Journal.

Now I take it that the object of the Preliminary examination is not to secure the payment of a certain fee to the Pharmaceutical Society, but to prevent the admission of a youth into the business (or *quasi*-profession) of a chemist and druggist until he has such ground-work of elementary education as will fit him for his future calling in life. I am astonished to hear Mr. Haselden express the opinion that it is possible to expect too much education. Did he ever know an assistant suffering from such an ailment? My own limited experience has been rather that the industry which will carry a youth through a somewhat severe course of training will, when he goes into business, be expended in the pursuit of his calling; and it is the man who has been lazy as a boy at school that turns out the troublesome and idle assistant.

Such being the object of the Preliminary examination, is it more likely to be better conducted by a body of men deputed to examine in technical subjects, or by a scholastic educational board? I maintain the latter; and let us have the standard sufficiently high. The entrance to most of the professions is through the gates of the matriculation examination of the London University. Perhaps this is too much to expect of the present generation of pharmacists, but I hope I may live to see our profession raised as high as the medical; and in order to gain that end we must start at the foundations. The worst that such a course could produce would be the necessary expense incurred by the parents of a youth who aspires to the honourable calling of pharmacy in keeping him another year or two at school; but surely with the class whom we wish to encourage to enter our ranks this item would be of small moment compared with the ultimate benefit to the student, whose increased worth would soon repay the extra outlay, even in a monetary point of view (if we must be mercantile in our arguments).

For the above reasons I should object to the conducting of the Preliminary examination, even by the London Pharmaceutical Board of Examiners themselves in person; but with how much greater force do they apply to its present mode of conduct. Certainly, it is a shade better than a few years ago, when the amount of questioning a provincial candidate received depended on the conscience of the examiner, who might be either a schoolmaster, a doctor, or a clergyman, and it depended very much on the selection whether the certificate was signed with but little questioning, or a thorough sifting was endured in Cæsar and Latin grammar. But we can hardly expect men like our local secretaries, actively engaged in business, to devote several hours on a particular day, not of their own choosing, to the conscientious supervision of an examination. They may be good men and true, but it is a little too much to expect them all to be so enthusiastic and self-sacrificing as Mr. Haselden and some of his former colleagues.

CHARLES FRYER.

Scarborough, Oct. 20th, 1873.

UNUSUAL DOSES IN PRESCRIPTIONS.

Sir,—In your impression of the 11th inst. appears a letter from Mr. Giles on Unusual Doses in Prescriptions, written in that gentleman's ordinary florid style.

Two of the individuals therein introduced to notice are disposed of by hanging, whilst I am left gasping for breath. Upon recovering myself, I just wish to say to all whom it may concern that I did not put forth the prescription so strongly commented upon as one that I had actually received, but as one containing an *unusual dose*.

Moreover, whilst pointing to a method of writing unusual quantities which seemed to me most likely to meet the requirements of the case, its being dispensed *as a matter of course* was never expected to be implied, as the entire article was written to uphold the right of a dispenser to follow the dictates of his own judgment.

Speaking for myself, I should not hesitate to refuse preparing any prescription that *seemed to me positively dangerous*, without in some way being ensured as to its compatibility with the safety of the patient.

And here, so far as my own defence is concerned, this communication might cease, but the exigencies of the important subject out of which it springs demand my going a little further.

Now, it must be admitted that a prescriber of known experience, in inadvertently writing strychnia for nux vomica, or perchloride of mercury for calomel, would not be likely to *authenticate it by any special mark*. It seems to me that this would never be a real difficulty to any of us.

But supposing a prescription containing ʒiv doses of tinct. digitalis, or gr. x. doses of ext belladonnæ, properly authenticated, from a well-known physician—are we to refuse them or to dispense them?

As to myself, the latter alternative would be adopted without much hesitation. For although it may be true that small doses of both of these powerful drugs have been known to produce very serious symptoms, still on the other hand we know that in peculiar forms of disease very unusnal doses are given with positive benefit.

As to the exhibition of digitalis in *delirium tremens*, sufficient has already been said in this Journal, as well as in the medical publications, but is it also well known that fabulously large doses of ext. belladonnæ have been given in chorea? I have many times made up even larger doses than 10 grains. Dr. Fuller, of St. George's Hospital mentions in one of his works the very large doses he has given with success.

In Royle and Headland's 'Materia Medica,' fourth edition, 1865, the dose is given as gr. ss.—gr. j gradually increased to gr. v, so that although gr. x doses might be justly considered unusual, they could scarcely be considered as alarmingly dangerous *under all circumstances*. And if a prescription properly authenticated were submitted to me to dispense, although it contained such unusual dose, I should suppose it to have been gradually taken up to this quantity, and that there was no real cause for concern. Without some special mark, certainly I should not dispense it.

Whatever amount of freedom in this matter we may allow to ourselves, we must under all events leave the great burden of responsibility upon the prescriber; having ascertained the standing of the medical man, and his authentication of the dose, we shall not run any great risk.

It is much to be desired that this discussion may be productive of good, and that the medical profession may see the necessity for meeting our just demands in this matter. If they will do this and endeavour to make their writing easily legible, and as free from perplexing hieroglyphics as possible, they will be justly entitled to our warmest thanks.

ONE WHO HAS KNOWN THE DRUG TRADE MORE THAN THIRTY YEARS.

"*Pharmacien.*"—(1) *Salvia Verbenaca.* (2) *Centaurea scabiosa*, var. *alba.* (3) *Reseda alba.* We should be glad to hear from what locality this plant was collected. (4) *Reseda lutea.* (5) Probably *Reseda lutea*: send a specimen with leaves and flowers. (6) *Trifolium arvense.* (7) *Sinapis incana.* (8) *Diplotaxis tenuifolia.* (9) *Matricaria inodora.* (10) *Centaurea calcitrapa.*

"*Truth.*"—As we stated in our former answer, the preliminary operation is to be conducted at the ordinary temperature of the atmosphere. The word "infuse" does not necessarily imply the application of heat.

H. W. Harris.—We think the binoxide would be meant. It occurs naturally as a mineral which is sometimes very pure. For its method of preparation artificially we must refer you to some work on chemistry.

"*Ne Sutor ultra Crepidam.*"—We do not think the method adopted by you was what was intended. A plan frequently adopted is to decolorize by adding to tinct. iodi. a sufficiency of liq. ammon. fort. and filter. Squire gives a formula for a liquor ammoniæ iodidi prescribed by Sir J. Y. Simpson, as follows:—"Liq. ammon. fortiss, 2 oz.; iodine, 10 grains; iodide of potassium, 20 grains; rectified spirit, 1 oz.: dissolve."

"*Graham.*"—See preceding answer.

L. X. Y.—The answer to your question would depend upon whether the widow is at present conducting the business as a registered chemist and druggist in her own right, or as a trustee. We should recommend you to communicate, giving full particulars, with the Registrar, 17, Bloomsbury Square.

The Report of the Manchester Chemists' Assistants' Association has been received, but too late for insertion this week.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Shaw, Kinninmont, Abraham, G. Brown, Long, A. Thompson, E. L. H., P. L., N. H., "A Country Firm."

CINCHONA CULTIVATION IN JAVA.

The examination of Java Cinchona barks commenced by K. W. van Gorkom some months since has been continued by him, and the results obtained are in general very satisfactory. It appears from a translation of his report by Dr. C. Hasskarl* that the several varieties of *Cinchona officinalis* contain different amounts of alkaloid, and that the small-leaved varieties are richest in quinine. The sample No. 29 is taken from a tree which is probably identical with the variety now very frequently cultivated in British India and there known by the name of *Cinchona officinalis Bonplandia* var. *angustifolia*. This variety is very rich in quinine. The opinion that *Cinchona officinalis* would require to be grown at a considerable elevation above the sea level, in order that it might furnish the maximum amount of alkaloid in its bark, is in this instance to some extent supported, for the barks of Kawah-Tjiwidai and Randja Bolang, grown at an elevation of 1950 metres, were those containing the smallest amounts of alkaloid. The examination of *Cinchona Calisaya* is also important in its results. There are likewise different varieties of this bark, and the amounts of alkaloid they contain are different. Those of Ledger's, Nos. 40 to 42, were examined because their identity was doubted. The results of analysis show that sample No. 40 belongs to another variety, while Nos. 41 and 42, although very rich barks, are nevertheless inferior to the true (?) *Cinchona Calisaya*, Nos. 43 and 44, which is always characterized by very small white flowers and very small fruit. The plants from which seed is taken are always examined previously. *Cinchona Caloptera* yields a bark very well suited for pharmaceutical purposes. The *Cinchona lancifolia*, No. 49, also furnishes a very excellent bark, and the examination of this kind will be continued subsequently.

Resumé of the Results of Analyses of Java Cinchona Barks during the 2nd Quarter of 1873.

No.	Cinchona.	Leaf.	Locality.	Planted.	Water.	Neutral Alkaloid Tartrates.	Quinine.	Cinchonidine.	Quinidine.	Cinchonine.	Amorphous Alkaloid.	Total Alkaloids.	Quinine Sulphate calculated.
26	Officinalis.	Broad.	Lembang.	1870	12·77	6·35	2·33	3·13	none.	0·71	0·80	6·97	3·13
27	,,	,,	Raong-gunung.	1868	13·32	6·25	3·27	1·59	trace.	0·21	0·80	5·87	4·30
28	,,	Average.	,,	,,	12·77	8·34	5·19	1·58	,,	0·86	0·20	7·83	6·98
29	,,	Very small.	,,	,,	13·07	7·90	5·86	0·74	,,	0·62	0·45	7·67	7·89
30	,,	Small, very pointed.	,,	,,	13·37	7·20	5·42	0·39	,,	0·44	0·64	6·89	7·29
31	,,	Three varieties mixed	Kawah-Tjiwidai.	1869	13·74	3·87	1·75	1·38	,,	0·34	0·26	3·73	2·35
32	,,	Broad.	,,	1868	12·17	8·64	2·68	4·29	none.	0·21	0·67	7·85	3·61
33	,,	,,	Rantja Bolang.	,,	9·07	5·35	2·71	1·61	trace.	0·35	0·96	5·63	3·64
34	,,	,,	Tjiburrum.	,,	9·14	5·99	4·25	0·76	none.	0·20	0·69	5·90	5 72
35	,,	Small, very pointed.	Raong-gunung.	,,	14·48	10·36	5·92	2·47	,,	0·19	0·91	9·49	7·98
36	Calisaya (Schuhkraft)	,,	Lembang.	1865	14·45	1·07	0·40	0·46	trace.	2·74	0·63	4·23	0·55
37	,, (crop)	,,	Nagrak.	,,	13·32	4·18	1·80	1·56	0·40	0·32	0·17	4·25	2·42
38	,, (Schuhkraft)	,,	Tjomas.	,,	14·00	1·28	1·04	trace.	0·48	2·03	0·66	4·21	1·40
39	,, (crop)	,,	Lembang.	1867	13·59	1·43	0·56	0·59	trace.	0·09	0·20	1·44	0·75
40	,, (Ledger)	Long fruit.	Nagrak.	,,	14·49	5·18	2·28	1·91	,,	0·33	0·70	5·22	3·07
41	,, ,,	,,	Tjiburrum.	,,	8·51	6·24	5·07	none.	0·91	0·50	0·63	7·11	6·82
42	,, ,,	,,	Raong-gunung.	,,	13·85	4·90	3·88	,,	1·02	0·96	0·99	6·85	5·22
43	,, ,,	,,	,,	,,	14·41	10·88	8·83	,,	none.	0·10	0·91	9·84	11·88
44	,, ,,	,,	,,	,,	14·73	11·20	9·09	,,	,,	0·17	1·21	10·47	12·23
45	Caloptera (seed plant)	,,	Tjiniruan.	,,	8·63	2·65	1·83	0·27	,,	0·17	0·79	3·06	2·46
46	Caloptera (crop of 1872)	,,	,,	,,	12·71	2·03	1·38	0·26	,,	2·28	2·00	5·92	1·86
47	Caloptera (young plant)	,,	,,	1865	14·37	1·02	0·65	0·16	,,	2·78	1·23	4·72	0·87
48	Lancifolia (from a dead tree)	,,	,,	,,	13·25	2·66	0·79	1·35	,,	0·72	0·47	3·33	1·06
49	Lancifolia.	,,	,,	,,	7·10	6·08	4·75	0·19	0·06	0·93	1·03	6·96	6·39
50	Succirubra.	,,	Lembang.	1869	15·00	9·98	1·67	6·36	none.	0·70	1·83	10·56	2·25
51	,,	,,	Kawak-Tjiwidai.	,,	12·98	7·44	1·06	4·39	,,	0·53	1·33	7·85	1·42
52	Pahudiana.	,,	Tjiboddas.	1854	13·20	1·54	0·30	0·73	,,	trace	0·46	1·49	0·40

The climate of Lembang appears to be favourable for the cultivation of *Cinchona succirubra*. The bark of *Cinchona Pahudiana* was obtained from one of the oldest trees planted by Hasskarl at Tjiboddas. The trees in those plantations have not been under regular inspection since 1866. Their bark is thick and of fine appearance; but the results of analysis entirely confirm the opinion already expressed, although the trees are now nearly twenty years old.

The weather during the second three months of this year was very favourable to the growth of cinchona plantations. There were again as many as 29,935 young trees planted out and there are now 1,800,252 plants. In the operations of stripping and drying the bark the wives of the workmen are employed on day wages. The harvest is commenced about the end of May; and though the showery weather at that time hinders the drying to some extent, as much as 7000 kilos of bark have been prepared for delivery. About 2000 cinchona plants have been distributed in Java among private plantations as well as those cultivated by the Government. Seeds also are in constant demand, and are always supplied. Thirteen samples of Java bark have also been sent to the chemists attached to the cinchona plantations in British India for comparative examination, and samples for the like purpose are expected from thence.

* *Pharmaceutische Zeitung*, 4th October, 1873.

BISMUTH, ITS ALLOYS WITH THE ALKALINE METALS AND ITS PURIFICATION.*

BY C. MÉHU.

Although the Codex recommends the process of purification of bismuth by nitrate of potassium, it is nevertheless true that there is no certainty of thus obtaining, at the first operation, bismuth free from sulphur and arsenic. I have long sought for a more

* 'Annuaire Pharmaceutique,' 1873, p. 23.

advantageous and certain method of purification, and the following is the result of my researches.

When commercial bismuth is heated over a spirit-lamp in a glass test-tube closed at one end, any arsenic that may be present in it forms above the metallic layer a ring of white crystalline arsenious acid composed of well defined octahedric crystals. Sulphur gives no such ring ; but is volatilized in the state of sulphurous acid. This test therefore appears to me to have little to recommend it, except to detect arsenic, for which it is a very delicate one. Commercial bismuth, which I have melted with 5 per cent. of sulphur, has nevertheless given a ring of arsenious acid in microscopic crystals without admixture with sulphur. Pure bismuth gives no similar reaction, and this simple and easy test allows of rapid estimate being made of the quality of a commercial bismuth. But I do not pretend to say that it will satisfy every requirement.

From the foregoing it will appear that in order to purify bismuth contaminated by sulphur and arsenic it is necessary to keep it melted at a sufficiently high temperature, and in the open air, throwing upon the sides of the vessel the oxide of bismuth as quickly as it is formed. Arsenic and sulphur are volatilized as arsenious and sulphurous acid. It is especially for the removal of arsenic that I recommend this roasting, for it is much more easy to remove sulphur. The following experiments form the basis for a more perfect process :—

In an earthern crucible I placed a mixture of 200 grams of powdered commercial bismuth and 100 grams of dried tartrate of potash and soda. The crucible was closed and kept at a red or even a white heat for about an hour, and at the end of that time the metal was run into a mould ; it then weighed 198 grams. It was besides possible to find some metallic granules in the scoriæ. In this operation I have often replaced the tartrate of potash and soda by a tartrate of potash with one or two equivalents of potash, and by a tartrate of soda with two equivalents of soda. In every case I obtained 198 grams of the metal.

At the temperature of red heat the tartrates are transformed into carbon and alkaline carbonates, then into caustic alkalies, and partially into metallic potassium and sodium. These alkaline metals combine with the bismuth. The tartrate of potash and soda gives a mixture of carbonates of potash and soda much more fusible than either of the alkaline carbonates separately.

I would direct attention to the first result. The dross which floated on the top of the metal was black ; not only because it contained carbon in its bulk, but also because it contained sulphide of bismuth. This was proved easily by heating the dross with water acidulated with hydrochloric acid, which caused a disengagement of sulphuretted hydrogen. As the alkaline tartrates used by me in my experiments were perfectly pure, the presence of the sulphides in the scoriæ could only be attributed to the reduction of alkaline sulphates in the melting. It should be observed, therefore, that this operation deprives the bismuth of any sulphur which it may contain.

The employment of the alkalies at a high temperature does not cause a loss of one per cent. It is true, that the bismuth retains some of the alkaline metal which compensates a greater loss. In operating upon previously purified bismuth, I ascertained that there was no loss in weight, because the alkaline metal replaced the volatilized bismuth ; in one case I found a slight augmentation.

An alloy of bismuth and an alkaline metal has a slightly less shiny and rosy appearance than pure bismuth. The iridescence of bismuth not only charms the eye, but is an evidence of the good quality of the metal, in which it indicates the commencement of oxidation. When much potassium has been present the bismuth has appeared to me more brittle, and its fracture greyish.

Although the surface of such an alloy may have been washed with water acidulated with hydrochloric acid, then briskly rubbed with sand, so as to remove every trace of scoriæ, and again washed and well-dried, the surface exposed to the air gradually becomes moist and tarnished. The moisture has an alkaline taste, insupportable by its causticity. An ingot broken and placed immediately upon the tongue produces a sensation of burning, and the metallic surface becomes covered with a lather, due to the disengagement of hydrogen produced by the decomposition of the water of the saliva.

Placed in water this alloy disengages hydrogen and combines with the oxygen ; the reaction continues for some time, gradually becoming feebler. The alloy is a slightly porous body.

When kaliferous bismuth is thrown into boiling water, there occurs immediately a tumultuous disengagement of hydrogen in great quantity. I have in this manner collected hundreds of cubic centimetres of inflammable hydrogen. When powdered the metal does not so easily produce the effect ; the powdered metal blackens rapidly, becomes strongly heated, and aggregated, and decomposes the humidity of the atmosphere. When the alloy has been obtained with tartrate of potash alone, it contains potassium : in the air its surface becomes covered with a layer of caustic potash ; gradually this absorbs carbonic acid from the air, and is converted into deliquescent carbonate of potash. If the alloy has been obtained with tartrate of soda it contains sodium : in the air it becomes covered with caustic soda, which is gradually converted into carbonate of soda, an efflorescent salt which covers the metal with a thick white layer. This finally becomes dry and powdery, and is easily removed by rubbing. With tartrate of potash and soda the alloy becomes eventually covered with a mixture of carbonate of potash and soda.

To obtain a bismuth as fully charged with an alkaline metal as possible, I recommend the employment of a crucible lined with charcoal, to operate at a high temperature, not to run the metal into an ingot, but collect it at the bottom of the crucible. The scoriæ solidify quickly when soda is employed ; but I have preferred potash or a mixture of the two as being more fusible. The addition of charcoal diminishes the action of the melted alkali upon the crucible. A crucible can scarcely serve for more than one operation.

Nothing is more easy than to free such an alloy from potassium or sodium. For this it should be melted in a porcelain capsule or iron vase exposing a large surface. Gradually the alkaline matter oxidizes, and if it be an alloy of bismuth and potassium a liquid layer of caustic potash is formed on the surface of the bismuth (which has the appearance of mercury under a layer of oil). When the bismuth contains no more potassium it commences to oxidize in its turn, its surface being then covered with a layer of yellow-brown oxide. At this point the metal should

be run off. During the oxidation of the alkaline metal, the caustic potash has formed a protecting varnish on the surface of the bismuth, and preserved it from oxidation. It is necessary to throw the layer of melted potash on to the sides of the crucible, and this may be done more readily if from time to time fragments of wood, paper, starch, etc., be thrown in; these convert it into the less fusible carbonate. The alkali dissolves a small quantity of oxide of bismuth.

It may happen that the bismuth retains a trace of potassium, which will cause no inconvenience when it is to be used in the preparation of the subnitrate. In such a case the metal tarnishes after a time, and the surface becomes alkaline.

The alkaline metal may be completely removed by melting with a small quantity of nitrate of potash, or, more simply, by stirring the fused mass with a wooden rod.

In this operation the alkaline metal carries with it, in oxidizing, such sulphur and arsenic as may not have been already converted into alkaline sulphide and arsenide. But although it is easy to remove the sulphur it is difficult to remove the last traces of arsenic.

The estimation of the quantity of alkaline metal contained in the bismuth yielded by the foregoing experiments appeared at first to be a difficult operation, but consideration has led me to the following method, which I believe to be satisfactory. I melt in a porcelain capsule 50 grams of the alloy, keeping the capsule over the flame of a spirit-lamp, and throwing on the side the layer of alkali as fast as it is formed, until the bismuth commences to oxidize. The alkaline oxide is then dissolved in water, the small quantity of metallic oxide that it contains removed by a current of sulphuretted hydrogen, the solution filtered, partly evaporated, saturated with dilute hydrochloric acid, finally evaporated to dryness, and heated to a dull red heat. The weight of chloride of potassium or sodium obtained serves to calculate that of the alkaline metal. In a button I have found 4·65 per cent. of potassium. In an ingot, washed for a long time, only 2·8 per cent. In another ingot, 3·22 per cent.

Purified bismuth is notably more malleable when hot than when cold. About 100° C. it may be bent, but I have never succeeded in bending it completely into a ring. It crackles when bent, like tin. When cold it is too brittle for this phenomenon to be appreciable.

It is entirely soluble in *pure* nitric acid. The solution is colourless; when concentrated it deposits fine crystals of nitrate of bismuth. Thrown into water it gives a glittering white subnitrate. The use of impure nitric acid in the preparation of subnitrate of bismuth is more frequently than is thought the source of many impurities.

In reducing to a metallic state the residues of bismuth, particularly the tannate, citrate, and sulphide, I have always preferred to roast them upon an iron plate heated to redness, which leaves an oxide of bismuth. This, thoroughly mixed with carbonates of potash and soda, and charcoal, gives easily a metallic button when heated to a red heat in a closed crucible. I have often replaced a portion of the charcoal by colophane or dried soap. The mixed carbonates of potash and soda fuse more readily than either carbonate separately, and considerably facilitate the aggregation of the metallic globules of the reduced bismuth. On the contrary, a considerable loss results by operating directly upon the bismuth salt, whether organic or not, and sometimes no result is obtained.

When impure commercial bismuth is dissolved in nitric acid, "it is observed," says Fourcroy, "that a black insoluble powder is detached from the metal, which Pott has regarded as an oxide of bismuth, and which other chemists have taken for sulphur. It is not yet known whether it is not carbon." This substance is at first sulphide of bismuth, which the nitric acid rapidly decomposes; the metal oxidizes at the expense of the acid, and the sulphur becomes free. This impure sulphur, at first greyish, eventually becomes a clear yellow when treated with dilute nitric acid. If the solution be sufficiently heated, the sulphur melts and collects into a soft paste, formed of amorphous sulphur. This black powder is especially abundant if the metal has been artificially impregnated with one to five per cent. of sulphur.

In order to clear up this point I have precipitated citrate of bismuth dissolved in ammonia by monosulphide of sodium. I have collected the brown-black sulphide of bismuth, and washed it for a long time in recently-boiled lukewarm water, and while moist treated it with pure nitric acid. Even in the presence of a dilute acid the sulphide immediately yielded its metal to the acid with disengagement of nitrous vapours, and the boiling liquor was covered with sulphur in a grey paste, becoming more and more yellow. A large quantity of yellow sulphur floated in the capsule. This sulphur is in great part insoluble in bisulphide of carbon; but upon heat being applied, it becomes soluble in that solvent.

In continuing the action of pure nitric acid upon sulphuretted bismuth the sulphur passes slowly to the state of sulphuric acid, which gives sulphate of bismuth. In concentrating the liquor it takes more and more the yellow colour of sulphur, and deposits sulphate of bismuth mixed with sulphur; the deposit is yellowish white. By adding distilled water freely a deposit is produced of subnitrate containing subsulphate of bismuth, whilst the acid mother liquor, added to a solution of nitrate of baryta acidified by pure nitric acid, yields a deposit of sulphate of baryta, insoluble in strong nitric acid, and reducible to sulphide of barium when heated with carbon to a high temperature.

The subnitrate of bismuth mixed with subsulphate, treated with a boiling solution of pure bicarbonate of potash, gives an alkaline solution in which sulphate of potash may easily be detected.

It appears therefore that the action of nitric acid upon sulphuretted bismuth introduces free sulphur into the subnitrate of bismuth, and if the acid reacts sufficiently long, and with a high degree of concentration, all the sulphur is converted into sulphuric acid; hence the presence of subsulphate in subnitrate of bismuth. The use of nitric acid containing sulphuric acid leads to the same result.

To sum up, the preceding experiments demonstrate —(1) The ready formation of alloys of bismuth with the alkaline metals. (2) The necessity of preparing the subnitrate of bismuth with ingredients of irreproachable purity. (3) The influence of the alkaline metals in removing from bismuth the last traces of sulphur and arsenic left by the roasting.

For the purification of bismuth I propose the following process. Melt the metal in a vessel presenting a large surface, at a temperature considerably above its fusing point. The result is an oxidation of

one-fourth of the metallic mass and a disengagement of sulphurous and arsenious acids. Let the metal cool and then reduce the mass to powder, mixing with it the oxide of bismuth. Then add carbonate of potash (one-fourth the weight of the original metal) quite free from sulphates, charcoal and dried soap. Place this mixture into a crucible which will be about five-sixths filled by it, and then complete the filling with well-washed vegetable carbon. Cover the crucible and keep it for about one hour at a red heat. At the end of that time run the metal into a mould, or, better still, let the crucible cool, when at the bottom will be formed the button of bismuth charged with potassium. I have already described the process for removing the alkaline metal.

Although in my experiments in order to be more precise I used the alkaline tartrates, I am convinced that in ordinary practice they may be replaced by the alkaline carbonate, combined with charcoal. I would also repeat that vegetable charcoal, and especially the use of a lined crucible, prevents the perforation of the crucible and facilitates the production of the purifying alkaline metal. But nevertheless, with bismuth much impregnated with arsenic, a single operation is not always sufficient.

This method would not apply to the elimination of copper or lead which might occur accidentally alloyed with the bismuth. Fortunately in the preparation of the subnitrate, copper and lead would remain in the mother liquor. Moreover I have never met with them in the specimens of bismuth that I have examined.

TEA.*

BY J. ALFRED WANKLYN.

There is no doubt that tea is sometimes adulterated with iron-filings and other preparations of iron, and when public analysts have found that iron had been put into tea leaves they have doubtless, in some instances, found that which really had taken place.

The ash of genuine tea leaves, however, contains iron, and by no means a small proportion of it. In a paper by Zöller (Liebig's *Annalen*, May, 1871), the percentage of oxide of iron in the ash of tea leaves is given as 4·38 per cent. The importance of this determination depends upon the circumstance of the tea having been received direct from the growers, who were personal friends of Liebig; in that instance, therefore, there could be no question of adulteration. It may be interesting to reproduce Zöller's analysis, which is as follows :—

Potash	39·22
Soda	0·65
Magnesia	6·47
Lime	4·24
Oxide of Iron	4·38
Protoxide of Manganese	1·03
Phosphoric Acid	14·55
Sulphuric Acid	trace
Chlorine	0·81
Silica	4·35
Carbonic acid	24·30
	100·00

From this it is abundantly manifest that the mere qualitative detection of oxide of iron in the ash of tea is no valid proof of adulteration; and that in order to make out a case it is necessary to show sensibly more than 4 per cent. of oxide of iron in the ash.

On the present occasion I wish to call the attention of public analysts to the importance of investigating the ash of samples of tea. Zöller found the ash of tea leaves to be 5·63 per cent., using in his investigation tea leaves of guaranteed purity. I find that commercial tea yields a very similar result, as is seen from the following analysis made in my own laboratory :—

	Percentage of Ash.
Specimen of Tea used by myself	5·63
Civil Service Tea	5·56
Horniman's Tea	5·99
Mandarin's Tea, 8*s.* per lb.	5·30
Orange Pekoe, 5*s.* per lb.	5·84
Do. do.	6·60
Green Tea, 4*s.* 6*d.* per lb.	5·86
Average	5·75

These determinations were made on tea in its ordinary air-dried condition, and agree sufficiently with Zöller's. The proportion of ash in absolutely dry tea is 5·92 per cent.

Zöller further calls attention to the composition of the ash of spent tea leaves. This, as might be expected, is far less rich in alkalies, being far less soluble. Zöller's analysis is as follows :—

Potash	7·34
Soda	0·69
Magnesia	11·45
Lime	10·76
Oxide of Iron	9·53
Protoxide of Manganese	1·97
Chlorine	trace
Phosphoric Acid	25·41
Sulphuric Acid	trace
Silica	7·57
Carbonic Acid	25·28
	100·00

This ash, as a matter almost of course, must be composed mainly of material insoluble in water.

For practical purposes, that is to say for use by the public analysts, a complete analysis of the ash would be too cumbrous and troublesome. A great deal of information may, however, be gathered from a tolerably simple operation, viz., from a determination of the relative quantities of soluble and insoluble ash in tea leaves. With the object of rendering a determination of this sort available, I have made such determinations on dried leaves of various kinds. The leaves, with the exception of the tea and Paraguay tea leaves, were gathered by my assistant on the 24th of August this year. The following are the results :—

	Percentages on the Dried Leaves. The Ash.		
	Total.	Soluble in Water.	Insoluble in Water.
1. Common Tea	5·92	3·55	2·37
2. Paraguay Tea	6·28	4·22	2·06
3. Beech	4·52	2·00	2·52
4. Bramble	4·53	1·84	2·69
5. Raspberry	7·84	1·72	6·12
6. Hawthorn	8·05	3·78	4·27
7. Willow	9·34	4·16	5·18
8. Plum	9·90	5·66	4·24
9. Elder	10·67	3·19	7·48
10. Gooseberry	13·50	7·83	5·67

From this table it will be apparent that the ash of Paraguay tea is the only ash capable of being mistaken for the ash of tea; the total percentage would of itself exclude all the others. The ash of Paraguay tea is, however, distinguished from the ash of common tea by containing a higher proportion of soluble matter.

The ash of beech and of bramble is distinguished from that of tea by being too small in amount, and by containing too little soluble matter. All the rest are exceedingly unlike tea ash.

The determinations of the total, the soluble, and the insoluble ash in leaves are made with great facility. Dried leaves burn up with great ease; and, for the pur-

* Reprinted from the *Chemical News*.

pose of getting a complete combustion there is no occasion for the employment of nitric acid. I am in the habit of employing about 2 grms. of the dried leaves for the experiment. These I burn in a small platinum dish, and when the resulting ash has become grey, I allow the dish to cool and weigh it together with its contents. The ash is then heated to boiling with a little water, and the solution filtered, and the filtrate evaporated to dryness in a small platinum dish ; the resulting residue is then ignited, cooled, and weighed. Thus I get determinations of "total ash" and "soluble ash ;" the "insoluble ash" is found by difference.

Sand is sometimes found in tea-leaves ; this is very easy of detection. It will, of course, remain in the insoluble portion of the ash, and refuse to dissolve when that is treated with hydrochloric acid. The portion of real tea-ash which is insoluble in water is almost entirely soluble in hydrochloric acid.

Very many uses may be made of a determination of the ash in a sample of tea. As an example of what may be learnt from such determinations, I will cite an imaginary case, which, however, finds its parallel in practice. Let us suppose that the tea yielded the normal proportion of ash, viz., 5·75 per cent. on the air-dried leaves, and let us suppose that one-third of this consisted of sand. With these data before him the analyst would be justified in finding, not only that there was a little sand in the tea, but that at least one-third of the sample did not consist of genuine tea, but either of some other kind of leaf or of spent tea (which is not so rich in ash as genuine tea).

On a future occasion I hope to publish further researches on tea. I will conclude now with an expression of my conviction that a little careful chemical work bestowed on the subject of tea would render the examination of it highly certain and satisfactory.

THE VEGETABLE COLOURING MATTER FOUND IN MADDER.*

BY W. J. RUSSELL, PH.D., F.R.S.

Of late years it has been the custom of my predecessors in this chair to open the business of the Section with an address, and the subject of this address has almost invariably been a review of the progress of Chemistry during the past year; I purpose, with your leave, to-day to deviate somewhat from this precedent, and to limit my remarks, as far as the progress of Chemistry is concerned, to the history of one chemical substance. The interest and the use of an annual survey at these meetings of the progress of Chemistry has to a certain extent passed away; for the admirable abstracts of all important chemical papers now published by the Chemical Society has in a great measure taken its place, and offers to the chemical student a much more thorough means of learning what progress his science is making than could possibly be done by the study of a presidential address. Doubtless these abstracts of chemical papers are known to others than professional chemists; but I cannot pass them over without recording the great use they have proved to be, how much they have done already in extending in this country an exact knowledge of the progress of science on the Continent, and in helping and in stimulating those who are engaged in scientific pursuits in this country. I believe few grants made by this Association have done more real good than those which have enabled the Chemical Society to publish these abstracts.

I dwell for a moment on the doings of the Chemical Society, for I believe in the progress of this Society we have a most important indication of the progress of chemical science in this country. The number of original papers communicated to the Society during the last year has far exceeded that of previous years; during last year fifty-eight papers were read to the Society, whereas the average number for the last three years is only twenty-nine. Further, I may say there is every appearance of this increased activity not only continuing but even increasing. Another matter connected with the Society deserves a passing word: I mean its removal from its old rooms at Burlington House, which afforded it very insufficient accomodation, to its new ones in the same building. This transference, which is now taking place, will give to the Society a great increase of accommodation, and thus admit of larger audiences attending the lectures, of the proper development of the library, and of the full illustration, by experiment, of the communications made to it. These improvements must act most beneficially on the Society, and stimulate its future development; even now it numbers some 700 members, and certainly is not one of the least active or least useful of the many scientific societies in London.

Since our last meeting at Brighton we have lost the most renowned of modern chemists, Liebig. His influence on chemistry through a long and most active life has yet to be written. Publishing his first paper fifty years ago, it is difficult for chemists of the present day to realize the changes in chemical thought, in chemical knowledge, and in chemical experiment which he lived through, and was, more than any other chemist, active in promoting. His activity was unwearied; he communicated no less than 317 papers to different scientific journals, and almost every branch of chemistry received some impetus from his hand.

Liebig took an active interest in this Association, and I believe the last paper he wrote was one in answer to a communication made at the last Meeting of this Association. On two occasions he attended Meetings of the British Association, and has communicated many papers to this Section. The Meeting at Liverpool in 1837 was the first at which he was present; he then communicated to this Section a paper on the products of the decomposition of Uric Acid, and further, gave an account of his most important discovery, made in conjunction with Wöhler, of the artificial formation of Urea. At this Meeting Liebig was requested to prepare a report on the state of our knowledge of isomeric bodies. This request, although often repeated, was never complied with. He was also requested to report on the state of Organic Chemistry and Organic Analysis; thus our Section was evidently desirous of giving him full occupation. At the Meeting in 1840, at Glasgow, a paper on Poisons, Contagions, and Miasms, by Liebig, was read; it was, in fact, an abstract of the last chapter in his book on Chemistry in its applications to Agriculture and Physiology; and the work itself appeared about the same time, dedicated to this Association. In his dedication Liebig says:—"At one of the meetings of the Chemical Section of the British Association for the Advancement of Science, the honourable task of preparing a Report upon the State of Organic Chemistry was imposed upon me. In this present work I present the Association with a part of this Report."

At the next Meeting, which was at Plymouth in 1841, there was an interesting letter from Liebig to Dr. Playfair read to our Section; in it, among other matters, Liebig describes an "excellent method," devised by Drs. Will and Varrentrapp, for determining the amount of nitrogen in organic bodies: he also says we have repeated all the experiments of Dr. Brown on the production of silicon from paracyanogen, but we have not been able to confirm one of his results; what our experiments prove is, that paracyanogen is decomposed by a strong heat into nitrogen gas and a residue of carbon, which is exceedingly difficult of combustion.

To the next Meeting (which was at Manchester, and Dalton was the President of this Section) Dr. Playfair communicated an abstract of Prof. Liebig's report on Organic Chemistry applied to Physiology and Pathology: this abstract is printed in our 'Proceedings,' and the complete work is looked upon as the second part of the report on Organic Chemistry. This Association may therefore fairly consider that it exercised some influence

* Presidential Address to the Chemical Section of the British Association, delivered at Bradford, Sept. 18, 1873.

on Liebig in the production of the most important works that he wrote. Playfair's abstract must have been listened to with the greatest interest, and I doubt not the statements made were sharply criticized, especially by the physiologists then at Manchester. Playfair concludes his abstract in these words, thus summing up the special objects of these reports:—"In the opinion of all, Liebig may be considered a benefactor to his species for the interesting discoveries in agriculture published by him in the first part of this report. And having in that pointed out means by which the food of the human race may be increased, in the work now before us he follows up the chain in its continuation, and shows how that food may best be adapted to the nutrition of man. Surely there are no two subjects more fitted than these for the contemplation of the philosopher; and by the consummate sagacity with which Liebig has applied to their elucidation the powers of his mind, we are compelled to admit that there is no living philosopher to whom the Chemical Section could have more appropriately entrusted their investigation."

At the Meeting at Glasgow in 1855 Liebig was also present, but he then only communicated to this Section a short paper on fulminuric acid, and some remarks on the use of lime-water in the manufacture of bread.

Such, I believe, is the history of the direct relationship which has existed between Liebig and this Association. Indirectly we can hardly recognize how much we owe to him. Interested as he ever was in the work of this Association, I could not but to-day record the instances of direct aid and support which this Section has received from him.

I pass on now to the special subject to which I wish to ask your attention. It is the history of the vegetable colouring-matter found in madder: it has been in use from time immemorial, and is still one of the commonest and most important of dyes; it is obtained from a plant largely cultivated in many parts of the world for the sake of the colour it yields; and the special interest which now attaches to it is that the chemist has lately shown how this natural colouring-matter can be made in the laboratory as well as in the fields—how by using a by-product which formerly was without value, thousands of acres can be liberated for the cultivation of other crops, and the colouring-matter which they formerly produced be cheaper and better prepared in the laboratory or in the manufactory. That a certain colouring-matter could be obtained from the roots of the *Rubia tinctorum* and other species of the same plant has been so long known that apparently no record of its discovery remains. Pliny and Dioscorides evidently allude to it. The former, referring to its value as a dyeing material, says:—"It is a plant little known, except to the sordid and avaricious; and this because of the large profits obtained from it, owing to its employment in dyeing wool and leather." He further says:—"The madder of Italy is the most esteemed, and especially that grown in the neighbourhood of Rome, where and in other places it is produced in great abundance." He further describes it as being grown among the olive-trees, or in fields devoted especially to its growth. The madder of Ravenna, according to Dioscorides, was the most esteemed. Its cultivation in Italy has been continued till the present time, and in 1863 the Neapolitan provinces alone exported it to the value of more than a quarter of a million sterling. At the present day we are all very familiar with this colouring-matter as the commonest that is applied to calicoes: it is capable of yielding many colours, such as red, pink, purple, chocolate, and black. The plant which is the source of this colouring-matter is nearly allied, botanically and in appearance, to the ordinary Galiums or Bedstraws. It is a native probably of Southern Europe as well as Asia. It is a perennial, with herbaceous stem which dies down every year; its square-jointed stalk creeps along the ground to a considerable distance, and the stem and leaves are rough, with sharp prickles. The root, which is cylindrical, fleshy, and of a pale yellow colour, extends downwards to a considerable depth; it is from this root (which, when dried, is known as madder) that the colouring-matter is obtained. The plant is propagated from suckers or shoots; these require some two or three years to come to full maturity and yield the finest colours, although in France the crop is often gathered after only eighteen months' growth. From its taking so long to develop, it is evidently a crop not adapted to any ordinary series of rotation of crops. The plant thrives best in a warm climate, but has been grown in this country and in the north of Europe.

In India it has been grown from the earliest times, and, as before stated, has been abundantly cultivated in Italy certainly since the time of Pliny; he also mentions its cultivation in Galilee. In this country its culture has often been attempted, and has been carried on for a short time, but never with permanent success. The madder now used in England is imported from France, Italy, Holland, South Germany, Turkey, and India. In 1857 the total amount imported into this country was 434,056 cwt., having an estimated value of £1,284,989; and the average annual amount imported during the last seventeen years is 310,042 cwt., while the amount imported last year (1872) was 283,274 cwt., valued at £922,244. In 1861 it was estimated that in the South Lancashire district alone 150 tons of madder were used weekly, exclusive of that required for preparing garancine. I quote these figures as showing the magnitude of the industry that we are dealing with. Another point of much interest is the amount of land required for the cultivation of this plant; in England it was found that an acre yielded only from 10 to 20 cwt. of the dried roots, but in South Germany and in France the same amount of land yields about twice that quantity. The madder cultivator digs up the roots in autumn, dries them, in some cases peels them by beating them with a flail, and exports them in the form of powder, whole root, or after treatment with sulphuric acid, when it is known as garancine.

The quality of the root varies much; that from the Levant, and known as Turkey-root, is most valued. According, however, to the colour to be produced is the madder from one source or another preferred. To obtain the colouring-matter, which is but very slightly soluble in water, from these roots, they are mixed, after being ground, with water in the dye-vessel, and sometimes a little chalk is added. The fabric to be dyed is introduced, and the whole slowly heated; the colouring-matter gradually passes from the root to the water, and from the water to the mordanted fabric, giving to it a colour dependent of course on the nature of the mordant.

To trace the chemical history of this colouring-matter we have to go back to the year 1790, when a chemist of the name of Watt precipitated the colouring-matter of madder by alum from neutral, alkaline, and acid solutions; he obtained two different colouring-matters, but could not isolate them, and many different shades of colour. Charles Batholdi asserted that madder contained much magnesic sulphate, and Hausmann observed the good effect produced on madder by the addition of calcic carbonate. In 1823 F. Kuhlmann made evidently a careful analysis of the madder-root, and describes a red and a fawn colouring-matter: but the first really important advance made in our knowledge of the chemical constitution of this colouring-matter was by Colin and Robiquet in 1827; they obtained what they believed to be, and what has since really proved to be, the true colouring principle of madder, and obtained it in a state of tolerable purity. Their process for preparing it was very simple: they took Alsace madder in powder, digested it with water, obtained thus a gelatinous mass, which they treated with boiling alcohol, then evaporated off four-fifths of the alcohol, and treated the residue with a little sulphuric acid to diminish its solubility; then, after washing it with several litres of water, they got a yellowish substance remaining. Lastly, they found that, on moderately

heating this product in a glass tube, they obtained a yellowish vapour formed of brilliant particles, which condensed, giving a distinct zone of brilliant needles, reflecting a colour similiar to that from the native lead chromate. They named this substance alizarin, from the Levant name for madder, *alizari*, the name by which it is still known there.

A few years later we find other chemists attacking this same subject. In 1831 Gaultier de Claubry and J. Persoz published the account of a long research on the subject; they describe two colouring-matters, a red and a rose one: the red one was alizarin, and the rose one was another body nearly allied to it, and now well known as purpurin. Runge also made an elaborate examination of the madder-root; he found no less than five different colouring-matters in it—madder-red, madder-purple, madder-orange, madder-yellow, and madder-brown. The first three he considers to be suited for dyeing purposes, but not so the last two. Runge's madder-red is essentially impure alizarin, and his madder-purple impure purpurin. He does not give any analysis of these substances.

During the next ten years this subject seems to have attracted but little attention from chemists; but in 1846 Shiel prepared the madder-red and madder-purple of Runge by processes very similar to those employed by Runge, and analysed these substances: for madder-red he gives the formula $C_{28}H_{18}O_9$, which differs only by H_2O from the formula now adopted; for the madder-purple he gives the formula $C_{28}H_{20}O_{15}$, and for the same substance after being sublimed $C_2H_8O_4$. The chemist who has worked most on this subject, and to whom we are principally indebted for what we know with regard to the different constituents contained in the madder-root, is Dr. Schunck, of Manchester. In Liebig's 'Annalen' for 1848 he gives a long and interesting account of his examination of madder; he isolates and identifies several new substances, which are most important constituents of the root, and has since that time added much to our knowledge of the chemical constitution of madder. In the paper above alluded to he confirms the presence of the alizarin, and gives to it the formula $C_{14}H_{10}O_4$. The principal properties of this body may best be sketched in here. Its volatility and brilliant crystalline appearance have already been mentioned; it is but slightly soluble in cold water, but much more so in alcohol, in ether, and in boiling water. The colour of its solution is yellow; and when it separates out from a liquid it has a yellow flocculent appearance, differing thus greatly from the red brilliant, crystalline substance before described. In order to obtain this latter body, heat had always been used; so, until the elaborate experiments of Schunck, it was a question whether the heat did not produce a radical change in the substance, whether, in a word, these two bodies were really identical. Schunck's experiments proved that they were, and consequently that this beautiful colouring-matter, alizarin, existed as such in madder. If, however, we go one step further back and examine the fresh root of the *Rubia tinctorum* (that is as soon as it is drawn from the ground), we shall shall find no trace of alizarin there. On slicing the root it is seen to be of a light carroty colour, and an almost colourless liquid can be squeezed out of it; but this is entirely free from the colouring-matters of madder. Let the roots, however, be kept if only for a short time, and then they will give abundant evidence of the presence of alizarin; if simply heated, alizarin may be volatilized from them. It appears, then, that the whole of the tinctorial power of this root is developed after the death of the plant. Schunck explains this curious phenomenon as follows:—In the cells of the living plant there is a substance which he has isolated and has named rubian; it is easily soluble in water and in alcohol; the solution is of a yellow colour, and has an intensely bitter taste; when dry it is a hard brown gum-like body. It has none of the properties of a dye-stuff; but if we take a solution of it, add some sulphuric or hydrochloric acid to it, and boil, a yellow flocculent substance will slowly separate out, and on filtering it off and washing it, it will be found to have the tinctorial properties of madder, and to contain alizarin. In the liquid filtered from it there is, with the acid added, an uncrystallizable sugar; so that in this way the original product in the root, the rubian, has apparently been split up into alizarin and into sugar. To apply this reaction to what goes on in the root after its removal from the ground, we have to find if any other substances can take the place of the boiling dilute acid; and Schunck has shown there exists in the root itself a substance which is eminently fitted to produce this splitting-up of the rubian. He obtained this decomposing agent from madder simply by digesting it in cold water and adding alcohol to the liquid; this threw down a reddish flocculent substance; and if only a small portion of this was added to an aqueous solution of the rubian and allowed to stand for a few hours in a warm place, it was found that the rubian was gone, and in place of it there was a thick tenacious jelly; this treated with cold water, gave to it no colour, no bitter taste, but much sugar. From the jelly remaining insoluble, alizarin could be extracted; in fact, of all known substances this very one found in the madder itself is best suited for effecting this decomposition of the rubian.

It has long been known to dyers that the amount of colouring-matter in madder will increase on keeping it; even for years it will go on improving in quality; and an experiment of Schunck's shows that the ordinary madder, as used by the dyer, has not all the rubian converted into colouring-matter; for on taking a sample of it and extracting with cold water, he got an acid solution devoid of dyeing properties; but on allowing this solution to stand some time it gelatinized, and then possessed dyeing properties.

It appears, then, that there must exist in the root two substances kept apart during the life of the plant in some way of which we know nothing; but as soon as it dies they begin slowly to act on one another, developing thus the colouring-matters in madder.

Coincident with the appearance of Schunck's first paper was one by Debus on the same subject: he looked upon alizarin as a true acid, and gave it the name of lizaric acid; but, as far as the composition of it was concerned, the percentage numbers he obtained agreed closely with those given by Schunck. One other investigation concludes all that is important in the history of alizarin as obtained from madder. This last investigation is of great interest; it was by Julius Wolff and Adolphe Strecker, and published in 1850; they confirm the results of others so far that there are in the madder-root two distinct colouring-substances, this important one alizarin, and the other one purpurin. They prepare these colouring-matters much in the same way that Schunck did, and very carefully purify and analyse them: the formulæ which they give for them differ, however, from Schunck's; for alizarin they give the formula $C_{20}H_{12}O_6$, and for purpurin $C_{18}H_{12}O_6$; further, they suggest that, by the process of fermentation, the former is converted into the latter, and they show that by oxidation they both yielded phthalic acid. Since the publication of this research, until the last year or two, this formula for alizarin has been generally adopted by chemists, and in most modern books we find it given as expressing the true composition of that body. It was not only the careful and elaborate work which they devoted to the subject, but also the ingenious and apparently well-founded theory on the subject which carried conviction with it. Laurent had shown, not many years before, that when naphthalin, that beautiful and white crystalline substance, obtained from coal-tar, was acted on by chlorine and then treated with nitric acid, a body known as chlornaphthalic acid, and having the composition $C_{20}H_{10}Cl_2O_6$, was obtained; and on comparing this formula with the one they had obtained for alizarin, Wolff and Strecker at once concluded that it really was alizarin, only containing two atoms of chlorine in place of two of hydrogen; make this replace-

ment, an operation generally easily performed, and from naphthalin, they had prepared alizarin. Further, this relationship between chlornaphthalic acid and alizarin is borne out in many ways; it, like alizarin, has the power of combining with different basic substances, has a yellow colour, is insoluble in water, melts at about the same temperature, is volatile, and when acted on by alkalies gives a strongly coloured solution. Taking, then, all these facts into consideration, can we wonder that these chemists feel convinced that they have established the composition of alizarin, and have shown the source from which it is to be obtained artificially? Apparently but one very simple step remains to crown their work with success, that of replacing the chlorine by hydrogen. Melsens had only shortly before shown how this substitution could easily be made in the case of chloracetic acid, by acting on it with potassium amalgam; and Kolbe had used the battery for the same purpose: both these processes, and doubtless all others that the authors can think of, are tried upon the chlornaphthalic acid; but chlornaphthalic acid it remains, and they are obliged to confess they are unable to make this substitution. Still they are strong in the belief that it is to be done and will be done, and conclude the account of their researches by pointing out the great technical advantage it will be getting alizarin from a worthless substance such as naphthalin. One cannot help even now sympathizing with these chemists in their not being able to confirm what they had really the strongest evidence for believing must prove to be a great discovery. We now know, however, that had they succeeded in effecting this substitution, or had they in any other way obtained this chlornaphthalic acid without the chlorine, if I may so speak of it, which since their time has been done by Martius and Griess, alizarin would not have been obtained, but a body having a remarkable parallelism in properties to it would have been. This body, like alizarin, is of a yellowish colour, but slightly soluble in water, easily in alcohol and in ether, is volatile, and on oxidation yields the same products; it is, in fact, an analogous body but belonging to another group. We also now know that the formula proposed by Wolff and Strecker, and so long in use, is not the correct one. But little more remains to be added with regard to the history of alizarin, as gathered from the study of the natural substance. Schützenberger and Paraf suggested doubling Wolff and Strecker's formula for alizarin; and Bolley suggested the formula $C_{20}H_{12}O_6$, which, owing to the uneven number of hydrogen atoms, was soon rejected. If we compare our present knowledge of alizarin with what it was when these researches on the natural product were completed, it is as light compared to darkness; and we may well ask, whence has come this influx of knowledge? The answer, I hope to show you, is undoubtedly that it has come from the careful and accurate study of abstract chemistry. I know of no history in the whole of chemistry which more strikingly illustrates how the prosecution of abstract science lays the foundation for great practical improvements than the history of alizarin does.

My object now is, then, to show you, as shortly as I can, how by indirect means the composition of alizarin was discovered, how it has been built up artificially, and how it is superseding for manufacturing purposes the long-used natural product.

To trace this history from its source we must go back to 1785, when an apothecary of the name of Hofmann obtained the calcium salt of an acid called quinic acid from cinchona bark. This acid is now known to be of common occurrence in plants; it exists in the bilberry and in coffee, in holly, ivy, oak, elm, and ash-leaves, and probably many other leaves. Liebig also prepared the calcium salt, and was the first to give a complete analysis of it; the formula he gave for it was $C_{15}H_{24}O_{12}$. Baup, on repeating Liebig's experiments, arrived at a somewhat different conclusion, and gave the formula $C_{15}H_{20}O_{10}$. In 1835, at Liebig's suggestion to determine which formula was correct, Alexander Woskressky, from St. Petersburg, then a student at Giessen, undertook the further investigation of this subject, and established the formula $C_{14}H_{24}O_{12}$, the one in fact now in use. In the course of this investigation, which he carried further than merely settling the percentage composition of this acid, he describes what to us now is of most interest, a new substance having peculiar and very marked properties. He says that when a salt of quinic acid is burnt at a gentle heat he gets aqueous vapour, the vapour of formic acid, and a deposit of golden needles, which are easily sublimed; afterwards he describes how this same golden substance may be obtained from any salt of quinic acid by heating it with manganic dioxide and dilute sulphuric acid; it then distils over, condensing in golden-yellow needles on the sides of the receiver, and may be rendered pure by resublimation. The composition of this body he finds to be C_3H_2O, and names it quinoyl, a name strongly objected to by Berzelius, as conveying a wrong impression of the nature of the body; he proposed in place of it the name of quinone, by which it is still known. Far as this body would seem to be removed from alizarin, yet it is the study of its properties which led to the artificial production of alizarin.

(To be continued.)

THE SEWAGE FUNGUS.

In the *Gardeners' Chronicle* (Oct. 25th, p. 1434) there appears under the signature, J. B., an interesting account of the detection of a microscopic fungus, in various waters suspected of being concerned in the development of cases of typhoid fever, and found to be contaminated with sewage matter. The first case was the water of a well at Cirencester, which the writer was requested to examine some years ago. The result of the examination and the inferences drawn from it we give in the writer's own words:—

"On examining the spout of the pump to the well in question, I found that it was lined with what seemed a thick mass of gelatinous matter. This, of course, I submitted to examination under the microscope, and found it to consist of some elegant transparent branched confervoid or fungoid threads, intermixed with which were minute ovoid or rounded cells, which I took to be scattered spores of these plants, and in my report upon the subject I made the following remark:—'The water contains an abundance of fungoid growths, and from the fact of their requiring nitrogen for their nourishment, I am of opinion that they must obtain their supply from some communication from a neighbouring cesspool.'

"At that time I named this plant provisionally the 'sewage fungus,' and subsequent inquiries have only confirmed my views that this fungus is more or less present in water which has been said, rightly or wrongly—I incline to the former—to be concerned in the production of typhoid fever, and I now offer some cases in proof. After examining this well I went to the exit drain of the sewerage of the town, where it is conveyed to some water meadows about a mile from Cirencester, and there I found that bits of sticks, leaves of water plants, and the like, were more or less covered with the same kind of gelatinous matter that I had met with at the mouth of the aforesaid pump, and which I should say the microscope showed to be floating filamentous threads in the water as pumped up from the well. Here, then, I felt sure that these plants were developed through the medium of sewage; and my drawings and report upon them found their way to Dr. Lankester, and in a paper descriptive of some suspected water at St. James', Westminster, he figures the same cryptogamic plant with some of my own figures, and adds the following remark:—'Professor Buckman's microscopic observations exactly coincide with our own, except that he has not found animalcules. His drawings are similar.'

"Having been requested to report upon the sewage works at Croydon, I there found the sewage conduits full

of the same cryptogam, which adhered to bits of sticks, leaves, etc., in the same manner as that previously observed in the Cirencester sewage, whilst the delicate threads before mentioned were found floating in the dirty water.

"Now, it is a very important point to observe that after these waters had been conducted through the soil—that is, had done their irrigating work—they became free from this fungoid matter, and water plants grew in the exit drains healthily, and fish were seen in abundance—all of which was just the reverse in dirty water.

"The next cases of the detection of this fungus in suspected water occurred in Dorset. Some members of my own family were severely attacked with typhoid fever, and, as usual, the medical man suspected the drains or the water to be the cause, and on making a microscopic examination of the water from the well, which was 120 feet deep, there, sure enough, was the same growth, and it was soon discovered that impurities got into the well from a defective drain, which was soon put to rights, and the whole of the water pumped out: since then the water has been of excellent quality.

"Another case occurred at Sherbourne Union Workhouse. As there were some cases of typhoid fever in the house the water was examined when it was found to be foul with fungoid matter, caused by a drain finding its way into the well; this cause was at once remedied, and no attack of typhoid fever has taken place in the house since.

"These facts seem to me to point to the conclusion that sewage-water favours the growth of a peculiar form of fungoid or confervoid growth, the presence of which in water renders it dangerous to health. How it acts it would be difficult to determine, but it is at least conceivable that the spores of the fungus may get into the circulation and bring about changes in the fluids after the manner of yeast in beer, and, if so, the seeds of the fungus would be likely to develop rapidly if they came in contact with milk, or water containing nitrogenous matter. 'A little leaven would leaven the whole lump,' and, as it appears to me, in this way much disease may be accounted for.

"The microscope, then, will enable us to make out the presence or absence of this fungoid or confervoid matter in foul water, and my own observations confirm me in the view that being present it is highly dangerous, and if its cause can be removed, and the water made pure, all danger from this cause at once ceases, whilst if it cannot it should be at once disused, and pure water be sought for elsewhere."

PROGRESS OF MATERIA MEDICA AND THERAPEUTICS DURING THE LAST TWENTY YEARS.

During his introductory lecture, delivered at the Medical College of the London Hospital, Dr. Prosser James alluded to the advance in the medical art which had taken place in the last twenty years, the term of his experience. Referring more particularly to materia medica and therapeutics, he said:—

"Fresh air, change of climate, bathing, exercise, gymnastics, rest, regulation of diet, whatever conduces to the restoration of health or the comfort of the patient, are properly embraced in materia medica, and the mode of availing ourselves of these or any other agencies comprises therapeutics. How erroneous, then, is the popular notion that medicine consists in prescribing drugs. Useful as these are, other things are more important, and therefore the sarcasm that 'the doctor is a man who puts drugs of which he knows little into a body of which he knows less' falls powerless on the scientific follower of medicine. We have, indeed, discovered new drugs, but more than that, we have advanced in our knowledge of the effects of old ones. We have made progress, too, in our methods of employing other remedies, and have devised or discovered no small number of new ones."

After speaking of the development of conservative surgery, antiseptic surgery, skin-grafting, the subcutaneous syringe and the aspirator, he continued:—

"Nitrous oxide has been revived, and other agents have been introduced with the view of finding a safe anæsthetic; while the application of the ether spray has furnished us with a mode of producing local anæsthesia. Allied to these in some respects is another new drug—chloral hydrate—which has already proved a blessing to thousands of sufferers, and from which much is to be hoped as its properties become more completely understood. We have all often longed for a remedy that should be applicable when we dare not administer opium, and the new anodyne is just the thing. It seems to be as great an acquisition to the physician as chloroform was to the surgeon. It has been used in almost all conceivable cases. Just as Liebreich's discovery was announced, I was on the point of crossing the English channel, and provided myself with some of it to test it in sea-sickness. I tried it on myself and others who accompanied me with sufficient success to lead to further trials, and it was mentioned at the Medical Society of London. Long afterwards I found in Germany that two professors had a warm dispute as to the priority in the use of the drug for the same purpose.

"The bromides also have come into use in this time. I remember well Sir C. Locock introducing the use of bromide of potassium as a sedative in certain special cases, and I watched its effect with considerable interest. Soon after it received a much wider application, and is at this moment one of the most interesting remedies to study. In my lectures I have related a series of experiments made with a view of determining its effect on the brain, so far as ophthalmoscopic exploration may be accepted as an index, and this appears to me a proper method of studying the effects. At the Medical Society of London, when speaking of iodides, I took occasion to show how other salts might be substituted with advantage for those formed by potassium with both bromine and iodine, and those observations seem to me still to be of value, inasmuch as they have since been put forward by foreign writers as original.

"The salts of lithia have taken a high position among remedies, and will, I have reason to anticipate, be still more largely used.

"Our knowledge of the alkaloids which form the active principles of certain plants is becoming constantly enlarged, and this ability to concentrate our remedies seems one of the greatest indications of progress.

"In the management of fever the use of the thermometer has enabled us to act with precision, and to measure the effect of treatment. No greater shock to ancient prejudices could well have been given than the proposal to keep fever patients in cold baths for hours; but it has been done, and the improvement has been measured by the thermometer. By cold baths it is to be understood that the water is a little cooler than the body of the patient—not that the contrast is too violent or the shock great. Here it is singular to note that the system called hydropathy has, after all, a rational foundation, though the excess to which it has been carried by ignorant charlatans has been as injurious as it was unscientific. The rational use of cool water in febrile diseases has been fairly tried in the London Hospital, and it is to be hoped that the profession will not abandon it to pretenders. I may add that where, as too often happens in private practice, there are many obstacles to the employment of prolonged baths, similar results may be obtained by assiduously sponging the surface.

"Recent observations go to prove that quinine possesses a considerable power of reducing the temperature in pyrexia, and the discovery enables us to see why it is sometimes so useful a remedy, and to measure its effect.

"Another agent which recent research tends to prove possesses like properties is alcohol. In all its forms this has long been employed as a stimulant, and it

will, perhaps, require further investigation to convince many that their sensations mislead them when they fancy it warms them. As to the medicinal use of alcohol, we have seen it go through a complete cycle of change—a circumstance that might well persuade us that it has not always been rationally employed, and that may also suggest doubts whether we even yet understand and appreciate its properties. Physiological experiment is probably leading us to the true method of employing it, and its power of reducing the temperature is an objective fact that may shortly receive its true interpretation.

"The next remedy I cite is electricity. Assuredly we have lately made great strides in applying electrical influences to the cure of disease. The galvano-cautery is in many cases taking the place of the knife or of the hot iron. The silent, painless, continuous current is made to effect what was vainly hoped for from the more obvious and painful shocks. We remove pain, get rid of effusions —nay, disperse solids by the galvanic current. No greater triumph of treatment can be mentioned than that involved in the removal of tumours by electrolysis."

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

A conversazione of the members of the above Society and their friends was held in the Music Hall, Sheffield, on Friday, October 24th. To add to the enjoyment of the company, many valuable and interesting objects were lent for exhibition by various sympathizers with the object of the Association. Amongst the most remarkable was a splendid case, contributed by Messrs. Southall, Son and Dymond (Birmingham), which justly gained much approbation, the samples of many pharmaco-chemical objects being especially worthy of notice, those of ferri cit. et quinæ, cit. ferri ammon., ammon. iod., with a splendid bottle of potass. iodid., being the more remarkable. Altogether the complete collection forwarded by these gentlemen, consisting of over fifty objects, was greatly admired.

Along with a quantity of novelties kindly lent by Messrs. Maw, Son and Thompson, a "Pindar's" pill-machine caused much amusement to the ladies.

Messrs. Hearon, Squire, and Francis also sent many fine materia medica specimens, noticeable among which were varieties of the cinchona family, a splendid sample of scammon. radix, with guarana, and other obiects too numerous to mention. We must not forget a wonderful piece of gum myrrh, also lent by this firm.

Messrs. Hodgkinson, Stead, and Treacher contributed rad. pareiræ vera, several varieties of gum benzoin, belæ fructus, etc., also a parcel of *hyraceum*, a substance not generally known.

There were also several contributions from the Pharmaceutical Society, comprising many objects perfectly irresistible to a lover of chemistry and its allied sciences. Numberless were the specimens which in display were productive of much instructive and pleasant discussion, many samples being of a character rarely presented for exhibition in the provinces. There were also numerous living botanical specimens of a highly interesting character, which by the permission of the Council of the Pharmaceutical Society had been collected and arranged at much pains by the Curator (Mr. Holmes), and which, duly labelled with their common and botanical names, deservedly excited universal admiration.

For want of space we are compelled to abridge our report, and merely in passing, mention some of the local contributions.

Messrs. Cubley and Preston (Sheffield) :—A collection of chemical apparatus, together with numerous scientific instruments, amongst which were a series of lactometers for the detection of adulterations in milk, etc.

Mr. Ewing, Curator, Botanical Society's Gardens (Sheffield) :—A large collection of cuttings of medicinal plants.

Mr. W. V. Radley (Sheffield) :—A series of rare chemicals, etc.

Mr. T. W. Hime, M.B., L.R.C.S., etc., etc.:—Leclarche's peroxide of manganese cell; also a beautiful instrument for the correct administration of chloroform, invented by himself, etc., etc.

Mr. W. Ward, F.C.S. (President, Sheffield Association): Indian curiosities, etc., etc.

Mr. E. Birks, F.L.S., etc.:—A fine collection of dried plants, arranged in Pharmacopœia order.

Mr. Ellinor (Sheffield) :—A large number of materia medica specimens, etc.

Mr. W. Jervis (Sheffield) :—Contributions of African curiosities, war instruments, etc., etc.

Mr. J. H. D. Jenkinson (Sheffield) :—Not the least attractive was this gentleman's contribution, consisting of a fountain of perfume beautifully embedded in flowers.

Mr. E. Wilson (Local Secretary, Pharmaceutical Society :—Old engravings.

H. Merryweather, Esq., M.D., M.R.C.S., etc. :—A set of specimens illustrating comparative anatomy, etc., etc.

During the evening the proceedings were enlivened from time to time by music, and also an opportunity was found for the delivery of a brief address by the President, Mr. W. Ward, F.C.S.

In the course of his remarks the President alluded to the various schemes put forth by the Council in order to make the Association a success; hitherto he regretted their efforts had not been productive of those salutary results they had hoped for and confidently anticipated. He believed, however, as he looked around him that evening and saw such a brilliant assembly of ladies and brother pharmacists, such as had never been seen before in their town, that a new era had dawned upon them, and that pharmacy would from that time receive such an impetus amongst them that all would feel impelled to aid and support an association which had for its object the advancement of pharmaceutical knowledge and the cultivation of mutual good-will and fellowship. After calling the attention of the visitors to the many and varied objects which were being exhibited, objects not only relating to pharmacy and the collateral sciences, but also of a literary and philosophical character, he said of all the sciences of which they were reminded that evening chemistry was the most sublime and delightful, and such was its general utility that there was scarcely an avocation which was not benefited by it, and even the enjoyments of life were multiplied and enhanced by it. He then showed how useful and important this science was, not only to the practitioner of medicine as a means of inspiring him with professional confidence, but to the manufacturer. He explained that in the manufacture of iron, for which their town had become so famous, from the smelting of the ore down to the conversion of it into steel, every operation was based upon the effect of *chemical* affinities. After congratulating the members and their friends, and giving them a hearty welcome, he concluded by hoping that this their first conversazione would prove the precursor to many others.

At the conclusion of the President's address, Dr. J. C. Hall expressed the great pleasure it had afforded himself and others to be present and take part on the occasion.

A short but highly interesting lecture was delivered during an interval by Mr. A. H. Allen, F.C.S. (borough analyst) on "Spiritualism," which was profusely illustrated by experiments, causing much amusement.

As may well be imagined, amid such numerous attractions the evening sped rapidly away, and at the conclusion of an entertainment which had been promoted by every means at the disposal of the Council, and which was evidently much enjoyed, dancing commenced, which, meeting with hearty appreciation, was sustained till a late hour.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 1, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE RESULTS OF THE RECENT EXAMINATIONS.

IF we may judge from the results of the more recent examinations, both in London and in Edinburgh, it would seem that there is still prevailing an extremely low estimate of the general qualifications and technical knowledge requisite for those who contemplate carrying on the business of a chemist and druggist.

To take, for instance, the examinations last held: we find that in London, out of ninety-nine candidates for the Minor, as many as fifty-six failed to pass; while at Edinburgh, out of thirty-one candidates, ten failed to pass. In an examination dealing almost entirely with matters which may be fairly regarded as coming within the daily cognizance of everyone engaged in the ordinary routine of a pharmacist's business, such high proportions of failures to satisfy the requirements of the examiners tend to show that much still remains to be done in the way of impressing the younger members of the trade with a due sense of the qualifications necessary for the creditable pursuit of their calling.

In the Preliminary examinations the case is similar; there being no less than 164 candidates who failed, out of a total of 311 who presented themselves for examination in England, Wales, and Scotland. Here, however, there is less cause for regret than in the case of the Minor examination, for the candidates who failed to pass the Preliminary would be mostly at the outset of their pharmaceutical career, and being made to feel their deficiency at an earlier period would have so much the better chance of remedying it.

But it is not only in reference to the Minor and Preliminary examinations that these remarks are applicable, for we find also a large amount of failure among candidates for the Major examination. This fact is perhaps the more striking, since the Major is still a voluntary examination, and we might reasonably expect that the candidates presenting themselves for it would have formed a more just appreciation of the acquirements that would enable them to pass.

Concurrently with the indications furnished by the examination returns as to the state of opinion prevailing among the junior members of the trade on the subject of pharmaceutical qualification, we may point to the reports of provincial associations as supporting the conclusion we have drawn. In those reports there are almost invariably expressions of regret and disappointment at the comparatively small attendance at the meetings and lectures. The opportunities of this kind now afforded throughout the kingdom are sufficiently adequate and numerous to justify the belief that if proper advantage were taken of them they would prove the means of effecting a vast alteration in the returns of the examining boards. But in order that this desirable result should be attained, there is great reason to believe that the state of opinion on the subject of qualification must be advanced even among the older, and as we may say, independent members of the trade. It is only by such advance that we can hope for that general improvement in the status of the trade which is so requisite. It is, we think, a mistake to argue, as a correspondent does this week, that scholastic training and technical knowledge should not be required of the young pharmacist because the business he contemplates following is a poor one. That would be a sure way to maintain its poverty. Equally mistaken is it to encourage the idea that the pharmacist, by reason of his occupation being trade, cannot hope to rank side by side in the social scale with members of the medical profession, or others in a similar position. It is a mischievous illusion to urge such an opinion as a reason for not insisting upon the education of rising pharmacists.

As a matter of fact, it is well known that even now many members of the trade do take a high social position in this country. They do so, however, as men of education, and we see no reason, if pharmacists be true to themselves, why that should not be very much more generally the case, as it has long been in Germany and France.

CONVERSAZIONE AT SHEFFIELD.

AT a conversazione held last week in the Music Hall, Sheffield, in connection with the Sheffield Pharmaceutical and Chemical Association, there was provided for the first time in the history of that Society an opportunity for the attendance of the fair sex and the immediate friends generally of the members, and from the numerous company assembled we may augur well for the success, should it be attempted, of such an entertainment another year.

The Council had exerted every effort to make the meeting successful, and the result, it is pleasurable to notice, quite accorded with their most sanguine expectations. On such an occasion, the objects sent for exhibition were of course the principal attraction, and the liberality and number of the loans, as enumerated on the preceding page, must have conduced to much of the success of the gathering.

THE next Evening Meeting of the Pharmaceutical Society will be held on Wednesday evening next, November 5th. The Chair will be taken at half-past Eight o'clock. Communications will be made on the Acetic Preparations of Ipecacuanha, and on the Adulteration of Drugs.

IN our remarks last week on Cinchona cultivation in Java we omitted to state that the analyses were made by Mr. MOENS, and that the author of the report was Mr. VAN GORKOM, the resident superintendent of the plantations. The report was only translated from the Dutch into German by Dr. HASSKARL.

Provincial Transactions.

MANCHESTER CHEMISTS' ASSISTANTS' ASSOCIATION.

The Third Annual Meeting of the above Association was held in the class-room of the Manchester Chemists and Druggists' Association on Wednesday evening, the 15th inst., the President, Mr. William Lane, in the chair. The Secretary, Mr. A. J. Pidd, read the report of the last session :—

"*Report.*

"Your Committee have much pleasure in congratulating you upon the success of the past session, at the same time they think that the attendance was not what it should have been in an important city like Manchester, although there was a decided improvement. They make an earnest appeal to all assistants and apprentices, not only to join the Association, but to show by their regular attendance at the fortnightly meetings, and entering into the various discussions, that they wish to strengthen the means already afforded for mutual improvement. The number of enrolled members was forty-eight, showing an increase on preceding sessions.

"The thanks of the members are due to Mr. Siebold for the great interest he takes in the success of the Association, and for his kindness in delivering a very instructive and interesting lecture on 'Volumetric Analysis.'

"Papers were read as follows :—

"On 'Chemical Combination, Atomic Theory, and Quantivalence,' by Mr. J. T. Clarke. On 'Arsenic and Antimony,' by Mr. F. Sanders. On 'Opium,' by Mr. R. de Burton. On 'Sulphur,' by Mr. W. Lane. On 'The Ferrous and Ferric Salts,' by Mr. Cooper. On 'The Alkalies and their Tests,' by Mr. A. J. Pidd. On 'Spectrum Analysis,' by Mr. T. Broughton. On 'The Formation of Cells,' by Mr. W. G. Booth."

The Treasurer's statement showed a balance in hand of £1 5*s.* 8½*d.*

The Chairman moved the adoption of the report, in doing which he urged upon all those present the necessity for united effort, both by their regular attendance at the meetings and by inducing as many of their friends as possible to join the Association, thereby raising its standard beyond that already attained. He also said that the kindness shown by the Chemists and Druggists' Association in placing their rooms at the disposal of this Association demanded the warmest thanks of the members. In concluding, he drew attention to the courses of lectures arranged for the benefit of pharmaceutical students of Manchester and neighbourhood, which he felt sure would prove in the future as it had done in the past, of the greatest use to those students preparing for examination.

Mr. Hedley expressed much pleasure in seconding the adoption of the report, which was carried unanimously.

The election of officers for the ensuing session took place with the following result :—President, Mr. William Lane, re-elected ; Vice-President, Mr. W. G. Booth ; Secretary and Treasurer, Mr. A. J. Pidd, re-elected ; Committee—Messrs. Bathe, Dodge, Hedley, Hodgson, Hughes, and Sanders.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Concluded from page* 336.)

Some Starches Microscopically and Polariscopically Considered.

BY HENRY POCKLINGTON, LEEDS.

Some excuse is due from me for the choice of a subject rather out of the normal sphere of pharmacy. The only one I have to offer is this, that circumstances quite out of my control have prevented the completion of an investigation I have long had in hand, and almost at the eleventh hour I have had to choose between the selection of the present subject and the breach of my engagement with our worthy Secretary. The subject is however not without interest to pharmacists—in truth it has importance to those engaged in analysis of drugs and foods ; for no one engaged in food analysis can afford to neglect the microscopical appearances of any of the economic starches. With a view to making my paper of as much technical interest as possible I propose to pass by the vexed and still unsettled questions as to the life history of the starch granules, their mode of development and structure, and to confine myself pretty closely to the consideration of their morphological and physical characteristics as shown to us by the microscope and polariscope.

Anything like a morphological classification of starch granules lies almost within the impossible if reference be had at the same time to the botanical classification of the plants from which they are derived. An elastic geometry might comprise the granules, but to interweave these with the botanist's diagnoses is quite another matter. In other words the morphology of the starch granules can only with difficulty be made to take its place with other plant diagnostics. At the same time certain starches are characteristic of certain plants, and the mean of the morphological peculiarities of any given starch will be a tolerably definite quantity for that plant. The starch granules of the potato for example may be described as ovate although a large number of individual granules may be round, or mussel shape, so that whilst he would be a very rash man who should pronounce any given granule to be that of the potato, he would be quite justified who should pronounce any given sample of starch to be potato starch. Starch diagnosis is further complicated by the morphological changes that are so easily induced by the application of heat, of water or denser fluids. The so-called amorphous starch that occurs in certain economic roots is, for instance, doubtless due to the drying of the root under a high temperature, and the sensitiveness of wheat starch to the action of heat and fluid is too well known to all who have studied its optical peculiarities. Whence in comparing starches it is needful to secure that they are under the same conditions, or at least, that the effects induced by any other condition be known.

Starches may be classified pretty much as follows, taking simple granules first, the basis of the classification being that of Schleiden.

Round-bodies. These are found everywhere in the form of excessively minute particles and are the commonest of all cell contents. In chlorophyll granules one or more are always to be found, and we may perhaps safely regard this as the primal form, and other shapes to be due to a more or less eccentric deposition of the amylaceous matter, and also look to chlorophyll, as the half way stage from protoplasm to starch. In which case the cause of compound granules becomes explicable. These small round starch granules are therefore of no diagnostic value. Larger granules, irregularly roundish, often truncated and multangular occur rarely. Very large and rough granules with small, more or less central hilum and a laminated formation, occur in certain cycads, and are morphologically transitional into the ovate form as seen in the potato. Common sago affords an example of this type. A still more modified form is the mussel-shaped granule, associated with round and ovate in the potato, and common also in the bulbs of many lilies, and nearly triangular in tulips. The starch of Indian corn affords a further and characteristic modification of the globular type of granule. Here the lamination is indistinct, hilum very distinct, multiradiate and central, and the granule polyhedric in shape, the spaces between the angles being rounded off. It is only by the aid of a high power and the careful use of a dilute magenta solution that lamination can be detected in these and several other starch granules. The starches of the pea family are roundish or oval, the hilum is central but elongated, and suffers much change if the granule be dried

or exposed to a high temperature. The starch of the official orris-root is a marked instance of a modification of this and a departure from the type of the natural order to which it belongs, being an approximation to the type we find in the leguminosæ. Here the granule is irregularly oval and the hilum presents the appearance of a hollow cavity.

Round starches, more or less compressed into lenticular granules, sometimes evidently laminated, more frequently not, with a very variable hilum, are found in our common cereals and are very difficult of accurate observation on account of their convergent refraction upon the illuminating pencil, and the modifications this refractive influence undergoes when different media are used in which to immerse them for microscopical observation. Very much more flattened discs, or granules ovate in contour, are found in the zingiberaceæ and are well known to those who have examined East Indian arrowroot.

The stick-like euphorbian starches defy classification, as also to a great extent do the compound granules found in very many official plants. The most satisfactory classification probably will be one based upon the morphological character of the compound granule, the number, on the average, of granules of which it is composed, their lamination, and the position and character of the hilum. The number of the constituent granules is the most constant diagnostic, after this the position and shape of the hilum, and lastly the shape of the resulting granule.

Of the starches occurring in pharmaceutical plants I have noticed from time to time, during the publication of my articles in the PHARMACEUTICAL JOURNAL, the following ones of interest :—

In Jalap the starch granules are large, vary much in size and shape, are aggregated or isolated. The compound granules consist of three triangular granules, the bases of the triangles being curved ; the resulting granule is muller-shaped, approaching the circular. Many of the single granules are nearly circular, flattened with a triradiate indistinct hilum. In calumba root the granules are also large and very variable, sometimes simple, generally compound. The simple granules vary from nearly circular to mussel-shaped ; the compound are usually muller-shaped. The normal form of hilum is a longitudinal furrow, but a simple point or a three or four radiate slit or furrow are *collectively* as frequent. This starch is exceedingly sensitive to the action of any medium in which it may be immersed, and disrupts under slight elevation of temperature. In Senega root the granules vary from a very small sharp-edged polyhedric granule to one of considerable size, more round and flattened. In rhubarb the compound granule is oval and composed of four well-formed granules, each with a distinct hilum. However, to describe all the starches of materia medica plants would be a longer task than I could well undertake, and detain you longer than you would care to stay.

The size of starch granules is a characteristic of importance, but not if taken alone. In connection with shape it is of the first importance, because although both size and shape vary exceedingly in starch of the same plant, yet a certain shape and a certain size go together pretty closely, and very much simplify the process of getting out a mean. Their measurement is a process of the simplest if an eye-piece micrometer be used, but it is needful to bear in mind that in the case of lenticular granules and discs, the medium in which they are immersed seriously affects their sharpness of outline, and therefore the accuracy of their measurement. It is perhaps hardly needful to mention in addition that if we use a lens of high angle of aperture, and therefore have to make occasional adjustments for difference of thickness of cover, it is necessary to correct the reading of our micrometer. It is in fact always best to use one uniform thickness of cover—and that the thinnest our lens works well with,—and also to mount our starches in some one medium, and to measure them immediately they are mounted. Mr. Rimmington's glycerine jelly is about the most convenient medium for the purpose. Variation in size in starch of the same plant is well seen in the potato, where the granules will range from the $\frac{1}{400}''$ in length and $\frac{1}{800}$ in width down to much less than the $\frac{1}{6000}''$. In maize, on the other hand, the mean is about half the extremes. These measurements of potato starch are taken just before the tuber comes to maturity. Earlier, the larger granules are not numerous ; later, small granules are comparatively infrequent. In wheat starch the granules rarely exceed $\frac{1}{1000}''$, but the smallest are exceedingly minute. The maximum in rice does not often exceed $\frac{1}{3000}''$, the smallest are not measurable by ordinary appliances. It was my hope when I set about this paper to give a somewhat extended series of measurements of the more common starches, showing their variation, their mean, and the change this undergoes, or the range of the mean at different periods of the plants' growth, but I must let it stand over for a more convenient season and ask your attention to a few notes on the polarization of starches.

Here we meet with very varied statements in the text-books, and must feel our way very cautiously lest we copy the inaccuracies of observers who, writing in the infancy of microscopy, used appliances far less perfect than are in the laboratories of the most ordinary observer of the present day. Wheat starch, for instance, is said not to give the black cross by nearly all writers on the subject, from Pereira to the Cantor Lecturer of the present year—Dr. Hassall being almost the only exception. All say rice starch does not polarize, and I think all say the same of oat starch. How far this is true we shall see.

We may conveniently begin with potato starch. This, when viewed by polarized light, shows, as every one knows, a beautiful black cross when the axes of the prisms are at right angles, the starches being white on a black ground, and this cross shifts a quadrant when the axes are parallel, the starches being then (dusky) black, with a white cross on a black ground. The white of the first case and of the second are different, and neither are quite the same white light as enters them from the mirror, as may be easily learned on micro-spectroscopic observation, and indeed follows from the nature of the phenomena. The position of the cross and the whiteness of the granules vary widely in different granules of the same, and still more in other starches, both being determined by the bi-refractive energy of the starch, the eccentricity of its lamination, and, to a great extent, by the medium in which it is immersed. Potato starch is not much affected by the latter condition ; wheat-starch, on the other hand, is, and this explains the varied statements respecting its polarization. The estimation of the bi-refractive energy of any particular starch is not difficult, and its comparison with the refractive energies of other starches is easy, and may be of importance. In the case of potato starch I find it is exactly equal to the bi-refractive energy of a film of selenite sufficiently thin to give the white and black immediately within the first of Newton's orders, the film itself being, as near as I can estimate, half the thickness of the starch granule. In wheat starch the bi-refractive energy is less, but the granule is rather thinner, so that the actual or specific energy will only be slightly less. It *is* less, probably by one-third, but the exact measurement of these energies is beyond the instrumental appliances at my present command. Their estimation may be made in several ways. The easiest is to place the granules over a wedge of selenite, and note where the one energy exactly overcomes the other, the axes of the selenite and starches being oppositely arranged, or we may ascertain by how much the tint of any selenite is raised or depressed by the starch. The former is the more accurate plan.

In the course of observations upon the polarization of starches, particularly of the potato, the black cross naturally comes prominently under attention. The first thing we ascertain is that it does not lie along fixed lines in the starch, but along fixed lines of direction as regards the plane of polarization. In a round granule one arm will be parallel with that plane, the other at right angles to it,

and if we rotate the granule the arms will remain fixed with regard to this plane. In an ovate granule the same holds good, and the hilum being eccentric, long arms of the cross are exchanged for short ones, and *vice versâ*, twice in the complete revolution of the stage. The arms are rarely, however, straight, but nearly always curved, and therefore of varying depth of blackness. If we arrange the plane of primitive polarization so that it is parallel with the front of the stage, and therefore right to left or the reverse, one arm of the cross will be from the stage towards the face of the observer, the other from his right to his left hand. This we will call the normal position of the cross in the following experiment. If we place a film of mica, known as a quarter wave film, between the starch and the polarizer, with its neutral axis parallel therewith, no change is produced in the position of the arms of the cross, but if we revolve the film until its neutral axis is at right angles with the plane of polarization, the prisms remaining crossed, the arms disappear and are replaced by two brush-like arms parallel with the axes of the film and at 45° to the plane of polarization, these arms covering two separate quadrants of the round granules with their brush-like expansions. If we revolve the analyser these arms revolve with it. If we rotate the film the arms are reversed. The explanation of this is that the bi-refractive energy of the granule is sufficient to restore the circular polarization of the mica film to plane polarization. This energy in two quadrants reduces it to vertical polarization, in the other two to horizontal; one is transmitted, the other absorbed, producing a brush. That the energy is in opposite directions, in other words that in one case the ordinary pencil is most retarded and in the other the extraordinary (with plane polarized light) in the two opposite quadrants, may be easily proved by placing any sensitive selenite giving colour beneath the granules, or more exactly by rotating a thin film behind them. In the case of the potato the one bi-quadrant raises the "sensible tint" to red, the other bi-quadrant depresses it to blue. Wheat starch is only competent to raise and depress it one half tint, and this only when immersed in some highly refractive medium. When immersed in water the change only amounts to about one quarter tint. Maize starch is slightly more energetically bi-refractive than potato, raising the violet one half tint beyond red; and Calabar bean is capable of raising the yellow into blue and is perhaps the most powerfully refractive of all the starches. The starch of *Curcuma leucorrhiza* will take rank close with that of wheat.

A few words about the starches that are said to give no cross and I have done.

Oat starch consists of compound granules each of which gives its own individual cross. The resultant when a sufficiently high power is used is weird looking in the extreme. The bi-refractive energy of this starch is a little more than that of wheat, but is difficult of measurement in the compound granule, as super-imposed granules frequently have their lines of force arranged oppositely. Rice starch is too small for observation without the use of a higher power than most persons use with the polariscope. Mounted in balsam each granule gives a decided cross, the point of intersection being central; its bi-refractive energy is twice that of wheat.

In some starches, as in curcuma, one line of no force lies along the side of the granule and the cross is thus not evident without special arrangements. The circularly polarizing film at once brings it into view.

The effect of media of various refractive power is as yet incompletely worked out by me. The general result so far is that a highly refractive medium increases the bi-refractive energy of the granule.

I conclude with an apology for the hasty and incomplete manner in which I am compelled to present this paper, and a promise to lay any further researches I may be enabled to make before the Conference at its next meeting, or otherwise as may be found most suitable.

Mr. Pocklington was thanked for his paper and his promise.

Adulteration Notes Respecting Turmeric in Rhubarb, Aromatic Chalk Powder, and Mustard.

BY W. L. HOWIE.

Turmeric in Powdered Rhubarb.—The experiments of which the following notes are the result were suggested by the expression of an opinion by many pharmacists of my acquaintance that turmeric was responsible for the brilliant yellow colour of certain samples of very fine powdered rhubarb.

The test for turmeric given by Pereira, Christison, and other authorities, and lately elaborated by Professor Maisch, U.S. (*vide* Pharm. Journ., vol. i., 3rd series, p. 1027), requires the preparation of a tincture or decoction of the rhubarb, and is far from delicate owing to the difficulty of detecting the brown-red tinge in presence of the deep yellow colour of the rhubarb. My aim has been to supplant this preliminary exhaustion of the suspected rhubarb by a process which should more completely eliminate the curcumine, and while rendering the test strictly practical for counter use, improve its efficiency.

An effort to discover a menstruum in common use which would dissolve the colouring principle of one only of the drugs under notice proved not altogether successful, in a measure owing to a variation in the peculiar constituents of different varieties of rhubarb, which will be further referred to.

Of turpentine, carbon bisulphide, benzole, ether, and chloroform, I have been induced to prefer the last-named, though the test can be applied with either of the others, should convenience suggest such a course; but, with the exception of ether, none seems so efficient as chloroform, on account of the readiness with which it dissolves curcumine, and its volatility, rendering the manipulation of a number of samples exceedingly rapid.

I discard ether, because crysophanic acid is much more soluble in it than in chloroform.

The application of the test is as follows:—

Let the required number of pieces of white blotting-paper, about three inches square, be numbered and placed on a pill tile or glass slip; in one corner of each of these papers place about five grains of the several rhubarb samples to be tested, keeping the powder as much together in one heap as possible; press it flat and smooth with the aid of a piece of paper, and drop cautiously on the centre of the powder, chloroform, so that it may slowly percolate to the circumference, carrying with it any soluble matters, and extend nearly one inch from the powder, taking care not to float any particles over or under the paper, which would interfere to some extent with the succeeding tests. Having allowed the papers to dry, it will be found that a yellow stain of varying intensity has been left around the powder. With really fine, bright-coloured East Indian rhubarb, this stain is scarcely perceptible, but cheaper and darker samples may yield a brilliant yellow, while even the finest bright-coloured English powder will give a yellow stain as deep, and in most cases, deeper, than the darkest East Indian. Should turmeric be present in quantity in any sample it will at once give a brilliant yellow stain, in tint undistinguishable from that of the rhubarb, but which may readily be identified by the following tests.

Place a minute pinch of biborate of soda in powder on that portion of the paper over which the chloroform had extended, and which probably has a yellow tint, choosing the deepest coloured part. With a glass rod deposit a a single drop of hydrochloric acid over the borax. In a few seconds, should turmeric be present, a distinct red will be produced, which is changed to black or greenish black with solution of potash, but no change, except a slight bleaching, takes place if the yellow is caused by rhubarb colours only. A drop of solution of potash instantly changes the yellow stain of turmeric to a more

or less brown tint, while a pure rhubarb gives a bright reddish-purple colour.

For delicate operations, a saturated solution of boracic acid is preferable to the powder borax, so that any obstruction of view by the white powder may be obviated ; but it is necessary in either case to use hydrochloric acid, which quickens and intensifies the action of the boracic acid.

By this means turmeric can readily be detected in rhubarb containing only 0·05 per cent. While 0·1 per cent., or seven grains in one pound of rhubarb, gives at once distinct and unmistakeable evidence of its presence.

As turmeric often carries in its train wheaten flour or farina, which can be best identified under the microscope (*vide* PHARM. JOURNAL, vol. ii., 3rd series, p. 841), rhubarb in which it is found should always be looked upon with suspicion.

It is gratifying to be able to state that of some thirty-six samples procured in different parts of the United Kingdom, only in one have I found turmeric ; and strangely it was in a specimen of the old time Turkey, which a friend had carefully stored as a curiosity. The quantity present however was so small, about 0·07 per cent., that it could hardly be called a wilful adulteration, and may be accounted for when we remember that it is, or was, the practice of some dealers to rub the roots with turmeric to improve the colour. Some such roots had no doubt been used in this instance for powdering.

That no one may be deterred from testing every parcel of rhubarb before taking into stock, I have only used chemicals found on the shelves of every pharmacy, and may just add that five samples may be tested in as many minutes, leaving no apparatus soiled but a glass rod and pill tile, and at the cost of a fluid-drachm of methylated chloroform.

European in East Indian Rhubarb.—The observation of the regularly varying depth of tint of the yellow stain on paper, given by different rhubarbs with chloroform, suggested this test as a useful and ready means of determining not only the absence of turmeric, but also the quality of the drug.

East Indian rhubarb, sound, pale in colour, dense, and freed from the cortical layer, when reduced to powder gives up almost no colour to chloroform. A dark-coloured but otherwise sound piece gives but a slight tint, while the cortical layer gives a more distinct yellow, as does in a yet more marked degree the interior of such pieces as are worm-eaten and rotten.

English indigenous rhubarb even when carefully selected gives a deep yellow tint, which is yet more intense from cortical and faulty pieces.

French indigenous rhubarb which sometimes appears in commerce in this country (*Vide* PHARM. JOURNAL, vol. ii., 3rd series, p. 1009), though in external appearance and density greatly superior, is in therapeutic value and chemical characteristics much like our own native root, and gives up about as much colour to chloroform.

Of the character of the stain given by inferior or false rhubarbs, excepting its intensity, as compared with that produced by fine East Indian root, I have unfortunately been unable to distinguish any peculiarity such as would lead to its unfailing detection : still the constancy of the variation, according to the kind of rhubarb used, is such, I think, as ought to give a reliable index of quality.

A powder offered as East Indian rhubarb, of pale brilliant colour, having the usual characteristics of that variety, should give but an exceedingly pale yellow tint. Should a deep yellow be given I would suspect English or French contamination. An East Indian powder of a dark hue however may give almost as deep a colour as English, and still be genuine ; though by this colour I would judge it was the product of unpicked roots, trimmings, or even worm-eaten pieces, according to the depth of tint.

The few specimens of Turkey rhubarb I have been enabled to experiment upon, through the kindness of several friends, yield results like East Indian.

The cause of this varying colour yielded by different rhubarbs is somewhat obscure, the chemistry of the drug being as yet far from satisfactorily elucidated. Chloroform seems to dissolve out chiefly the resinous principles erythroretine, phæoretine, (and aporetine ?) which exist in varying quantity in different parts and varieties of root, while the crystalline principles chrysophanic acid and emodine are left behind.

Beautiful aggregates of granular crystals of chrysophanic acid may be easily obtained by percolating ether after chloroform through East Indian rhubarb, and allowing the ether to evaporate spontaneously. It is noteworthy that English and French rhubarbs treated thus yield no such crystals, the residue being a minute quantity of pale brown gummy extractive ; though from all varieties distinct brownish acicular crystals, probably emodine, will be observed on the sides of the evaporating basin.

It may be suggested that chrysophanic acid which is recognized as the chief principle of rhubarb, by continued exposure to atmospheric influences, absorbs oxygen and is converted into what is at present known as the resins erythroretine and phæoretine, which some have not accepted as distinct principles, but assert to be "nothing but impure chrysophanic acid" (Batka). Being thus changed in the exterior insect-perforated and spongy portions of the root into amorphous resins soluble in chloroform, we may trace in imagination the cause of the deep yellow stain given by deteriorated roots.

The formulæ slightly bear out this theory, that of chrysophanic acid given by Rochleder and Heldts, who seem to have obtained it from the lichen *Parmelia parietina*, is $C_{10}H_8O_3$, and that given by Thann, who procured it from rhubarb, is $C_{17}H_{10}O_2$, while that of phæoretine is stated as $C_{16}H_{10}O_7$, and erythroretine $C_{19}H_{18}O_7$ by Gmelin, whose formula for chrysophanic acid is $C_{14}H_{10}O_3$ (altered to new notation).

Chrysophanic acid gives with caustic alkalies a red colour, and erythroretine a bright purple, as may be observed on touching the yellow rhubarb stain with solution of potash.

With a substance such as rhubarb, varying in chemical as well as physical characteristics, great care must be exercised before pronouncing definitely upon any test for distinguishing between the varieties, depending upon such a minute difference as depth of tint. While putting forward this method of identifying European in presence of fine Eastern grown rhubarb with some degree of confidence, having found unvarying results from the examination of well-nigh one hundred specimens, it is much to be desired that others would take up the subject and confirm or discredit the results I have obtained.

It is necessary that day-light be used in following these tests, as gas, or other common artificial light being yellow, the delicate tints are thereby rendered invisible.

Turmeric in Aromatic Chalk Powder.—As with bright-coloured rhubarb, so it is not uncommon to hear turmeric suggested as the cause of the fine yellow colour of some makes of aromatic chalk powder.

This and other powders containing saffron may be tested in exactly the same manner as above directed for rhubarb. Polychroite, or crocine, the colouring principle existing to the extent of 50 to 60 per cent. (Pereira) in hay saffron is quite insoluble in chloroform, which only dissolves out a small quantity of yellowish oil. Aromatic chalk powder should therefore give no yellow stain with chloroform, a very small proportion of turmeric will thus be at once detected.

The saffron yellow, which may be obtained by using alcohol instead of chloroform, unlike that of turmeric, is changed to green by concentrated nitric acid, and to indigo blue, fading to dirty-red and brown, by sulphuric acid.

Turmeric in Mustard.—In "mustard condiment" turmeric will be found by the same process, though like the gilding on otto bottles, it is generally expected, and not so

likely to disturb a proper estimation of the quality; besides, it seems to serve an important purpose in keeping the article presentable for a week or more after being made, while a pure flour soon becomes unsightly, and has to be renewed for table use almost daily.

Mustard branded "genuine" should contain no turmeric.

Other applications of the principle involved in this test will no doubt suggest themselves to many pharmacists.

The author was thanked for his paper, but want of time precluded its discussion.

THE PLACE OF MEETING NEXT YEAR.

The PRESIDENT: You are doubtless aware of the circumstances that have rendered it undesirable that the next meeting of the Conference should be held at the same place as that of the British Association, and the question has arisen, what place shall we select instead of Belfast. Connected with this subject, I have received the following letter from the President of the Pharmaceutical Society:—

"*Pharmaceutical Society of Great Britain,*
"17, *Bloomsbury Square, W.C.*
"*August 7th*, 1873.

"The President of the
British Pharmaceutical Conference:

"My dear President,—I have been requested by the Council of the Pharmaceutical Society of Great Britain to convey to you the following resolution, passed at their meeting yesterday, August the 6th:—

"'That in the event of the members of the British Pharmaceutical Conference deciding to hold their meeting next year in London, the Council authorize the President of the Pharmaceutical Society to write to the President of the Conference, offering the use of the Society's rooms for the purposes of the meeting, and the Council further desire to add that they will be happy to afford every facility for promoting the success of the meeting.'

The VICE-PRESIDENT seconded the resolution, which was carried unanimously.

"And I assure you, Mr. President, that not only will the Council of the Pharmaceutical Society be glad to welcome the Members of the British Pharmaceutical Conference should they determine to meet in London next year (1874), but also that every member of the Pharmaceutical Society, and every pharmacist in London and the Metropolitan Districts, will be glad to welcome and entertain their brethren of the Conference.

"I remain, my dear President,
"Yours sincerely,
"THOMAS HYDE HILLS,
"*President of the Pharmaceutical Society of Great Britain.*"

The Executive Committee have considered the question fully, and they recommend that the Conference should meet next year in London, the exact time being left to the Committee to fix, in such a manner as may least interfere with the arrangements of the Pharmaceutical Society and those of the British Association.

The recommendation was agreed to.

The following letter was read:—

"*Glasgow Chemists and Druggists' Association,*
"*Andersonian University.*
"132, *London Street, Glasgow,*
"*September 9th*, 1873.

"Prof. Attfield,
"Hon. Sec., British Pharm. Conference,

"Sir,—I am instructed by the Council of the above association to express the hope that Glasgow may be honoured in the year 1875 by the presence of the British Pharmaceutical Conference, and to promise the members of the Conference a most hearty welcome.

"I have the honour to be, Sir,
"Yours most respectfully,
"JOS. A. CLARKE,
"*Hon. Sec.*"

THE ELECTION OF OFFICERS.

The PRESIDENT: The next business is the election of officers for the ensuing year.

Professor ATTFIELD: The Committee suggest the following list of officers:—

President.

THOMAS B. GROVES, F.C.S., Weymouth.

Vice-Presidents who have filled the office of President.

H. DEANE, F.L.S., Clapham, London, S.W.
Professor BENTLEY, F.L.S., M.R.C.S., London.
D. HANBURY, F.R.S., F.L.S., Clapham, London, S.W.
W. W. STODDART, F.C.S., F.G.S., Bristol.
H. B. BRADY, F.L.S., F.C.S., Newcastle-on-Tyne.

Vice-Presidents.

T. H. HILLS, F.C.S., London.
J. WILLIAMS, F.C.S., London.
R. REYNOLDS, F.C.S., Leeds.
CHAS. H. SAVORY, London.

Treasurer.

G. F. SCHACHT, F.C.S., Clifton, Bristol.

General Secretaries.

Professor ATTFIELD, Ph.D., F.C.S., 17, Bloomsbury Square, London, W.C.
F. BADEN BENGER, 1, Market Place, Manchester.

Local Secretary.

M. CARTEIGHE, F.C.S., London.

Editor of the Year-book.

(The Editorship is at present vacant.)

Editor of the Transactions.

Professor ATTFIELD.

Other Members of the Executive Committee, 1873-4.

F. C. CLAYTON, Birmingham.
C. EKIN, F.C.S., Bath.
T. GREENISH, F.C.S., London.
W. MARTINDALE, F.C.S., London.
R. PARKINSON, Ph.D., Bradford.
F. M. RIMMINGTON, Bradford.
L. SIEBOLD, Manchester.
F. SUTTON, F.C.S., Norwich.
C. UMNEY, F.C.S., London.

Auditors.

M. ROGERSON, Bradford.
A. ALLCHIN, London.

A ballot having been taken the officers were declared to be duly elected.

ELECTION OF MEMBERS.

During the day the following gentlemen were elected Members of the Conference:—Mr. J. M. Cuthbert (Bedford); Mr. W. Tucker (Bridport); Mr. R. Watkinson (Bamford).

VOTE OF THANKS TO THE LOCAL COMMITTEE.

Mr. SCHACHT: It has been more than once my pleasant duty to propose a resolution thanking the Local Committees of the different towns in which we have met for their successful efforts in organizing the annual meetings. It is evident to those who come from a distance that the success of these meetings depends largely upon the energy and cordiality with which the Local Committees act. On this occasion we can all testify to the brilliant success which has resulted from the efforts

of the Local Committee of Bradford. I beg to move "That the cordial thanks of this assembly and the non-resident members be given to Mr. Rimmington, Dr. Parkinson, Mr. Rogerson, and the other members of the Local Committee for their most successful efforts in organizing the present meeting."

Professor ATTFIELD: It is with the greatest pleasure that I second the resolution. As Secretary of the Conference I have of necessity been thrown into constant communication with the gentlemen named in the resolution, and I have been much struck by the care and forethought with which the arrangements for the meeting have been made by the Local Committee. The Local Committee had considerable trouble in providing rooms for the Conference, and at length succeeded in obtaining those in which we have assembled. Let me add that none of us from a distance can ever forget the hospitality we have received in Bradford on all sides.

The PRESIDENT: Before putting the resolution I should wish to add my personal testimony to what has fallen from Mr. Schacht and Professor Attfield. The task of the Local Committee on this occasion has been unusually difficult, and I can only express my personal thanks to them for the kindness with which the wants of the visitors have been provided for.

The resolution having been put, was declared carried, amid loud applause.

Dr. PARKINSON: I can only express my obligation for the vote of thanks which you have passed for the little the Local Committee have done in the matter, although I may say that that little has been done with hearty good will. I was one of those who were present at Newcastle when the Conference was originated, and I have attended it as often as I could since then. Hence my interest in it and the interest of my colleagues was and is great and what we have done has been done *con amore*.

Mr. GROVES (the President-Elect): I may say that the nomination of the officers for the ensuing year took place in my absence, and that I was never more surprised than when I entered the room this morning to find that I had been nominated as President for the ensuing year. I should not have felt astonished at receiving a step in promotion, but this highest honour is one altogether unmerited. I do not know what to say on the occasion except that I will not show the white feather, and that I will endeavour to discharge the duties you have imposed on me to the best of my power.

I have to propose a vote of thanks to the president and committee of the Church Institute, of Bradford, for their kindness in lending us this handsome room in which to hold the Conference.

Mr. BENGER: I beg to second the vote, and I only regret that we were not sufficiently numerous to quite fill the room.

The vote was agreed to.

THE RETIRING PRESIDENT.

Dr. EDWARDS: I beg to propose that the thanks of the Conference be given to Mr. Brady for the excellent manner in which he has conducted this meeting. To a large extent Mr. Brady has been the backbone of the Conference since its establishment, notwithstanding his numerous other scientific researches and business engagements.

Mr. BELL (Bradford) seconded the vote.

Mr. SCHACHT: I shall not offend your taste by putting this vote to the meeting, because I am sure that it will be carried by acclamation.

The vote was declared carried amid loud applause.

The PRESIDENT briefly expressed his thanks for the cordial manner in which the vote had been agreed to.

THE SECRETARIES.

The PRESIDENT: I beg, gentlemen, that you will not separate without allowing me to propose a vote of thanks to the Secretaries who have so ably discharged their multitudinous and laborious duties.

The vote was also heartily agreed to.

Professor ATTFIELD: I thank you for the manner in which you have recognized my services. So long as there is good work to be done, and I can do it, I shall gladly continue to occupy my present position.

Mr. BENGER also replied.

The Conference then terminated.

Parliamentary and Law Proceedings.

THE COLLECTION OF DEBTS.

On Friday, September 5, Mr. Charles Foottit, of Great Marlow, chemist and druggist, was sued in the Guildhall County Court, London, by Messrs. Stubbs and Co., for the sum of 20*s*. The plaintiffs had been employed by the defendant to collect debts, and the sum in dispute was for a subscription in advance. Mr. Footit pleaded that being dissatisfied with the manner in which the terms of the contract were fulfilled, he had determined not to continue his subscription. He contended that his order had been given in the country, and therefore he had not troubled to send back the circulars. The registrar held that no cause for action could lie at that court, and allowed Mr. Foottit 20*s*. expenses for coming to London to defend the action.—*From the South Bucks Free Press.*

POISONING BY MORPHIA.

The coroner's inquest upon the body of Mrs. McLeod, the earlier proceedings of which were reported last week (p. 336), was resumed on Thursday and concluded at a late hour on Saturday night, Oct. 25. The report of the medical gentlemen who conducted the *post mortem* examination was to the effect that there existed no disease of any vital organ such as would have caused death, and that the appearances were such as would be produced by a fatal dose of morphia. The report of Professor Maclagan, of Edinburgh, upon an analysis of the contents of the stomach and intestines of deceased, stated that he had failed to detect morphia, which he suggested had been decomposed. Traces of the atropine which was injected were detected.

After further evidence as to the affectionate terms upon which Dr. and Mrs. McLeod lived together, the Coroner, in summing up the evidence, said the statement of Mrs. Golland, mother of the deceased, and Miss Golland, as to the affectionate terms upon which Dr. McLeod lived with his wife, rendered a charge of murder untenable. The next question was—was it manslaughter — the unlawful killing of another without malice, either expressed or implied, either by the commission of some unlawful act, or in the pursuit of some lawful act criminally or improperly performed? Again, if a surgeon or physician gave a patient a potion to cure him, and, contrary to his expectation, he killed him, that was neither murder nor manslaughter, but misadventure. The coroner warned the jury against attaching weight to the evidence of a girl as to Dr. McLeod having taken liberties with her. That evidence was open to grave suspicion. It was in evidence that Mrs. McLeod had lost her rest in nursing her sick son, and that was Dr. McLeod's assigned reason for exhibiting an opiate, which he went to the druggists' to purchase. At this time a bottle of hydrate of chloral was standing on the mantel piece capable of destroying two lives. Dr. McLeod obtained 20 grains of morphia and continued to administer it in repeated large doses in a manner quite contrary to accepted theories. That Dr. McLeod should hold such opinions was extraordinary; but they had it in the evidence of Dr. Walker that Dr. McLeod's brain had been degenerated—probably by his twenty years' residence in India. His conduct was utterly irreconcilable with the healthy action of the brain.

The jury retired at nine o'clock. At five minutes to eleven the foreman returned and told the coroner that the

jury could not agree upon their verdict. They were divided into three parts. One part was for a verdict of wilful murder against Dr. McLeod, one was for manslaughter, and one for acquittal. The law upon the subject was referred to, and it was found that if the jury could not agree they must be locked up ; but if that was ineffectual, the coroner should adjourn until the Assizes for the opinion of the Judge. The jury being still unable to agree at a few minutes before midnight, the Coroner adjourned until the next Assizes. Immediately afterwards the chief constable of the city said it was his duty to take Dr. McLeod into custody on the charge of causing the death of his wife. Dr. McLeod, who made no remark, was immediately admitted to bail.

Reviews.

Local Botany. By C. B. Allen. Reprinted from the Cornwall Polytechnic Society's Report, 1872. Falmouth.

This little contribution to the history of the flora of a western county is the work of a pharmaceutist who has recently passed his examination. We gladly welcome efforts in this direction. Though "culling of simples" be not now the recognized occupation of our craft, botany is still in close alliance with pharmacy, and whether we see further developments or not of the uses to which the medicinal virtues of our native plants may be applied, it is obviously of importance as well as of interest to the pharmaceutist to be acquainted with them. The therapeutical properties of conium, for instance, are clearly not availed of to their fullest extent. We were recently told by a surgeon that a woman applied to him respecting a rodent cancerous ulcer of the lip ; he proposed to operate, but deferred doing so on account of her weak state. When she came again, in a few days, it was almost well ; and he found she had treated it with the juice of hemlock, chamomile and a species of ragweed. He attributed the cure to the conium, which, though not unfrequently used in such cases, has fallen into disrepute, mainly because it is with difficulty procured in a perfectly fresh state, and it speedily becomes inefficacious. He spoke of this as but one of the instances within his own knowledge. Then again, accidents occur from eating aconite roots, belladonna berries, etc. Quite recently, one occurred to a serious extent from the roots of *Œnanthe crocata*, which gave rise to quite a controversy in the papers as to what the plant was. Ought a druggist to be absolutely ignorant of these and other poisonous plants if applied to in an emergency ? Surely not ; and although an examination in botany has been decried by some, it is clearly necessary that a decent pharmaceutical education should embrace some practical acquaintance with the science. We believe that it should be an adjunct to all education. Whilst many amongst pharmaceutists have been and are honourably distinguished for their knowledge of botany as connected with materia medica, there are doubtless many others who are known in their respective districts as ardent local botanists. As we write, looking from the side of the Malvern Hills over the beautiful valley of the Severn, the name of one occurs to us who has left an honourable name in its botanical records, the late Mr. T. W. Gissing, afterwards of Wakefield. Our present author is emulous to walk in the same path. The pharmacist of this country is, alas ! a man too often chained by stern necessity behind his counter, but he is also a man who in contradistinction to an ordinary tradesman is expected to know something beyond the mere routine of his business ; he is expected to be a man of general information, and the more he can show that he is not a mere *épicier*, the better will be his position, and correspondingly, if he take care of it, his business.

The west of Cornwall, the district to which this pamphlet refers, differs in its climatic influences from the other English counties. The comparative absence of frost enables many representatives of a vegetation that requires a greenhouse in other parts of England to flourish here in the open air. Orange trees and camellias bear the winter out of doors. We have seen the *Agave americana*, so well known as the "aloe," throwing up a magnificent flowering scape fifteen to twenty feet in height. Numerous other plants might be cited, and it would be an interesting experiment to establish a "physic garden" here, confined to sub-tropical plants. The present list bears evidence of variation from the species to be met with in most midland and southern counties. *Echium violaceum*, and *Illicebrum verticillatum*, Cornish plants, and the beautiful *Erica vagans* are noted, but the pretty *Sibthorpia europea* and *Physospermum cornubiense* do not appear to occur in this district of Cornwall. It would be foreign to our purpose to dwell upon the purely botanical aspect of the distribution of species, but we observe that plants common to the Mediterranean strike the Channel Islands, the coasts of Devon and Cornwall, and the south of Ireland, working their way northwards with more or less vigour, mostly coastwise, many getting as far as, but not beyond, the midland counties. Quite recently *Plantago arenaria*, a native of eastern Europe, was found to have established itself at a point on the Carmarthenshire coast, but it is doubtful how long it may remain, though it may have more chance than if recognized as a British plant, the rarities amongst which are rapidly disappearing under cultivation and the ruthless hands of collectors. The list given of medicinal plants is pretty comprehensive, whence it would appear that a pharmaceutist may obtain his requirements in good condition without much difficulty. In a revised edition which we think might still yield further information, a few printer's errors, probably the result of a country press, might be avoided.

Scientific Handicraft : a Descriptive, Illustrated, and Priced Catalogue of Apparatus suitable for the Performance of Elementary Experiments in Physics. By John Joseph Griffin, F.C.S. Volume I : Mechanics, Hydrostatics, Hydrodynamics, and Pneumatics. 1873.

Every one engaged in experimental chemistry must be familiar with the excellent catalogue of apparatus, published by Mr. Griffin under the title 'Chemical Handicraft,' and, moreover, must have had frequent occasion to acknowledge its usefulness in supplying information as to the construction and use of such apparatus as must necessarily be obtained from the maker, as well as in giving practical hints for numberless little contrivances that can very well be put together at home. In bringing out the 'Chemical Handicraft,' the editor announced his intention of publishing a series of works on the same plan, but relating to apparatus for the illustration of other branches of science. After some considerable delay he now partly redeems this promise by presenting the first volume of the proposed series.

These books, as most of our readers are aware, are illustrated and priced catalogues of the apparatus made and sold by the firm of J. J. Griffin and Sons, but those who have used them will admit that they are in reality something more than that ; and that they deservedly rank far above ordinary specimens of business literature. The 'Chemical Handicraft' contained an account not only of common forms of apparatus, but was characterized by the introduction of many ingenious contrivances.

In the new volume we find all the ordinary experiments and apparatus intelligibly described with the aid of a sufficient number of very fair illustrations, but being restricted to elementary matters, few attempts seem to have been made to improve or modify long familiar forms of instruments. The illustrations consequently exhibit nothing remarkable for novelty. The directions for manipulation seem in some instances—for example, "barometer"—to be less complete than, from experience

of the 'Chemical Handicraft,' we should have expected. Nevertheless, we ought to add that there are here and there very timely hints as to the preservation of apparatus, which will be acceptable to many amateurs, and probably, in these days of science in schools, to many teachers unfamiliar with the practical employment of apparatus.

We have said nothing about the prices, but we fear with the present cost of coal, metals, and glass, the prosecution of experimental science is not likely to become less expensive than it always has been.

THE HALF-YEARLY ABSTRACT OF THE MEDICAL SCIENCES: being a Digest of English and Continental Medicine. By WILLIAM DOMETT STONE, M.D., F.R.C.S. January to June, 1873. London: J. and A. Churchill.

Dr. Stone continues to attempt single-handed an undertaking which can be satisfactorily performed only by division of labour. His volume retains most of the features of its predecessors, while we observe no improvement in the spelling of German words, or, indeed, in the requisite knowledge of German science. A compiler who can pass such things as "Langënbeck's Archiv" (p. 164); "Archiv für Gynäkologi" (p. 294), and so forth, is not likely to have much acquaintance, at first hand, with treatises in the German language. The 'Abstract,' moreover, teems with matter which, except for its filling up space, has no right to be republished. What good can possibly accrue to any reader from this sentence of Dr. Ch. Kidd on chloroform (p. 138):—"The beautiful discovery of anæsthetics, that we owe to Morton, coming in, as Lord Bacon says, aura leni with its 'still small voice,' is ill-adapted to all the contentions, exparte advocacy, and twenty years' continuous doubt which have beset it; scribendi recte, etc., clearness, good sense, and practical experience, the first principles of authorship, too often lost in hasty generalization." The next time Dr. Kidd talks of the "first principles of authorship," let him express himself in grammatical English.

"Turpe est doctori cum culpa redarguit ipsum."

In the "Appendix" Dr. Stone inserts a rather gratuitous puff of "chlorozone" as a disinfectant. His admiration of the commodity is not shared by competent chemists.

BOOK RECEIVED.

PRACTICAL EXAMPLES IN QUANTITATIVE ANALYSIS, forming a Concise Guide to the Analysis of Water, etc. By ERNEST FRANCIS, F.C.S. London: H. K. Lewis. 1873. From the Publisher.

Obituary.

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

On the 4th October, 1873, Mr. James Brocklehurst, Pharmaceutical Chemist, of Hyde, Cheshire. Mr. Brocklehurst had been a Member of the Pharmaceutical Society since 1842, and for many years had acted as Local Secretary for Hyde.

On the 1st October, Mr. John Dickinson, Chemist and Druggist, of 118, Great College Street, Camden Town.

The following journals have been received:—The 'British Medical Journal,' Oct. 25; the 'Medical Times and Gazette,' Oct. 25; the 'Lancet,' Oct. 25; the 'London Medical Record,' Oct. 25; 'Medical Press and Circular,' Oct. 25; 'Nature,' Oct. 25; 'Chemical News,' Oct. 25; 'Gardeners' Chronicle,' Oct. 25; the 'Grocer,' Oct. 25; 'Journal of the Society of Arts,' Oct. 25; 'Grocery News,' Oct. 25; 'Produce Markets Review,' Oct. 25; 'Carlisle Patriot,' Oct. 23 and 24; 'Leicester Journal,' Oct. 17; 'Practical Magazine,' for November.

Notes and Queries.

[362.] COCHINEAL COLOURING.—*E. Nicholson* will find—

Carmine . . .	60 grs.
Liq. Potas. . .	qs. to deepen colour.
Spt. Vin. Rect. .	℥ x.
Aquæ . . .	ad ℥ x.

a good form for pink colouring.—L.

[363.] MARKING INK WITHOUT NITRATE OF SILVER.—One dram of aniline black is rubbed up with sixty drops of strong hydrochloric acid and 1½ oz. of alcohol. The resulting liquid is then to be diluted with a hot solution of 1½ drachm of gum arabic in six ounces of water. This ink does not corrode metallic pens; is affected neither by concentrated mineral acids nor by strong lye. If the aniline black solution be diluted with a solution of 1½ oz. of shellac in 6 oz. of alcohol, instead of with gum water, an ink is obtained which when applied to wood, brass, or leather, is remarkable for its extraordinary black colour.—*Year Book of Pharmacy*, 1870.—J. B

[365.] POISONOUS KIPPERED MACKEREL.—*C. S.* writes that four persons after eating kippered mackerel have suffered from an effusion of blood into the brain. In each case, the face became almost purple, a burning heat pervading the whole of it, and there was a heavy pain in the temple that lasted some time. *C. S.* asks whether these fish are ordinarily unwholesome when cured.

CHLORODYNE.—*B. G.* and *P. C.* write, in reference to a form given for Chlorodyne in vol. i. of the present series of the PHARMACEUTICAL JOURNAL, p. 496, that they have attempted to make the preparation as there directed, but have not succeeded, because the ether separates. We have therefore communicated with the correspondent who furnished the formula, who says:—"I must confess I have at times subsequently been somewhat puzzled at the different results from the same process. I have come to the conclusion that some treacle will make very good chlorodyne alone, and some will not make it all. For some time I have used equal parts of treacle and muc. tragac. cold, in place of the hot treacle, from which I get more uniform—I think I may say quite uniform—results."

PHOSPHORUS PILLS.—The following extract from a letter on the subject of phosphorus pills, by Mr. B. S. Proctor, of Newcastle-upon-Tyne, has been placed at our disposal by a correspondent:—

"My book does not treat of phosphorus pills. I have had no experience of them, consequently delayed answering yours received till I had time to try the formula. I take bread-crumbs to mean any excipient which I think best.

"A general consideration of the question suggested the following mode of procedure, which I have found work without difficulty. It is my first attempt at phosphorus pills. I have made twenty-four and send you twelve of them:—

"℞.	Phosphorus	gr. vj.
	Bisulph. Carbon	gtt. vj.
	P. Tragacanth	gr. xij
	Sapo Mollis	gr. xxiv.
	Pulv. Glycyrrh., Conf. Rosa.	āā ℥ss.

"In pil. xxiv.

"Put the P into a test tube, with half the CS_2; whilst it is dissolving weigh the tragacanth and put it into the mortar. Have the soap, etc., weighed upon paper, ready to be added at the right moment. Then pour the solution of P on the gum tragacanth, rinse the test-tube with the other half of the CS_2, adding this to the other, rub them together. The CS_2 is almost immediately volatilized, and the P would take fire if the soap were not quickly combined with it. As soon as these are rubbed to a smooth paste, add the liquorice and conserve, work into a mass, divide into pills, and coat with varnish."

Correspondence.

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

The Preliminary Examination.

Sir,—I observe a letter in this week's Journal, signed by Mr. Fryer, on the subject of the Preliminary examinations. Doubtless he has had more schooling than some who call themselves by the dignified name of "pharmacist," but it is a question if he be not one of those very men to whom Mr. Haselden refers, and whose existence he denies—the over-educated; and whether a little more experience will not dissipate some of his utopian ideas.

Surely there is sufficient demand already upon the pockets of the rising generation of pharmacists without imposing a stringent scholastic examination and its consequent expense, as Mr. Fryer advocates. Is the pharmacist now so much overpaid for the knowledge already dearly purchased by the expenditure of time and labour that he can afford still further to increase the outlay at starting? I think not.

There can be no doubt that the pharmacist is called upon frequently to perform duties of a professional character, but it is an unmistakable fact that his calling is principally mercantile, hence he does not and never can expect to rank side by side in the social scale with his friends of the medical profession. What folly then to insist on a standard of education utterly beyond his requirements—such as a university matriculation.

I endorse Mr. Haselden's opinion that the Pharmaceutical Society is and ever should be the proper examining body for those who desire to wield the pestle, as well as for those who are further advanced in the art of compounding; and although a system can never be made so perfect but that a flaw may somewhere occur, yet the practice of having one standard examination, superintended by qualified men of our own body, is as perfect as could be devised. The possibility of irregularities such as have been asserted to occur under the present *régime* might be reduced to a minimum if, instead of the examinations being conducted in every town that boasts a local secretary, they were only held in certain towns, each commanding a surrounding district. In conclusion, let us rather trust to the dictates of common sense and experience than to high-flown theories.

Charles W. Taylor.

Darlington.

Sir,—Though like my friend Mr. Fryer I have my doubt as to whether the Preliminary examinations would not be better conducted by some distinct examining body, still I think we seem compelled by the wording of the 6th Section of the Act of 1868, to provide them for the convenience of such candidates as may prefer to present themselves to our Society in preference to any other. Such being the case, I would suggest that the number of centres at which they are held be considerably reduced; say to about twelve for England and four or five for Scotland; as it must be evident to all that it is quite unnecessary to hold examinations at many of the places named in last week's Journal. Witness the absurdity of holding examinations at four towns in Norfolk, a county whose extreme breadth is only about seventy miles.

At each of these sixteen or seventeen centres there might be a paid superintendent, who should devote his whole attention to the candidates during the examination, and on its termination hand the papers to the local secretary. By this means all chance of copying would be prevented and the local secretaries relieved of that present call upon their time, which some do not seem able to afford, whilst the extra expense to the examinee would be so slight that I should not fear any complaints on that score.

Whilst writing on the subject of examinations I may perhaps be permitted to express my regret at finding so few of the Minor candidates have any intention of even trying to pass the Major; a circumstance I principally attribute to the apparent impossibility of getting the public to recognize the difference between pharmaceutical chemists and members and associates of the Society, and also to the great mistake of granting to associates in business privileges almost identical with those enjoyed by pharmaceutical chemists. The only remedy for this state of things seems to be either the granting of a new title (such as Fellow of the Society) to such members as are also pharmaceutical chemists, or compelling the attendance of all students for a certain period at such schools of pharmacy as the Council may agree to recognize.

By the former method students would receive an extra inducement to pass the Major, and the latter rule would prevent the excuse so often made of not having had sufficient time to study for it.

Edward H. Storey.

42, *Castle Street East, W.*

Removal of Nicotine from Tobacco Smoke.

Sir,—In the Pharmaceutical Journal for August 30, under the head of "Notes and Queries," I find a quotation from the *Canadian Pharmaceutical Journal* relative to the above subject.

I find it stated that "a patent has been taken out for a process for the removal of nicotine from tobacco. The smoke is drawn through a sponge saturated with a solution of tannic acid, tartaric or citric acids, glycerine, and a flavouring ingredient, such as Florida or clove water."

I beg to direct the attention of your readers to a note in the *Lancet* of April 7th, 1866, in which M. Melsens' method of preventing the baneful effects of nicotine is indicated. It will be seen on reference to this note that the method devised by M. Melsens is essentially the same as that for which the patent has been obtained.

In a letter of mine in *Scientific Opinion*, April 18th, 1866, I thus comment on M. Melsens' method. "The chemical theory on which his method is based is strictly correct, but I cannot say as much for the method itself. I have tried many experiments with the ball of cotton impregnated with the tannic and citric acids, and in every case I was able to detect nicotine in the smoke, and that too in considerable quantity. I am bound to say, however, that the quantity was by no means so great as when the cotton ball was not used. In a manuscript work which I communicated to the Royal Academy of Medicine of Belgium on the 'Effects of Tobacco' I describe an apparatus for bringing the tobacco smoke through *water* before allowing it to enter the mouth. After I read of M. Melsens' method I substituted a solution of tartaric and citric acids for the water, and in no instance could I then detect the slightest trace of nicotine in the tobacco smoke." I would ask whether it is strictly fair of our Canadian friends to take out a patent for a process which has been invented seven years ago, without tendering some acknowledgment to those who have been, so long ago, working at the subject.

W. Handsel Griffiths,
Ph.D., L.R.C.P.E., L.R.C.S.E.

2, *Sydenham Road, Dundrum, Dublin.*

R.C.—It is not legal for any person to call himself a pharmacist who is not on the Register of Pharmaceutical Chemists.

"*Count your Corks.*"—We have received a letter from "*A County Firm,*" headed as above, in which the details of a purchase of corks are given, where, after the seller had departed, the buyer found that the bags sold as containing twelve gross each contained only eight or nine gross. We think the only way to avoid such occurrences is either to put our correspondents' motto into practice, or to purchase of persons who are known and can be trusted.

P. L.—We are unable to answer the question. Apply to the Inland Revenue authorities.

J. G. Iverach.—The preparation meant is probably that of the London Pharmacopœia, which is essentially the same as that of the present British Pharmacopœia.

W. H. H.—(1) *Athyrium filix-fœmina*, var. (2) *Polystichum angulare.* (3) *Athyrium filix-fœmina.* (4) *Lastrea spinulosa.* (5) Probably *Lastrea oreopteris:* the specimen is too young and not in fruit. (6) *Lastrea dilatata*, var.

W. B. E.—*Euonymus europæus.*

Communications, Letters, etc., have been received from Sir R. Christison, Messrs. Harper, A. Thompson, Druce, Gratte, Holmes, Armstrong, Hallawell, Abraham, Mason, "A Subscriber."

PHARMACEUTICAL NOTES.*

BY J. B. BARNES.

Guaiacum resin, as it is imported, is exceedingly impure, which will be seen by the following experiments:—Sixteen ounces of guaiacum resin supplied by the wholesale druggist, a sample of which I place before you, was exhausted by boiling in rectified spirit, the quantity of purified resin obtained was 13 ounces and 288 grains; the insoluble woody particles weighed 2 ounces and 139 grains, or 14·4 per cent. of impurity.

Another experiment was made by operating in a similar manner upon 8 ounces of powdered guaiacum resin obtained of a wholesale house, which yielded about 7 ounces of pure resin, and 412 grains or 11·7 per cent. of impurity, consisting of a brown bulky powder.

These results show that pure guaiacum resin should be used for all pharmaceutical purposes, in preference to the guaiacum resin as imported and, I believe, universally used.

Simple extract of colocynth, prepared by two macerations of the pulp in cold distilled water, pressing, boiling the liquor, separating the coagulated matter, evaporating to dryness, and exhausting with rectified spirit, yielded the same amount of extract as was obtained from the same quantity and sample of colocynth pulp which had been exhausted with proof spirit and evaporated to dryness until the weight was constant. By this means the use of a large quantity of spirit and subsequent distillation was avoided.

The infusion of roses of the Pharmacopœia, as is well known to all pharmaceutists, loses its transparency when cold. I find that when one part of glycerine is added to eight or nine parts of infusion of roses it at once becomes bright and continues so as long as it keeps good. Also that when three fluid-drachms of glycerine are added to a mixture composed of one grain sulphate of quinia, one minim of dilute sulphuric acid, and nine fluid-drachms of infusion of roses, the precipitate of tannate of quinia which forms is dissolved, and the result is a beautifully bright solution. The precipitate which occurs in gargles containing tannic acid and infusion of roses can also be dissolved by the addition of two fluid-ounces of glycerine to the pint.

[*The discussion upon this paper is printed at p.* 369]

THE PREPARATION OF LIQUOR BISMUTHI.†

BY C. MÉHU.

In the formula given by Mr. C. H. Wood for the preparation of Liquor Bismuthi‡ there are two equivalents of citric acid ordered to one equivalent of bismuth. I have satisfied myself many times that a single equivalent of citric acid is sufficient to obtain a perfectly stable solution of bismuth. In this manner an excess of citrate of ammonia in the liquor is avoided. The method which I adopt is as follows:—

I dissolve an ascertained weight of pure bismuth in three times its weight of pure nitric acid, then concentrate the solution and leave it to crystallize. After one or two days the mother liquor which surrounds the crystals is decanted and evaporated in a porcelain capsule at a moderate temperature, so as to completely drive off the excess of acid: in cooling the liquor forms a crystalline mass. All the crystals being put together, I then pour upon them a concentrated solution of citric acid, made with heat. For each equivalent of bismuth I employ an equivalent of crystallized citric acid, being very nearly equal weights of each. The solution of citric acid dissolves completely the crystals of nitrate of bismuth.

In order to obtain citrate of bismuth I divide this solution of nitrate of bismuth in citric acid into two equal parts, and pour into one of them a sufficient quantity of ammonia to dissolve the precipitate that is formed at first, leaving only a slight excess of ammonia, and then add the other portion of the solution. From this mixture there results a very white precipitate of citrate of bismuth, which I wash with warm water as long as it gives any traces of acidity, and then dry in a stove. The washings are acid and contain a large proportion of nitrate of ammonia, with scarcely any traces of bismuth. This can be isolated in a state of sulphide by means of sulphite of sodium.

The citrate of bismuth so prepared dissolves in ammonia; the solution can be diluted at will with water without becoming turbid, and may be preserved for years. I have examined during two years several solutions of bismuth containing from 20 to 50 grams of metallic bismuth per litre without recognizing the least alteration. The solubility of the citrate of bismuth is very rapid and easy; it is only necessary to wash solid citrate of bismuth with a strong solution of ammonia to obtain a perfect solution too strong for ordinary use.

When the solution of citrate of bismuth in ammonia is evaporated upon plates there is left a white residue insoluble in water, but completely soluble, although rather slowly, in ordinary solution of ammonia.

The citrate obtained by the evaporation of the ammoniacal solution yields nothing perceptible to alcohol, unless it contain nitrate of ammonia in excess or some other impurity soluble in that menstruum. The solution of citrate of bismuth in ammonia is not rendered turbid by acetic acid, chloride of sodium, chloride of ammonium, iodide of potassium, ferrocyanide of potassium, or bichromate of potash. It is precipitated by oxalate of ammonia, nitric acid, phosphoric acid, sulphuric acid, and nitrate of urea.

THE PERMANENCE AND PRESERVATION OF PEROXIDE OF HYDROGEN.*

Hitherto it has been accepted as a fact that peroxide of hydrogen is a very easily decomposable compound of hydrogen and oxygen, which, especially in a non-acid state, cannot be kept without decomposition. Böttger however has found that a peroxide perfectly neutral, and particularly well adapted for medicinal use, may be kept for a month together without any change, in an ordinary corked bottle,—indeed that it might be exposed for some time to a boiling heat, without being impaired in the least; then, if the same liquid, cooled, be mixed with a strong solution of cadmium iodide, and a few small crystals of ferrous sulphate be added to the mixture, the

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, November 5, 1873.

† 'Annuaire Pharmaceutique,' 1873, p. 55.

‡ Pharm. Journ. [3] vol. ii., p. 233.

* *N. Jahr. f. Pharm.*

peroxide of hydrogen immediately becomes coloured deep sky blue, just as if it had not been previously heated; proving that it had not suffered decomposition by the heat.

PATCHOULI.*

Patchouli, or Pucha-pat, is the Hindostanee name of the plant from which the perfume is obtained, which is known to botanists as *Pogostemon Patchouli*. It belongs to the order *Labiatæ*, which furnishes us with so many of our aromatic plants, such as sage, thyme, marjoram, rosemary, lavender, mint, pennyroyal, etc. The patchouli is tall and shrubby, not unlike the garden mint in habit, with broad, egg-shaped, opposite leaves, about three inches long, and thick spikes of small purplish-white flowers. It is a native of Penang, Silhet, and the Malay Peninsula, and is imported into Engand from Hindostan and Bengal. In India it is a very popular perfume, being generally sold in the bazaars, besides being used in tobacco for smoking, and for scenting the hair of women. It was not imported into England until 1844, when forty-six cases, some containing fifty pounds, others one hundred and ten pounds, were put up for sale at Garraway's Coffee House. The price asked was only six shillings a pound; but there were no biddings, which proves that its popularity is of but recent date. This lot was brought from New York, to which place it is said to have been taken from China. The plant flowered in Europe for the first time in the winter of 1844, in the greenhouse of a gentleman at Orleans; since then it has been in cultivation in many botanical gardens, and may usually be seen in the Economic House at Kew. Some years ago genuine Indian shawls could always be distinguished by the peculiar odour which they bore, the cause of which was long unknown. It was, however, at length discovered by the French manufacturers that this odour was due to patchouli, and they imported the plant in order to give articles of home manufacture the same perfume. The smell of patchouli may also be detected in Indian ink, in the manufacture of which it is an ingredient. The dried leaves and tops are the parts imported, and these may be bought in the markets in bundles of half a pound each. Dr. Wallich states that a native friend of his told him that the leaf is largely imported by Mogul merchants, that it is used as an ingredient in tobacco for smoking and for scenting the hair of women, and that the essential oil is in common use among the poorer classes of the natives for imparting the peculiar fragrance of the leaf to their clothes. The sachets of patchouli which are sold in European shops consist of the herb coarsely powdered, mixed with cotton wool, and folded in papers. These are simply placed in drawers and wardrobes to drive away moths and insects. The patchouli plant is in great favour with the Arabs, who use and export it more than any other nation. They take up great quantities on their annual pilgrimage, and use it chiefly in stuffing mattresses and pillows. They believe it to be very efficacious in preventing contagion and prolonging life. It is also said to protect clothing from moths. The preparation of the herb is very simple, the tops—about a foot in length—being merely gathered and dried in the sun. It must not, however, be allowed to get too dry, or the leaves will become brittle and crumble in packing. It is recorded that ill effects, such as loss of appetite and sleep, have arisen from the excessive employment of patchouli as a perfume; and it is very probable that such effects would be produced by it upon certain constitutions. The scent is more powerful in dry than in damp places. The odour is due to a volatile oil, which is contained in the leaves and stems. When distilled, it is yellowish-green, with the same smell as the herb, but neither a burning nor an astringent taste. It is almost as heavy as water. A hundredweight of the plant yields about twenty-eight ounces of oil, or, according to a specimen of the latter in the Kew Museum (where may also be seen the plant in its dried state as imported), one ounce of oil may be obtained from two hundred ounces of the herb. It is from this oil that the essence of patchouli is prepared. In the sachets of patchouli, however, the coarsely-powdered leaves are used.

* From the *Journal of Applied Science*.

SOAP-MAKING AND TALLOW-MELTING.

During the past session of Parliament an interesting inquiry was held by a Special Committee of the House of Commons with regard to certain provisions of the Metropolitan Building Act of 1844, which enacts that it shall be illegal after the expiration of thirty years from the passing of the Act—that is, in 1874—to carry on what are termed noxious businesses nearer than fifty feet to a dwelling-house, or forty feet from a public way. Amongst the trades affected by this legislation are soap-makers, tallow-melters, etc., and a good deal of chemical evidence was given in the course of the inquiry as to the processes used in these manufactures. Mr. Cattley, a large soap-maker, testified as to there being nothing noxious in soap manufacture as at present carried on. The principal ingredients used were tallow, palm oil, and resin. All sorts of grease could be used, and they also used alkalies. The greases are boiled with ley, which is formed from boiling alkali, lime, and salt together, a solution thereof being designated "ley." They had never had any complaints as to their works being injurious to the health of the inhabitants of the neighbourhood. Thirty years ago, when this Act was passed, the manufacture of soap was carried on in a very different way from what it is at the present time. The use of steam has effected quite a revolution in the business. In former days the coppers were boiled by open fires; now they are all boiled by steam. The melting of the material also is done in a much more cleanly way. In 1853 the duty was taken off soap. This set the trade free, and allowed chemistry to do a great deal for soap which was scarcely possible before. Prior to 1853 the "ley" was made from barilla and kelp, and in the process of manufacture the residue contained a certain quantity of sulphuretted hydrogen, which was offensive. From this process, too, the "waste ley," after the soap was made, was boiled down again to recover the "neutral salts" in the form of black-ash. This, however, is now all done away with, the "ley" being made from pure British alkali. The smell of the ley, when deprived of soda, is not offensive, though heretofore it possibly was so. At the present time the manufacture of British alkali is different from what it used to be before the salt duties were repealed.

With regard to the tallow used in soap-making, it is described as being particularly pure, especially that which comes from Australia. This description of tallow, it appears, is very largely superseding the Russian, "as the Russians use their own tallow as civilization increases." Soap-boiling and tallow-melting must not be confounded as similar business; they are quite distinct. Soap-makers do not necessarily melt their own tallow. The business of tallow-melting is described as rendering fat to make yellow soap, kitchen-stuff to make mottled soap. One large manufacturer who gave evidence before the committee, described tallow-melting as simply cooking on a very large scale. If the fat be supplied to the tallow-melter fresh, there is no more harm (quoting the same authority) arising from tallow-melting than there is from cooking a sirloin of beef; it is precisely the some thing. Fresh fat is taken from the inside of the animal, is cooked just the same as a large piece of beef for the table; and supposing the fat to be fresh the process is quite innocuous. It is stated that the fat is usually fresh.

Generally the evidence taken by the committee frees both soap-making and tallow-melting from the imputation of being noxious businesses; and it is difficult to see why they should have been included in the Act of Parliament. There is no doubt that many other trades are infinitely more injurious, and of which the Act takes no cognizance.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 8, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE OPERATION OF THE ADULTERATION ACT IN THE DRUG TRADE.

THE recent case in which a fine of ten pounds was inflicted under the Adulteration Act for the sale of effervescent citro-tartrate of soda under the name of "citrate of magnesia" is one in which so many members of the trade might be involved that it has naturally excited considerable interest. We have received a number of letters on the subject, most of which are published in deference to the principle that this Journal should offer facilities for the free expression of opinion. But we cannot concur with some of the views put forward by our correspondents, and in the first place we dissent from the suggestion that it is the province of the Pharmaceutical Society to prescribe names by which such preparations as the one in question should be designated. To say nothing of the possibility that such a proceeding might be regarded with great disfavour by those who object to centralized action by the Society in regard to trade matters, it must be borne in mind that the case in point is so very simple that every one may protect himself by the use of a label which will correctly represent the nature of the article sold. We are glad to see that steps are already being taken in this direction by individuals, and in the interest of the trade we trust their example will be generally followed.

So long as the Adulteration Act remains in force in its present form there will be a possibility of its being applied as an engine of persecution, as in the case now referred to, where there is not really any ground for the charge of adulteration. It is of course intelligible that when a man is charged with selling as a preparation of magnesia an article that does not contain a particle of magnesia, persons ignorant of the essential facts of the case—as magistrates, lawyers, and public writers too frequently are—may well be impressed with the belief that some serious enormity has been practised. Hence we find sensation paragraphs making fun of the trustworthiness of druggists, and on such an erroneous though plausible basis exciting in the public mind prejudices detrimental to the whole pharmaceutical body.

The only blame, however, that can be imputed to sellers of "citrate of magnesia" is that of lending themselves to the practice of calling things by names that do not belong to them. This practice was long since denounced by Mr. SANDFORD in one of his presidential addresses; it has also been formally condemned by the Pharmaceutical Conference, and, if its continuance be fraught with liability to legal prosecution, it seems idle to attempt to excuse it by saying that the public insist upon its use. It is not the public who introduce these articles or name them.

It seems at least equally unreasonable to attempt to shift the responsibility in such cases upon the wholesale dealers or manufacturers, and we think that Mr. MCDERMOTT was specially ill advised in adopting that course in his defence. We would be loth to lend any support to the plea of ignorance as an excuse for the sale of adulterated or inferior articles, and since we think members of our trade should in this respect take higher ground than the grocer or the oilman, we cannot dissent from the magistrate's proposition that a chemist ought to know whether the drugs he sold were genuine. As to this point, too, we must remind our readers that the decisions of the courts have all tended in this direction; so much so, indeed, as to neutralize the intention of the framers of the Act that liability to its penalties should depend upon guilty knowledge of adulteration on the part of the vendor.*

There is another feature in Mr. MCDERMOTT's case which seems worth notice in connection with our recent remarks on alleged substitution of one article for another in dispensing prescriptions.† Consistently with those remarks we will not attempt to raise any objection to the magistrate's declaration that this was a very serious offence, though we still hold the opinion that it is an ideal offence. So far as we can judge from the newspaper reports, there does not seem to have been any ground for introducing a reference to a prescription in this case, though it was in this way the magistrate was induced to inflict such a heavy fine. We should be sorry to impute improper motives to public officers who in the exercise of their duty may be called upon to take steps which seem harsh; but, all things considered, we cannot avoid the conclusion that in the prosecution of Mr. MCDERMOTT there was at least an excess of zeal.

BOTANICAL students will be glad to hear that the new (third) edition of BENTLEY'S 'Manual of Botany,' is now ready. Messrs. CHURCHILL also announce that another work on a kindred subject will shortly be issued in monthly parts. It will be a book on 'Medicinal Plants,' and will be written by Professor BENTLEY and Dr. HENRY TRIMEN. The work will include full botanical descriptions, and an account of the properties and uses of the principal plants employed in medicine, especial attention being paid to those which are officinal in the British and United States' Pharmacopœias. The plants which supply food and substances required by the sick and convalescent will also be included. Each species will be illustrated by a coloured plate drawn from nature.

* *Ante*, vol. iii., p. 1007. † *Ante*, p. 303.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

Wednesday, November 5th, 1873.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Frazer, Greenish, Hampson, Owen, Radley, Robbins, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick, and Williams.

The minutes of the previous meetings of Oct. 1st and 22nd were read and confirmed.

The New Bye-Law.

The Secretary read a copy of the letter which had been sent to the Privy Council with the new Bye-Law in pursuance of instructions given by the Council at their last meeting. The letter was ordered to be entered on the minutes.

A Member and an Apprentice who had neglected to pay their subscriptions within the proper time were ordered to be restored to their former status on payment of the subscription and a fine of one shilling.

Elections.

MEMBERS.

Chemists and Druggists.

Akhurst, William Edward .....London.
Dawson, Alfred.....Woking.

ASSOCIATES.

The following having passed their respective examinations, and being in business, were elected "Associates in Business" of the Society:—

Minor.

Matthews, Thomas Averill .....Gloucester.
Moore, John .....Greenwich.
Morgan, George Henry..... .....Wem.

Modified.

Webster, John Henry.....Scarborough.

The following having passed the Minor examination were elected "Associates" of the Society:—

Appleton, Thomas Alfred .....West Brompton.
Baxter, John Newsome .....Rotherham.
Bibbings, John Henry .....Exeter.
Booth, George Samuel.... .....Heckmondwike.
Campbell, Colin.....Glasgow.
Carson, Robert .....Manchester.
Chapman, Joseph John.....Chertsey.
Clark, William Coltart..... .....Dalbeattie.
Clark, William Inglis .....Edinburgh.
Grant, Donald .....Elgin.
Harding, William.....Bristol.
Holt, George Alfred.....Douglas.
Holyoake, Francis..... ...Wandsworth Road.
Huggett, Sydney .....Lancaster.
Ingham, Thomas Whittaker ...Rawtenstall.
Kirkby, Robert .....Ulverston.
Lathbury, Charles John .....Worcester.
Leslie, John Morison .....Port Elizabeth.
Lewis, Edward Prosser .....Tenby.
Moore, John Ernest .....Southampton.
Normand, Claude .....Hammersmith.
Peacock, Percy.....Chelsea.
Righton, James.....Southport.
Rogers, William Sexton .....Southsea.
Savage, John Welch.....Wells.
Somers, Robert Walter .....Guildford.
Southwell, John William.....Scarborough.
Twist, Edward Herbert .....Prescot.
White, Thomas Lee .....Edinburgh.
Wills, George Sampson Valentine...Hay.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination were elected "Apprentices or Students" of the Society:—

Crompton, John Clayton .....Manchester.
Dashwood, James.....Portsmouth.

Finance.

The report of this Committee, recommending sundry accounts for payment, was received and adopted.

House.

The report of this Committee was read. It stated that steps had been taken for the furnishing and lighting of the library, etc.

Mr. Greenish stated that he and another member of the Council had accompanied the surveyor to choose a gasalier for the library, but they had not definitely fixed upon one which they could recommend.

Mr. Williams said it was very important that no time should be lost in providing gas fittings for the new Council room.

Mr. Betty suggested that the discussion of the details of these matters should be left in the hands of the Committee.

The President said it was important that the floor covering of the library should be immediately decided upon, in order that the room might be opened for use.

Mr. Sutton said he had found linoleum exceedingly durable.

The report and recommendations of the Committee were received and adopted. A resolution was also passed for the laying down of the linoleum, according to estimate.

A payment of £400 to the builder on account of the alterations was also ordered.

Mr. Hampson moved that the House Committee be instructed to take steps to fit up and furnish the new Council room in a proper manner. It would be a great pity after the expense which had been gone to of fitting ventilators in the Secretary's room that it should not be occupied as proposed.

Mr. Sutton said the present Council room was often required for the purpose of examinations.

The President was not aware that it had ever been definitely settled that the Council meetings should be held in the Secretary's room in future; in some respects he preferred the present room, and thought that if a ventilator were added it would be all that could be desired. He suggested that at any rate the new room should be tried for one month before the change was finally made.

Mr. Betty also thought it had been understood that the new room should be tried before removing definitely into it.

The Vice-President drew attention to the resolution passed at the July meeting:—

"That the room now used as the Secretary's office be taken for Council meetings."

After some further conversation,

Mr. Hampson said he would not press the motion for a month, on the understanding that the new room should be tried for the next meeting.

Benevolent Fund.

The report of the Committee was read, stating the result of the recent election, which was as follows:—

Potts	2503
Kennett	1416
Moss	1351
Beaton	895
Linging	129

A resolution was passed authorizing the Secretary to pay Mr. Potts and Mr. Kennett, the two successful candidates, the proportionate amount of the pension up to Christmas next.

The Committee also recommended two grants of £10 each, one to a registered chemist and druggist, the other to the widow of a registered chemist and druggist. It appeared, however, that the former had died since making the application, and although it was suggested that the money might be paid over to the widow of the applicant, the Council decided, after full consideration, that such a course could not be taken, but that an application in due form from her would doubtless meet with every consideration. The other grant recommended by the Committee was duly made.

Mr. WILLIAMS wished to draw attention to the small amount of subscriptions to the Benevolent Fund, for it certainly was not supported as it ought to be. The casual grants swallowed up a great deal of money which in his opinion ought to be reserved for annuities, for he believed the Fund was most useful when applied in the form of annuities. He should be sorry to see these grants reduced, because he knew they often did great good, but at the same time, he would remind the Benevolent Fund Committee that so long as the subscriptions were so small as to amount to only £3 18*s.* in a month, they should be cautious not to make too many of these grants.

Mr. URWICK thought it must be satisfactory to the Council and members to know that the applications for relief were principally from registered chemists and druggists, and not from pharmaceutical chemists. He hoped that when this was known chemists and druggists would be induced to support the fund to a greater extent than they did at present.

Mr. BETTY hoped there would be no distinction drawn between pharmaceutical chemists and chemists and druggists.

Mr. OWEN said they ought to know what was the average monthly receipt, as Mr. Williams had given one month's receipt as £3 18*s.* He hoped every reader of the Journal would take this matter to heart, and see what could be done. They were continually charged with not making a right use of the Benevolent Fund, but it now appeared that they had hardly any money to apply. He agreed with Mr. Robbins that they should be liberal at all times, if possible, and he trusted chemists and druggists would become subscribers.

Mr. RADLEY said he had for some time past bestowed some thought upon this subject, and was of opinion that any general appeals were not of much avail. He should be glad if a committee of subscribers could be formed to take the subject in hand and make a direct appeal to every person on the register. He was quite sure any trouble taken in the matter would be well repaid.

The PRESIDENT said the Secretary made a direct appeal a short time ago, the result of which perhaps he would state.

The SECRETARY said the last time he issued a general circular to the whole trade the result was, not money, but applications for relief; he did not, in fact, get anything like enough to cover the cost.

Mr. WILLIAMS hoped those who read the Journal would see that they were really doing good with the money, and that it was being expended for the relief of distress, that more money was wanted for that purpose, and that they were not hoarding the funds. The Council wished to expend the money, and had plenty of objects and means of expending it if it were only liberally supplied; unfortunately it was not, as the subscription list showed.

Mr. ROBBINS said this question ought to be taken into serious consideration, and he should be glad to see a committee formed for considering the whole question of the management of the Benevolent Fund. His opinion was they did not do as much with the money as they might. He thought that with such a number of chemists and druggists in the country the fund ought to be better supported, but still, the first duty of the Council was to distribute the funds which they received from time to time. He did not think it was at all proper to have only about fourteen annuitants in so large a body. Whilst there are deserving cases, they ought to continue to elect until the number reaches at least twenty. There were plenty of funds.

Mr. WILLIAMS: No.

Mr. ROBBINS said he maintained they would have plenty of funds for thirty annuitants, which would only take £900 a year. There would be no difficulty in getting subscriptions to double the amount if they really did good with the money, but if the subscriptions should fall off they would simply have to say that they would not elect another annuitant, until subscriptions came in more freely. They need never touch the original capital. There would still be enough to relieve urgent cases, because the income on account of the Benevolent Fund was between £1100 and £1200 a year, and thirty annuitants would only take £900. In his opinion they went to work the wrong way, making it the first object to save money for future generations, and the second to relieve present necessities, whereas he contended they ought to reverse that principle. Whatever money was wanted he believed would be provided.

Mr. WILLIAMS said he was glad to hear there was a likelihood of so large an amount coming in.

Mr. ATHERTON remarked that his experience of country chemists would show that they were very good hearted, but rather apathetic where money was concerned. On several occasions it had been his duty to go round collecting money, and as a rule he must say they did not subscribe as readily as ought to be expected. Still he thought by organized local effort the Benevolent Fund might be made more effective. He suggested that special meetings should be held in various localities, and an appeal made to increase the funds.

Mr. STODDART said he was very often met with the objection when asking for subscriptions that the Pharmaceutical Society did not help the non-pharmaceutical chemists, and therefore he was very glad that Mr. Urwick had drawn attention to the fact that the "outsiders," as they were called, really got the greatest advantage from the fund. No doubt people would subscribe readily if they could only be got into the humour, but unfortunately that was rather a difficult thing to do. A great deal of money was subscribed in his locality for various objects, but it was always done by means of a dinner.

Mr. GREENISH reminded the Council that the Chemists' Ball would take place on January 21st, and as there was always a contribution from that source to the Benevolent Fund he would suggest that members of the Council should send in their names as stewards.

Mr. SUTTON thought a good deal might be done by looking after little subscriptions which now did not come in at all, and suggested that a personal appeal be made to all chemists and druggists throughout the kingdom to subscribe a trifle, if it were only one shilling per annum. If that were done generally the amount obtained would come to something considerable.

Mr. OWEN observed that the "outsiders" were by far the most numerous, and therefore it was only to be expected that applications for relief should be more numerous in their case also.

Mr. BAYNES was surprised to hear there was so much difficulty in getting subscriptions. In his own town some six years ago an effort was made, and something like twenty-five subscribers were enrolled. But this was only done by personal canvassing. If the local secretaries would make an effort in this direction he thought a good deal might be done, for when they got the first half-a-dozen names to start with the rest would come in tolerably easy.

Mr. SCHACHT said the local associations had other things to do besides attending to the Benevolent Fund. They had to look after educational appliances in their own locality, and that was a great tax upon them, quite independent of their contributions to the Society or to the

Benevolent Fund in connection with it. If attempts were made to draw more and more money out of the pockets of local chemists for imperial objects, the question would be put, What did the imperial society do for them? In fact, that question was frequently raised now. If the Society were a little more liberal in its distribution of funds for the first and most important matter in his opinion, viz., education, possibly they would have a better argument with which to go and ask people to contribute to the Benevolent Fund. Very often persons in a particular locality would say—Come to me for any local case, and I shall be happy to assist you; and he must say that was the manner in which he himself dispensed what charity he was able. He had never subscribed to the Benevolent Fund, although possibly he gave as much in the way of charity as other persons of equal means. He did not think this was the direction in which the chief energies of the Society should be directed, but they should rather aim first to spend their money and efforts in improving the status and education of the whole body, and afterwards, perhaps, assist the unfortunate ones.

Mr. SHAW said that the chemists in Liverpool had supported a local association for many years. They had found considerable difficulty in getting subscriptions from parties who originally had contributed to the support of the institution, and under these circumstances, if they made a direct application, the reply would be, they received no kind of assistance from it, and generally speaking, they declined to give anything. He might also state however that some three years ago they had sent up twenty guineas to the Benevolent Fund from Liverpool, being part of an amount of £150 which had been raised for the purposes of the Conference which had not wholly been expended; and having given so much, of course parties naturally did not feel inclined to subscribe further. He should be happy, for his own part, to make another attempt in Liverpool, and see if anything could be done.

Mr. OWEN said circulars were very often not successful, where a personal appeal would have a better effect.

Mr. FRAZER suggested that a special appeal should be made to all persons whose names were on the register, not at present subscribing, to contribute a shilling or upwards, and that this be recorded in the Journal, and otherwise made known.

Mr. RADLEY said he should much prefer a committee of subscribers being appointed to look into the whole matter.

Mr. ROBBINS said the advantage of having a committee would be that it would take other matters into consideration besides the raising of more funds. For his part he thought those who did not subscribe anything to the Fund ought not to have votes.

Mr. SUTTON said that would involve altering the bye-laws and regulations.

Mr. SCHACHT observed as the Society gave large amounts to the Benevolent Fund such a measure would be out of the question.

Mr. BETTY was rather inclined to favour a proposition for a committee, especially as there appeared to be a feeling in some parts that the Benevolent Fund was not administered to the best effect. If they went immediately and asked for contributions whilst these criticisms remained unanswered, particularly at that time of the year, they would very probably not get very satisfactory replies. Mr. Robbins thought the funds might be available for thirty annuitants, and although that involved a problem which he had not yet mastered, still if the matter were referred to a committee he should be very pleased to be convinced, if possible, that it could be done.

Mr. SCHACHT thought there was no necessity for having a special committee for this purpose, inasmuch as the Benevolent Fund Committee might very well deal with it.

After some further conversation, it was moved by Mr. RADLEY, seconded by Mr. ROBBINS, and carried unanimously:

> "That the subscriptions to the Benevolent Fund falling short of the amount which in the opinion of this Council they should reach, a Special Committee, consisting of the Benevolent Fund Committee, and Messrs. Atherton, Betty, Radley, Sandford, Shaw, and Williams be appointed to consider what steps it is desirable to take to increase both the amount of subscriptions and the usefulness of the fund."

LIBRARY, MUSEUM, AND LABORATORY.

The minutes of this Committee were read. Amongst other things, they recommended the purchase of two additional book-cases for the library, and also certain modifications in the regulations recently laid down by the Council as to the manner in which the professors should use the apparatus and specimens belonging to the Society for the purpose of their lectures. Upon this latter point they suggested that the matter should be again remitted to them before a final decision was come to. The report also stated the number of students now attending the lectures—viz., in the pharmacy class 33, as against 60 last year; in the botany and materia medica class 21, as against 69 last year; and in the laboratory 30, as against 40 last year.

Mr. SCHACHT said it was rather interesting to notice the number of students now attending the establishment after the great change that was made a few months ago. As many of these students probably attended each of the classes, there would be probably from 30 to 45 students in all receiving education or advantages in that institution.

The PRESIDENT said that Professor Redwood was in hopes that his class would very much increase, and believed that the present plan would be ultimately successful.

Mr. SUTTON said it was not at all astonishing they should have this falling off, because they had been doing all they could to stir up educational matters in the country, and great progress had been made in that way. The Chemists' Association at Norwich was associated with the South Kensington Museum, and one of his own apprentices was a certificated teacher, having taken the first prize in botany at South Kensington, and two other of his assistants, having passed the Major examination in honours, were teaching chemistry and materia medica. Under these circumstances, therefore, there was not that necessity for coming up to London there formerly was.

Mr. WILLIAMS said it was only fair to remind the Council that the session being now divided into two parts, they could hardly compare the present numbers with the state of things a year ago. His opinion was that most of the young men would come into the second course, because they would have certain advantages in joining at that time, and he, therefore looked forward to the second half of the session showing a more than usually numerous attendance. He must say he could not account for the falling off in the laboratory.

Mr. SCHACHT thought it was the most natural result possible, seeing that under the new arrangements there was a diminished quantity of instruction given for double the price.

The Report and recommendations of the Committee were received and adopted; the arrangements as to the use of specimens, etc., being left in the hands of the Committee.

GENERAL PURPOSES.

The minutes of this Committee held the previous evening were read, stating that a deputation from the Board of Examiners had been present, who recommended that the Preliminary examinations should be held at thirty or forty centres instead of in every town where there was a local secretary; that the persons to superintend or supervise these examinations should be appointed by the Board of Examiners, and be paid for their superintendence on each occasion; that the examinations be conducted in

a public room, and that the examinations for the Jacob Bell Memorial Scholarships, the Pereira Medal, and the Prize of Books be held in London and Edinburgh only.

The PRESIDENT said they had had a rather lengthened meeting of the Committee, when several irregularities in the mode of conducting the Preliminary examination had been mentioned, and the suggestions above mentioned had been made. For his own part, he should prefer the superintendence being still left in the hands of the local secretaries rather than leave it to the Board of Examiners to appoint superintendents. The Committee had arrived at no conclusion on the subject.

Mr. SCHACHT asked what course was intended to be taken on the present occasion, whether to endeavour to decide on something like general principles and then refer the matter in detail to a sub-committee, or whether to discuss each detail on its merits, and come to a final conclusion at once.

The PRESIDENT thought they might discuss the whole of the recommendations now brought forward.

Mr. BETTY, in the absence of Mr. Hampson, and on his behalf, moved :

"That this Council, having heard the suggestions of the Board of Examiners with reference to the Preliminary examinations, thinks it desirable that the local secretaries, or other properly appointed persons shall continue to supervise the examinations, and that they shall receive fees for holding the same.

"That the examinations be held only in rooms connected with public institutions ; that there be adopted local centres, conveniently placed, and that a committee, including Messrs. Schacht, Greenish, Urwick, Williams, and Hampson, with two members of the Board of Examiners, be appointed to arrange the details for carrying out the new arrangement and framing regulations for guiding the supervisors."

He thought probably it would be more convenient to discuss the first paragraph first.

Mr. SAVAGE begged to second the motion. He could not see why these examinations should be conducted differently to university local examinations, which were carried out by appointing a local committee.

Mr. SCHACHT thought they were proceeding rather too hastily, and not very wisely. He had listened at the committee meeting to the exposition of the view taken by the Board of Examiners with regard to these examinations, and found that their charge amounted to this, that there had been improprieties and irregularities in the carrying out of the regulations, and on the strength of that fact they made a few suggestions, one at least of which appeared to him quite revolutionary, touching a very important principle at present existing and sanctioned by the Society. The bulk of the other suggestions were simply improvements in matters of detail. It appeared to him that the first thing they should do would be to discuss whether they admitted that the case made out was sufficient to involve such a radical change as was proposed, and in the next place to determine whether those irregularities might not be met simply by improvements in details, or whether it was necessary they should go to the extreme length of that important change which was suggested with reference to the Bell Scholarships and the Pereira Medal. His own experience was, that the whole objections to the process already in existence were objections which might be remedied by more resolute attention to details. From all he gathered, no one could say the present regulations had failed, simply, because as yet they had not been carried out. He wished to make no reflections whatever on the Board of Examiners, who, no doubt, had difficult duties to perform, and who exercised their abilities with the very best intentions, but his opinion was, that if they had been resolute in their action a little earlier these irregularities would never have continued to exist. At any rate, it was an argument to show that when the evil was pointed out, they should not immediately jump to extreme measures of reform until they had well tried what milder, more simple, and less revolutionary modifications would accomplish. These gentlemen themselves proposed a number of alterations in the regulations, many of which were very sensible and useful, and many of which were in accordance with those laid down by the Science and Art Department in carrying out their very much more extensive though somewhat similar system of examination. Those regulations were applicable to the entire ground covered by the Society, as might easily be shown. Some gentlemen attempted to draw a distinction between conducting preliminary examinations and those which led to rewards, but the South Kensington authorities gave away large sums of money as rewards, both in a great number of small prizes and also in a few great prizes, such as scholarships of £50 a year, gold medals, etc., and he had never heard of any complaint being made of injustice or irregularity in those examinations. Therefore that the thing could be done was a matter of proved fact, if only rigid attention were paid to the regulations laid down. Feeling, therefore, that the Pereira Medal and Bell Scholarships were rewards which would stimulate their members throughout the country, and bind the provincial members to the Association, he should feel that it would be a grievous mistake if the examiners were taken from the provinces and again centralized in London. He was quite sure that such a measure would do great damage to the cause of general pharmaceutical progress, and therefore, before any question of details was discussed, he hoped they would come to a conclusion on this first point of general principle. He would therefore move—

"That this Council having heard the report of the General Purposes Committee are of opinion that the change in the method of conducting the examination for the Bell Scholarship and Pereira Medal and Prize of Books suggested by the Board of Examiners ought not to be adopted until it be shown that the regulations for the same cannot be so amended and enforced as to meet the necessities of the case."

After this question had been determined, he should be happy to go into any matter of details, or to refer it to the same or a fresh committee, to form new regulations, if it were desired.

Mr. STODDART seconded Mr. Schacht's proposition, and desired to endorse everything which he had said. From what he had been told, he had expected to hear on the previous evening of some great crime having been committed, and he was much relieved when he left at ten o'clock to find that nothing at all had been proved against the Preliminary examination being conducted properly, except the non-compliance with the regulations by persons who supervised the examinations. He held that the present system was perfectly satisfactory; and that it was so, was abundantly proved, because there were other examinations far more extensive conducted on the same plan—viz., those in connection with the South Kensington Museum, and there had never been any complaint made in connection with them. If anything could be said against the present mode of conducting the Preliminary examination, it was with regard to the few persons who literally did not attempt to carry out the regulations. For his own part, if he had held an examination on a wrong day, or at a wrong hour, he should have expected that the examiners would have sent the papers back cancelled. If three or four young men presented themselves at the wrong hour, he should not consider himself authorized to conduct the examination. He might also say that if he had known some time beforehand that he should not be able to conduct the examination on the day appointed, he should have written to the Secretary to apprise him of it, when no doubt his friend, Mr. Schacht, would have been appointed in his place, and no harm would have been done. It appeared to him that the fault lay with the examiners for not cancelling those papers which were irregular ; and he strongly urged the Council not to make any alteration at present in a system which was really working very well

If they would only conduct their examinations for the scholarships and Pereira Medal in the same manner as those of the Science and Art Department, it would be impossible to have anything more perfect, if only the regulations were strictly carried out. He must say to those who had not certificates from authorized bodies, it was a great boon to be able to go to the next town to pass their Preliminary examination, instead of having to come to London at a great expense.

Mr. ATHERTON said he must confess to not having carried out the examinations properly on some occasions, inasmuch as he had not always put his initials in the corner of each paper, but that was no reason why the examination should be taken from the country. He thought other objections ought to be got over in a similar way. As a matter of principle, he believed the Council had agreed that these examinations should not be taken from the country, though whether they should be confined to a certain number of centres was a matter of detail to be settled afterwards. For his own part, he knew several cases where the local secretaries would be very glad to escape the duty of superintending these examinations, and perhaps if a centre were appointed where eight or ten candidates could be examined at once, it would be an improvement. At all events, they should insist upon the examinations being permitted in the country, and not taken away from it.

Mr. SAVAGE said he agreed so thoroughly with Mr. Schacht's views that he should be inclined to withdraw in favour of them the motion he had seconded. He wished to know if he had properly understood Mr. Stoddart to say that if he could not conduct the examination himself he could ask a friend to do it ?

Mr. STODDART said that was not his meaning, he should write to the Secretary and ask that some one else should be appointed.

Mr. FRAZER agreed that there was not a case made out against the local secretaries at present, and it was evident from the numbers rejected from time to time, that these examinations, even as now conducted, were not so inefficient as some gentlemen appeared to suppose. It should also be remembered that from the recent change in the examinations, leading to increased strictness in the Minor, it was really of less importance if one or two men, not thoroughly prepared, did slip through the Preliminary examination. He held that the Minor examination was now quite sufficient without any Preliminary at all. They must take care not to defeat their own object by making regulations so strict that the difficulty already existing of getting assistants would be much increased. He believed they would have to conduct their businesses in many instances with the assistance of men who had not passed any examination at all. The Council ought to protect the interests of the existing trade, and not make the restrictions too onerous.

Mr. WILLIAMS said he was inclined to move an amendment to this effect :—

> "That the proposal of the deputation of the Board of Examiners, laid before the General Purposes Committee, be received and referred to a special committee for consideration."

Mr. SCHACHT thought it would be desirable that the Council should express an opinion upon the general principle in the first place.

Mr. BETTY said that having charge of Mr. Hampson's motion, he should be willing for the whole matter to be referred to a committee.

Mr. SANDFORD said the amendment of Mr. Schacht really went to this extent. that the Council did not agree with the Board of Examiners in their proposition at all, and it stated that the regulations could not be said to have failed, because they had not been fairly tried. But how could they have been tried in any fairer or more perfect way? A perfect code of regulations was sent to the local secretaries, and in return informal certificates, and letters describing irregularities, were constantly received. He had in his hand a bundle of papers stating the irregularities for the last month only. It had been constantly the practice for local secretaries to appoint other parties to superintend the examination ; for certificates were often sent up signed by so-and-so for so-and-so. Now how could they compel local secretaries to abide by the regulations ?

Mr. SCHACHT said the examiners should not pass the candidates. He contended that the Board of Examiners had not carried out the regulations. They should have returned every one of the irregular papers.

Mr. SANDFORD said if the Board of Examiners had returned these informal certificates they would have thrown back the young men for three months, which would have been considered a great hardship ; therefore they felt great difficulty in doing so. He had given proof of the irregularities which occurred, and they seemed to him a great argument in favour of conducting the examinations in some better way. He need not give the instances in detail, but there were abundant proofs of the regulations not having been carried out. If certain centres were fixed upon, so that the young men would not have to go more than twenty or thirty miles, he did not see that it would be any great hardship ; and if one gentleman were appointed to conduct the examination, and paid for it, and it took place in a public room, with proper appliances, so that candidates could not see each other's papers, there would be much greater security for the examinations being properly conducted. As to the Pereira Medal, he considered that of much more importance, because it was the highest honour the Society could bestow, and therefore it was essential that all who competed for it should do so under exactly similar circumstances. Now, when candidates were gathered round the table in that room, under the superintendence of one of the Board of Examiners, it would be a great honour for any young man who gained for himself such a distinction ; but he was always of opinion that if a man in the country, either in Liverpool or Manchester, or any other provincial town, writing his paper under the eye of a local secretary, were successful, it would throw a doubt on the value of the prize altogether. He was not speaking of any particular local secretary, and he had the greatest respect for those gentlemen generally ; but the appointment of them was very loose and vague, there being more than two hundred of them, many of whom were totally unknown to the Council. He hoped, therefore, that the Council would agree in principle to the recommendations of the examiners, or at any rate let it be referred to a committee, for he should be very sorry indeed if they agreed at once to Mr. Schacht's motion, which amounted to a direct repudiation of the view taken by the Board of Examiners.

After some further discussion,

The PRESIDENT appealing to Mr. Schacht to withdraw his amendment in favour of Mr. Williams,

Mr. SCHACHT said, he could not resist the general intimation of opinion, if it were understood that the whole matter was to be referred to a committee for further consideration.

Mr. SHAW said, as far as he could gather the opinion of the committee on the previous evening, it appeared to be against the desirability of an examination being transferred to Edinburgh and London. It appeared that certain irregularities had been committed, and that the system of examination required revision. He was quite certain, however, that the Council would not accede to the removal of these examinations from the country.

The motion of Mr. Williams, seconded by Mr. Greenish, was then carried unanimously :—

> "That the proposal of the Board of Examiners laid before the General Purposes Committee be received and referred to a Special Committee for further consideration, the committee to consist of Messrs. Schacht, Stoddart, Sandford, Betty, Hampson, Williams, Shaw, and Atherton."

It was also decided that the Committee should meet on Tuesday, December 2nd, at 4 o'clock p.m.

Report of Board of Examiners.

The following Reports of the Boards of Examiners were presented :—

Reports of Examinations.

October, 1873.

ENGLAND AND WALES.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	6	2	4
Minor	99	43	56
Modified	23	7	16
Preliminary	286	129	157
	414	181	233

Certificates received in lieu of the Preliminary Examination :—

University of London	1
University of Cambridge	2
University of Oxford	1
University of Edinburgh	1
College of Preceptors	3
Royal College of Surgeons	2
Faculty of Physicians and Surgeons in Glasgow	1
	11

SCOTLAND.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	2	1	1
Minor	31	21	10
Modified	6	4	2
Preliminary	25	18	7
	64	44	20

Certificates received in lieu of the Preliminary Examination :—

Royal College of Physicians and Surgeons in Edinburgh	1
University of Edinburgh	1
	2

Mr. Williams said it was rather remarkable that the candidates in Edinburgh were much more successful in passing than in London.

Sheffield Chemists' Association.

A letter was read from the association at Sheffield asking for a grant of £10 for apparatus and £5 for books for the library.

The Secretary stated that the application was made in due form, stating the number of members and associates and the arrangements made for classes during the ensuing session. The application was referred to the Provincial Education Committee.

PHARMACEUTICAL MEETING,

Wednesday, November 5th, 1873.

MR. THOMAS HYDE HILLS, PRESIDENT, IN THE CHAIR.

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

The following donations to the Library and Museum were announced, and thanks were awarded to the donors :—

'Chemistry, General, Medical, and Pharmaceutical,' Fifth (American) Edition, from Professor Attfield; 'Manual of Botany,' Third Edition, from Professor Bentley; 'University College Calendar for 1873-4,' and 'Professional Dissertations, 1872-3,' from the College; 'Qualitative Chemical Analysis,' by Douglas and Prescott; 'Todd's Student's Manual,' from Mr. T. H. Hills; 'Smee on Sewage, Sewage Produce, and Disease;' 'Canadian Illustrated News Portfolio and Dominion Guide,' from Dr. J. B. Edwards; 'Statistical Tables of Patients in St. Bartholomew's Hospital during 1872,' from the Hospital; a specimen of Rye with the Ergot upon it, from Mr. D. Hanbury.

Mr. Barnes read a paper entitled "Pharmaceutical Notes."

[This paper is printed at p. 361, and gave rise to the following discussion :—]

The Adulteration Act.—The Sale of so-called "Citrate of Magnesia."

The President thanked Mr. Barnes for his communication, and remarked that such papers were always very interesting to practical pharmacists. It was new to him that glycerine would dissolve tannate of quinine, but he had found it useful to dissolve tannin to mix with infusion of roses for gargles.

Professor Redwood said that guaiacum resin was not perhaps a very important medicinal agent, but there was reason to believe that other articles in which impurities were more serious were also frequently impure, and therefore the whole question deserved very careful attention. Scammony, for instance, was often impure, and at the present time, particularly, as it appeared to him, it behoved pharmacists to consider the question of impurity in drugs far more seriously than they had hitherto done. Many impurities had become conventional, and were consequently overlooked, but he was by no means sure that this could be done in future; at any rate it was very undesirable to do so, and he believed it would become an absolute necessity to scrutinize more minutely than had hitherto been the practice the composition of the drugs used. In some cases such impurities were of great importance and really affected the foundation of medical practice, and if permitted would naturally affect the character and position of pharmacists throughout the country. They, as a body, would be looked to to make some greater progress in the way of resisting all attempts at the introduction of impurities in drugs, and also of the sale of substances under incorrect names which did not strictly represent them. There were numerous substances for the sale of which druggists were liable to be punished, although they sold them under the names by which they were commonly known, and thus even imprisonment with hard labour might be their lot, as well as heavy fines, for doing things which really had become conventional acts.

Mr. Bland said imprisonment with hard labour would be no fresh punishment to the majority of chemists and druggists, as they were pretty well accustomed to it already.

The President asked if Mr. Barnes had examined tears of guaiacum, which he believed were generally pure.

Mr. Barnes said he had not. He believed they were generally pure, but they were not often used by druggists.

The President said he was not quite prepared to accede to that.

Mr. Williams thought that the sale of a drug as it came into the market, although it might contain some small per-centage of woody or inactive matter, could not be treated as that of an adulterated article, and he did not believe the Act of Parliament would extend to such a matter as the sale of guaiacum as imported.

Professor Redwood thought it would be very difficult to define exactly what the Act did comprehend in cases of that description. The meaning of the Act had to be interpreted by magistrates when charges were made before them, and different interpretations had been put upon it by different parties. For his own part, he considered that even in the case of a drug sold in the same state in which it was imported, if it could be clearly shown that it was adulterated, it was no exoneration to the dealer that he sold it in the same state in which he received it. It would be considered that a chemist and druggist in the present day ought to be able to distinguish between what was pure and impure, genuine,

and adulterated, and it would be no excuse in a legal point of view to say he did not adulterate it himself. If it came into the market in such a state that it was not fit for use, no druggist would be justified in using it.

Mr. HODGKINSON said the specimen of guaiacum produced was a very poor sample, and any druggist who would go to the expense would find no difficulty in getting a much better article.

Mr. WAUGH said it was very important to know how far their responsibility extended, and whether in such cases as were now referred to the responsibility was with the retail druggist or with the wholesale dealer.

The PRESIDENT was not quite prepared to say that that was the time and place in which to decide so important a question of law. He believed there was a clause in the Adulteration Act providing that a man not knowingly or willingly selling an adulterated substance was not liable. In fact, Mr. Sandford, Mr. Haselden, and himself got those words inserted. No doubt chemists ought not to buy any but good articles, and if this rule were observed a good effect would be produced. For instance, he remembered some twenty-five or thirty years ago, one of the first matters brought before the Society was the adulteration of senna, and by the combined action of the chemists and druggists of that time senna came into the market in a much better state. Professor Redwood had spoken very strongly on the subject of impurities, but he had heard him say himself on a former occasion that it was impossible to find strict purity anywhere. His own impression was that a man was not liable to imprisonment or fine if he sold an article not knowing it to be adulterated.

Professor REDWOOD said a person was only liable to imprisonment with hard labour when he had adulterated an article himself or given instructions to that effect; at the same time, if he sold an adulterated article, and, being an educated man, were deemed to be capable of judging of its quality, and had not exercised that knowledge in detecting that adulteration, he would be liable to a penalty.

A MEMBER thought that the sale of guaiacum did not involve the question of adulteration, since it and similar substances only came into the market with the natural impurities resulting from the rough method of collecting. It was really a question of the purification of drugs rather than their adulteration, which implied the artificial admixture of some impurity.

Mr. HUCKLEBRIDGE asked the President if the question of citrate of magnesia had come before the Council that morning, and, if so, what decision had been arrived at?

The PRESIDENT said the matter had been considered, but it was in committee, and therefore the discussion would not be published. He might say, however, that the decision come to was to sell that which they knew to be pure and genuine and label it accordingly; and that they ought, if possible, to name every article according to its composition. However, the Council were fully agreed as to the injustice of the magistrate's decision in fining Mr. McDermott £10 for selling the article in question, which had been universally known and sold to the public for many years under the name of "granular effervescent citrate of magnesia."

Mr. HASELDEN said, with regard to the Adulteration Act, he was one of those who waited on the Marquis of Salisbury when the Bill was passing through the House of Lords. His impression from what passed then was that if an article were sold, the seller being ignorant of its being adulterated, he was not liable to any penalty. They now found that magistrates had convicted over and over again, entirely refusing to acknowledge that clause. The matter was especially pointed out by Mr. Sandford to Lord Salisbury, and scammony and otto of rose were specially mentioned. It would be a very hard case if a man were summoned for selling virgin scammony if it had 15 per cent. of matter in it which was not scammony resin, and therefore might be said not to be pure, especially if it contained chalk or gum, which it generally did. It was impossible for a man to carry on business and examine everything that came into his establishment, he would have to keep an assistant constantly employed for the purpose, and of course increase his charges accordingly, which would not be to the satisfaction of the public. He should like to ask Professor Redwood his opinion of isinglass, which was, no doubt, sold to them as pure Russian isinglass, while at the same time it was frequently adulterated with gelatine. The Adulteration Act seemed to him one of the most absurd Acts ever placed before the public, and he thought it ought to be repealed.

Professor REDWOOD said that many years ago he had taken up the subject of adulteration of isinglass, and he was not aware that for some time past it had been practised. If it were so, he should certainly bring it again before the public. He should not hesitate to say that anyone selling adulterated isinglass would be liable to the penalties imposed by the Act. Where a man sold an article which had been adulterated by another, he would be liable if he were in a position such as was assumed to give him the knowledge which would enable him to judge of the quality of the article sold. In all such cases he believed that the seller would have his remedy against the man who sold him the article.

Mr. HASELDEN said he could not say positively that isinglass was adulterated at the present moment, though he suspected it was from the various prices at which it was offered. The remedy suggested by Professor Redwood against the original seller of an article at a loss of four or five days' time, and a considerable expense and uncertainty, would be a very poor consolation.

Professor REDWOOD said it might be as well to state how the adulteration of isinglass could be detected. The practice was to roll out a sheet of gelatine between two sheets of isinglass before it was cut, and it might be easily detected by soaking it in water and then putting it under the microscope, when the gelatine would become transparent, whilst the isinglass remained opaque, so that the three strata would be at once apparent.

The ASSISTANT SECRETARY read the first two clauses of the Adulteration Act as follows:—

"1. Every person who shall wilfully admix, and every person who shall order any other person or persons to admix, with any article of food or drink, any injurious or poisonous ingredient or material to adulterate the same for sale, and every person who shall wilfully admix, and every person who shall order any other person or persons to admix, any ingredient or material with any drug to adulterate the same for sale, shall for the first offence forfeit and pay a penalty not exceeding fifty pounds, together with the costs attending such conviction, and for the second offence shall be guilty of a misdemeanour, and be imprisoned for a period not exceeding six calendar months, with hard labour.

"2. Every person who shall sell any article of food or drink with which to the knowledge of such person any ingredient or material injurious to the health of persons eating or drinking such article has been mixed, and every person who shall sell as unadulterated any article of food or drink, or any drug which is adulterated, shall for every such offence, on a summary conviction of the same before two justices of the peace at petty sessions in England, or before two justices of the peace in the justices of the peace court, or before the sheriff substitute of the county, or before any magistrate acting under any general or local Police Act in Scotland, or before justices at petty sessions or a divisional justice in Ireland, forfeit and pay a penalty not exceeding twenty pounds, together with such costs attending such conviction as to the said justices, sheriff-substitute, magistrate, or divisional justice shall seem reasonable; and if any person so convicted shall afterwards commit the like offence, such justices,

sheriff substitute, magistrate, or divisional justice shall cause such offender's name, place of abode, and offence to be published, at the expense of such offender, in such newspaper, or in such other manner as to the said justices shall seem desirable."

Mr. BLAND said he was rather inclined to agree with the President that that was not the time or place in which to enter into a full discussion of this question. It was well-known to many present that before the Adulteration Act came into operation he had expressed a strong opinion as to some of the results which it was likely to produce. Looking to the necessary qualifications of a man who might be able conscientiously to undertake the duties of an analyst, they could not expect to find many such men in the country, and for this reason, that it was necessary not simply to have a theoretical knowledge of chemistry, but a very extensive acquaintance with technical chemistry was also necessary, or else the analyst might fall into most serious blunders, and be the instrument of perpetrating the most grievous injustice. Looking at the different views taken by different magistrates before whom questions had been brought, and the vindictive penalties which in some cases had been inflicted, the severe remarks made by some of the magistrates, and the serious consequences, independently of the mere pecuniary result of the fine, to any person brought up on such a charge. Even if it were competent to any person who had been fined to bring an action against the person who had supplied him with an adulterated article, that would afford no compensation whatever for the very serious loss of reputation in business which might ensue. He was strongly of opinion, looking at the manner in which the Act had been carried out in many places, that the only real remedy would be to get it repealed altogether.

Mr. SANDFORD said he was one of the deputation who waited on Lord Salisbury to represent to him the hardship which the Bill as originally drawn would inflict. They did not go to him with the idea that chemists would wish to connive at the adulteration of drugs by anybody, but they told him there were certain articles brought into the market, scammony, otto of rose, and musk being particularly mentioned, which it was only possible to obtain in a state of comparative purity. The druggist had no power to do more than buy the best samples he could obtain. The Bill as it passed through the House of Commons would have rendered a druggist who sold guaiacum, the article brought under the notice of the meeting by Mr. Barnes, in its ordinary state, liable to penalties, and Lord Salisbury was informed that it was absolutely necessary there should be a guilty knowledge in order to constitute an offence. Lord Salisbury therefore introduced into the Bill certain words making a guilty knowledge necessary, but unfortunately the magistrates had construed the Bill differently; and not only so, but he found that the Court of Queen's Bench had been appealed to, and had decided that a dealer was bound to know and to be a judge of the article in which he dealt. Thus, if a grocer sold mustard, he ought to know whether it was pure or impure. That was not the intention of Lord Salisbury when the Act was passed, though perhaps the wording was not as clear as it might have been. The Bill as amended came into his hands about two o'clock in the day, and having no time to consult any of his friends, he went to the House of Lords, and, meeting Lord Salisbury, pointed out to him its defects, and his lordship then introduced other words, to make it more clear that a guilty knowledge should be required. A few minutes afterwards he met Lord Granville, who agreed to the same course, and considered Lord Salisbury's proposed alteration sufficient for the purpose. The Bill was then produced as it now stood, and though there was a little difficulty as to the punctuation which rendered it somewhat obscure, as almost all Acts of Parliament were, he could not help thinking that those who were interpreting it were running rather wild. The decision of the Queen's Bench, in June last, was to the effect that it was not necessary to prove a guilty knowledge on the part of the seller, and whether or not that was in strict accordance with the wording of the Act, he was quite sure that it was not the intention of Lord Salisbury, Lord Eustace Cecil, or Lord Granville, when the Bill passed through Parliament. He was glad the citrate of magnesia case had been mentioned, because he knew it was in everybody's mind. Everybody knew that what was sold under that name was not citrate of magnesia, and he remembered seven years ago, when occupying the president's chair in that room, saying how much he regretted the tendency of chemists to send out articles under false names, and he then mentioned this very article as one. He then said that citrate of magnesia was a definite chemical term, and the article sold under that name had no relation whatever to it, and it was therefore their duty to discourage it. He was glad to see that the matter had been taken up since at Dundee, at Liverpool, and again at Bradford, and it had even been proposed to enter into a combination to discourage such a thing. It was not right to sell an article as citrate of magnesia which was not that substance at all, but a mere mixture of another alkali and acid. It had been called citro-tartrate of soda, but he had heard it said that it was not even that until mixed in water, and therefore it could not properly be sold even under that name. He could not help thinking that the man who had been fined the other day was most unjustly treated for selling an article under a conventional term by which it was always known. He did not think, however, they could take any action in the matter, because he believed there was no appeal.

Professor REDWOOD said a case could be carried to a higher court.

Mr. URWICK said he had been informed that a fresh hearing could be had before the magistrate. The opinion of some who read the case was that the decision was not in accordance with the facts, and that it would not be fair to the magistrate to appeal in this case until he had had an opportunity of reconsidering his decision.

Professor REDWOOD said an appeal could only be had on a question of law.

Mr. SANDFORD remarked that the question in the case before the Queen's Bench was that of knowledge or no knowledge on the part of the seller. Now the citrate of magnesia case involved simply a question of selling an article by a popular name which did not properly describe it. For his own part he never lost an opportunity of telling a customer that citrate of magnesia was not the correct term. He had always felt ashamed that chemists should condescend to such a misnomer, and on that ground he did not regret the decision, because he thought it would stir them all up to do that which was right. He had heard one gentleman say that he did not care whether he sold any more citrate of magnesia or not, but he would not sell it under a false name; he (Mr. Sandford) thought there would be no fear of any falling off in the sale. Another gentleman had adopted a label saying that it was the preparation generally called citrate of magnesia, and the consequence was that he sold more even than he did formerly. Although he felt that Mr. McDermott had been badly treated, partly he thought owing to his own foolishness, he hoped that the occurrence would do good by opening the eyes of magistrates to the absurdities brought before them as adulterations. They did not want any privilege of adulteration, but simply to be protected in the ordinary exercise of their business.

Mr. URWICK said what had happened to Mr. McDermott might have happened to any one of themselves. He abominated all incorrect names, but many of them had been deprived of the sale of their own preparation of magnesia bearing genuine names by this citrate, and they had simply acted between the maker and the public. Many persons would be looking to see what was suggested at that meeting, and he hoped some decision would be arrived at. There was another question also requiring consideration. Prescriptions very often came in for

a couple of pills to be taken at night with two or three drachms of citrate of magnesia, to be taken in the morning. Now, what were they to do in such a case? He had always, without hesitation, put up what was ordinarily known as citrate of magnesia, feeling sure that that was intended, because if he sent the neutralized citrate of magnesia there would be a very nearly insoluble powder to be taken, which was hardly intended; but since the recent decision he hardly knew what to do. Probably the best way would be to consult the medical man or the customer. Another article of a similar character was lemon and kali, which was really lemon and natron, and not kali at all.

Mr. WILLIAMS said this was a question of names and titles. What authority were they to take as to the name,—the Pharmacopœia or Mr. Bishop's label? A new label was now proposed for Mr. Bishop's citrate—"citro-tartrate of soda with magnesia, commonly called citrate of magnesia." Certainly if they called it citro-tartrate of soda they would be as incorrect as ever, and even the Pharmacopœia preparation was not correctly named, because that was really citro-tartrate of carbonate of soda, there being no citro-tartrate of soda existing as such in the preparation. It was not until it was dissolved or taken into the stomach that it could be so called. He thought the label such as he had mentioned might be adopted without difficulty.

Professor ATTFIELD said it was important that the public should know that chemists had always discountenanced the adoption of misleading names. So far back as 1862 the pharmacy section of the juries of the International Exhibition discouraged this practice; at Dundee in 1866 the subject was again discussed at the annual meeting of the British Pharmaceutical Conference, and it was considered that such names as citrate of magnesia were improper, and should be avoided as much as possible. The next year it again came up at the conference at Norwich, and there again the opinion was tolerably unanimous that such names should not be used. Still more enthusiasm was thrown into the matter at the meeting of the British Pharmaceutical Conference in Liverpool in 1870, when a resolution was passed unanimously to the effect: "That this Conference is of opinion that the term citrate of magnesia, as applied to the ordinary granulated preparation of commerce is a misnomer and ought to be discouraged as inconsistent with the true interests of pharmacy." But this matter of inexplicit and inappropriate names was not so much in the hands of the chemists and druggists as the public seemed to imagine. A medical demand arose from time to time for such compounds as "effervescing iodide of potassium," "effervescing bromides," "effervescing nitrates," and such things. Such names were no doubt absurd and wrong, but the chemist supplied the desired articles according to the prescription, and was he afterwards to be fined for selling that which largely consisted of other ingredients than those mentioned on the label? The history of these things showed that generally a preparation was produced and a name given to it merely describing its leading character at the time it was discovered or introduced. Then improvements were made and other improvements followed, until it became considerably altered from its original composition. Still the public practically would not allow any alteration of the name, for the sale of an article was generally lost if its name was changed. Was the public demand for a good and perfectly definite article not to be supplied, because a few people clamoured for exact names for substances of inexact composition. The name "Citrate of Magnesia" for the ordinary article was wrong, and chemists had long been anxious it should be altered; at the same time interpreters and administrators of the law should be given to understand that they must not condemn as adulterated a medicinal article containing other things than that by which it was named.

Mr. BISHOP said when this article was originally introduced he had no idea it would become such a household institution as it had been, and at that time people were not quite such sticklers for the exact composition of substances as had been hinted at by Professor Attfield. Still he was very sorry that he ever made the mistake of calling this article citrate of magnesia, although it really did contain magnesia, and from that it took its name. He had never practised any deception, and always abhorred anything of the sort. He had now drawn up a new label, which he should be glad to have the opinion of the President and the meeting upon, and if it were approved he would introduce it, though retaining the old label which he had now placed upon something like a million and a-half of bottles. He was very sorry that Mr. McDermott had got into trouble through selling this article, and should take care to see, with the aid of a few friends, that he was not out of pocket by it. He thought it was a very great pity that the learned magistrate should have made such an observation as he was reported to have made as to the composition of an article as analysed by Dr. Muter, which contained citric acid, tartaric acid, carbonate of soda and sugar, as being injurious to the public health. This objectionable phrase had been copied into several of the newspapers, and he hoped to hear an expression of opinion that evening that it was not justified. He was not aware that law courts were the places where lawyers acquired a knowledge of medicine, and he thought if the learned magistrate would turn to his "Phædrus" and read the line in which occurred the words "*Ne sutor ultra crepidam*," it would do him good.

The PRESIDENT said he was unable in his official capacity to answer the question put to him by Mr. Bishop; it was not in his province to give a name to an article belonging to any gentleman, and he would remind Mr. Bishop that fourteen years ago when the preparation was first introduced by him he (the President) thought it a very elegant preparation. On having it examined and finding it contained so very little magnesia, he hesitated about using it, and preferred using an article of his own preparation, which he called citro-tartrate of soda, that being the nearest name by which he could describe it. He had been looking over all his own labels, and he recommended every one to do the same, and to label everything as correctly as possible. Though he could not give an official sanction to Mr. Bishop's new label, he certainly thought it a great improvement on the old one, and saw no objection to it.

Mr. BISHOP said, that as it had been stated by some persons that his preparation did not contain any citric acid, he might be allowed to remark that that article figured as an item in his business last year to the amount of very nearly £4600, and probably he was the largest consumer of it in the country.

Mr. HUCKLEBRIDGE wished some action could be taken by the Council in this matter, and that some rule should be laid down what this article should be called. They hardly knew what to call it. It could not be called citro-tartrate of soda. Saccharated citro-tartrate of soda with magnesia, known as effervescing citrate of magnesia had been suggested, but that was rather a long name. Supposing persons came and asked for citrate of magnesia, and some was put up in a paper and given them, and they went away and then found they had something with another name to it, what would be the result? It had been ruled that if a person asked for coffee, and you gave him a preparation of coffee with chicory, merely putting a label on, it was no defence.

The PRESIDENT said perhaps Professor Redwood could suggest a label.

Professor REDWOOD said what he wished to impress upon the meeting was this, that whoever the article might be made by there was in the first place a certain essential character about it, and, in the second place, there were certain non-essential characters. The essential character was that part of it resembled in composition and properties a preparation ordered in the Pharmacopœia

under the name of citro tartrate of soda, though he would admit there might be a question whether that name was critically correct. Nevertheless, it conveyed all that was required to be conveyed with reference to an article of that description, and did not at any rate give a false impression with regard to it. This effervescing preparation was essentially a compound of bicarbonate of soda with citric and tartaric acids, and when it was administered it formed what might be called citro-tartrate of soda, which was its essential character. Therefore, the name citro-tartrate of soda being given in the Pharmacopœia, he thought, as members of the Pharmaceutical Society, they would do right in following that example and adhering as nearly as possible to that name. It would not be right, however, to adopt it without qualification, which would be as wrong as to continue the old name. He thought the name proposed by Mr. Bishop was quite unobjectionable, namely, citro-tartrate of soda with magnesia or with magnesia and sugar. Although this might be critically objected to, still it gave a generally correct impression, and there was no deception if the article were sold under that name. He thought Mr. Bishop would take both a wise and politic step in endeavouring to bring the name as nearly as possible to represent the real nature of the preparation. He hoped the meeting would be unanimous in recommending one name, so that there might not be a variety in use all different from one another.

The PRESIDENT asked if the use of the word magnesia could not be dispensed with in reference to this preparation.

Mr. WILLIAMS said the public would have it.

The PRESIDENT said there was very little magnesia in the preparation.

Mr. BISHOP said there was more than the President imagined, and it was a most useful adjunct; in fact, the Pharmacopœia preparation was not nearly so useful; the magnesia was required as a slight laxative.

Mr. BARNES suggested "effervescing magnesia" as the name.

Mr. URWICK said he had examined Mr. Bishop's preparation and found it to contain magnesia.

Mr. UMNEY suggested the name granular effervescing citrate, known to the public as effervescing magnesia.

Mr. WILLIAMS suggested "granular effervescing saline compound."

Mr. UMNEY said in parcels in bulk they might call it "sodæ citro-tart. effervescens, B.P., with sugar, magnesia and lemon flavour." That would correctly indicate the composition of the salt, while the simpler label could be put on for the public.

Mr. SANDFORD asked what would then be done with respect to other citrates—citrate of lithia, citrate of iron, and so on. It seemed to him they were discussing a name for Mr. Bishop's preparation, not for that of the Pharmacopœia. Mr. Bishop's composition was citro-tartrate of soda with magnesia and sugar, but in the Pharmacopœia there was no magnesia at all, and no sugar. He knew many persons sold Mr. Bishop's preparation, as he did himself, thinking it the best, but they must adopt some name which would correctly describe the Pharmacopœia preparation.

Mr. HASELDEN remarked that in his opinion the gentleman who undertook the prosecution in Mr. McDermott's case did a very nasty and unfair thing in attacking an article which had always been known under a certain name, a popular article, and only known by its popular name. He thought that if they altered the name, the public would not know what they were going to have in future. He was as much opposed to wrong names as any one, and, fifteen years ago, writing an article in the PHARMACEUTICAL JOURNAL on names in general, and pharmaceutical names in particular, he drew attention to the false names given to preparations which did not represent what they consisted of. He should advise them to stick to their present name, and add a little magnesia, if necessary, in the shape of sulphate. Paregoric was another name which did not represent what was sold under that name, but the public knew what was meant and approved of it. If they did not take care, they would be interfering with the names of half the patent medicines in use. He believed if the Council represented the matter fairly, they would be allowed to retain the name without being considered as infringing the Act of Parliament, and he should like that step to be taken. Mr. McDermott had evidently been made a scapegoat of.

Mr. URWICK said he had taken a legal opinion on the matter, and was assured that if proper representations were made the name could stand as it was. It was the name given by the proprietor to an article which he had introduced, and he had a right to give it any name he liked.

Mr. SAVORY remarked that according to the report of the case which he had read, the article analysed was merely citro-tartrate of soda, without a particle of magnesia in it. Probably if it had contained magnesia, as Mr. Bishop said his preparation did, that might have made a considerable difference in the magistrate's decision.

Mr. GERRARD suggested that a definite formula should be given for this preparation, and let it be inserted in the Appendix. There would then be something tangible to go upon.

The PRESIDENT said this preparation was a child of Mr. Bishop's, and perhaps it would be the best way for that gentleman to take a ease upon it. He hoped the Council would do all they could to assist him, but he did not see how they could take the initiative in the matter.

Mr. BISHOP said his difficulty was that he was constantly receiving applications from chemists in all parts of the country, asking what they were to do.

The PRESIDENT agreed that everybody must have felt the difficulty, but Professor Redwood had given his approval to the new label suggested by Mr. Bishop, and probably that would meet the case.

Mr. BLAND suggested as a label "effervescing citrate, formerly called citrate of magnesia."

Professor REDWOOD said the objection to that would be that it did not sufficiently indicate the nature of the composition.

Mr. BLAND thought one of the principal reasons for giving a particular name to a new preparation was to conceal its composition. The maker of any proprietary article was entitled to keep the nature of the composition secret.

The PRESIDENT observed that the only person entitled to take action in the present case was the party aggrieved, Mr. McDermott.

Mr. BISHOP said unfortunately he had a bad case to start with, because the article sold did not contain a trace of magnesia. If he had sold his preparation he did not believe the difficulty would have arisen.

Mr. SANDFORD, in reply to a question, said he considered that Mr. McDermott had acted foolishly in that instead of putting forward as a defence the popular name of the article, he simply relied on the fact that being out of it himself he had got it from a neighbour, and sold it in the same state as he had received it. There were special difficulties in the way of the Council taking action in the matter, Mr. McDermott not being a chemist and druggist at all.

After some further conversation,

The PRESIDENT suggested that Mr. Bishop should consult his legal adviser and afterwards communicate with the Council.

Mr. BISHOP said that he would adopt this suggestion and the discussion terminated.

It was announced that the next Evening Meeting would be held on Wednesday, December 3rd.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The second general meeting of the Association was held on October 23rd. The President, Dr. Charles Symes, in the chair.

The following gentlemen were elected members :—Messrs. Fred Ellis, James Marson, and Joseph Brown.

The following donations were announced :—The American Chemist, The Pharmaceutical Journal, and the New York Druggists' Circular.

Mr. J. Hallawell, in opening the discussion on the President's address* said that a resolution which had just been passed by the Council rendered, for the present, further discussion unnecessary. He would, however, say that he concurred in all that Dr. Symes had said. No one who had attended the meetings of the Association during the past session would deny that there had been very little interest shown in its proceedings, and that the attendance had been very poor indeed. It was stated at the last meeting that other similar associations were no better off in this respect than themselves. He doubted this, and even if it were so it was no excuse for their apathy. In one comparison that was made the circumstances were very different. There were in the town mentioned two associations, one for the masters, and another for assistants. This division was objectionable, and in itself a considerable element of weakness. If there were not sufficient members and business for one society, there were still fewer and less to do for two ; he hoped that this Association would always remain united, as both masters and assistants ought to have the same aim and end in view, and would work better together than divided. In the instance mentioned also, although the meetings were not so well attended as they ought to be, the classes for the students had this year proved a success, more than fifty pupils having joined the chemistry, pharmacy, and materia medica classes which had been formed. But the question was, not what others were doing, but what they were doing themselves. If they felt they were falling behind, they should acknowledge the fact and try to remedy the evil. Complaints had been made that the papers read were devoid of interest for the members ; but that is merely an excuse for non-attendance. It was absurd to expect that those who could read papers of interest at the meetings would expend time and labour in producing them, and then find they had to address almost empty benches. Let the members by their regular attendance at the meetings prove that they felt the want of the help this Association was intended to afford, and there would very soon be an adequate supply of valuable and instructive papers, and the Council would be glad to add to these any other means of help and instruction that might be found desirable, either by forming classes or assisting the younger members in forming classes amongst themselves.

Dr. Symes then gave an invitation to apprentices and assistants engaged in the study of pharmacy to meet the vice-president, Mr. Alfred Mason, F.C.S., at the Royal Institution, Colquitt Street, on Thursday evening, November 6th, at 7 p.m., to take into consideration the best means by which this Association could assist students in prosecuting their studies.

Dr. Cook then read the following paper on

Some Practices of the Trade which it would Benefit the Profession to Abandon.

BY EDMUND ALLEYNE COOK, PH.D., F.C.S.

Many times and oft I have heard the question discussed and read discussions on the way in which the pharmaceutical career may be made to take rank as a profession, may be enabled to regain the position of dignity it once held when apothecaries were few and honoured. As you all know, the method most esteemed to attain this end has been to petition Parliament to grant exclusive privileges to such as hold the certificate of the Pharmaceutical Society—which certificate is only granted to those who pass its examinations. This may not be the place to discuss the absolute wisdom of this proceeding. The method is on its trial, and, although it is a return to the monopolising system of ancient days, we can only say it has not yet brought in its train the ancient honours. So far as *I* know the pharmaceutical world, there is not now less dissatisfaction with its position than before the inauguration of the new system. The method is on its trial—results alone can decide its efficacy—and perhaps the time of trial has not yet been sufficiently prolonged to enable us either to discuss or pronounce an opinion on it.

But we can at any rate say this—Whatever means are the right ones to employ to raise the pharmaceutical faculty in the estimation of the public to such a degree that they shall esteem it a profession, they *must* go hand-in-hand with honesty and fair-dealing. So far as I can gather, the plea for its being considered a profession is principally that the practice of pharmacy requires an amount of skill which no person can be expected to possess without having passed through a curriculum of study sufficient to make him more than a generally well-educated man. But we must not ignore the half of what this plea carries with it, viz., that if so much skill be required to practise pharmacy rightly, an equal amount of skill must be necessary to detect imposition and fraud on the part of the skilled pharmacien if he be disposed to practise it. The very qualities on the ground of which he asked to be ranked as a professional man place in his hands a power of imposition against which he offers no guarantee whatever, and to which the public are fully aware they are often subjected.

With the medical men the inducements to fraud and imposition are so few and paltry compared with the interests at stake that the public willingly accord confidence and consideration. No medical man would for his own sake (to take the lowest ground) delay the recovery of his patient for the purpose of increasing his fees. But on the other hand, how often is it the complaint of medical men that medicines they prescribe of ascertained virtue do no good unless obtained from thoroughly reliable sources ; and a "thoroughly reliable source" is by no means necessarily every pharmaceutical chemist's shop.

There are two opposite ropes pulling the pharmaceutical chemist ; on the one hand, he wishes to raise his calling, and on the other he has his living to get, and he naturally wants to get it as well as he possibly can. When, then, these influences do not happen to be in conjunction, the temptation is, in too many cases, to let the profession slide.

I happen to have some considerable knowledge of the wholesale drug trade, and can point my meaning more emphatically. Anyone dealing in drugs knows quite well the variable quantity of active principle contained in many of them. The jalapine in jalap root, the cantharidine in flies, the morphia in opium, the quinine in scale preparations, are excellent instances in point. I can attest that the jalapine in jalap root may and does vary from 2 to 12 per cent. ; the cantharidine in flies from 1 per cent. to none at all ; the morphia in opium from 10 per cent. to none ; the quinine in citrate of iron and quinine from 25 per cent. of sulphate to none. And all the qualities of these different drugs are offered for sale to the pharmaceutical chemist at, of course, varying prices. As matters stand at present, he offers to the public no guarantee which he will buy and sell—and certainly the inferior drugs are bought and sold—and yet it is in the present position of matters that he asks for professional consideration at the hands of the public. Gentlemen, it is an axiom that "the public are gullable," but in hitherto refusing your calling the consideration you have asked, they have shown that they not "gullable" to an unlimited extent.

In these days of competition it is natural for every man to wish to buy as cheaply as he can, for he knows he must sell as cheaply as his neighbours, but there is a point broadly indicated by the common sense of every pharmacien, beyond which cheapness simply means fraud ; and inasmuch as he cannot lay the soothing unction to his soul that he has been deceived, cheapness beyond a certain point means fraud on the public. If the market

* See *ante*, p. 327.

price of sulphate of quinine is 9*s.* per oz., and a druggist is offered and buys citrate of iron and quinine purporting to contain quinine equal to 25 per cent. sulphate, at 2*s.* per oz , or, in other words, purporting to contain 2*s.* 3*d.* worth of quinine alone he must be a very stupid man to suppose it genuine, and it would take a very "gullable" public, acquainted with the facts, to acquit him of *unprofessional intentions.* And even if he is informed that the reason why the preparation is sold at so low a price is because it is indefinitely poorer in quinine than the orthodox preparation, the character of the transaction can bear but one opinion, for the object of its purchase is to retail to the public who know of one quality only.

Yet it is well known to every wholesale druggist that by far the largest quantity of citrate of iron and quinine sold is the cheap variety, the variety sold so low that it is impossible it could contain the official quantity of quinine. I have heard of instances where houses offering the good variety and being undersold have represented to the druggist the impossibility of making the genuine thing for the amount he had paid, and the reply was—"We obtain it from a highly respectable house, in which we have every confidence."

I ask you, gentlemen, Is it likely when such things as these can be, that your calling will be raised in standpoint? Is it likely that any number of Acts of Parliament granting monopolies will effect that object? There is something left undone without which the public will not regard you in a higher light with more respect. In the first place, if it is desirable or essential for a candidate to know all about the source of oil of rhodium, for instance, it is still more essential that he should be able to test the purity and strength of every drug he deals in. By this I do not mean that he should be able to *say* how it is done but to satisfactorily *do* it. In the next place, if pharmaceutists voluntarily offer the public a guarantee of the purity and strength of their articles, transgression of which will entail loss to themselves, they will add a very large claim to consideration and esteem. And if they do not offer it the time, I firmly believe, is not far distant when the public will demand and enforce it, and it will be as dangerous to sell drugs below the official strength as it is to sell adulterated tea or butter.

A guarantee of this kind can easily be offered, and so far as this city is concerned, it is within the power of the Chemists' Association to initiate the reform. If each pharmaceutical member of this Association binds himself to buy and sell only drugs of known and recognized strength, and in cases of doubt to submit them to analysis, either by himself or some appointed chemist, the influence of the Association would take a great leap onwards, the confidence of medical men would be gained, and through these means the respect and consideration of the public, for which you seek. It would be futile to assert that drugs of equal and recognized strength are difficult to obtain and must be purchased at more than a proportionate increase of price. You cannot expect to get a gold ring for a brass price.

For many years it has been the rule in the United States that no opium shall be admitted containing less than 10 per cent. morphia. Whether or not this kind of regulation is applied to the importation of other drugs I cannot say, but of its beneficial effect there can be no two opinions. In the London and Liverpool markets can be purchased all kinds of drugs of all strengths. The manufacturers of extracts and active principles know too well what they are about to purchase the qualities of real inferiority. What, then, becomes of them? They must be taken by the trade to retail, and they *are* retailed to and swallowed by the British public.

What can be more annoying to a medical man prescribing a medicine for a patient than to find a thing supplied destitute of therapeutical properties, or prescribing a blister for some urgent case and finding his efforts rendered perfectly nugatory. It is a grim and trite kind of joke to say men often die by the doctor, but let me ask you to whom the joke should apply—to the doctor who prescribes the right thing, or the man who supplies the wrong?

Can I place before you any more cogent reason why the practice of dealing in drugs of uncertain quality should be abandoned? Can I mention any weightier inducement which can sway honest men to voluntarily band together to offer to the public a reasonable guarantee of their integrity, and so separate them from the fraudulent members of the craft? I trust not; and if you will fully consider the advantages such a proceeding will bring you, in all ways, if properly organized and carried out, I am sure it will not be long before you act together and establish an association as necessary as it will be useful, as highly entitled to consideration and esteem as any recognized profession. In fine, let me sketch roughly a plan in which all earnest pharmaciens might join, by which benefit of the public and of the trade might be secured in the matter of drugs.

I would suggest that the Council of this Association should frame a few rules and lay them before a general meeting; that they announce their willingness to form a branch association, consisting of pharmaceutists only, a chief condition of membership being that the member subscribing to the rules and paying the yearly fee shall thereby undertake to sell drugs of genuine and standard quality only, and agree that if he be proved to have sold any of inferior quality after joining the association that he can on judgment of the Council, confirmed by vote of general meeting, be expelled the association, and that such expulsion be advertised in the public papers. That a chemist to the association be appointed who shall be authorized to report upon any drugs which may be purchased in a recognized way in the shops of members, which on analysis may not come up to the official standard of the association, which shall in some degree be regulated by the pharmacopœia. That the association publish a monthly minimum price-list showing the lowest possible prices at which drugs may be purchased of guaranteed purity. That this price list be for the guidance of members only, and for private circulation among members only. That a private list be kept by the Association of the names of firms known to manufacture or offer for sale drugs of inferior quality, or utterly destitute of therapeutical virtue.

I have no doubt many objections may be stated, and pungently stated, to the above rules, that many additions might be made. One very possible objection which I might perhaps be permitted to notice beforehand is the restriction on free trading which such rules and such an association would exercise.

I am ready to maintain that free trade in drugs for the use of the public is not permissible in the way in which free trade in other articles of commerce is desirable. That this fact is generally recognized to a certain extent is patent by the monopoly granted to pharmaceutists. But that the limit of the restriction should be the dealer himself is manifestly absurd. What earthly cause is there to prevent a man selling jalap containing 2 per cent. active principle in place of 12 per cent.? It may be a fact that the less medicine the consumer takes the better, but this has nothing to do with the question as between buyer and seller; there is every reason that what is deemed desirable as a dose should be honestly supplied. A restriction such as the association and the rules for similar ones to those I have had the honour to propose to you is not too severe a one under the circumstances. Drugs whose quality cannot be judged by appearance should in no case be sold but by analysis.

No one rising to speak,

Mr. Abraham remarked on the silence with which the paper was received. Dr. Cook said he had derived his information from his opportunities in connection with the business of a wholesale house, and he (Mr. A.) hoped some of their wholesale friends would throw further light on the subject. For himself he could neither contradict

nor corroborate what had been said in respect to many of the statements of Dr. Cook, but it was important that retailers should know the facts and be put on their guard. He could not but think that there had been an improvement since the establishment of the Pharmaceutical Society, and the more general diffusion of pharmaceutical and chemical knowledge. But he thought that some of the articles said to be sold would bring the sellers within the provisions of the Adulteration Act—for instance, the sale of citrate of iron and quinine with half or less than half the proper quantity of quinine. He did not see how it could be expected that chemists could wish to join an association which exposed them to penalties which they would avoid by simply ignoring it.

Mr. A. H. Mason : Had not Mr. Abraham broken the silence I am afraid our friends would say, "Silence gives consent," but I am not content to let the matter rest with the onus upon the shoulders of the wholesale dealers. I can fully endorse Dr. Cook's observations about citrate of iron and quinine. It is a fact that three qualities are easily obtainable and are largely bought by chemists—one of B. P. strength ; another with about half the quantity of quinine, and the other of indefinite weakness in quinine. If Dr. Cook's paper will do anything to remove this evil so much the better. Without Dr. Cook from his considerable experience can find us some very much more simple tests for the presence of alkaloid in a given specimen of a drug, I am afraid his suggestion to have only analysed drugs sold would meet with very many difficulties, and if all the evils which he refers to *do* occur the only remedy is for physicians to prescribe alkaloids or active principles only, but this again is not practicable.

Mr. Hallawell said he thought the Association was doing more good in its efforts to thoroughly educate the pharmacist than it could ever do in initiating a movement of the kind suggested by Dr. Cook. If every pharmacist could himself with ease and certainty examine the purity of the preparations he employs, and if he were taught the importance of doing so, very few adulterations would creep into use : the interest that each would feel in his business would prompt him to exercise his knowledge for the protection of his customers. But for this there must be better training and less cramming ; and it was one of the objects of this Association to so direct the studies of its younger members, as to render each of them familiar with the highest branches of pharmaceutical science.

Mr. T. F. Abraham said he thought the Adulteration Act would meet most of the cases described by Dr. Cook. That Act required that when the name used in the British Pharmacopœia was employed the article sold should be of the nature and strength therein specified, and that if the contrary were the case the seller should be deemed guilty of an offence against the Act. With reference to the association suggested by Dr. Cook he apprehended that *were it ever formed* the number of analysts required would be almost as great as the number of members, seeing that most chemists received into stock several samples of fresh drugs daily.

Mr. Redford said he thought that some wholesale houses were now offering to the retail trade drugs which had been analysed by themselves, and he supposed with these a written warranty would be given, such as a dealer gave in selling a horse.

Mr. Shaw said that he had listened to the paper with much interest, and considered that it was one which ought to command the serious attention of every chemist and druggist throughout the country, but he was not prepared to endorse all the representations contained in it. Some of the suggestions, he thought, were quite Utopian. He quite agreed upon the necessity of all chemical preparations being definite in their character, and that when citrate of iron and quinine contained less than 25 per cent. of citrate of quinine it should be labelled accordingly. He then alluded to the difference in price and quality between the foreign and English aconitine, and the temptation to substitute one for the other; the so-called cake-saffron, composed exclusively of the florets of *Carthamus tinctorius*, *refined* bees-wax, etc. In reference to the quality of opium, he remarked that the B. P. required that each sample should contain not less than 6 per cent. of morphia, and qualities were often used containing 10 per cent., being nearly double the strength. He thought it very desirable that the Pharmacopœia should indicate a definite quality, say 8 per cent., so that the opium preparations would be more definitely uniform in their character. Some of the evils alluded to by Dr. Cook time alone would remedy. With respect to the analysis of jalap, rhubarb, etc., the trade must in a great measure depend upon the physical character of the drug and the respectability of the wholesale dealer, at the same time paying a fair price. He agreed with Professor Murphy as to the difficulties of a satisfactory analysis, especially after recent experiences of professional analysts.

After Dr. Cooke had replied to criticisms and answered several questions, a vote of thanks to him was proposed by Mr. J. T. Armstrong, seconded by Mr. Mason, and carried by acclamation.

Parliamentary and Law Proceedings.

Sale of the So-called Citrate of Magnesia. Important Decision.

At the Southwark Police Court on Friday, Oct. 31, Mr. Philip McDermott, chemist, 155, Abbey Street, Bermondsey, was summoned before Mr. Partridge, by Mr. Doman, the sanitary inspector of Bermondsey under the Adulteration Act, for selling as citrate of magnesia a compound not containing any magnesia, thereby liable to cause injury to health, etc.—Mr. Harrison, assistant vestry clerk, attended to prosecute.

Mr. Doman said that on the 26th ultimo he left at defendant's shop a prescription to be made up, and on his return for it he saw defendant, and purchased a quarter of a pound of citrate of magnesia, for which he paid one shilling. He distinctly asked for citrate of magnesia, and when he received it he told defendant he was going to take it to the analyst. The defendant said it was the same as he received it. Witness took it to Dr. Muter, who analysed it, and gave him the certificate produced.

The defendant objected to the certificate being received as evidence, as he wished to ask Dr. Muter a few questions.

Dr. Muter was accordingly sent for, and on being sworn said he was analyst to the vestry of Bermondsey. On the 26th of last month he received a parcel from last witness marked "Citrate of magnesia." He analysed it, but there was not a particle of magnesia in it.

Mr. Partridge asked what it was composed of.

Dr. Muter replied that he found citric acid, tartaric acid, carbonate of soda, and a little sugar. It might be injurious to health if mixed in other medicines where citrate of magnesia was prescribed.

Mr. Partridge asked defendant what he had to say in answer to the charge.

The defendant said that when the inspector left the prescription to be made up he was out of citrate of magnesia, consequently he sent to Mr. Farmer, a neighbour, and purchased 2 lbs. weight of him, and he sold it to the inspector just as he received it.

Mr. Partridge told him that as a chemist he ought to know whether the drugs he sold were genuine.

Defendant replied that such was the case, but it would be impossible for him to have all his drugs analysed.

Mr. Partridge told him it was a very serious offence for chemists to mix articles with drugs which were not mentioned in the prescription. In fact, the consequences might be very serious, and the public must be guarded against such conduct. He must pay a penalty of £10 and the costs of the analysis.—*Standard*.

Is "Rowland's Odonto" a Patent Medicine?

At the Wandsworth Police Court, before Mr. Bridge, Mr. Joseph Delayen, hairdresser, Wimbledon, was summoned by the Excise authorities for selling patent medicines and drugs without a licence.

The son of the defendant said his father was not aware that a licence was required, and the defendant a Frenchman, who spoke very little English, said "Rowland's Odonto," which was the article he sold, was not a drug.

Mr. Harris, the supervisor of Excise, said he called upon the defendant, after the article was sold, for an explanation. He said he was not aware that it was subject to duty. He asked him if he would take out a licence, which would cost him £2, but he said he would not. The son said they did not sell enough in the year to cover the £2.

David Collins, an officer of Excise, said that on the 27th of August last he was passing the defendant's shop when he saw "Rowland's Odonto" in the window exposed for sale. He went in and asked the defendant if he sold it. He said he did, and he gave him 2*s.* 9*d.* for a box.

Mr. Bridge looked at the Act which applied to all things for the prevention and cure of any disease or complaint affecting the human body. He said "Rowland's Odonto" was merely a powder for cleansing the teeth. Every hairdresser in London sold it, but they did not take out a licence.

Mr. Harris said they did.

Mr. Bridge then expressed an opinion that it was not a medicament.

Mr. Harris said it preserved the gums. He submitted that by the advertisement set forth that it would cure disease it came within the meaning of the Act.

Mr. Bridge said "Rowland's Odonto" was no more a medicament than a piece of soap was.

Mr. Harris then referred to the fact that the box of "Rowland's Odonto" bore a stamp.

Mr. Bridge said persons might like to get their articles patented for the purpose of giving them additional character in the eyes of the public. It may be that Rowland was not bound to patent it. He should not convict, but he should be happy to give them a case on the point.

On the suggestion of Mr Harris, the case was adjourned for a month to enable him to lay the case before the Board.

Obituary.

GEORGE DYMOND.

We regret to have this week to record the death of a well-known member of the pharmaceutical profession, Mr. George Dymond of Birmingham. Mr. Dymond was a native Exeter, and after being apprenticed to the trade became a pupil at Bloomsbury Square in the early days of the Society, his certificate on passing the Major examination bearing the early number of 64. He commenced business in Manchester, but in 1856 he married the daughter of Thomas Southall and joined the firm of Southall Brothers and Co., of Birmingham.

Mr. Dymond took a lively interest in both the politics and the progress of pharmacy. His services in the former direction culminated in 1870, when he was elected a member of the Council. This was the session in which the celebrated poison regulations were discussed, and Mr. Dymond moved the resolution which removed those regulations from the realm of law to that of ethics, in which they have since quietly slumbered. The adoption of Mr. Dymond's resolution, though it caused the resignation of the president, Mr. Sandford, did not soothe the feelings of the country, and Mr. Dymond with others lost his seat at the Council at the election of 1871, and did not attempt to regain it.

Mr. Dymond was warmly interested in the progress of pharmacy and in affording facilities for pharmaceutical education in the provinces. He was an active supporter and for two years president of the Midland Counties Chemists' Association; and it was mainly through his efforts that the Association found a local habitation, which, though it has not answered all expectations, has proved of considerable service to assistants in Birmingham in providing them with a reading room and a place of meeting.

For the past year or two Mr. Dymond had partially retired from business, but he was at his office on Tuesday, the 28th ultimo. He had visited Atherstone the previous day on a religious mission, and whilst there he supposed that he had slept in a damp bed, as he felt a chill during the night. That evening he was taken seriously ill with what proved to be an attack of inflammation of the lungs. This increased in severity, and he succumbed to it during the following Monday night. He leaves a widow and several children to deplore his loss.

FREDERICK CRACE-CALVERT.

After a long-continued and severe illness Dr. Frederick Crace-Calvert, F.R.S., died on Friday, October 24th, at his residence, Clayton Vale, Newton Heath. While on a visit to Vienna last July, in order to perform the duty of a juror in the chemical department of the exhibition in that city, he was seized with typhoid fever, from the effects of which he never rallied. His condition was aggravated by ulceration of the lungs, which was the cause of death.

Dr. Crace-Calvert was born in London, he being the son of Colonel Crace, a gentleman of fortune, who took his wife's name on marriage. Dr. Crace-Calvert, however, was educated in France, and it is stated such was the success with which he pursued his studies that the value of the numerous honours awarded to him in the schools was sufficient to defray the cost of his education. He studied chemistry at Rouen, under Girardin, and afterwards at Paris, under Chevreul, of whom he was one of the favourite pupils. Under the latter master he was appointed assistant-chemist at the Gobelin works. Upon his return to England, in 1846, he received the appointment of Honorary Professor of Chemistry in the Manchester Royal Institution. He was also for some time a lecturer at the Manchester School of Medicine. As an active member of the Manchester Sanitary Association his attention was particularly attracted to hygienic subjects, and this, it is said, led him to take out a patent for the preparation of carbolic acid, which was a successful application of the results of the Prussian chemist Runge. Another of his patents which led to a considerable business was for the desulphurizing of coke by means of chloride of sodium. Other patents for the sizing of cloth and the preparation of aniline colours from coal tar were not so successful.

Dr. Calvert's experiments on protoplasmic life and the origin of putrefaction, so far as they are published (see Pharm. Journ., vol. ii., pp. 184 and 1013), have been of great interest, and were the cause of the invention of an ingenious apparatus for the distillation of absolutely pure water free from germs (Pharm. Journ., ii., p. 263). In connection with the Society of Arts, Dr. Calvert delivered courses of Cantor Lectures on "Chemistry Applied to the Arts," "Synthesis, and the Production of Organic Substances," "Aniline and Coal Tar Colours," and on "Dyes and Dye-stuffs other than Aniline," the latter printed in the second volume of this Journal.

Dr. Crace-Calvert was a Fellow of the Royal Society of England, Fellow of the Chemical Society, Honorary Fellow of the Chemical Society of Paris, a Member of the Royal Academy of Turin and of the Imperial Academy of St. Petersburg. His doctor's degree was forwarded to him by the late Baron Liebig.

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

On the 6th October, 1873, Mr. Benjamin Jones, Chemist and Druggist, of London Road, Twickenham. Mr. Jones was a Member of the Pharmaceutical Society.

On the 23rd October, 1873, Mr. William Horsley, Chemist and Druggist, of Malton, Yorkshire.

On the 3rd November, 1873, Mr. Joseph Bateman Dodd, Chemist and Druggist, of Manning Street, Bermondsey.

Correspondence.

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

THE ADULTERATION OF FOOD AND DRUGS ACT AND THE SO-CALLED "GRANULAR EFFERVESCENT CITRATE OF MAGNESIA."

Sir,—The decision of the magistrate in the McDermott case, fining him £10 for selling a preparation labelled "Citrate of Magnesia," which, according to the analysis of Dr. Muter, did not contain a particle of magnesia, has caused much anxiety among chemists, dealers in the so-called citrate of magnesia. The subject was brought before the Council of the Pharmaceutical Society in committee, on Wednesday afternoon, and again at the evening meeting of the Society of the same day. The Council appeared to be fully agreed as to the injustice of the magistrate's decision in fining Mr. McDermott £10 for selling a popular, useful, and harmless preparation, under the name it was called when first introduced about fifteen years ago, and by which name it has been universally known and sold to the public ever since, and I leave to the report in to-morrow's Journal that which took place at the evening meeting, when there was great discussion and much interest felt in giving this useful and harmless preparation a new designation; and, in reply to many private correspondents, I beg to say that I intend to attach the following label to all sold by us—John Bell and Co.—until I hear of a better one, and which I trust will be sufficient to prevent us chemists from being placed in the position of the unfortunate defendant, Mr. McDermott, to whom I yet hope that justice will be done by getting the decision reversed:—

This preparation, generally known as "Granular Effervescent Citrate of Magnesia," is the "Effervescent Citro-tartrate of Soda" of the British Pharmacopœia, with Magnesia, Sugar, and Essence of Lemon.

THOMAS HYDE HILLS.

338, *Oxford Street, W.*

Sir,—On account of the recent prosecution of a retail chemist for the sale of so-called "citrate of magnesia" we have determined as manufacturers to label all such effervescent salt when sent out in bulk as

SODÆ CITRO-TART. EFFERVES.
(*Brit. Pharm.* 1867).
WITH MAGNESIA, SUGAR, AND LEMON FLAVOUR,
KNOWN BY THE PUBLIC AS
CITRATE OF MAGNESIA.

As it is undoubtedly advisable that the label to which the public has for so many years been accustomed, upon the usual retail bottle, be altered as little as possible, we would suggest that the name (for retail) be modified as follows:—

GRANULAR
EFFERVESCENT CITRATE,
KNOWN BY THE PUBLIC AS
CITRATE OF MAGNESIA.

and possibly in addition, in order more strictly to comply with the requirements of the Act, and that the public may be educated as to its true composition, it would be expedient to affix a small label to the bottle indicating that citro-tartrate of soda, sugar and magnesia are the component parts of the salt.

Although we have during the past week communicated our views by circular to our friends, still we thought, that through the medium of your valuable Journal, greater publicity would be given to a matter which at the present time is of interest to the trade.

HERRINGS AND CO.

40, *Aldersgate Street, London, Nov.* 7, 1873.

Sir,—I wish to call your attention to the prosecution of a chemist which appeared in Saturday's papers, the result of which will, I am sure, astonish and rouse the pharmaceutical brotherhood.

It is doubtless a desirable thing to have the watchful eyes of inspectors and the scientific skill of analysts brought to bear upon all frauds and adulterations, so that the public may enjoy the necessaries of life without fear and suspicion, but there is a possibility of over-officiousness, which, combined with the ignorance of the presiding authorities, may render its working vexatious and unjust. Now, I venture to say that no chemist will concur in the justice of the fine imposed last week upon Mr. McDermott of Bermondsey for supplying the well known granular preparation, popularly as citrate of magnesia, but in reality being nothing more than the Pharmacopœia preparation of citro-tartrate of soda with sugar.

The offence consisted in supplying the above-mentioned compound under the name of citrate of magnesia, backed up by the opinion of the analyst (Dr. Muter) that it might be injurious when taken with other medicine. Mr. McDermott, in defence, said he supplied his customer with the article as he obtained it from another chemist, being himself out of it at the time. But a second "Daniel had evidently come to judgment," and decided that as a chemist he was responsible for, and should know whether his drugs were pure or not.

Such a decision is evidently a matter of congratulation for the wholesale trade, for it relieves them in future from all responsibility, and the retail chemist must henceforth submit his goods to the strictest analysis, and, in the event of having to send out for anything in haste, must keep his customer waiting till the analysis is performed. It is very unfortunate that names should be given to compounds, which in no way express their composition until the public identify the article with a certain name, and will receive it under no other; and it is rather hard that the penalty—a public fault—should fall upon the shoulders of an individual. I am sure the trade will watch with anxiety the steps which the Pharmaceutical Society may think fit to take in the matter, and will feel much relieved for such information as shall enable it to be secure from traps such as that in which Mr. McDermott has been caught.

WM. WARREN.

1, *Ormond Villas, Cheltenham.*

Sir,—I enclose paper extracted from the *Daily Telegraph* of Saturday, November 1st. If such convictions are to take place very few chemists are, I think, free from danger.

In my opinion the article sold as mag. cit. should have its official christening by the Society, who should look after chemists' interests.

T. BIFFIN.

Herne Hill, Nov. 3rd.

Sir,—The recent decision of the Southwark magistrate with reference to citrate of magnesia must have caused an anxious thought to many chemists, as it may safely be asserted that all, from the proprietor of the select West-end dispensing establishment to the remote country sundryman, are equally liable to be placed in the same unpleasant position as Mr. McDermott.

As a temporary bridge over the present difficulty, I would suggest to others of the brethren favoured with a similar prescription for effervescing citrate of magnesia the following form, while in selling the article now known by the name of citrate of magnesia the labels might be printed to read "Granular Effervescing Salt, usually called Citrate of Magnesia," etc., etc.

℞

Mag. Carb.	6½ drachms.
Sodæ Bicarb.	12 ,,
Acid. Citric.	20 ,,

Mix.

H. BUTTERWORTH.

70, *Tottenham Court Road, London, Nov. 3rd,* 1873.

Sir,—Prominent members of our Society have been very fond of advocating and agitating for legislative enactments calculated to render more select and "respectable" the pharmaceutical body in which they themselves have won, *or inherited*, so much credit.

The 5th of November of this year will be memorable in the annals of *our* Parliament for the spectacle it afforded of the consternation and indignation of these our representatives at the turn events have recently taken; our worthy leaders are afraid of being "hoist by their own petard"! I do not mean by this to insinuate that the indignation of the trade at large (of which the Society has now become the recognized embodiment) will lead them to do anything so revolutionary as to sweep away the old regime *in toto* and substitute a less oligarchical form of government—one less aristocratic and more representative of the average shopkeeper. Without presuming to prophesy this I do urge that if the Council wish to remain popular they should not ask individuals to bear the brunt of such a contest as now threatens, so evidently felt by everybody as affecting themthemselves. Subscriptions have accumulated to an inconvenient amount, yet when the subscribers are threatened with heavy penalties by Acts which Council-men have promoted, the said Council backs out from the onus of settling the question, though that solution would be a relief to every member of the trade. We are not *all* getting our living by the leading dispensing establishments of Britain, and cannot therefore wash our hands of the matter by saying we do not care if we never sell another ounce of mag. cit.

As far as I am personally concerned I do not suppose I shall sell any more, but if I run foul of the Act it will be in the capacity of manufacturer (at others' dictation) and therefore incur the "imprisonment with hard labour" which amused the meeting so on Wednesday.

JOHN P. CATFORD.

36, *Prince's Square, Kennington Park Road,*
Nov. 6, 1873.

Sir,—Now that the Adulteration Act passed in August last year is being enforced in a manner by which many vendors of food, drink, and drugs are fined, as they think not altogether in accordance with either the letter or the spirit of the Act so far as the meaning of the word adulteration is held to be there laid down, I think the time has arrived when it has become necessary for the drug trade, or the Council of the Pharmaceutical Society as having the initiative in the enforcement of the Pharmacy Act, 1868, which it will be recollected is incorporated in the Adulteration Act, to take some steps of united action to prevent and protect themselves from factious and, if not ignorant, hastily considered litigation upon the purity of drugs. Some vendors of the first and second divisions—food and drink, and notably milk in the latter—admit their adulterations, are fined, and may be dismissed accordingly, hoping they will "go and sin no more;" but I am induced to write to you to bring under consideration cases of the third division—drugs—where there is not the slightest intention of adulteration or fraud upon the public, and these cases, as I think, will apply with the same force to the wholesale as to the retail trade. By the Medical Act, 1858, and a subsequent Act, 25 and 26 Vic., the British Pharmacopœia, 1867, is the unquestionable standard and guide whereby the definition, nature, strength, and composition of the *medicines the physician prescribes* is to be ascertained and determined, and in the Pharmacopœia, so far as I can find, though the word drugs is not mentioned, yet I presume no one will cavil at the idea of the words being considered synonymous, and, therefore, chemical compounds used in medicine would be classed in the division of drugs. Those engaged in the preparation of medicines, that is drugs as intended in the Adulteration Act, sell them to the public in two ways, either by prescription of some medical practitioner, which method is under particular restrictions, as laid down in the Pharmacy Act, or directly to the vendee on demand. This being the case prescriptions can only be prepared with strictly pharmacopœial articles, and any departure in such articles in nature, strength and composition must be looked upon as an adulteration and ought to be rigorously treated as such; but when selling direct I apprehend the argument does not hold, at any rate, the Pharmacopœia nowhere notices it. Drugs that are simple natural products at once and clearly speak for themselves. Compound medicinal substances if according to some Pharmacopœia, though differing from that of 1867, surely ought not to be considered as adulterations of the said 1867 pharmacopœial articles, when they happen to have the same or a similar name, and when sold ought not to require the double declaration, printed and verbal, that they are compounds not injurious to health. I have purposely put this in its widest or most general sense, but as an illustration will take the (in England) familiar instance of the every day sold sweet spirit of nitre formerly spt. etheris nitrici, sp. gr. ·850. The ultimate replacement of this as in the present Pharmacopœia is the spirit of nitrous ether, sp. gr. ·845., and which is, as every one in the trade knows, the dearer of the two, arising both from spirit, strength and process of manufacture. Now if I sell the former under the ordinary popular name, have I committed an offence, as defined in the Adulteration Act? I think not, and should like to see some authoritative opinion, say that of the public analysts themselves and the trade, on the subject in all its bearings.

With regard to the citrate of magnesia prosecution of Mr. McDermott, of Bermondsey, reported in the London papers of Saturday last, you will doubtless have numerous communications, so I will not trouble you about it at present, as I fear I have trespassed already too much on your space.

Will you allow me to suggest that if you were to publish the full text of the Act it would be a great aid to the discussion of the legality of a certain course of action contemplated by the sanitary authority in one of the metropolitan districts?* I refer to the reported recommendation to the public analyst in that district that he should obtain *privately* samples of drugs for analysis. That this phase of the Act, if legal, is a very undesirable one, is the opinion of

A DRUG TRAVELLER.

THE ADULTERATION ACT.

Sir,—Seeing in the *Standard* of the 1st inst. an account of a chemist and druggist in London being fined £10 for selling citrate of magnesia, which same was proved to contain no magnesia whatever, I beg to make a few remarks on the subject.

It is well known that the substance commonly called citrate of magnesia is used chiefly, throughout England, simply as a cooling effervescent drink.

When prescribed by physicians it is usually called by its correct name—sodæ citro-tartras effervescens.

With regard to this case, the defendant pleads that he cannot have *all* his drugs analysed, and with great truth too. Surely our profits are not so large that we must fling them away on analysis.

As to the fine, I must say, and I know that others will think with me, that it is excessive for so slight an adulteration, if one it can be called. As the article in question does not appear in the Pharmacopœia (under its present name), why does Mr. Partridge comment so strongly on the danger the public are placed in by taking citrate of magnesia, which same contains no magnesia. Surely it is a voluntary act on their part, and I doubt very much whether, were the magnesia added in such proportion as to make it effective, one half of the people would patronize it who do so now. Are there no other things called by wrong names? In a seidlitz powder how much is there of the *real* salt? How much oftener is seltzer water made from water and carbonic acid? and of the chief part of the soda and potash water sold how seldom do we find either one or the other alkali in them on analysis?

The man who sells adulterated tea is not tho more leniently dealt with because he pleads that he is not responsible for the failings in honesty of his wholesale house. But who is it that ought to be dealt with on *this* and on other similar occasions? Surely the manufacturer. The chemist orders citrate of magnesia, never expecting for an instant that the respectability and high principle of the manufacturing establishment carried on for so many years back would stoop to send him anything but the *genuine* article; and he receives a compound in which the most prominent ingredient (in the name of the substance) is entirely left out. He takes it in perfect good faith and retails it to his customers, fully believing that it is all right, until he is awakened from his lethargy by finding, from the sudden demand on his pocket, that it is not all right—in fact, it is anything but right. No wonder he exclaims, "Is this justice!"

In conclusion, let me advise the members of the profession

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* It has already been printed in vol. iii. p. 252.

to endeavour to rectify the error into which they have fallen as regards this compound by appending a new label to the following effect:—"Effervescing Citro-Tartrate of Soda, commonly called Citrate of Magnesia."

A. P. S.

Nov. 3rd, 1873.

Some Practices of the Trade which ought to be Abandoned by the Profession.

Such is the title of a very suggestive paper read at a recent meeting of the Liverpool Chemists' Association by Dr. Cook.

It is generally admitted that one of the greatest difficulties in preparing a paper is the selection of a proper title, one which will convey to the mind what is really intended by the author, and I might venture to suggest that a title somewhat shorter and to the purpose would have read thus—"Some Unprofessional Practices of the Trade"; for wherever the trade merges into the profession the practices which Dr. Cook charges on the former must of necessity have disappeared. It is a case in which Darwin shines resplendent; an instance of development and natural selection. In our primitive condition we are *tradesmen*, (and it would appear not always of the most satisfactory character); as our educational position improves—in fact, as we rise in a higher state of development—the tone of our business improves, our drugs become purer, and these facts influencing the medical profession and the public, selection is made for confiding the higher duties of our calling.

If this be correct, it will be evident that there is still much, very much, of the trade character existing amongst us. Dr. Cook makes his statements from his past experience in the wholesale, and it could have been hoped that the "practices" were of the past also, but that in the subsequent discussion they were substantiated as of the present by two representatives of wholesale firms.

Citrate of iron and quinine is taken as a familiar example, and we are told that about three-fourths of the quantity sold in this country does not contain more than 12½ per cent. (much of it an indefinite quantity) of citrate of quinine instead of 25 per cent. as required by the British Pharmacopœia. It seems almost impossible to realize such a fact, such an open violation of all law and conscience. Before its introduction into the B. P., manufacturers had a right to prepare this article of any strength they chose, and allow it to stand on its merits, but immediately it became thus recognized, citrate of iron and quinine meant simply a preparation containing one-fourth citrate quinine and three-fourths ammonio-citrate of iron, and *the manufacturer who uses a less proportion of the former is just as much a sophisticator and adulterater as he who waters our milk, tampers with our food, grinds sawdust with medicinal powders, or mixes cinchonine with quinine, and is equally amenable to the law.* It would be well if the wholesale people would expunge such compounds from their lists, and cease to offer them for sale. The questions, too, of opium with only 4 per cent. of morphia, jalap containing but 2 per cent. of jalapin, and yellow bark minus quinine, are such as merit attention. If there were no demand for these the supply would soon cease, and here the sin comes home to the retailer, who has many plausible excuses for his malpractices. If in a poor neighbourhood, he says, his customers will not pay the price for best drugs. This I believe to be a mere subterfuge; I have had some experience amongst poor as well as rich customers, and never found the former more unwilling than the latter to pay a fair price for a good drug.

Pharmacy is indebted to Dr. Cook for the initiative step he has taken, but I trust the matter will not rest here. There are many as desirous as himself of seeing the English market cleared of such vile compounds and such unsatisfactory drugs. Let us hope it will not be long ere it is so.

A Practical Pharmacist.

The Remuneration of Assistants.

Sir,—In the Journal of Nov. 1, I observe a leading article upon the result of the recent examinations held in London, and an expression of surprise at the reluctancy with which assistants avail themselves of the great advantages and opportunities offered to them.

Now it is my opinion as an assistant, studying at the present time for the Minor, that before the assistants will grasp the opportunities offered to them, with readiness and pleasure, a better future must be offered, with better situations and larger salaries, and with sufficient time for study.

Now, to you as a man of practice, and one with an interest in the trade, it must be evident that after being in business from 7.30 a.m. until 9 or 10 p.m., any time between that and bedtime is required for bodily exercise, not *mental labour*. I have myself filled several situations, but at neither of them have I had time given me for attending lectures, or for study. The time an assistant gets to himself as a rule is that part of the day or night which is of little use to his employer or himself; and before the body of assistants are condemned for want of knowledge it would be more in place to show to them some leniency and pity, and consult those under whom they labour, as I think the matter lies more in the hands of employers than with the employed. I, during my career in the trade, have not met with a single man who did not wish to shine and progress in the scientific part of his trade, if money and time would but allow him.

It is well for those living in London, where lectures, museums, botanical gardens, etc., are available; but assistants must be had in country as well as town, and to country assistants these examinations are a great hardship, and a great labour, and it is not in the power of all to go up to London for three or six months' scientific training; salaries will not allow that. For my part, I do not quite see what amount of science is required to qualify one to retail horse powders, face powders, paraffin oil, and lamp candles, which constitute a part of a country chemist's stock in trade. In conclusion, I should like to relate an instance respecting salary that was brought under my own notice. A chemist, who had passed the Minor with honours, being in London, applied at a pharmacy not far from South Kensington, for a situation there vacant. His qualifications were stated, and he was offered the magnificent sum of *twenty-five* pounds per annum, more being decidedly refused; of course the offer was declined. With such encouragment who would strive to become a Minor man, with honours, by severe application to hard study, and spend in the attempt money which it would take two years of hard work to return.

W. H. Heynes.

Remuneration of Chemists.

Sir,—I find in the Journal of Oct. 18th a letter from "Sensitive," 520, Oxford Street, having reference to the remuneration of chemists, and complaining of the low charge made by a "House of position" for dispensing a prescription. I would wish to point out to "Sensitive" that statements made by customers are not always to be depended upon, and that a chemist charging 1*s.* 3*d* for dispensing the prescription in question does not himself occupy such a position as would warrant him in finding fault with prices charged by any other House, however low they may be.

E. L. H.

Chelsea.

R. Y.—The genitive should be used, some such phrase as "a sufficient quantity of" being understood.

"*Colchicum Autumnale.*"—A thorough acquaintance with the contents of Attfield's Chemistry would enable you to pass the chemical portion of the Minor examination. The other subjects are pharmacy (including practical dispensing and the reading of prescriptions), botany, and materia medica.

"*Subscriber.*"—Forms for pot-pourri and sachet perfume will be found in the first volume of the present series of this Journal, pp. 377, 496, and 515.

A. D.—'Proctor's Practical Pharmacy' is published by Messrs. Churchill. Price 12*s.*

"*A Pharmaceutical Chemist*" is thanked for his communication. The case was not heard by the magistrate until after the last number of the Journal had been printed.

E. L.—The colouration is probably due to the presence of a little free acid.

C. B. A.—(1) We have not found that anything of the kind that you describe takes place. (2) The specimen you have forwarded is ordinary soluble glass.

Communications, Letters, etc., have been received from Messrs. W. J. Pridgeon, G. L. Napier, Whitrod, Bilney, E. T. H., R. T., J. H., W. J. S., Secretary of Glasgow Chemists' Association, Secretary of Norwich Chemists' Assistants' Association.

MUSTARD.

BY THOMAS GREENISH, F.C.S.

Since the passing of the Act "for the Prevention of the Adulteration of Food," no article has created more discussion or been more severely handled than mustard. The public press has teemed with letters on the subject of its adulteration, some from writers who evidently know little or nothing about it, and others from those who should know all about it. In some of them it is not difficult to detect the promptings of the manufacturer; as a consequence, a cloud of "commercial dust" has blinded many persons to the real question at issue, Does the admixture of flour with mustard fulfil any beneficial or necessary purpose, or must its presence be regarded as a substance to "increase weight or bulk, in fraud of her Majesty's subjects"—in fact, as an adulterant?

A glance at the early history of the mustard manufacture may not be out of place here, Mustard seed was used medicinally by the Greeks, and held by them in such estimation that the discovery of its medicinal value was attributed to Æsculapius. It would be difficult to determine satisfactorily when it was first used as a condiment in this country, but it seems probable that its employment dates from about the time of the Saxons. It does not appear generally to have been ground up, as it is at the present time, but was usually eaten whole, a practice that at least protected the consumer from adulteration. Gerarde says, "The seede of mustard, pounded with vinegar, is an excellent sauce, good to be eaten with any grosse meates, either fish or flesh, because it doth help digestion, warmeth the stomacke, and provoketh appetite." At the present time vinegar and spices enter into the composition of the French mustard, and contribute to its keeping qualities. Mustard is not a fancy condiment, it has a distinct hygienic value. A French writer* thus speaks of it:—

"Of all the condiments used at table for giving flavour to meat, for stimulating the appetite, and disguising the faults of cooks, mustard is without doubt that which occupies the first rank, not only from its antiquity, which dates back to the time of the Hebrews, but also from its beneficial qualities. According to medical authority this condiment, the dietetic use of which is so general, greatly assists the organs of digestion. It augments, by the slight irritation it causes, the strength and elasticity of the fibres, it excites in the stomach and intestines the digestive juices, and promotes the passage of the residues of food by accelerating the peristaltic movement.

"Mustard agrees, therefore, with indolent, lymphatic, and weak stomachs. It is wholesome to those whose stomachs and intestines are torpid, and hence it is especially useful to aged persons."

Previous to the year 1720, mustard was prepared for use by pounding the seeds in a mortar, and roughly separating the integuments, but it is said to have occurred to a woman named Clements, of Durham, to grind the seed, and then dress the flour. The mustard so prepared was superior to any other, received royal patronage, and enjoyed an extensive sale; the process was kept a secret, and a fortune realized. Hence Durham mustard became celebrated, and the name was long retained by makers to indicate mustard of a superior quality. Thus far efforts were directed to the manufacture of a pure mustard; but all this has long since undergone a great change, and now looking over a manufacturer's list of qualities we see a great variety, from a mustard flavoured with flour to a flour flavoured with mustard.

Attempts have been made to justify the addition of flour to mustard on two grounds only worth consideration. The first is, that a pure mustard when made for table use is more liable to fermentation than one made with an admixture of flour. Theoretically, I should doubt this statement; at this cold season of the year any experiments to determine the point would not be conclusive, but my own experience is opposed to it, and I have frequently examined samples which had been mixed and kept in a mustard pot more than a week, without showing any sign of decomposition. If mustard for table use will keep good a week or more, I do not think there is much ground for complaint. Pure mustard becomes darker after being prepared for use, but the same remark would apply to the mixed article did not the turmeric present in it keep up the colour. I do not, therefore, consider the statement as regards the relative keeping qualities of a pure mustard and one having the addition of flour of much value.

The second ground of justification is, that the public taste prefers the mixture of flour and mustard to pure mustard, on the same principle, I presume, that a donkey prefers thistles when unable to get hay. I have long kept nothing but a pure mustard flour, and have used nothing but a pure mustard flour, but I am ignorant of any difficulty as regards its introduction or use. I would here refer to a letter bearing on this part of the subject, written by Mr. Frazer, and to which I would direct attention.* He states that his difficulty in introducing the genuine mustard was mainly due to its differing from the commercial mustard in colour; the public had been accustomed to a bright yellow, whereas a genuine flour of mustard is rather of an olive green colour. The demand is daily increasing for a pure flour of mustard, and manufacturers may rest assured that the time is not far distant when the public will have no other. I cannot conceive any special difficulty in its more general introduction and use, neither can I accept the apologies for the admixture of flour, and those other things which follow in its train. If flour possesses a value in itself, why add turmeric to make it resemble mustard? I have not yet heard an argument capable of being maintained in justification of this dilution of mustard by the addition of flour, and I must adhere to my former statement that a mixture of the flour of black mustard seed with a fair proportion, not more than 20 per cent. of that of the white seed, will make a mustard acceptable for table use; strong it must necessarily be, but that surely cannot be considered an objection.

It is curious to observe the different reasons given for the addition of flour to mustard: one says that a little flour gives a flavour to mustard; another that it adds to its keeping properties; and a third that mustard without flour is too pungent for use at the table. It is much to be desired that the advocates of these several theories would institute some experiments, and publish the exact quantity of flour necessary for each and all of these purposes.

It is a significant fact that in the International Exhibition just closed, a large and celebrated manufacturer of mustard had a model manufactory, showing every stage of the process, and nothing but the

* *Journal des Travaux de l'Académie Nationale.*

* PHARM. JOURNAL [3], vol. iii., p. 783.

pure flour of the black and white mustard seed was manufactured, packed, recommended, and sold there. No allusion was ever made to such a "valuable" addition as flour, and no apology made for its absence.

The mixture of flour in different proportions with mustard enables the manufacturer to suit the article to the price of the retailer, but the ultimate purchaser is the sufferer; he pays for the mixed article more than the intrinsic value of the mustard and flour. Its sale to the public as mustard is not justifiable.

In a former paper I have shown that the flour of the black seed is the essential constituent of mustard, and to the production of its volatile oil the pungency is due; that white mustard yields the milder flour; and also the theory of its addition to the black in definite proportions. I have likewise alluded to the process for detecting by the microscope the presence of flour and turmeric in commercial samples; but this is not all that a thorough examination of mustard, even when pure and free from flour, involves; care must be taken to determine the relative quantity of black and white, as the latter in too great a quantity is also a diluent, though not an adulterant.

In mustard the distinction should always be borne in mind between genuineness and quality. A genuine mustard may be made of any quality and to suit any price, dependent mainly on the relative proportions of white flour to the black. The large white seed costs less as seed and gives more flour than the black; and on reference to trade circulars it will be seen that genuine mustards range from 9*d.* to 1*s.* 6*d.* per lb. In some cases the mustard sold at a low price as genuine is composed of the white flour alone.

I cannot avoid the conclusion that if the retailer, when asked for mustard, sells a compound of mustard and flour, without at the same time declaring it as such, he renders himself liable to the second part of the 2nd section of the Adulteration Act,—"and every person who shall sell as unadulterated any article of food which is adulterated, etc.,"—in selling an article adulterated or "debased by foreign mixture."

BOTANICAL ORIGIN OF THE BALSAMS OF TOLU AND PERU.*

BY PROFESSOR BAILLON.

The plant which yields the balsam of tolu, and which, during the present century, has been described under the name of *Myroxylon toluiferum*, was named by Linnæus, in his 'Materia Medica,' *Toluifera balsamum*, and that name should still be retained for it. The younger Linnæus thought that the balsam of Peru was the product of another leguminous plant of the same genus, which he had received from Mutis, and which he named *M. peruiferum*. This was an error, since the pretended balsam of Peru did not even come from South America, but from the *Costa del Balsamo*, or Balsam Coast, in San Salvador. The tree which produces the greater part of this San Salvador balsam is that which Klotzsch, multiplying beyond measure the species of the genus, designated under the name of *M. Pereiræ*, but which cannot be separated specifically from *Toluifera balsamum* (*M. toluiferum*). Here, as in the entire genus, characters taken from the form, size, and proportions of parts of the fruit,—especially of the wing at its base, which varies infinitely in size and direction in one and the same plant,—cannot be held sufficient for the separation of species. The elongated, or more or less punctiform pellucid spots of the leaflets, do not appear as though they ought to be considered to have specific value; hence the slight value of *M. punctatum*.

The different qualities and characters of the balsams seem to depend entirely upon the method of extraction. But all the forms of *T. balsamum* have one constant character in the smooth surface of the seeds, which arises from the fact that the cotyledons are not ruminated. On the contrary, in *M. peruiferum*, which should take the name of *Toluifera peruifera*, they are ruminated. This latter tree yields scarcely any useful products, or at least any sent as such to Europe. The balsamic substance is present, however, on the surface of the seed, as in *T. balsamum*, but in less quantity, and it is sunk into the crevices of the seminal envelope, instead of being deposited in a smooth layer. This is the sole difference between the two species of the genus *Toluifera*.

* Note read before the Congress at Lyons (*Répertoire de Pharmacie* [N.S., i., 566], from the *Revue Scientifique*).

THE VEGETABLE COLOURING MATTER FOUND IN MADDER.*

BY W. J. RUSSELL, PH.D., F.R.S.

(*Concluded from page* 348.)

Some years afterwards Wöhler also examined the decomposition of quinic acid; he prepares again this quinone, and follows exactly the process described by Woskrensky: he states that, with regard to the properties of this remarkable body, he has nothing particular to add; however, he proposes a different formula for it, and discovers and describes other bodies allied to it; among these is hydroquinone, $C_6H_6O_2$. Laurent afterwards shows that the formula proposed by Wöhler is inconsistent with his and Gerhardt's views, and by experiment confirms the former formula for this body. Although many other chemists devoted much attention to this substance, still its real constitution and relation to other compounds remained long unknown. Thus Wöhler, Laurent, Hofmann, Städeler, and Hesse all had worked at it, and much experimental knowledge with regard to it had been acquired. One important point in its history was, first, the discovery of chloranil by Erdmann in 1841, and then Hofmann showing that by heating quinone with potassic chlorate and hydrochloric acid, chloranil could be obtained from it—that, in fact, chloranil was quinone in which all the hydrogen had been replaced by chlorine. Perhaps the most general impression among chemists was, that in constitution it was a kind of aldehyde; certainly its definite place among chemical compounds was not known. Kekulé suggests a rational formula for it; but it is to Carl Graebe that we owe our knowledge of its true constitution. In 1868 he published a remarkable and very able paper on the quinone group of compounds, and then first brought forward the view that quinone was a substitution-derivative of the hydrocarbon benzol (C_6H_6). On comparing the composition of these two bodies, it is seen that the quinone contains two atoms of oxygen more and two atoms of hydrogen less than benzol; and Graebe, from the study of the decomposition of quinone and from the compounds it forms, suggested that the two atoms of oxygen form in themselves a group which is divalent, and thus replace the two atoms of hydrogen; this supposition he very forcibly advocates, and shows its simple and

* Presidential Address to the Chemical Section of the British Association, delivered at Bradford, Sept. 18, 1873.

satisfactory application to all the then known reactions of this body. This suggestion really proved to be the key, not only to the explanation of the natural constitution of quinone and its derivatives, but to much important discovery besides.

At this time quinone seemed to stand alone, no other similarly constituted body was known to exist; but what strikingly confirms the correctness of Graebe's views, and indicates their great value, is that immediately he is able to apply his lately gained knowledge, and to show how really other analogous bodies, other quinones in fact, already exist. He studied with great care this quinone series of compounds and the relation they bore to one another—the relation the hydrocarbon benzol bore to its oxidized derivative quinone, and its relation to the chlorine substitution-products derivable from it. At once this seems to have led Graebe to the conclusion that another such series already existed ready formed, and that its members were well known to chemists—that, in fact, naphthalin ($C_{10}H_8$) was the parent hydrocarbon, and that the chloroxynapthalin chloride ($C_{10}H_4Cl_2O_2$) and the perchloroxynaphthalin chloride ($C_{10}Cl_6O_2$) were really chlorine substitution-compounds of the quinone of this series, corresponding to the bichloroquinone and to chloranil; that the chloroxynaphthalic acid, $C_{10}H_4Cl(HO)O_2$, and the perchloroxynaphthalic acid, $C_{10}Cl_5(HO)O_2$, all compounds previously discovered by Laurent, were really bodies belonging to this series; and, further, that the supposed isomer of alizarin discovered by Martius and Griess was really related to this last compound, having the composition $C_{10}H_5(HO)O_2$. Further, he was able to confirm this by obtaining the quinone itself of this series, the body having the formula $C_{10}H_6(O)_2''$, containing also two atoms less of hydrogen and two atoms more of oxygen than the hydrocarbon naphthalin; and to this body he gave the characteristic name of naphthoquinone. The chlorine compounds just named are, then, chlornaphthoquinones or chloroxynaphthoquinones, and correspond to the former chloroquinones; and Martius and Griess's compound will be an oxynaphthoquinone: many other compounds of this series are also known. Another step confirmatory of this existence of a series of quinones was made known by Graebe and Bergmann: as the choranil could be found by treating phenol with potassic chlorate and hydrochloric acid, and quinone derived from it, they showed that in the next highest series to the phenol series, viz. with cressol, the same reaction held good; and by treating it in the same way, they obtained a di- and a trichlorotoluquinone, $C_6\begin{cases}CH_3\\(O_2)''\\Cl_2\\H\end{cases}$, $C_6\begin{cases}CH_3\\(O_2)''\\Cl_3\end{cases}$, which in physical properties very closely resembled the corresponding compounds in the lower series: other compounds have also been prepared.

In the next step we have the application which connects these series of discoveries with alizarin. Following the clue of a certain analogy which they believed to exist between chloranilic acid $\left(C_6Cl_2\,\frac{(O_2)''}{(HO)_2}\right)$ and the chloroxynaphthalic acid $\left(C_{10}H_4Cl\,\frac{(O_2)''}{HO}\right)$, which they had proved to be quinone compounds and alizarin, believing that a certain similarity of properties indicated a certain similarity of constitution, Graebe and Liebermann were led to suppose that alizarin must also be a derivative from a quinone, and have the formula $\left(C_{14}H_6\frac{(O)_2}{(HO)_2}\right)$.

This theory they were able afterwards to prove. The first thing was to find the hydrocarbon from which the quinone might be derived. This was done by taking alizarin itself and heating it with a very large excess of zinc powder in a long tube, closed at one end. A product distilled over, and condensed in the cool part of the tube. On collecting it and purifying it by recrystallization, they found they had not a new substance, but a hydrocarbon discovered as long ago as 1832 by Dumas and Laurent, and obtained by them from tar. They had given it the formula $C_{15}H_{12}$; and as apparently it thus contained once and a half as many atoms of carbon and hydrogen as naphthalin did, they named it Paranaphthalin. Afterwards Laurent changed its name to Anthracene, by which it is still known. Fritzsche, in 1857, probably obtained the same body, but gave it the formula $C_{14}H_{10}$. Anderson also met with it in his researches, established its composition, and formed some derivatives from it. Limprich in 1866 showed it could be formed synthetically by heating benzyl chloride (C_7H_7Cl) with water; and Berthelot has since proved that it is formed by the action of heat on many hydrocarbons. This first step was then complete and most satisfactory; from alizarin they had obtained its hydrocarbon, and this hydrocarbon was a body already known, and with such marked properties that it was easy to identify it. But would the next requirement be fulfilled? would it, like benzol and naphthalin, yield a quinone? The experiment had not to be tried; for when they found that anthracene was the hydrocarbon formed, they recognized in a body already known the quinone derivable from it. It had been prepared by Laurent by the action of nitric acid on anthracene, and called by him anthracenuse; and the same substance was also discovered by Anderson, and called by him oxanthracene. The composition of this body was proved by Anderson and Laurent to be $C_{14}H_8O_2$, and thus bears the same relation to its hydrocarbon anthracene that quinone and naphthaquinone do to their hydrocarbons. Graebe gave to it the systematic name of Anthraquinone.

We have then now three hydrocarbons—C_6H_6, $C_{10}H_8$, and $C_{14}H_{10}$—differing by C_4H_2, and all forming starting-points for these different quinone series. Anthraquinone, acted upon by chlorine, gave substitution-products such as might have been foretold. It is an exceedingly stable compound, not acted upon even by fusion with potassic hydrate. Bromine does not act upon it in the cold, but at 100° it forms a bibromanthraquinone. Other bromine compounds have also been formed.

Now, if the analogies which have guided them so far still hold good, they would seem to have the means of forming alizarin artificially. Their theory is that it is dioxyanthraquinone $\left(C_{14}H_6\frac{(O_2)''}{(HO)_2}\right)$, and if so, judging from what is known to take place with other quinone derivatives, should be formed from this dibromanthraquinone on boiling it with potash or soda and then acidulating the solution. They try the experiment, and describe how, contrary at first to their expectation, on boiling dibromanthraquinone with potash no change occurred; but afterwards, on using stronger potash and a higher temperature, they had the satisfaction of seeing the liquid little by little become of a violet colour. This shows the formation of alizarin. Afterwards, on acidifying this solution, the alizarin separated out in yellowish flocks. On volatilizing it they get it in crystals like those obtained from madder; on oxidizing it with nitric acid, they get phthalic acid; and on precipitating it with the ordinary mordants or other metallic solutions, they get compounds exactly comparable to those from the natural product. Every trial confirms their success; so, by following purely theoretical considerations, they have been led to the discovery of the means of artificially forming this important organic colouring-matter. A special interest must always attach itself to this discovery, for it is the first instance in which a natural organic colouring-matter has been built up by artificial means. Now the chemist can compete with nature in its production. Although the first, it is a safe prediction that it will not long be the only one. Which colouring-matter will follow next it is impossible to say; but, sooner or later, that most interesting one,

scientifically and practically, indigo, will have to yield to the scientific chemist the history of its production.

Returning for a moment to the percentage composition of alizarin, now that we know its constitution, its formula is established; and on comparing it ($C_{14}H_8O_4$) with all the different formulæ which have been proposed, we see that the one advocated by Schunck was most nearly correct—in fact that it differs from it only by two atoms of hydrogen. It is not without interest to note that the next most important colouring-matter in madder, purpurin, which so pertinaciously follows alizarin, is in constitution very nearly allied to it, and is also an anthracene derivative.

Scientifically, then, the artificial production of this natural product was complete; but the practical question, Can it be made in the laboratory cheaper than it can be obtained from the root? had yet to be dealt with. The raw material, the anthracene, a by-product in the manufacture of coal-gas, had as yet only been obtained as a chemical curiosity; it had no market value; its cost would depend on the labour of separating it from the tar and the amount obtainable. But with regard to the bromine necessary to form the bibromanthraquinone it was different; the use of such an expensive reagent would preclude the process becoming a manufacturing one. But could no cheaper reagent be used in place of the bromine, and thus crown this discovery by utilizing it as a manufacturing process? It was our countryman Mr. Perkin who first showed how this could be done, and has since proved the very practical and important nature of his discovery by carrying it out on the manufacturing scale. The nature of Perkin's discovery was the forming, in place of a bibromanthraquinone, a disulphoanthraquinone; in a word, he used sulphuric acid in place of bromine, obtaining thus a sulpho-acid in place of a bromine substitution-compound. The properties of these sulpho-acids, containing the monovalent group HSO_3, which is the equivalent to the atom of bromine, is that on being boiled with an alkali they are decomposed and a corresponding alkaline salt formed. Thus the change from the anthraquinone to the alizarin was effected by boiling it with sulphuric acid. At a high temperature it dissolves, becoming a sulpho-acid, $C_{14}H_6\begin{cases}(O_2)''\\HSO_3\\HSO_3\end{cases}$; and then the further changes follow, as they did with the bromine compound. The sulpho-acid boiled with potash is decomposed, and a potash salt of alizarin and potassic sulphite is formed; acid then precipitates the alizarin as a bright yellow substance.

While Perkin was carying on these researches in this country, Caro, Graebe, and Liebermann were carrying on somewhat similar ones in Germany; and in both countries have the scientific experiments developed into manufacturing industries. My knowledge extends only to the English manufactory; and if any excuse be necessary for having asked your attention to-day to this long history of a single substance, I think I must plead the existence of that manufactory as my excuse; for it is not often that purely scientific research so rapidly culminates in great practical undertakings. Already has the artificial become a most formidable opponent to the natural product; and in this struggle, already begun, there can be no doubt which will come off victorious.

In the manufactory is rigidly carried out the exact process I have already described to you. In tar there is about one per cent. of anthracene; this, in a crude impure state, is obtained from it by the tar-distiller and sent by him to the colour-works. Here it is purified by pressure, by dissolving from it many of its impurities, and lastly, by volatilizing it. Then comes the conversion of it into the anthraquinone by oxidizing agents, nitric or chromic acid being used, then the formation of the sulpho-compound by heating it with sulphuric acid to a temperature of about 260° C. The excess of acid present is then neutralized by the addition of lime, and the insoluble calcic sulphate is filtered off. To the filtered liquid sodic carbonate is added, and thus the calcic salt of the sulpho-acid is changed into the sodic salt, $C_{10}H_6\begin{cases}(O_2)''\\NaSO_3\\NaSO_3\end{cases}$. This is afterwards heated to about 180° C. with caustic soda, thus decomposing the sulpho-acid and forming the soda salt of alizarin and the sodic sulphite. The alizarin salt so formed remains in solution, giving to the liquid a beautiful violet colour. From this solution sulphuric acid precipitates the alizarin as an orange-yellow substance. It is allowed to settle in large tanks, and then is run, in the form of a yellowish mud, which contains either 10 or 15 per cent. of dry alizarin, into barrels, and is in this form sent to the print-works, and used much in the same way as the original ground madder was used.

This alizarin mud, as I have called it, containing but 10 per cent. of dry alizarin, is equal in dyeing-power to about 8 times its weight of the best madder, and is the pure substance required for the dyeing, in place of a complicated mixture containing certain constituents which have a positively injurious effect on the colours produced.

The scientific knowledge and energy which Mr. Perkin has brought to bear on the manufacture of this colouring-matter seem already to have worked wonders. The demand and supply for artificial alizarin are increasing at a most rapid rate, and yet the manufacture of it seems hardly to have commenced. The value of madder has much decreased; and in fact, judging by what occurred in the year of revolution and commercial depression (1848), when the price of madder fell for a time to a point at which it was considered it would no longer remunerate the growers to produce it, that point has now been again reached, but certainly from very different reasons. Last year* artificial alizarin equal in value to about one fourth of the madder imported into England was manufactured in this country. This year the amount will be much larger.

Thus is growing up a great industry, which, far and wide, must exercise most important effects. Old and cumbrous processes must give way to better, cheaper, newer ones; and lastly, thousands of acres of land in many different parts of the world will be relieved from the necessity of growing madder, and be ready to receive some new crop. In this sense may the theoretical chemist be said even to have increased the boundaries of the globe.

THE ADULTERATION OF LINSEED OIL WITH COD OIL.†

BY AUG. MORELL.

Among many other adulterations of linseed oil is one which has been practised only recently, *i.e.*, by means of cod oil almost deprived of smell. This is most frequently to be observed in the oil which is intended for the preparation of printing ink. The proportion used is such that it is impossible, by the smell or by external appearance, to suspect any admixture in the oil mentioned.

In order easily to ascertain the presence of cod oil in the oil to be tested, ten parts by weight of the latter are poured into a small cylinder glass with about three parts by weight of crude nitric acid, well stirred up with a glass rod, and the whole left at rest. The oil and acid soon separate into two distinct strata.

If the linseed oil operated upon contains cod oil, after long standing the oil layer assumes a dark brown to blackish brown colour, whilst the acid at the bottom of the vessel is coloured bright orange to orange or even dark yellow. The depth of colour indicates the extent of

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* On the 1st of this month (September) the value of madder-roots in France was 24 to 26 francs per 50 kilogrammes. The average price in 1848 was 27, but in June and July of that year it was 22 francs.

† *Pharm. Cent. für Deutsch.*, No. 40, Oct. 2, 1873.

the adulteration. Linseed oil to which not more than three per cent. of cod oil has been added, shows the above reactions unmistakably.

If the oil examined is, on the other hand, pure and unadulterated, during the stirring it becomes first sea green and afterwards dirty greenish yellow; whilst the separated acid shows a light bright yellow colour.

DETECTION OF DIGITALIN AND ATROPINE.*

BY H. BRUNNER.

The detection of digitalin in toxicological researches is very difficult. By employing the method of Stas-Otto, the greater part of this glucoside is obtained from the acid ethereal solution as a resinous body, which in most cases does not give the characteristic red colour with sulphuric acid and bromine-water. The smaller portion which is found in the alkaline-ethereal solution, cannot be distinguished from delphinine and aconitine, because delphinine gives the same reaction with sulphuric acid and bromine, and both alkaloids yield the same results with the phosphoric acid test as digitalin. The latter compound can, however, easily be detected by Pettenkofer's test.

On adding sulphuric acid to a dilute solution of dried bile containing a trace of digitalin, a splendid red colour is produced as soon as the temperature rises to 70°. One c.c. of a decoction of 0·3 gram of foxglove-leaves in 180 grams of water gave the reaction quite distinctly. 0·03 and 0·05 gram of digitalin were dissolved, each in half a litre of Bavarian beer, and the solutions treated by the method of Stas-Otto; no digitalin could be detected in the residue by means of bromine and sulphuric acid, whilst the least trace of it, after being washed with water, gave an intense colour with Pettenkofer's test. Other glucosides give the same reaction, but this does not prevent its application in a toxicological research, if the physiological effects are also taken into consideration. A similar case is the detection of the picrotoxin by means of Fehling's solution, which is also reduced by many other substances.

The residue obtained from the acid ethereal solution may also contain lactic acid, tartaric acid, colchicine and traces of atropine and picrotoxin, but these bodies are not coloured by Pettenkofer's test, nor are other alkaloids affected by it, with the exception of narcotine and others which give a red colour with sulphuric acid alone.

The most characteristic tests of atropine are the dilatation of the pupil and the aromatic smell which is produced by adding this alkaloid and a little water to a hot mixture of sulphuric acid and potassium dichromate or ammonium molybdate. The latter reaction, although very characteristic, requires great skill; but it takes place without fail on placing the atropine on a few crystals of chromic trioxide contained in a porcelain basin, and applying a gentle heat until the trioxide assumes a green colour.

AUTUMNAL COLOURING OF LEAVES AND FORMATION OF VEGETABLE ACIDS.†

BY C. KRAUS.

The author considers it doubtful if xanthophyll is converted by oxidation into erythrophyll, but regards the red colouring matter of autumnal leaves as due to the presence of pyrocatechin together with organic acids. In red leaves the same xanthophyll grains are seen under the microscope as in yellow leaves, but a red sap is present in addition. Pyrocatechin mixed with citric acid, and exposed to the air, becomes of a beautiful red colour, and after some time ceases to give the reaction with ferric chloride. Watery extracts of all the autumnal leaves observed gave the reactions of pyrocatechin, but ceased to do so on standing with citric acid in the air. That access of air is necessary to the red colour in plants, is seen in leaves of poplar, etc., injured by insects, or otherwise turning red, also in the young shoots of Mahonia, which are only imperfectly protected by the cuticle, whilst in autumn the cuticle of leaves is so altered that air obtains access to the cells containing the pyrocatechin. It is probable that pyrocatechin is a very generally distributed ingredient of plants. Gorup-Besancz (*Chem. Soc. J.* [2], x, 171) found it in the leaves of *Ampelopsis hederacea*, and it is not unlikely that it has been confounded with, or at all events occurs along with, quercitrin, which it resembles closely in many reactions, and which has been found by various observers in the leaves of the tea-plant, horse-chestnut, and vine. Again, leaves and berries containing much organic acid are generally coloured red. This view is in accordance with the observation of Hoppe-Seyler (*Chem. Soc. J.* [2], ix, 226), that carbo-hydrates heated in sealed tubes with water, yield pyrocatechin together with formic acid.

The author suggests that chlorophyll decomposes carbonic anhydride into oxygen and carbonic oxide, this latter combining with hydrogen from water to form formic aldehyde, which with water $= CH_2(OH)_2$; this, by polymerization and abstraction of water, would form a carbo-hydrate, $C_6H_{12}O_6$, probably on the type of Carius's phenose. This carbo-hydrate (grape sugar) by elimination of water and oxygen, would form pyrocatechin, the oxygen so set free oxidizing other molecules of carbohydrate, to form vegetable acids.

The following formulæ represent the possible simultaneous formation of pyrocatechin and organic acids from grape sugar:—

$$10C_6H_{12}O_6 = 9C_6H_6O_2 + \underset{\text{Oxalic acid.}}{3C_2H_2O_4} + 30H_2O.$$

$$8C_6H_{12}O_6 = 6C_6H_6O_2 + \underset{\text{Malic acid.}}{3C_4H_6O_5} + 21H_2O.$$

$$11C_6H_{12}O_6 = 9C_6H_6O_2 + \underset{\text{Tartaric acid.}}{3C_4H_6O_6} + 30H_2O.$$

$$4C_6H_{12}O_6 = 3C_6H_6O_2 + \underset{\text{Citric acid.}}{C_6H_8O_7} + 11H_2O.$$

OLIVE OIL FROM CRETE.

The export trade of Crete to Great Britain is confined entirely to olive oil, the other products of the island not being of sufficiently good quality to compete with those grown in Sicily, Cyprus, etc. The export of oil for the home market is influenced by two circumstances—the quantity of the crop in any given year, and the prices of oil in England. After a redundant harvest, it is stated that the export to foreign countries from Crete has sometimes amounted to as much as 6000 tuns, while on the other hand the quantity available for export after a poor crop has occasionally only reached 2000 tuns. A great deal, however, depends on the prices the article will realize for exportation, as in the event of rates being low a large portion of the oil is converted into soap for the Turkish market. The quotations for the oil during the past twenty years have ranged from £33 to £57 per tun. With regard to the latter sum once only, in 1855, was it realized, while during more recent years prices have oscillated between £40 and £45. The greater part of the Cretan olive oil used formerly to find its way to Marseilles: but of late years, excepting 1871, the Egyptian and Russian markets have taken by far the largest quantities, as the crushing mills at Marseilles have had their machinery adapted for extracting oil from various oleaginous seeds. In the Consular Report from Crete for the year 1855 it is noted as an unusual circumstance that as much as 772 tuns of olive oil were shipped for England: and it may be worthy of notice that in no subsequent year, until 1870 and 1871, has so great an exportation of

* Deut. Chem. Ges. Ber., vi. 96—98. From the *Journal of the Chemical Society.*

† N. Rep. Pharm., xxii. 273—296. From the *Journal of the Chemical Society.*

the oil been sent to this country. In 1871 the amount shipped to England was 2573 tuns, valued at £103,267. In 1871 the price was as low as £40. As an instance of the fluctuation of the trade it is mentioned that last year the export of the oil to England was very inconsiderable, the falling off being attributed principally to the deficiency of the crop, which left but a small surplus for the purposes of exportation. The oil trade of Crete with the English markets is carried on by commission merchants, who receive orders from their principals in Smyrna and Constantinople to make purchases, and the necessary funds are remitted in specie. No English firm, it is stated, could carry on this business which had not commercial relations with a house in one of the above cities or in Syra, on account of the impossibility of remitting bullion for purchases in consequence of the absence of a bank in the island. Another difficulty which would be experienced in carrying on the trade is the necessity for the vessels which ship the oil bringing with them a supply of barrels, for which they have to call previously at Gallipoli, Messina, or Naples. One great obstacle thrown in the way of British trade with Crete has been a long standing grievance with the merchants of the town of Candia, consisting in the custom prevalent there of weighing olive oil destined for exportation instead of measuring it. The latter method is usually practised and entails the least possible trouble and expense to the merchant, the operation simply being that the oil is poured from the measuring vessels into skins at the merchant's store, in the presence of a custom-house officer, who verifies the quantity. After this the skins are allowed to be sent direct to the ship, and emptied into casks in the hold. By the weighing process, however, the casks, filled with the oil, must be weighed before being sent on board, and as each weighs from half a ton to nearly a ton, considerable additional expense is incurred. The casks, moreover, have first to be weighed and their weight deducted before receiving the oil; and generally this process is described as a loss of time and an increase of trouble. No good reason seems to exist why a uniform system of measuring should not prevail throughout Crete, and doubtless this might be obtained by a little judicious pressure upon the authorities.

THE MODERN PROGRESS OF CHEMICAL INDUSTRIES.*

BY AIMÉ GIRARD.

Among the chemical products which are used in manufactures there is one which science has designated under the name of sulphuric acid, but to which an old custom still preserves the name of oil of vitriol. Its importance is very great, so great indeed that it has been thought that in the amount of its consumption might be found a measure of the degree of civilization of modern times. This is an error. Without doubt the civilization of a people is a function of its industry; but other elements also concur in assuring it, and moral and intellectual influences do not yield the palm to those which are purely practical. But if it be an error to estimate so highly the value of this substance, still it must not be forgotten that it is the common pivot around which revolve all the industries that call chemical reactions to their aid.

Heated with rock salt, or marine salt, sulphuric acid gives us on the one hand sulphate of soda, and on the other hydrochloric acid; that is to say, the primordial agents in the manufacture of soaps, glass, and paper, and in bleaching, dyeing, etc. Heated with saltpetre it engenders aquafortis, or to use the language of science, nitric acid, the oxidizing agent *par excellence*, the creative agent of those splendid colouring matters which are now used so magnificently in Lyons for the dyeing of silks. It is by the aid of sulphuric acid also that metals are cleaned, oils are purified, and candles made; thanks to it, it has been possible to popularize the galvanized silver and gold ware; it is from the reactions to which it gives birth that the greater part of the chemical products employed in the arts and sciences, the greater part of the medicaments used in the art of healing, result. In one word, it is the principal reagent in the whole range of chemical industry.

To manufacture this sulphuric acid on the colossal scale required for modern consumption would cause serious embarrassment if we had now to look for it to the only source that furnished it forty years since, namely, to the burning in leaden chambers of the native sulphur got from the volcanic soil of Sicily. At that time not much of this sulphur was required; chemical industry was in its early stage, and about 20,000 tons sufficed for the manufacture of all the sulphuric acid then used in Europe. At the present time this manufacture has increased more than tenfold, and 250,000 tons of sulphur would scarcely yield sufficient sulphuric acid for the European demand.

Where, then, is this sulphur found? Sicily is powerless to furnish it in such large quantities, and moreover, the vine disease,—the oïdium,—by causing the vine growers to become large consumers of sulphur, has during the last twelve or fifteen years created an industry of considerable importance. It has therefore become necessary to resort to another source. In 1793, when France, separated by war from the rest of Europe, was compelled to find upon her own soil the resources necessary for her industrial existence, a scientific man, D'Artigues, attempted to substitute pyrites, those compounds of iron and sulphur, of which France possesses such rich beds, for the sulphur of Sicily. But he failed. Later, in 1818, the same substitution was tried in England, but with the same want of success, and it was reserved for Lyons to resolve the problem. At that time there existed, very modestly then, the manufactory of chemical products which its skilful directors, MM. Perret, have since rendered celebrated. It was there that, in 1830, a fresh attempt was made to manufacture sulphuric acid by means of pyrites; it was there too that the manufacture succeeded for the first time, and from thence it spread through the world. The mines of Chessy, near Villefranche, had been already worked to extract the copper. Afterwards MM. Perret worked them in order to utilize the sulphur, and now the manufacture of sulphuric acid has nearly exhausted them. The mines of San-Bel, and of Sourcieux, near Arbresle, have succeeded them; minerals of the same nature have been discovered and worked in Gard and in Ardeche, and gradually the sulphur of Sicily has had to recoil before the French pyrites. Nor is this progress limited to France: it is general. Throughout England and Germany there is a consumption of pyrites analogous to that in France.*

I have made approximate calculations, and do not think that I am far wrong in estimating the annual production in Europe of concentrated sulphuric acid at 800,000 tons. I know not whether these figures, speak with sufficient plainness to the mind, but in order to assist in appreciating their grandeur I will put them into a more popular and, perhaps, more telling form. Imagine that all the sulphuric acid made in Europe were carried to Lyons, and that it was intended to store it in a lead-lined canal dug parallel to the Rhone, what dimensions would it be necessary to give to such a canal? Supposing that it had been dug two metres in depth, and were ten metres wide, it would be necessary, in order to contain all the sulphuric acid manufactured in Europe in one year, that it should be carried past Givors to Vienne in the department of Isère, or a distance of from twenty-five to thirty kilo-metres; and to produce all this sulphuric acid pyrites would be required to the extent of 660,000 tons—a quantity that would fill an ideal train of 60,000 to 80,000 railway waggons.

* Abstract of a lecture delivered at Lyons upon the occasion of the visit of the French Association for the Advancement of Science. (*Moniteur Scientifique*, vol. iii., p. 851.)

* Probably the restrictions attempted by the Sicilian Government on the export of sulphur were the most decided influence in determining the general use of pyrites as a source of sulphur. The chief sources of sulphur pyrites now are Spain and Sweden.—Ed. Parm. Journ.

And now to indicate rapidly some of the directions in which modern chemical industries have made very great progress. You are near to Marseilles, and know how its industrial growth keeps pace with its commercial power. The manufactories of chemical products there are numerous. It is there that the Marseillais *soudier* decomposes the salt of the salt marshes, and manufactures by millions of tons the alkali required by the soap makers; it is there also that, arising from the same decomposition, is produced the hydrochloric acid gas, or "spirit of salt." Formerly this was all lost; the immense streaks of smoke which escaped from the high chimneys of the works and covered the horizon with white and picturesque clouds will not readily be forgotten. But those clouds, which at a distance may have looked so charming, contained in their womb a cruel enemy, which the improvident manufactories spread daily in surges over the culture and harvests of the neighbourhood. This was the hydrochloric acid originated in the reaction of the sulphuric acid upon the marine salt; the acid which offends our lungs, burns the vegetation, rusts the iron, and carries everywhere that it goes disorder and perhaps ruin. Examine now the manufacturing centres where formerly those vapours were seen, and they will no longer be found. If the chimney still shows a discharge, that consists only of smoke and the vapour of water; the hydrochloric acid has completely disappeared. Skilfully condensed, it has now become the primary material of new manufactures; at the same time, cultivation freed from its pernicious influence can be carried on down to the very doors of the works.

It was from England that this progress came. True, there it was not spontaneous, and the English parliament perhaps has the best title to claim the honour of its initiation. In 1864, induced by the incessant complaints of agriculturists, it had the boldness to impose upon manufacturers of chemical products the condensation of 95 per cent. of the hydrochloric gas yielded by the decomposition of the salt. Whether such condensation were possible, especially economically, was not yet certain; that was not the question for the legislators. The public health required that the gas should be condensed, and the law ordered that it should be done. The manufacturers, complaining a little at first, but obedient to the law, set themselves promptly to the task, and four years had not passed before, throughout Great Britain, the problem was resolved. From England the progress spread to the continent, and to-day it is general.

But it must not be thought that this salutary change has been a source of loss or vexation to the manufacturers; on the contrary, it has been to them a source of wealth, at the same time that it has exercised a considerable influence upon the general welfare. The reason of this is simple. The hydrochloric acid once condensed, the gas once transformed into the yellow fuming corrosive liquid, it was necessary to seek some way of utilizing it. It was then that it was used in making the decolorizing chlorides, all those products that are known popularly as chlorine, bleaching powders, javelle water, etc., products which skilfully used render such valuable services in the bleaching, staining, and manufacture of paper, etc.

It is a remarkable fact, of which history offers more than one example, that the importance of these added manufactures increases each day, and the consumption of their products develops with such rapidity that to-day it is the skilful and scientific utilization of hydrochloric acid—the residue of yesterday—which has become the regulator of the profits of general manufactures. At the present time, it is to the perfecting by the aid of chemistry of the processes by which these bleaching agents are manufactured that the attention of investigators is directed. In England, Weldon regenerates the manganese usually employed in the conversion of hydrochloric acid into chlorine; more boldly, Deacon has endeavoured to do away with it altogether, demanding from the air itself the oxygen necessary for the transformation, and has promised the production of chloride of lime at ten to twenty francs the kilogram instead of thirty-five or forty francs as heretofore. These would be immense advances, rich in unexpected consequences; for the day in which we can cheaply obtain from this hydrochloric acid the chlorine which it contains, we shall furnish to the textile industry the means of bleaching economically the tissues of thread and cotton of which our populations make their usual dress, and we shall supply to the paper manufacturer the means of utilizing substances hitherto refractory, and consequently of producing a substantial paper at a low price.

When the salt has been decomposed, when the manufacturer, besides the hydrochloric acid, has obtained sulphate of soda, the era of transformation commences for that compound. Of those transformations the most important is its conversion into carbonate of soda. In order to do this it is heated to a high temperature—1000° C., or thereabouts—in reverberatory furnaces, the sulphate being previously mixed with calculated quantities of chalk and carbon. But to this heat, in order to obtain a good result, must be added a nearly continuous agitation of the mass. Formerly this was a most laborious operation. In front of the furnace stood two, or sometimes three, workmen, naked to the waist. They used enormous iron shovels, with handles at least ten metres long, which sometimes weighed fifty kilograms; armed with these formidable utensils, they stirred the thousand or twelve hundred kilograms of burning and half-melted matter with which the furnace was filled. But this severe labour is gradually disappearing. In some of the large English works the ordinary alkali furnace has given place to a new machine, which imparts to the mass the motion necessary to the formation of the alkali. This, which is called a revolving furnace, is an enormous horizontal cylinder, about five metres long and three in diameter, which, by means of a small steam engine, is caused to rotate upon its axis, that traverses from end to end the flame of a fire. The contents, thus thrown pell-mell together, shaken and stirred without cessation by the rotation of the cylinder itself, react rapidly upon each other, and the soda is converted without the intervention of muscular labour to assist the reaction.

But the products originating in the decomposition of sea-salt and rock-salt ought not alone to occupy our attention; they are not the only chemical agents utilized in the arts and manufactures. The compounds of potash also have their importance, for from them are manufactured crystal glass, soft soaps, manures, saltpetre, etc., so that it would be a grave forgetfulness not to allude to them. Moreover, it is in the production of these potash compounds that perhaps the most remarkable progress in the modern history of chemical industries is to be met with.

It will be remembered how potash was formerly obtained. The ash left in the fire-place or stove where wood has been burned is a mixture of lime compounds which are insoluble, and of potash salts which are soluble in water, and among the latter the carbonate predominates. Thrifty housewives know this well, and it is to utilize the detergent properties of the carbonate of potash that they employ wood ashes in the washing of their linen. This, so often done on a small scale, was for a long time carried on in vast proportions in the woody countries; but gradually, as the demand for wood for the arts and manufactures has increased, and the means of transport have been improved, the barbarous practice of incineration has disappeared. It was formerly very prevalent in France, in the Vosges, where it is now no longer practised; Germany and Austria formerly thus manufactured considerable quantities of potash, but there, also, the practice has been displaced by progress, and one may search Bohemia in vain for the places where it was made. In their stead will be found extensive saw mills, the manufacture of natural potashes having disappeared before a more judicious employment of the wood. It is only in Hungary, America, and Russia that this method of production still continues.

Whence then comes the supply of potash required for various purposes? This question leads us to notice three important modern events in chronological order. It was the sugar industry that first competed with the forestal potash manufacture. The beetroot is a very absorbent plant, carrying off from the soil in which it is grown the potash compounds that are mixed with it. A beetroot of ordinary weight—about two kilograms for example—contains no less than one to two grams of those compounds. Submitted to various operations in the sugar manufactory the root is eventually divided into three parts: a cake of pressed pulp used by the agriculturist for feeding cattle, the sugar, and the molasses. In the latter product are concentrated all the potassic salts which the beetroot originally contained, and from it they are extracted by the method of M. Dubrunfaut. Allowed to ferment, the molasses is converted partly into alcohol, which is collected by distillation, and a solution, which when evaporated and the residue calcined in a reverberatory furnace, yields finally in a saline state the potash which the beetroot had fixed in its tissues during vegetation. It was in 1840 that this process was first applied, its importance rapidly increased, and at the present time it yields in France annually about 6000 tons of potash compounds, representing a value of 3,000,000 francs. But these 6000 tons are not sufficient to supply the demand in France; more than double that quantity is required, and it is necessary to seek elsewhere that which will supply the deficiency.

(*To be continued.*)

THE DOSES RECOMMENDED IN THE PHARMACOPŒIA.

In a recent number of the *Practitioner*, Dr. Anstie writes as follows upon the subject of "Doses," in relation to the recent occurrence at Ramsgate:—

"The chief fault rests, as it appears to us, with the compilers of the posological list of the Pharmacopœia, who, by indicating 30 minims as the extreme dose of tincture of digitalis, have been guilty of an unpardonable blunder which might well mislead the dispensing druggist. * * * The matter is all the more important because this is by no means a solitary instance of extraordinary ignorance or negligence on the part of the officials who have compiled the list of doses of different drugs published in the British Pharmacopœia. In fact, the evil is so serious that we propose to call attention to a number of instances in which it is easily apparent to a careful observer.

"Let us take first the case of hyoscyamus, of which we find that the Pharmacopœia recommends the tincture to be given in doses of 15 to 60 minims. The smaller of these quantities is probably completely without effect upon the human organism; and as to 60 minims being the maximum dose, anyone in the least familiar with asylum practice must be aware that as much as half an ounce is frequently required by, and given with good effect to, maniacal patients. In the case of belladonna, the official scale of doses is deficient in both directions; 5 minims is far too large to be assigned as a minimum, and 20 minims is a long way from being the largest dose that may be given with benefit in certain conditions. The official doses of the extract only range from $\frac{1}{4}$ to $\frac{1}{2}$ grain, a still more obvious absurdity to anyone who is familiar with the varied circumstances under which belladonna may be usefully employed.

"Take next the instance of conium: what sort of value can be attached to the statement that the succus conii may be given in doses of from 30 to 60 minims? It has certainly been known for many years past that 4 or 5 drachms may often be given without the production of any marked physiological phenomena; and it is only to-day that a physician of large experience in the treatment of nervous diseases reported to us that he had been administering *ounce* doses of a succus made by one of our very best manufacturing druggists, without producing any recognizable effect whatever.

"Again, look at the official dose of potassium iodide—2 to 10 grains; what kind of guidance does such a direction afford to the student or the practitioner? Surely it had been discovered long enough before the publication of the last Pharmacopœia that doses three and four times as large as the highest of those just mentioned might be given, not only with impunity, but with the most remarkable benefit, in many cases of tertiary syphilis and of lead-poisoning. Now these are cases in which a timid and feeble style of administration is very far from being a trifling evil, for the affections in question are often most dangerous, and urgently require to be treated with rapidity and efficiency.

"Take next the instance of quinine (we are purposely selecting examples of remedies that are in constant and familiar use): the official dose of the sulphate ranges from 1 to 5 grains. It is unnecessary to remind any well-informed practitioner that in severe intermittent and septicæmic fevers, and also for the specific purpose of reducing pyrexial temperatures, it is idle to talk of a maximum dose of 5 grains; 30 would have been nearer the mark, but even larger quantities than this, in repeated doses, have been recommended by high authorities.

"If the examples above given seem to indicate a lamentable timidity on the part of the compilers of the Pharmacopœia, there are others which show quite a different tendency, in fact an unaccountable rashness in recommending high doses of very powerful poisons. Who could have suggested such a range of doses of tincture of nux vomica as 10 to 30 minims, and of the extract of the same as $\frac{1}{3}$ grain to 1 grain? The person, whoever he was, must have been entirely unfamiliar with the practical use of the drug, or he would have known that much less than 30 minims of the tincture would half tetanise many patients, and that it is very rarely advisable to exceed 10 minims; this is a matter on which we speak with great confidence from a large experience of the use of nux vomica. The official dose of strychnia is not quite so extravagantly wrong; yet $\frac{1}{30}$ grain is at least twice as high as the minimum dose should be fixed, and $\frac{1}{12}$ grain is a quantity far too large to be given in repeated doses (as strychnia usually is given) with advantage or even safety. So again with morphia: the acetate and hydrochlorate are recommended to be given in doses of from $\frac{1}{8}$ to $\frac{1}{2}$ grain; the former of which is excessive as a minimum dose even for adults, much more for children.

"We could go on, for a considerable time, multiplying these examples of an insufficient and often mischievously misleading official posology: and we cannot but remark that the occurrence of such errors in works of official authority are exceedingly to be regretted, for more than one reason. That the result may be highly inconvenient in a practical point of view is shown by such an occurrence as that which led to the recent inquest at Ramsgate; but there is another point of view in which the official neglect of accurate attention to dosage is of even more unfortunate significance. We fear that it does but indicate an ignorance and a carelessness which are very widespread in the profession, and of which we are constantly encountering proofs in prescriptions which come under our notice. It is not too much to say that the majority of practitioners—consulting and general—seem to be almost wholly unaware of the important differences of effect which may be produced by extending the range of variations of doses, and especially by so breaking up one large dose into many small ones as to ensure its passage into the circulation without exciting inconvenient and unnecessary disturbance. We believe that no greater service could be performed by the colleges, or the great medical societies, than the formation of a committee of competent men for the special investigation of this question of dosage: for it is a subject which is as yet only in its infancy, and the best knowledge which exists about it is undoubtedly confined to a very small section of the medical profession."

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 15, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

POSOLOGICAL DOUBTS.

WE learn that the President of the British Pharmaceutical Conference, in pursuance of the request addressed to him at the Bradford meeting, is about to issue a circular for the purpose of communicating to the leading representatives of the medical profession the suggestions embodied in the resolutions passed after the discussion of the subject of unusual doses. It is hoped that the action taken in this matter will be approved and supported by physicians and medical practitioners generally, and in order to give more general publicity to the proposals made by the Conference, we avail ourselves of the opportunity afforded by the courtesy of the Honorary Secretaries to publish the substance of the circular and resolutions, as follow :—

"Sir,—At the tenth annual meeting of the members of the British Pharmaceutical Conference, held at Bradford during the third week of September, 1873, the important subject of unusual doses in prescriptions, and the position which pharmacists should occupy in relation thereto was carefully and patiently discussed in its pharmaceutical bearings by members from all parts of the country. By an 'unusual dose' was understood a large quantity of potent medicine designedly prescribed in rare cases, but which, as a rule, would not be dispensed by the pharmacist without hesitation. The result of the debate was the unanimous adoption of a series of resolutions embracing what was believed to be the essentials of safe practice in the matter. Further, the President of the Conference was requested to bring the resolutions under the notice of the presidents of the medical colleges and corporations, and other leading medical authorities, and the medical journals, in the hope that the action taken would be approved and supported by physicians and medical practitioners generally. The proposal is that the prescriber should call attention to an unusual dose by adding, on the same line, his bracketed initials, thus, (F. W.) A similar plan is already adopted on the continent, and indeed in some countries is enforced by law.

"On the next page is a copy of the resolutions. I trust that they will meet with your individual approval, and that you will contribute your influence in giving them wide publicity amongst the members of the medical profession.

"I am, Sir, yours faithfully,
"THOMAS B. GROVES, *President.*"

"UNUSUAL DOSES OF MEDICINES.

"The following resolutions were passed at the tenth annual meeting of the members of the British Pharmaceutical Conference, held at Bradford, Yorkshire, during the third week of September, 1873 :—

"'That this Conference having considered various proposals for the use of special signs to mark unusual doses on prescriptions, and the great advantages to be derived from such signs, considers that the bracketed initial letters of the prescriber's signature, written immediately after the unusual dose, is the best suited for the purpose.

"'This Conference also respectfully urges upon medical men the importance of the prescriber's full name and address being written on *all* prescriptions, to facilitate communication between the prescriber and dispenser.

"'This Conference likewise considers it desirable for the dispenser to retain all prescriptions in which initialled unusual doses are prescribed.'"

Together with these we have placed in the previous page an extract from an editorial article in the *Practitioner*, where the subject is treated of from a medical point of view, and thus our readers will be in possession of material to enable them to form correct views.

In the current number of the *Druggists' Circular and Chemical Gazette*, just received from New York, we find the course taken by some of the medical journals in regard to the Ramsgate case is severely commented upon, and described as partaking of the Yankee principle satirized by Mr. LOWELL, that "the side of our country must ollers be took." Our Transatlantic contemporary, perceiving that the affected astonishment as to anybody being unaware of the practice of Mr. JONES of Jersey was inconsistent with the accompanying sneering animadversions on the exercise of judgment by a druggist, asks what would be the use of a druggist studying Mr. JONES of Jersey at all, unless it were for the purpose of using his new information somehow ?

The notion that the dispensing druggist is a mere serf to the physician is also repudiated and dismissed as not worth argument to disprove it, since "physicians themselves do not so regard him, and it is not worth while to vex ourselves over the acrimonious diatribes of writers whose first aim is smartness." And, as regards the duty of the dispenser, we are glad to find it stoutly declared that, with the chance of a verdict of manslaughter hanging over his head, it surely behoves him to be cautious, and gives him a right to decline accepting any risk.

Singularly enough, the correspondence columns of the same journal contain a query respecting a case somewhat similar to that which occurred at Ramsgate. The following prescription was taken to a druggist in Manchester, New Hampshire, to be dispensed :—

℞

Hyd. Chl.	ʒss.
Syr. Ginger	℥iss.
Tr. Card. Co.	ʒj.
Aquæ	ʒss.

Mix.

The druggist on looking at it told his customer that if he put it up as written one dose would be fatal, and the inquiry was made whether he was justified in making such a statement. The editor, in his reply, expresses the opinion that he was not altogether wrong, since "Hyd. Chl." sometimes stands for corrosive sublimate, and he adds that a druggist would be justified in hesitating to dispense such a prescription unless he were satisfied by other evidence that hydrate of chloral were intended, and that the patient

or his attendant knew when and in what doses the medicine was to be administered.

As regards the wider question of unusual doses, our American contemporary expresses approval of the course taken by the Pharmaceutical Conference, and adds the suggestion that if medical journals would only urge this practical point, instead of expending their influence in trying to arouse a bad feeling between medical practitioners and pharmacists, they would be serving their generation more worthily than is sometimes the case. We trust that the suggestions of the Conference will be received by the medical profession in the same spirit that they have been offered, and that by mutual consideration and assistance, a means may be devised of protecting prescribers, patients, and dispensers from possible disappointment, inconvenience, and perplexity.

ALBUM OF AMERICAN PHARMACISTS.

Two years ago Mr. HENRY B. BRADY, on his return from a visit to the United States, collected the card-photographs of leading English pharmacists, arranged the pictures in an album, and presented them through Professors PARRISH, MAISCH, and PROCTER to the American Pharmaceutical Association. An account of the reception of the gift will be found in the 'Proceedings of the American Pharmaceutical Association,' 1872, p. 56. Soon afterwards a Committee of the American Association with Professor F. W. BEDFORD as Secretary, collected the "shadows," as they termed the photographs, of the prominent pharmacists of the United States, mounted the cards in an album, and sent it over a few weeks ago as "A Souvenir of fraternal regard from the American Pharmaceutical Association to the British Pharmaceutical Conference." That album, to which an alphabetical index has been added, will remain in the possession of Professor ATTFIELD, as the Senior Secretary of the Conference, who will gladly show it to pharmacists or others, or will forward it to any provincial pharmaceutical association whose members would like to see it at their meetings. Photographs of the following gentlemen are contained in the album :—

Andrews, G. W.	Chapman, W. B.	Grahame, I. J.
Bache, F.	Close, G. C.	Gordon, W. J. M.
Bakes, W. C.	Coggeshall, G. D.	Green, T. T.
Balluff, P.	Colcord, S. M.	Hancock, J. F.
Bartlett, N. G.	Covell, T. J.	Harrop, J.
Bedford, P. W.	Cummings, H. T.	Haviland, H.
Berriam, G. W.	Dalrymple, C. H.	Hays, D.
Boyden, A.	Diehl, C. L.	Heintsch, C. A.
Boxley, J. B.	Doliber, T.	Hoffmann, F.
Brewer, W. A.	Durand, E.	Jamieson, T. W.
Bridges, R.	Eberle, C. L.	Jenkins, T. E.
Brill, W. H.	Ebert, A. E.	Jennings, N. H.
Bringhurst, F.	Ellis, C.	Judge, J. F.
Brown, A. J.	Ferguson, R. B.	Kennedy, R. W.
Buck, G.	Fish, C. F.	Kent, R.
Bullock, C.	Fish, H. F.	Kiersted, H. T.
Bunting, S. S.	Frohwein, T.	King, J. T.
Campbell, I. S.	Fuller, H. W.	Lane, H. S.
Campbell, S.	Garrigues, S. S.	Lemberger, J. L.
Chandler, C. F.	Gaylord, H. C.	Lincoln, H. W.
Maisch, J. M.	Parrish, E.	Shinn, J. T.
Markoe, G. F. H.	Pile, W. H.	Smith, C. B.
Meakim, J.	Procter, W., jun.	Smith, D. B.
Mellor, A.	Reinhold, B. H.	Stabler, R. H.
Merrill, W. S.	Remington, J. P.	Stearns, F.
Metcalf, T.	Ritterhouse, H. N.	Strehl, L.
Milhau, J.	Robbins, D. C.	Stratton, J.
Mill, J. W.	Roberts, J.	Squibb, E. R.
Milleman, R. L.	Rother, K.	Taylor, A. B.
Moore, J. B.	Russell, E. W.	Thompson, W. S.
Moore, J. F.	Rust, W.	Tufts, C. A.
Neergaard, W.	Sander, E.	Wayne, E. S.
Newton, L. V.	Sargent, E. H.	Wenzel, W. T.
Nichols, E. P.	Saunders, W.	Whiting, F. T.
Orne, J. S.	Scheffer, E.	Wiegand, T. S.
Osborne, H.	Shedden, J. W.	Wood, G. B.

Drs. Bache and Wood are well known to us as the authors of 'The United States' Dispensatory.'

Among the twenty-one distinguished men who have presided over the meetings of the American Pharmaceutical Association since its formation in 1852, we have the good fortune to possess in this album the likeness of twenty, namely, Messrs. D. B. Smith (1852), Brewer, Chapman, Meakim, Andrews, Ellis (Kidwell, 1858, absent), Colcord, Kiersted, Procter, Moore, Gordon, Lincoln, Stearns, Milhau, Parrish, Sargent, Stabler, Sander, Ebert, Hancock (1873).

Authors of researches, whose works will last even longer than their photographs, are also well represented. P. W. Bedford, who has contributed eight papers to the Association ; G. C. Close, seven papers ; S. M. Colcord, ten or eleven papers on ethical subjects ; C. L. Diehl, six or seven pharmaceutical papers ; T. Doliber, four papers ; A. . Ebert, who was at the Dundee meeting of our Conference, four papers ; H. F. Fish, four ; S. S. Garrigues, six ; W. J. M. Gordon, four ; H. W. Lincoln, four ; Professor Maisch, twenty-five papers, besides annual reports ; Professor Markoe, who was present at our Brighton Conference, nine papers ; J. W. Mill, four ; Professor J. F. Moore, several papers and reports ; the late Professor Parrish, twenty-eight ethical and scientific papers ; W. H. Pile, six papers ; Professor William Procter, Junr., who is personally known to most of us, twenty-nine essays and reports ; J. P. Remington, five papers ; Dr. E. R. Squibb, forty reports, notes, and researches ; Frederick Stearns, nineteen papers ; A. B. Taylor, seven papers ; Professor Wayne, six papers ; and T. S. Wiegand, seven papers.

A leading feature in the organization of the American Pharmaceutical Association is the formation of committees to investigate subjects affecting pharmacy, and the photographs of hard workers on such committees will be found in the album : Chairmen and other Members of Committees on the Progress of Pharmacy, the Drug Market, Papers and Queries, Adulteration and Sophistications, Legislation, the Pharmacopœia, etc.

Photographs of the Treasurers and Secretaries of the Association are included ; also Editors of Journals, Authors of Educational Works, and the Phar-

maceutical Members of the Council or Convention entrusted with the preparation of the Pharmacopœia of the United States. The Schools of Pharmacy distributed throughout the country are represented; We mean, of course, educational schools, for cram-schools such as have recently sprung up in England are unknown in America.

Almost all the photographs are good works of art. They are mostly vignettes of the bust; quarter, half, and full-plate size. The first president has all the appearance of the father of the Association; William Procter, Junr., seems younger than ever; the picture of Professor Parrish, whom everybody loved so much, is particularly clear and vigorous; Albert E. Ebert was evidently still an invalid when he sat to the sun; C. Lewis Diehl, in photograph, is strikingly like the late J. C. Brough, and the features of Dr. Newton still more vividly recall those of Thackeray; Wm. Saunders need not to have written across his *carte* words stamped there already, namely, "very sincerely yours"; Professor Bedford has the face of a kind and shrewd teacher; the pictures of Charles F. Fish and Professor Judge are marvels of sharpness and relief.

The whole album is interesting; it and that which has gone across the Atlantic are the offspring of "fraternal regard," which is mutual. Their interest is lasting, and will increase from year to year.

VOTING FOR THE BENEVOLENT FUND ELECTIONS.

It may not be altogether useless to inform our readers that since the election on the 24th ult. voting-papers have still continued to come in daily up to the early part of this month, and that as many as twenty-five have thus been sent in, of course too late to count. It so happens likewise that most of these votes are for one candidate. We think the mention of these facts may tend in future to render voters more mindful of the conditions to be complied with in sending in papers, and that a knowledge of them may conduce to prevent disappointment on their part as well as on the part of the candidates they support.

LECTURES have been arranged to be delivered in connection with the Bristol Pharmaceutical Association, at the Museum and Library, Queen's Road, Clifton, on Friday, January 16th, by Dr. PORTER SMITH, late of China; on Friday, February 13th, by Dr. WATTS, F.C.S., of Oxford; on Friday, March 13th, by Mr. THOMAS WILLS, F.C.S., Royal Institution; and on Friday, April 10th, by Dr. REDWOOD.

A NOTICE has been issued by the National Chamber of Trade, inviting chemists and druggists to attend a meeting at the offices, Sussex Chambers, 10, Duke Street, St. James's, S.W., to consider the late prosecution under the Adulteration Act, and to take steps, if necessary, to obtain an amendment of that Act. The meeting will be held on Wednesday next, the 19th November, at eight o'clock P.M., under the presidency of Mr. A. F. HASELDEN.

Transactions of the Pharmaceutical Society.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING THE MONTHS OF JULY, AUGUST, SEPTEMBER, AND OCTOBER, 1873.

LONDON.

	£	s.	d.
A Friend	1	1	0
Baxter, William, Central Public Laboratory, Kennington Cross, S.E.	1	1	0
Betty, S. C., 6, Park Street, Camden Town, N.W.	0	10	6
Connon, C., Wrekin House, Seven Sisters Road, N.	1	1	0
Chapman, S. S., 11, Grove Street Road, South Hackney, E.	0	5	0
Cole, Frederick, High Street, Stoke Newington, N.	0	10	6
Cornelius, James, 73, Camden Road, N.W.	0	10	6
Gething, W. B., 75, Fleet Street, E. C.	1	1	0
Gorton and Sons, 144, High Street, Whitechapel, E.	0	10	6
Goosey, W., 6, Bull Lane Stepney, E.	0	10	6
Hanbury, Daniel Bell, Clapham Common, S.W. (1872-73)	2	2	0
Hickman, William, Archer Street, Notting Hill, W.	0	10	6
Huskisson and Sons, 77, Swinton Street, W.C.	2	2	0
Lacy, B. W., 129, High Street, Kingsland, E.	2	2	0
Marshall, C. E., 67, Bedford Street, Mile End, E.	0	5	0
Shirley, John George, 2, Westbourne Grove, W.	2	2	0
Strange, Paul, 34, Surrey Square, Old Kent Road, S.E.	0	10	6
Williams, R., 2, Gresham Place, Brixton, S.W.	1	1	0
Yarde, Giles, 60, Lamb's Conduit Street, W.C.	1	1	0

COUNTRY.

Almondbury, Lee, David	0	10	6
Barrow-in-Furness, Steel, Thomas. 89, Duke Street	0	10	6
Barton-on-Humber, Ingoldby, William	0	2	6
Bath, Rolfe, W. A., 59, Sandgate Road	0	10	6
Birmingham, Mantell, Charles	0	10	6
,, Palmer, Charles F., 100, Islington	0	10	6
,, Robinson, E., 166, High Street	0	10	6
,, Rowbotham, G. H., 54, Dale End	0	10	6
Bradford (*Yorks.*), Walker, John, 200, Manor Road	0	10	6
Brighton, Bradley, Thomas D., 33, Bond Street	0	10	6
Bristol, Long, J. T., Hotwells	0	10	6
,, Troake, R. J., 16, White Ladies' Road	0	10	6
Bury St. Edmunds, Hardwicke, J. E., 4, Meat Market	0	10	6
Cambridge, Pearse, John	0	5	0
Cardiff, Coleman, E. J., High Street	0	10	6
Cheltenham, Butcher, Thomas	2	2	0
,, Prockter and Forth, 397, High Street	1	1	0
Chipping, Watson, James B.	0	5	0
Crook, Wilson, James	0	10	0
Deal, Green, J. (previously subscribed 10*s.*)	0	0	6
Dorchester, How, William, 52, South Street	0	10	6
Dewsbury, Foster, Abraham, Market Place	0	10	6
,, Fox, George	0	10	6
Duffiown, Chalmers, George	0	5	0
Edinburgh, Baildon, H. C., 73, Princes Street	1	1	0
,, Raimes, Blanshard and Co., Leith Walk	1	1	0
Eynsham, Carr, William M.	0	9	11
Faringdon, Ballard, A.	0	5	0
Florence, Groves, Henry	1	1	0
Forest Hill, Furze, Mrs.	0	10	6
,, Simpson, T.	0	5	0
Fowey, Wellington, J.	0	3	0
Frodsham, Harvey, S.	0	5	0
Gloucester, Mumford, Francis C., The Infirmary	0	5	0
Grantham, Welborn, George	0	5	0
Great Bedwyn, Gerard, G. R.	0	10	6
Great Grimsby, Cook, Robert	0	10	6
Greenock, Macnaught, William	0	8	0
Guildford, Busby, Henry H., 33, High Street (previously subscribed 7*s.* 6*d.*)	0	3	0
Heage, Bates George	0	10	6
Howdon-on-Tyne, Robson, M.	0	10	0
Hull, Dobson, J. B.	0	5	0
,, Hudson, John, Esq. (per Mr. Jas. Baynes)	2	2	0
,, Kellington, M. L., Brooke Street	0	10	6
Hunstanton, Twiss, W.	0	10	6
Ilkeston, Potts, R. S.	0	5	0
Ipswich, Cornell, William	1	1	0
Leamington, Smith, Samuel A., 3, Lower Parade	1	1	0
Lee, Jarvis, John S., Manor Villa	0	10	0
Lewisham, Groves, Henry Francis	2	2	6
Liverpool. Lloyd, J. W., 30, Mount Pleasant	0	10	6
Long Bennington, Bemrose, John	0	10	6
Maidstone, Rogers, William	0	10	6
Manchester, Beard, James, 5, Great Ancoats Street	1	1	0
,, Booth, W. G., 69, Market Street	1	1	0
,, Gibson, Robert, 37, Erskine Street, Hulme	1	1	0
,, Lambert, Thomas (Bradford)	0	5	0
,, Mumbray, H. G., Great Cheetham Street	0	10	6
,, Payne and Chapman, 63, Piccadilly	0	10	6
Mansfield, Oldham, J., Market Street	0	10	6
,, Patterson, D. J.	0	5	0
Mirfield, Crook, Charles	0	5	0
Mold, Evans, William, Chester Street	0	10	0

New Brompton (Kent), King, W. S., 1, Montague Villas	0	10	6
,, ,, King, T. S. ,, ,,	0	10	6
Newport (Salop), Picken, T. W.	0	10	6
New Wortley, Child, T., 84, Wellington Road	1	1	0
North Kelsey, Dixon, James	0	3	0
North Shields, Hunter, Thomas, 24, Duke Street	0	10	0
Nottingham, Truman, Henry V., Sandfield House	1	1	0
Oakenshaw Johnson, Mark	0	10	0
Oldbury, Briggs, George	0	10	6
Oldham, Bates, Henry, 38, George Street	0	10	6
,, Berry, Thomas, 189, Henshaw Street	0	5	0
,, Braddock, George, Market Place	1	1	0
,, Braddock, James, 97, Yorkshire Street	0	5	0
,, Brelsford, James, Greenacre's Moor	0	5	0
,, Eckersley, James, 103, Lees Road	0	5	0
,, Geddes, William, 8, Market Place	0	5	0
,, Goodall, F,, Manchester Street	0	10	6
,, Haslop, William, 43, George Street	0	5	0
,, Hulme, John, Greenacre's Hill	0	5	0
,, Kershaw, Joseph, 125, Manchester Street	0	5	0
,, Lord, Robert Booth, Market Place	0	5	0
,, Myott, William, 4, Greenacre's Moor	0	5	0
,, Parkinson, Wm., Lees Road	0	10	6
,, Shepherd, Jas., 144, Huddersfield Road	0	10	6
,, Wharton, Frederic, 110, Lees Road	0	10	6
,, Wild, William, 43, Lower West Street	0	5	0
,, Wrigley, William, Manchester Street	0	10	0
Pau (France), Jarvis, John	1	1	0
Peterborough, Loveridge, T. P., 18, Long Causeway	0	5	0
Plymouth, Woods, W., 45, Bedford Street	0	11	0
Pontardulais, Hinds, H. D.	0	5	0
Preston, Hogarth, W.	0	10	6
Reigate, Forbes, W.	0	10	6
Richmond (Surrey), Mumbray, R. G.	0	10	6
Romford, Lasham, J. W.	0	10	6
Rhyl, Foulkes, W. H., High Street	0	10	6
Saffron Walden, Mahon, Henry, Market Place	0	10	6
St. Andrew's, Govan A.	0	10	6
St Clear's, Williams, Evan	0	10	6
St. Leonard's-on-Sea, Maggs, S. B.	0	10	6
Sandgate (Kent), Walton, G. C.	0	10	6
Sedgley, Thompson, J. W.	0	10	0
Shaw (near Oldham), Wall, Harriet	0	5	0
,, ,, Whitaker, Elizabeth H.	0	5	0
Sheffield, Holme, P., 13, Eldon Street	0	10	6
Sidmouth, Chessall, Rowland	0	10	6
Southport, Fowls, J., 45, Kensington Road	1	1	0
South Shields, Rowell, Robert	0	5	0
Stockport, Royse, R., 22, Great Portwood Street	0	10	6
Stony Stratford, Cox, Mrs	0	10	6
Stowmarket, Simpson and Son	0	5	0
Sunbury, Leare, James	0	10	6
Swaffham, Gardner, J.	1	1	0
Tunbridge Wells. Dunkley, E., High Street	0	10	6
Tweedmouth, McIntyre, P. S.	0	5	0
Uppingham, Hope, William	0	10	6
Ventnor (Isle of Wight), Weston, Charles	1	1	0
Waltham Abbey, Marshall, J. A.	0	10	6
Wavertree, Hay, Thomas A.	0	10	6
Wigan, Polding, Peter	0	10	6
Winchcombe, Howman, Philip	0	5	0
Wisbeach, Bradley, William	1	1	0
Worcester, Twinberrow, John, 53, Broad Street	1	1	0
Yaxley, Thomas, S. C.	1	0	0

DONATIONS.

Clark, W. B., Leicester	1	1	0
Faulconer, R. S., 272, Walworth Road, S.E.	1	1	0
Good, Thomas, 47, Minories, E.	2	2	0
Pound, Matthew, 60, Leather Lane	1	1	0
Smith, S. H., 31, High Street, South Norwood	3	3	0
Sparks, John, 37, Arundel Square, N.	21	0	0

Provincial Transactions.

NORWICH CHEMISTS' ASSISTANTS' ASSOCIATION.

The annual general meeting of the above was held October 9th.

The Treasurer (Mr. W. J. G. Butler) presented the following financial report, which was unanimously adopted :—

BALANCE SHEET.

Dr.

1872-3.	£	s.	d.
Balance in hand from 1872	4	10	11
25 Members' Subscriptions at 10s. 6d. each	13	2	6
13 Hon. Members ,, ,,	6	16	6
Donations—			
J. D. Smith, Esq., for Books for Prizes	1	10	0
J. Robinson, Esq.	1	1	0
F. Sutton, Esq.	0	10	6
	3	1	6
Library Fines	0	3	9
	£27	15	2

Cr.

1872-3.	£	s.	d.
Rent	10	0	0
Rates	3	3	5½
Gas	1	8	6
Cleaning and Firing	3	0	6
Printing and Stationery	2	11	2
Books	2	13	1
Chemicals and Apparatus	1	5	5
Messenger	0	5	0
Sundries	0	11	6
Balance in Hand	2	16	6½
	£27	15	2

Mr. G. C. Fox (the Secretary) then read the following general report :—

"The Council regret that they are compelled to report a marked falling off in the number of members and students during the past year.

"As the reports of the class teachers and examiners were read at the distribution of prizes, it is unnecessary to refer to them now, further than to notice that while the attendance was in the point of numbers highly discouraging, the attention shown by the few regular members was most satisfactory, and the progress made was good. The practical testing carried on by the practical chemistry class seems especially to have been successful in causing greater diligence among the pupils. The reports of the examiners show that while the pupils are well up in theory they are in many cases deficient in the practical part of the subjects, showing that the class teaching is not supplemented by homework and attention to the general routine of business. The chemistry class, however, forms an exception to the rule—Professor Attfield's report last spring having been most satisfactory.

"The Council believe that the regularity and attention have been to some extent owing to the system of prizes now carried on during two sessions, and last session so much extended by the kind donation of J. D. Smith, Esq.

"The resolution passed at the last annual meeting to the effect that Preliminary classes should be carried on during the then ensuing session has been of no effect, no members having offered themselves as pupils.

"The ill-success of lectures during the session 1871–72 deterred the Council from making arrangements during the past year.

"The library presents the most satisfactory feature of the Association. The Librarian says : 'The library has been opened sixty-eight times during the past year. It now consists of forty-two volumes ; and these have been issued and re-issued 188 times among seventeen members. These numbers show that although comparatively few members have availed themselves of the use of the library, those who have done so have been very regular in their applications.

"During the past year five members have passed the Minor (two in honours) and one the Major. Two pupils have also taken good positions in the Science and Art examinations.

"The most important subject for the consideration of the members is the marked falling off in the number of members and students. During the three years of the Association's existence the numbers of members have been respectively 42, 36, and 25, and the average attendance of students at the classes has been 14, 10, and 8. This falling off the Council regard as a most serious feature, showing as it does that the Association fails to interest many of its members and still more to enlist in its ranks the recent additions to the apprentices of the city. Under these circumstances the Council cannot recommend, even supposing the necessary funds would be forthcoming, in the face of the reduced numbers, that the Association should be carried on under the existing conditions, feeling

that the expenditure of labour is not justified by the results. In consequence, however, of many expressions of regret at the probable dissolution of the Association they are disposed to recommend that an attempt should be made to extend the sphere of labour by engrafting the Association upon the Science and Art Department and admitting upon payment of certain fees to the chemical and botanical classes any of the public who may be desirous of pursuing those studies. By this step the Council imagine larger classes would be attained, and at the same time the funds would be considerably augmented.

"The Council cannot close the report without mentioning the entertainment so kindly given to the candidates at the spring examinations by H Thompson, Esq., and without expressing their sense of the deep obligation which the Association is under to the class teachers, Messrs. Corder, Caley, Butler, and Nuthall; to the examiners, Professor Attfield and Messrs. Corder, Fox, Hill, Nuthall, and Mason; to the librarians, Messrs. Lincoln, King, and Woolnough."

After a desultory conversation it was agreed to adopt this report without discussion, as its more important features would come under notice when the programme for the ensuing session was arranged.

The usual votes of thanks where thereupon passed, and after a resolution reducing the number of the Council had been adopted, the following officers were elected :—President, Mr. E. Nuthall; Vice-President, Mr. A. Hill; Treasurer and Financial Secretary, Mr. W. J. G. Butler; Honorary Secretary, Mr. G. C. Fox; Messrs. G. S. Tooke, H. A. Woolnough, and W. G. Piper; Librarians Messrs. Piper and Decarle.

Mr. Nuthall said he had been entrusted with the task of proposing certain resolutions which would bear out the recommendation of the retiring Council, to the effect that the Science and Art system should be introduced to their Society, but before doing this he wished to state that the Council had not been entirely unanimous in adopting this recommendation, and, in fact, most of the members had only done so after great hesitation. For his own part, also, he regretted extremely that such a step should be necessary, but he certainly could not see how the Association could be satisfactorily carried on in face of the figures of the prceding reports. He said "satisfactorily" because he had no doubt but that by strict economy they might drag on a sluggish existence for another year or so, but this was far from what had at the foundation of this Association been anticipated. Then they all looked forward to an active and useful course, imagining that each year would strengthen their position, but now, after three years, their Council were driven to confess that they considered the results attained far from being equivalent to the amount of money or effort in teaching expended, and were unable to recommend that such an outlay should be continued, or that so much work should be done by the various class-teachers with so little encouragement. The questions, then, for them to decide were "How to increase their funds?" and "How to enlarge the number of their students?" The former was necessary for the convenient carrying on of the Society, and especially if they wished to realize the long-cherished plan of establishing a working laboratory, which would undoubtedly largely increase the popularity of the Association. The latter was necessary to give them sufficient grounds for asking the class-teachers again to undertake their arduous tasks. Both these requirements would be fulfilled if the recommendation of the Council be adopted. After explaining the working of the Science and Art Department, Mr. Nuthall proceeded to say it had been proposed that as several of their number held teachers' certificates under this department, two of them should undertake respectively classes in botany and chemistry, and those gentlemen, Messrs. Piper and Tooke, who had volunteered to do so, had promised that what grants they might obtain as results of their teaching should be handed over for the use of the Association. He therefore begged to propose—

"That the botany and chemistry classes be affiliated to the Science and Art Department, and that the teaching at the same be especially directed to the requirements of the pharmaceutical examinations, and those of the Science and Art Department."

"That the existing rules of this Association be so modified as to admit the general public, upon payment of fixed fees, to the above classes."

Mr. Tooke seconded both these resolutions; but the second one was opposed by Messrs. Woolnough and Lincoln, who brought forward a negative proposition.

After a spirited discussion, in which most of the members present took part, the original resolutions were carried, and the meeting shortly afterwards closed with a vote of thanks to the chairman, Mr. A. Hill.

Since the above meeting, arrangements have been made to cater for the winter session, comprising lectures on the chemistry of the Pharmacopœia, materia medica, and pharmacy, by Messrs. Nuthall, Caley, and Butler; and Science and Art classes in botany and chemistry, by Messrs. Piper and Tooke.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The second general meeting of this Association was held in Anderson's University, on Wednesday, Oct. 29th, at 9 p.m. Mr. John Currie, president, in the chair.

The attendance was remarkably good. Preliminary business being over, Dr. A Wood Smith, Glasgow, delivered an able and very interesting lecture on "The Circulation of the Blood," illustrated both by means of diagrams and microscopes.

Before closing the lecturer gave a short sketch of the life of Harvey, the discoverer of the circulation of the blood.

On resuming his seat, the lecturer was accorded a most hearty vote of thanks; as were also Drs. Gemmill and Oliver, who assisted the lecturer with the microscopes.

The secretary then drew the attention of the junior members to a note which he had received from Professor Thorpe, asking if the hour from 4 to 5 p.m. would suit those intending to join his chemistry class, as it was the desire of the medical students that it should be held at that hour. This being agreed upon, the meeting dissolved.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION.

Inaugural Meeting of the Winter Session, Soirée, and Exhibition.

A meeting of an exceedingly interesting character, well calculated to increase the popularity of this Association, and at the same time to deepen the interest of its members in scientific pursuits, and widen their knowledge of the many practical applications of physical science, was held in the Memorial Hall, Albert Square, on Friday evening, November 7th. The attendance was large and thoroughly representative, including nearly all the members and associates, many medical men, professional chemists, and others interested in the objects of the Association. The exhibition was opened in the large hall at half-past six o'clock, tea was served in an adjoining room at seven, and at half-past eight the chair was taken by the President, Mr. W. Scott Brown. The only formal business was the election of twenty-five associates. The President then delivered the following address :—

"Gentlemen,—

"In conformity with custom, it is my duty as President to open the formal proceedings of this evening, and I have to ask your indulgence for the few remarks I shall offer. This being the fifth year since the formation of the Manchester Chemists and Druggists' Association, it was thought desirable that we should commence the term by an exhibition of pharmaceutical and chemical appliances,

specimens, and other objects of interest, and hold a soirée of a similar character to that held in this hall during our first session, on April 20th, 1869, and which excited considerable interest, and I hope afforded information as well as gratification to the large assembly who on that occasion assisted us by their presence. I trust the meeting this evening and the exhibition now displayed, may lead to a more general interest in the objects of our Association, and be the means of strengthening the bonds of union and inducing a larger number to take an active interest in our periodical meetings. The educational arrangements made through this Association result from, and are largely dependent on, the co-operation of the chemists and druggists of this city and district. To-night our twofold object is to gratify our members and friends, and to promote those social relationships which are fostered by such gatherings as the present. The number of medical friends who, I am gratified to say, have favoured us with their company evidences their interest in the efforts we are making to educate the rising generation of chemists and druggists. We hope also to stimulate to a more lively interest in and appreciation of the labours of our Association, the large body of our own trade in this city, the adjoining borough, and the surrounding towns, who have not yet joined our ranks. Five years have elapsed since the formation of this Association, and it is fitting that I should refer to the period of its formation, the objects then contemplated, and reviewing the work of the past, ask how far we have accomplished the task we then undertook, and what we may hope in the future. When the Pharmacy Act of 1868 became law, we possessed no association ; we had no educational machinery ; we had no means of giving to our assistants or apprentices that scientific knowledge the possession of which had suddenly become legally essential. I recall the efforts of the past and the names of many good and enlightened men, who in their day strove to establish meetings for mutual instruction and improvement, and lectures and classes for the juniors. It is somewhat saddening to me this night to find myself, by the lapse of years, placed in a position which was then filled by abler and better men, whose names we still hold in respect, and to think that all their efforts were in vain, and that for so many years Manchester, with its vast material resources, did not maintain among the large and respectable body engaged in our business, an association for such desirable purposes as mutual intercourse and improved scientific education. All this changed in 1868, and the interest then awakened will I trust continue to have effect and produce results in the future which will well repay the toils and labour of to-day. At the commencement of our Association we declared our objects to be to provide for the better education of assistants and apprentices, the foundation of a library and museum and a school of pharmacy for Manchester and district ; these were our views, and subsidiary, the monthly meetings for promoting mutual improvement and social fellowship. During the past five years how have we succeeded and what is our present position ? I venture to assert that we have to a great extent accomplished what we then commenced ; true, if judged by the number of members, we may seem to have retrograded and I wish that my remarks may induce the whole or a large proportion of the trade to join us. We know that the ordinary routine of our business avocations does not and cannot furnish the accurate and scientific knowledge required to pass the compulsory examination of the Pharmaceutical Society, and though it is gratifying to know that the hours of labour are somewhat diminished, and more opportunities for self culture afforded to young men of the present than were available in the past, the duty still devolves on all the principals in the business to aid in supporting the means by which systematic and special teaching may be given to apprentices and assistants, as it is difficult to attend examinations unless so aided. It is only by large association of members that a school of pharmacy can be supported, and it would indeed be a most deplorable circumstance if for want of sympathy and support the council of this Association should be placed in any difficulty. Indeed, though much has been accomplished, more remains to be done, and I earnestly appeal to all for assistance. We have steadily adhered during our five years' career to the lines laid down at first, and have now a reading-room, a lecture-room, a fair library, a good museum, and most excellent and complete courses of lectures. All these are, of course, on a small scale as compared with the parent institution in London, but being our own unaided work, we feel a justifiable satisfaction in contemplating what we have accomplished. I need not refer to the details of our work, or to the subjects which have engaged attention at our many meetings, all, I am sure, will unite in the feeling that we have, whilst doing good to our young men, been receiving much benefit ourselves. Mutual association has, I feel assured, produced many pleasant results, and as our object is, and ever has been, the public interest, protecting them from ignorance and incompetence by providing an educated and responsible body for their future requirements, we hope to receive from the members of the medical profession a full recognition of our Association. I am pleased to say this has not been wanting, and I gratefully acknowledge it. To the young men who are with us to-night I would address a few words. It has afforded great satisfaction to the Council that a Chemists' Assistants' Association has been formed and has prospered so well ; the advantage of the rooms and the means of instruction provided has been felt to be a boon, and I feel certain that the future will develop many good results which have had their foundation and commencement in Blackfriars Street. I ask only that what has been cheerfully and freely given be extensively and constantly used, remembering that much is expected from those who have advantages placed within their reach. Let this stimulate to thoroughness. The immediate gain may not be apparent, but the public are learning to appreciate the distinction between the title and the qualities that should accompany the name ; and as by them you must be judged, and the requirements are yearly advancing, strive to be ahead, and to anticipate the day when, as (educated and competent) members of the pharmaceutical body, you will be trusted by the physician, his patients, and the public."

Mr. J. T. Slugg, F.R.A.S., then briefly addressed the meeting. He congratulated the members on the variety and interest of the exhibition, alluding especially to the microscopes and the immense importance of those instruments in the study of chemistry, pharmacy, and medicine.

Later in the evening Mr. Louis Siebold delivered a lecture on dialysis and its applications to pharmacy. Mr. Siebold's experiments were of a most striking and convincing nature, showing both the theory and practical application of the process. The latter he demonstrated by separating the meconic acid from a mixture of mucilage, extract of liquorice, and a trace of tincture of opium. The lecturer said dialysis afforded to the pharmaceutical student a wide field for original research, in the isolation of many alkaloids and active principles at present involved in much obscurity and the very existence of which was sometimes doubted.

In connection with Messrs. Howards' contribution of sample bottles of sulphate of cinchonidine, Mr. F. B. Benger gave a short explanatory lecture on that substance, describing its chemical and physical properties, the tests by which its admixture with or substitution for quinine may be detected, and detailing the opinions expressed by members of the Royal Commission appointed by the Indian Government to inquire into the value of it and other cinchona alkaloids. The importance of giving it a fair trial in this country was urged, as, should the results obtained in India be confirmed at home, a most important addition to the materia medica would be gained ; one especially to be appreciated at a time when the great demand for quinine had so enhanced its price, and when

there seemed every probability of an unlimited supply of cinchonidine obtained from barks grown in the Indian plantations.

Votes of thanks were passed to the exhibitors, the medical profession for their presence and support, the lecturers of the evening, and the president for his address.

The following were the most important contributions to the exhibition :—

Messrs. Howards and Sons (London) :—Fine specimens of cinchona barks, grown in India, and 200 sample bottles of sulphate of cinchonidine.

Messrs. Hopkin and Williams (London) :—Rare chemicals.

Messrs. Johnson and Mathey (London) :—A collection of platinum vessels, and a very beautiful series of platino-cyanides, and other chemicals not commonly met with by pharmaceutical students.

Messrs. Southall, Son, and Dymond (Birmingham) :—A fine display of chemicals, pharmaceutical preparations, and materia medica specimens.

Messrs. Poths and Semple (London) :—The contribution of this firm was very varied and interesting, consisting largely of German pharmaceutical appliances, many of them little known, and therefore little used in this country. The many applications of transparent horn in the construction of scale pans, dishes, strainers, spatulas, pill-silverers, etc., were remarkable. The hardness, durability, lightness, beauty, and nonmetallic nature of this substance, admirably adapting it for those purposes. Cardboard boxes of exquisite finish, and almost endless diversity of form, enamelled labelled bottles, delicate balances, and an array of German productions too numerous to describe. Mr. Poths, himself an examined chemist of England and Germany, came from London to be present at this meeting, and was most courteous and obliging to the many inquirers respecting the nature and uses of the appliances exhibited.

Mr. P. Spence (Manchester) :—A large case of specimens illustrating his patent processes for the manufacture of alum.

Messrs. F. C. Calvert and Co. (Manchester) :—Carbolic acid. Preparations of ditto, and apparatus for diffusing its vapour as a disinfectant.

Messrs. C. Lowe and Co. (Manchester) :—Fine specimens of crystal carbolic acid.

Messrs. J. Woolley, Sons, and Co. (Manchester) :—An extensive collection of chemical apparatus, furnaces, drying-closets, microscopes, etc.

Messrs. Mottershead and Co. (Manchester) :—English, French, and German batteries for medical purposes. Electric bells and fire alarms. Revolving stereoscopes, graphoscopes, and microscopes. Slides illustrating Stoddart's micro-chemical test for quinine, etc., etc.

Messrs. Bailey and Co. (Salford) :—Electric bells and patent indicators for use on board ship. A tell-tale clock "to watch the watchman," etc.

The Middleton Botanical Society :—A collection of rare indigenous plants, and two copies of a very valuable old work, 'Flora Londinensis,' by W. Curtis, Demonstrator to the Company of Apothecaries, published in 1777, consisting of large coloured plates of all plants growing in the neighbourhood of London, with descriptive letter-press.

Mr. Cockshott (Manchester) :—A selection from his fine herbarium of British plants.

Mr. Louis Siebold (Manchester) :—Herbarium pharmaceuticum, arranged for medical and pharmaceutical students.

Mr. Johnson (Bury New Road, Manchester) :—A very valuable microscope and a remarkably choice collection of objects to the exhibition of which Mr. Johnson most kindly devoted the whole evening.

Professor Attfield (London) :—A case of beautiful models of gems, showing their crystalline form and colour.

Mr. Leech (Lower Broughton) :—A polariscope, and objects for ditto, constructed by himself.

Mr. Robinson (Pendleton) :—Microscope and objects.

Mr. Goodwin Mumbray (Richmond) :—A very interesting series of diagrams of microscopical subjects.

Mr. W. S. Brown (Manchester) :—A number of valuable illustrated books.

Messrs. Payne and Chapman (Manchester) :—Revolving stereoscopes and graphoscopes.

Messrs. Kay Brothers (Stockport) :—Specimens of their new patent soda-water bottle, percolators, etc.

The British Pharmaceutical Conference :—An album of photographs of members of the American Pharmaceutical Association.

Messrs. Zimmermann (London) :—Wine-testing apparatus, etc.

Mr. Hughes (Manchester) :—An improved pill machine.

The Aniline Company (Manchester) :—Specimens illustrating their manufactures.

Mr. Warrick Brookes :—A series of most effective photographic studies.

Mr. Clark (Mount Pleasant Square, Salford) :—An improved compound screw tincture press, affording a means of exerting enormous pressure, and appearing to offer many advantages over the press commonly used by pharmacists.

Mr. H. G. Mumbray (Higher Broughton) :—Gyroscopes, etc.

Messrs. Allen, Harrison, and Co. (Manchester) :—Stills and models of vacuum apparatus.

Mr. Darling (Manchester) :—Specimens of minerals, etc.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 6th November, 1873. Dr. Odling, F.R.S., etc., President, in the chair. After the ordinary business of the Society was finished, the President delivered a short address, congratulating the Fellows on taking possession of their new rooms in Burlington House. A paper was then read by Mr. David Howard: "On the Optical Properties of some Modifications of the Cinchona Alkaloids," being an elaborate investigation of the variations in the rotatary powers of this class of bodies when examined by the polarimeter.

The other communications were, "A Preliminary Notice on the Oils of Wormwood and Citronella," by C. R. A. Wright, D.Sc.; "On the Estimation of Nitrates in Potable Waters," by W. F. Donkin, B.A.; and "A Note on the Action of Iodine Trichloride upon Carbon Disulphide," by Mr. J. B. Hannay. The meeting finally adjourned until Thursday, 20th Nov.

Parliamentary and Law Proceedings.

The Case of Poisoning by Morphia at Carlisle.

On Friday afternoon, October 31, Dr. C. F. McLeod, surgeon-major in the Madras army, was charged before the magistrates at the Town Hall, Carlisle, with having caused the death of his wife. After some evidence had been taken, during which Mr. Ruston, the druggist's assistant stated that the amount of hydrochlorate of morphia supplied by him was twenty grains, and that he was quite clear that Dr. McLeod did not ask for ten grains, the magistrates intimated that they had heard enough to justify them in committing the prisoner for trial upon a charge of manslaughter. Dr. McLeod simply said that he should reserve his defence, and immediately after his committal he was admitted to bail.

The Adulteration Act.—Prosecution of a Wholesale Dealer.

At Bow Street, John Tyman, Witherden Farm, Ticehurst Road, was summoned before Mr. Flowers to answer the charge of supplying Mr. George Barham with adulterated milk. Mr. Longstaff, solicitor, who appeared for

the prosecution, stated that Mr. Barham was the managing director of the Express Country Milk Company, and had entered into a contract with the defendant to supply him from time to time with pure unadulterated cow's-milk. Mr. Barham, however, received complaints from numerous customers respecting the weak state of the milk, and in consequence submitted the milk received one day to Dr. Muter, and that received the next day to Dr. Redwood, both district analysts appointed under the Act. Dr. Muter found the milk to contain water to the extent of a fourth part; Dr. Redwood deposed that the second quantity contained 30 per cent. of water and a small quantity of fat. Mr. Barham had no ill-feeling in the matter, although he was liable to be prosecuted by each of his customers. Evidence was called in support of this statement. In reply to the charge, the defendant admitted that the milk was adulterated, but not with his knowledge or consent. His assistant had put the water in. The man was called, and deposed that he put three pints of water to four-and-a-half "barn" gallons of milk without his master's knowledge. Dr. Muter said that such a quantity of water would scarcely be detected. The defendant then insinuated that the milk had been watered after it had left his hands. Mr. Flowers said the assertion that the defendant was not aware his assistant had adulterated the milk did not render him any the less responsible to the law. He felt it was a very serious matter, and should therefore fine the defendant £10 and £5 costs. It was hardly fair to punish sellers in London, since it appeared that the farmers themselves adulterated the milk. The defendant on leaving the court complained of the amount of costs, and said that the doctors and solicitors would no doubt like cases of this sort every day, if they could get them.

Remarkable Results of Bread Analysis.

At a meeting of the Shoreditch Vestry, held on Thursday, November 6, a deputation of master bakers attended to complain of the unsatisfactory character of certain analyses of bread recently carried out by the public analyst of the district, Dr. Stevenson, and to present the following resolution, passed on the 20th ult. at a meeting of master bakers, ratepayers of the parish of Shoreditch :—"That in the opinion of this meeting the present method of analysing bread is far from satisfactory to the respectable portion of the trade. who have a desire to conform to the existing Act of Parliament in regard to the Adulteration of Food Act." Mr. Butler, the spokesman of the deputation, said that a sample of pure bread, made by himself, was recently sent to Dr. Stevenson, who analysed the same and gave a certificate to the effect that it was one of the best that had been analysed, and that it contained no adulteration which would be injurious to health. As this was a somewhat qualified statement in regard to a pure article, he was instructed at a subsequent meeting of master bakers to procure two samples of cheap bread, which there was every reason to believe was not pure. Two such samples were submitted to the analyst, who pronounced them not adulterated, and cast not the slightest suspicion upon them. He (Mr. Butler) was then deputed to make an adulterated loaf of bread, and, in accordance with his instructions, he made a two-pound loaf, containing one drachm of alum—a quantity sufficient to be injurious to health. It was submitted to the analyst, the usual fee of half-a-crown being paid, and the certificate returned was "not adulterated." A portion of this sample was then taken to the Royal Polytechnic Institution for analysis, and handed to Professor Gardner, who charged half-a-guinea, and afterwards returned the following certificate :—"I have examined this piece of bread, left with me; it is perfectly free from alum." On receipt of this astounding information he wrote to Professor Gardner, informing him that one drachm of alum had been purposely put in the loaf, and expressing his surprise that no adulteration had been detected. In reply Professor Gardner wrote that unless a quantitative analysis were performed it was impossible to tell the quantity of alum in bread. For the half-guinea he had only performed a qualitative analysis, and had certainly found indications of alum, but of so slight and feeble a character that he did not think it worth while to mention it in his report lest it should be used as a cause for prosecution. The charge for a quantitative analysis was five guineas. He (Mr. Butler), on behalf of deputation, hoped the vestry would give the matter their serious consideration, for heavy fines were in some parishes being imposed upon those who adulterated bread, and the respectable bakers of this parish were anxious that the law should be put in force against dishonest tradesmen; but, at the same time, if the certificates of public analysts could not be relied upon, the question would arise, of what use were such officers? After a long discussion a select committee was appointed to investigate the matter and report to the vestry.—*Standard.*

Review.

The Febrifuge Properties of the Cinchona Alkaloids, Cinchonine, Quinidine, and Cinchonidine. By Joseph Dougall, M.D.

On Cinchonidine. By Howard and Sons.

Compared with several other remedial agents,—such as rhubarb, jalap, aloes, ipecacuanha, sarsaparilla, etc.,—the cinchona barks have had an unusually large amount of attention paid to their collection and cultivation, and science has been successfully called in to assist nature in the production not only of a regular supply, but a supply of those varieties which yield the particular alkaloids in favour with medical men. And yet how little is known even upon this subject is evidenced by the prevailing impression that compared with quinine,—the only officinal cinchona alkaloid,—the remaining cinchona alkaloids are comparatively worthless. At any rate such would appear to be the case from the fact that cinchonidine can be obtained at less than half the price of quinine, and that it is barely alluded to in the last edition of 'Pereira.' This would be the more remarkable if it be true, as Mr. J. E. Howard thinks, that the early reputation of cinchona bark was gained by a kind in which cinchonidine is the predominant alkaloid, as illustrated in the analyses recently published in Van Gorkom's report on Java bark. An explanation of this neglect is given by Messrs. Howard in the leaflet bearing the title quoted above, which also calls attention to important medical testimony as to the therapeutic value of cinchonidine. Messrs. Howard say that of the less known cinchona alkaloids "Cinchonidine has been most neglected, in great measure owing to the confusion, scientific as well as commercial, which arose between quinidine and cinchonidine—the name quinidin being still applied by German writers to cinchonidin. The sulphate of quinidine of commerce has hitherto consisted of a mixture of the two alkaloids, and in some cases of almost pure sulphate of cinchonidine."

In 1866 medical commissions were appointed in Madras and Bombay for the purpose of testing on a large scale the comparative efficacy of the sulphates of cinchonidine, quinidine, and cinchonine in the treatment of the forms of fever met with in the malarious districts of Southern India. The general results of these experiments were recorded in this Journal (vol. i., p. 325) immediately after the issue of the report, and need not be repeated here. Suffice it to say that the Madras Commissioners stated their opinion that these alkaloids are scarcely inferior, if at all, to quinine, and that any difference is of degree and not of kind. The cases treated appeared to show that "chemically pure and ordinary commercial sulphate of quinine and sulphate of quinidine are equal in value; sulphate of cinchonidine only slightly less efficacious, and sulphate of cinchonine, though considerably inferior to the others, is a valuable remedial agent in fever." The Bombay Commission reported that they

considered all the alkaloids to be febrifuges, antiperiodics, and tonics, and that the doses of each required to produce similar results would be—Quinine, 3 to 20 grains ; quinidine, 5 to 20 grains ; cinchonidine, 7 to 20 grains ; cinchonine, 7 to 20 grains.

In 1866 the author of the pamphlet under our notice, after some years' experience in the usual treatment of malarious fevers in India, China, and the Straits of Malacca, but during which he had never tested the physiological or therapeutic action of cinchonine, quinidine, or cinchonidine, received a suggestion from the Principal Inspector General of the Madras Medical Department, that he should experiment upon the comparative utility of those alkaloids. He entered upon the investigation "entirely free from bias in favour of any one of them being more efficacious than another, or of any or all of them proving either more or less active towards the desired end than the sulphate of quinine."

In order to meet with an adequate number of well-marked cases of malarious fever of the most perfect type, the author visited four of the most noted feverish places,—Russelkondah, Kimedy, Chetterpore, and Jeypore. The cases were taken mostly from the public hospitals, where the patients were under some amount of control, and they were treated indiscriminately in rotation with the three alkaloids. The result is a series of facts which have formed the groundwork of a thesis, for which a gold medal has been awarded by the Medical Faculty of the University of Edinburgh, and an abstract of which has been kindly brought under our notice by Sir Robert Christison.

This would not be the place to enter into the medical details of the various cases instanced by Dr. Dougall. But the importance which attaches to the question whether the at present comparatively unused alkaloids may not be more generally utilized will give the general results a special interest to the pharmaceutist. In all 108 cases of intermittent fever,—92 quotidian, 16 tertian, and 2 quartans,—are reported upon, and these were treated in nearly equal proportions with quinidine, cinchonidine, and cinchonine. The whole of these cases recovered. In 27 cases there was either no paroxysm at all after the first dose, or a very mild one merely, although the alkaloid was given during a single day only ; in 30 the treatment was continued for two days, and in 14 others for three days only, and in three cases only was it necessary to prolong it to twelve or thirteen days. Dr. Dougall states that there was very little difference between the alkaloids in the necessary duration of the treatment, but a difference was observed in the doses required. This agrees with the report of the commission quoted above. The quantity of quinidine given in each case, excluding extreme cases, varied between 31 and 70 grains ; of cinchonine between 54 and 76 grains, and of cinchonidine from 43 to 90 grains. The conclusion drawn is "that quinidine is the most powerful, cinchonidine next to it, and cinchonine the least active ; but that even cinchonine is energetic, and in an adequate dose a sure remedy." The relation of these alkaloids to quinine in point of energy was not made the subject of direct trial, but previous experience leads Dr. Dougall to believe that quinine is equally active and certain in doses between two-thirds and three-fourths those of quinidine.

In closing this notice we thoroughly adopt the opinion of Dr. Dougall, that the conclusions flowing from the preceding inquiries seem of great practical consequence, since it has been established by frequent recent experience that in various circumstances quinidine. cinchonine, and cinchonidine are largely obtained from several valuable cinchona barks used by manufacturers for obtaining quinine, and that they are by no means the feeble much less the inert febrifuge remedies which at one time they were supposed to be.

BOOKS RECEIVED.

A Manual of Botany, including the Structure, Functions, Classification, Properties, and Uses of Plants. By Robert Bentley, F.L.S., M.R.C.S. Eng., etc. Third Edition. London : J. and A. Churchill. 1870. From the Publishers.

Waste Products and Undeveloped Substances : A Synopsis of Progress made in their Economic Utilization during the last Quarter of a Century, at Home and Abroad. By P. L. Simmonds. London : Robert Hardwicke. 1873.

Obituary.

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

On the 21st October, 1873, Mr. Alfred Rushton, Chemist and Druggist, of 285, Mile End Road.

On the 9th November, Mr. Robert Roper, Chemist and Druggist, of Sheffield.

Notes and Queries.

[363.] MARKING INK WITHOUT NITRATE OF SILVER.—ANILINE MARKING INK.—A good recipe for making this ink is still a desideratum. *W. H.* writes in reference to the recipe given on p. 359 from the *Year Book of Pharmacy*, "Unless my aniline black is at fault, I consider the form a miserable failure. There is not enough gum to make it writeable, it is not permanent, and very calculated to rot the material."

[366]. LAVENDER WATER.—*E. T. H.* would feel obliged by any correspondent supplying a formula for best lavender water.

[The following is given by Piesse ('Art of Perfumery,' 3rd edition, p. 96).—Ed. P. J. :—

"Take—

English Oil of Lavender . . .	4 oz.
Spirit	3 quarts.
Rose Water	1 pint.

Filter, and it is ready for sale."]

[367]. INSECTICIDE.—Would you kindly allow me to ask, through the medium of the Journal, if any reader could tell me how to go about clearing a closet (by my kitchen fireside) which is infested with ants ? I cannot find any nest of them, but any article placed in the closet gets covered with them.—W. Rudd.

[368.] POMADE.—Would you kindly oblige me with a formula for a pomade, with a colour that will stand sunlight ? I find it is difficult to produce an article which will not turn white round the sides of the bottle. – J. W. Y.

[369.] AQUARIUMS.—What is the best grass, etc. to put in a leech aquarium ?—T. P. Clark.

[370]. HOMINY.—A customer of mine asks me for a dietetic preparation called "Hominy." I have tried in vain to get it. Can any reader give me any information respecting such a preparation ?—*J. T. H.*

ADMINISTRATION OF PHOSPHORUS.—Mr. S. M. Bradley of Manchester, in a letter to the *British Medical Journal*, publishes the following formula for the administration of phosphorus, constructed by Mr. Potts, Dispenser to the Manchester Royal Infirmary :—Ten grains of phosphorus are dissolved in two ounces of ether, the solution being agitated from time to time. Of this solution, one minim (containing one-hundredth of a grain) is administered in an ounce of water with half a drachm of glycerine. The glycerine suspends the phosphorus so perfectly that a transparent mixture is the result. It is stated to be tasteless, but the addition of a little bitter infusion would effectually cover any trace of the savour of phosphorus.

Correspondence.

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

Pity the Poor Plucked Preliminarians.

Sir,—I had recently occasion to question the correctness of the circular which plucked preliminarians receive in reply to their inquiry as to what part of their examination paper was so faulty as to cause their rejection. All the unfortunates receive the same reply—that they had failed "in every subject." In reply to my inquiry fuller information was given me in confidence, and an intimation that the circular in question did not fairly convey the meaning intended by the Board of Examiners, and that it would be altered. This was so far quite satisfactory, and I might have let the matter rest had it not been that some hundreds of preliminarians have been plucked, and I do not know how many of them may be suffering from the impression that injustice has been done to them, or are discouraged from trying again, knowing that they had worked honestly, and believing that they had done fairly well in one or more of their subjects, and yet being informed that they had failed in them all. In my very limited acquaintance with plucked candidates I know some, having feelings such as those alluded to, have resolved to quit the trade. Now, my object in writing is to give a word of encouragement to the downhearted, and to advise them if they can induce the Board of Examiners to give them the information as to which was their weak point that they should steadily give two nights a week to that subject, and one night a week to each of the others, through the winter, and when they present themselves again to commence answering the questions in a subject in which they feel some confidence of success; then take the most difficult, the consciousness of having gone through the first satisfactorily will relieve them of the nervousness which a candidate is apt to feel at the commencement, and the knowledge that he has something less formidable to finish with, will encourage him through the difficulty. Some say too much is made of this question of nervousness, but I cannot agree with them so long as I find examined men who do not understand the meaning of five per cent., and cannot convert grams into grains with the aid of the Pharmacopœia, and plucked men who at home appear in all respects better qualified.

And as an ex-member both of Board and Council I would like to give publicity to my opinion that the best thing for plucked students would be to let them know precisely the position they have taken, and the position they will be required to take before they can be passed; and there might advantageously be added a word of caution against their allowing their better subjects to grow rusty while they were polishing up the more defective.

Barnard S. Proctor.

11, *Grey Street, Newcastle, Nov.*, 1873.

The Benevolent Fund.—A Suggestion.

Sir,—On reading the minutes of the "Council Meeting" held last week, I regret to find the subscriptions to this fund are inadequate to meet its requirements. This I much regret, as it is an institution which has ever had my best sympathies, though I have been unable hitherto out of my stipend as an *assistant* to contribute materially to it.

The discussion following the statement of deficiency has induced me to take a liberty which I trust will not be considered impertinent or out of place, that of making the following suggestion:—

That instead of a circular being posted to every "chemist" throughout the country merely, such "circular," stating in clear and concise terms the objects of the "Fund," having appended to it a list giving the numbers of past recipients, whether pharmaceutical chemists or otherwise, with the amount expended, and further showing the urgent necessity of increased subscriptions to meet the requirements of the Fund, be placed in the hands of a committee in towns where there is a local association, and in smaller places entrusted to the local secretary to be presented "personally" to the members of the trade, and their assistance urgently solicited.

I venture to hope that the short time necessarily employed in calling upon these gentlemen would be devoted ungrudgingly, as large towns might be divided into districts, which would greatly facilitate the work and decrease individual labour, each taking a part.

I think one reason why the Fund is not more generally supported is, that its operations are not brought forward with sufficient prominence.

On the majority of chemists, who do not read the "Journal," a communication sent through the post simply would hardly make sufficient impression; such might, however, be used in cases where personal application is impossible.

I think, sir, if some such plan were to be adopted, and the committees were to work in the spirit of true benevolence a noble result would follow.

Local cases might be cited to show that the Fund was distributing its benefits to many who through misfortune, sickness, or old age, were unfortunately compelled to apply for help.

Could these nonsubscribers but once see for themselves the look of gratitude and thankfulness which is lit up in many a poor wan face by this means they would not readily withhold their hand.

As I write I see before my mind's eye the form of one old gentleman who has been the "recipient" of this bounty, and as I remember his aged and decrepit form—bent with the weight of many years—I see his face before me bright with happiness once again, and hear him say in language simple but *sincere*: "I am very thankful, very; please tell the gentlemen I am *very thankful*. My friends paid more than one hundred pounds premium for me *once*." And I notice as he turns to go, the tear just now glistening in his eye falls upon his rugged hand, and mingles with the modicum just received.

Then can nothing be said about the widows and orphans? Surely compassion *must* be felt for them.

It may be suggested that "Charity begins at home," therefore I beg to enclose my humble contribution to an object which I believe to be alike admirable and humane.

E. R. L.

Sheffield.

[*** We beg to acknowledge the receipt of the stamps enclosed as our correspondent's contribution to the Fund, and have handed the same to Mr. Bremridge.—Ed. Ph. J.]

How to Increase the Revenue of the Benevolent Fund.

Sir,—My time will not permit me to write a long letter in support of the proposition I am about to make; but I trust its practicability will be self-evident. I beg to suggest to the Committee of this Fund, as a means by which to increase its income and of obtaining subscriptions from the general body of chemists and druggists as well as pharmaceutists, that a circular letter be addressed to every local secretary, requesting that a meeting of the trade be called, and that a committee be elected to canvass the town for subscriptions. Some statistics should at the same time be furnished. In this way there is little doubt a large addition to the annual income might be made.

F. M. Rimmington.

Nov. 10*th*, 1873.

Honour to whom Honour is Due.

Sir,—I think it should be more generally known that the firm of wholesale druggists, Southall, Son, and Dymond, of Birmingham, have long publicly condemned the practice of calling effervescing citro-tartrate of soda "citrate of magnesia," having for some years labelled all they sent "so-called," and more latterly attaching a slip certifying what the ingredients really were. I believe I am correct in stating that the late George Dymond, whose sudden death was mentioned in your last Journal, was the first to call public attention to the misnomer, and to urge on chemists the desirability of adopting a correct name. A reference to the report of the Conference Meeting in Dundee will bear out my statements. It is there stated that at the conclusion of Mr. Dymond's paper, "Several Members took part in the discussion, etc., etc. . . . the general feeling, however, did *not* appear to be that the practice of using the conventional name of Granular Citrate of Magnesia was an *abuse demanding protest*." Then again at the Liverpool Meeting, although Mr.

Dymond's resolution was carried, the members were far from being either unanimous or warm on the subject. Compare these two, however, with the Evening Meeting of the 5th instant, where every member appeared only too anxious to clear his conscience. Mr. Bishop's repentance comes too late, himself and his brother manufacturers should have taken the matter into their consideration six years since, and not have left its settlement to a police magistrate.

Mr. Dymond's persistency through dire opposition has at length been fruitful, and it is a curious and sad coincidence that the evening before the meeting to which reference has been made Mr. Dymond breathed his last.

M. J. ELLWOOD.

Leominster, Nov. 10th, 1873.

THE SO-CALLED "CITRATE OF MAGNESIA."

Sir,—The "effervescent citrate of magnesia" seems to have thrown the trade into a panic. How far this is justifiable remains to be seen.

This article, primarily the speciality of one manufacturer, has become such a favourite of the public and physicians that other makers have been called into existence, more or less faithfully imitating the original formula. The original compound did, and still does, contain magnesia as a salt, and many of the preparations of other makers contain it also, and produce the citrate of magnesia when in solution. Whether citrate of magnesia be formed depends entirely on the proportions of bicarbonate of soda, sulphate of magnesia, and citric acid used. If citrate of magnesia be *not* formed carbonate of magnesia can be thrown down by boiling the solution of the granule and volatilizing the excess of carbonic acid. To sell citro-tartrate of soda for the magnesian compound is manifestly wrong, and is open to be characterized by the legal term fraud, as I understand it. This was Mr. McDermott's case.

The magnesian granule is certainly not a citrate until in solution, but then no more is the citro-tartrate of soda, which is an authorized medicine.

Again, "citrate of magnesia" is said to be liable because it contains other articles than citrate of magnesia. Well, so also do sulphate of beberia, (for which, by-the-bye, a chemical formula is given in the B. P.!) soap liniment, the solutions of arsenious acid, and ammonio-citrate of bismuth. The last-named is very similar to the magnesian preparation, inasmuch as it also is a citrate combined with abundant quantities of other unnamed substances. The term applied to it is intended to represent a speciality and a definite solution of a salt, but the preparation contains other and, perhaps, antagonistic substances.

Some of the alterations of name proposed would still leave us within the scope of the Act. Thus Mr. Bishop proposes to designate the compound a citro tartrate of soda with *magnesia* and sugar, but how comes it that free magnesia can exist with carbonic and citric acids in the same solution?

Mr. Umney proposes "effervescing citrate," but this leaves the tartrates unnamed, and seems to be as objectionable as our present name.

I proposed at the meeting to call the preparation effervescent compound citrate of magnesia, and if physicians would so order it we should be able to understand when the granule or when the salt was required.

The Act, as I understand it, was intended to catch wilful adulterators, and not to stop the sale of popular articles by micro-chemical definition. Let the trade therefore demand the immediate repeal of the Act, and substitute in its stead one that will catch the fraudulent without becoming vexatious.

GEO. BROWNEN, F.C.S.

Laboratory, 143, *New Bond Street, London, Nov. 8th*, 1873.

Sir,—The discussion at the last Pharmaceutical Evening Meeting commends itself to the attention of every pharmacist. I feel, therefore, no apology is needed in adding a few further remarks upon the same subject.

The chief point, of course, is the settlement of the name by which the preparation long known to the public as citrate of magnesia is in future to be recognized—*i. e.*, to re-christen an old friend so as to satisfy the demands of our legislators, and at the same time be intelligible to the general public.

Being absent from home through sickness, I am unable to refer to the Adulteration Act, but so far as my memory carries me I do not remember that that Act requires the distinct avowal of the exact composition of every article offered to the public; hence, would it not be far more simple and desirable to all parties (analysts excepted) at once to drop any attempt at a chemically accurate name, and to introduce one in no way committing either manufacturer or retailer? We have already an endless catalogue of such names—*e.g.*, Dover's Powder, Gregory's Powder, Parrish's Chemical Food, Seidlitz Powder, etc., familiar household terms representing definite preparations, the assumed compositions of which, to a great extent, are known by the purchasers, although in no way hinted at by their respective names. Might not the same be adopted in the present case, instead of inflicting upon our customers and their not always over-intelligent messengers, such to them unintelligible terms as "Citro-tartrate of soda, with magnesia, sugar, and lemon flavour?" What might we not expect such a name to be turned and twisted into before being asked for at our counters?

The addition of "known by the public as, etc.," of course being intended to stem over a temporary difficulty, should be dropped as soon as the new name becomes sufficiently familiar to the public.

One difficulty alone presents itself to the absence of any reference to the composition of the article in question, viz., the fact that magnesia being so intimately associated therewith in the public mind its retention seems an absolute necessity, but on the authority of Mr. Bishop we are assured that magnesia not only *is* an ingredient of his preparation, but that its presence is absolutely desirable. May we not therefore fairly assume that in future its addition will be universally adopted by all makers, and the quantity also increased, as far as practicable, so as to render its presence no longer a questionable fact.

The name I would venture to suggest as embracing all these requirements, is—Granular Effervescent Magnesian Saline—with the additional statement (*pro. tem.*)—originally called Citrate of Magnesia. It appears to me this would be a simple and sufficiently clear exponent of the article to which it would be attached. Commending it as such to the consideration of the trade.

EDWIN B. VIZER.

Montpelier Road, Brighton, Nov. 11th, 1873.

Sir,—With regard to the recent discussion on the so-called citrate of magnesia, we must all agree that it is highly desirable to alter the name of the old familiar preparation as *little as possible*, and it has occurred to me that the following designation would meet the requirements of the Act, and protect the trade from more unfair prosecutions:—"Granular Effervescent Citrate, *with* Magnesia." This form presents simply the trifling alteration of one word, without any pretension to a definite chemical composition which it may not possess. And it would be only necessary for practical purposes, that it should contain *some proportion* of magnesia.

The basis of the late prosecution evidently consisted of the fact that the label signified a definite compound which analysis in that particular case proved not to exist.

H. J. BROUGH.

30, *Conduit Street, London, W., Nov.* 11, 1873.

Sir,—Having been somewhat exercised in my mind of late, in common, I suppose, with all other chemists, on the subject of the misnomer, "Citrate of Magnesia," it has occurred to me that since magnesia is as stated by Mr. Bishop, the essential ingredient in the compound, the best name would be, "Effervescent *Granules* of Citrate of Magnesia," which would come under the same category as pills of iodide of iron, or lozenges of bismuth, etc., etc., and would involve less alteration in the words than any name I have seen suggested.

It is of course superfluous to inform the public that the above pills are compounded with the aid of liquorice, etc., as it is that the lozenges are made up with sugar, and it seems to me that it would be equally unnecessary to enlighten that body as to the nature of the excipient used in the formation of "Effervescent Granules of Citrate of Magnesia."

J. GIBBS.

Cheltenham, Nov. 11th 1873.

THE SO-CALLED CITRATE OF MAGNESIA.

Sir,—Having read the discussions which took place at the Pharmaceutical Meeting on the 5th inst., respecting the name of the above article, etc., being difficult to get at a proper one, in consequence of the new Adulteration Act, I propose the following label to be adopted for it, with safety, from any analyst or Act of Parliament :—

For the Profession.
SODÆ CITRO-TARTRAS EFFERVES. CO.

For Retail.
Compound Effervescent Citro-Tartrate of Soda,
Known by the Public as
CITRATE OF MAGNESIA.

This form of label is equally as proper for the above preparation as the term "compound tincture of cardamoms" is for that preparation: if the latter term be legal the *former* is quite as legal. I think a formula for the preparation should be inserted in the Appendix to the British Pharmacopœia.

D. J. T.

Brixton, S.W.

REMUNERATION OF ASSISTANTS.

Sir,—Observing in your last issue a letter from Mr. Heynes respecting "Remuneration of Assistants," allow me to supplement it by a few remarks as to my own experience in the matter, leaving your readers to judge of the pecuniary encouragement held out in some quarters to the rising generation of pharmacists.

Some few years ago, having completed a six years' apprenticeship, I heard of a vacancy for an outdoor assistant in an establishment holding a foremost position in a northern city, and I accordingly made personal application. The principal (who by-the-bye, rejoiced in the title "Pharmaceutical Chemist"), after putting numerous questions as to experience and capability, and requesting me to furnish him with a specimen of my caligraphy, in the form of a label for "two tablespoonfuls to be taken three times a day," offered to conclude an engagement (*outdoor*, remember,) with me, for three years, at the rate of £40 for the first year, £45 for the second, and £50 for the third. Comment is superfluous, I therefore merely add as my opinion that those who are unable, or unwilling, to offer more than such pittances as the above-named should work the harder themselves instead of holding out temptations to dishonesty in the shape of salaries such as would be spurned by the commonest unskilled labourer.

AN ASSOCIATE IN BUSINESS.

Mexborough, Nov. 11th, 1873.

REMUNERATION OF CHEMISTS.

Sir,—In reply to E. L. H., I would beg to inform him that before attempting to point out to "Sensitive" what he already knows, it would, in his opinion, be decidedly better to get a more extended knowledge of the subject. If E. L. H. thinks it worth his while to call upon "Sensitive" he will try to explain matters to him, his predecessor being abroad, and therefore unable to give an account of his miscalculation. As this was not the first, second, or, I might say, the twentieth offence by the house spoken of, "Sensitive" felt justified in penning the letter of the 18th. more especially as the gentleman, who had up to that period been a good book customer, has almost discontinued coming at all, attributable no doubt to the exorbitant price, as he then called it, of the liniment. Perhaps his being a foreigner will partially excuse his young ideas of English prices, still, had "Sensitive" occupied the position he now does, he would not have charged less than 2*s.* 6*d.*—so much for the house in question. Perhaps another would serve to strengthen my statement. The following was left at the same house by a German and charged 1*s.* 6*d.*; afterwards with a first-class chemist in Bayswater, "not at Chelsea," who also was surprised at the extremely low price. The same will vouch for the truth of the above fact:—

℞

Quinæ Disulph. . . . . gr. xxxvi.
Divid. in pulv. xii.

SENSITIVE.

520, *Oxford Street, W.*,
Nov. 10th, 1873.

"*An M.P.S. from the Country*" is referred to the rule respecting anonymous contributions.

P. M.—See the British Pharmacopœia, under "Alcohol Amylicum."

"*Alpha*"—The publication referred to is the *British Journal of Dental Science*, published monthly by Messrs. Churchill, price 1*s.*

C. H. L.—See some particulars respecting croton chloral in the present series of this Journal, vol. ii., p. 424, and vol. iv., p. 233. See also *Brit. Med. Journ.*, p. 484.

W. J. S.—A formula for Ol. Morrhuæ c. Ferro was given in vol. ii., p. 858, and see also p. 488 of the same volume.

H. Whitrod.—We should recommend you to study carefully Wanklyn's work on "Water Analysis."

"*Chemist*" (Bourne).—Formulæ for Glycerine Jelly have been given in the present series of this Journal, vol. i., pp. 397 and 497. We are unable to answer your second question.

J. W. Y.—(1) See preceding answer. (2) It would be one of the lower oxides of nitrogen. (3) Although ¼ grain of phosphorus would be a very unusual dose, still larger doses than those you mention are given. For instance, Mr. Thompson reports (*Practitioner*, July, p. 16), that a patient took ¼ grain every four hours for some days without harm. But the object of the formula was the pharmeceutical one of furnishing a method of exhibiting phosphorus in pills rather than of prescribing any fixed dose.

Brighton Association of Pharmacy.—The report of the opening meeting of the session, on Friday, the 7th instant, has reached us just as we were going to press, too late for insertion in the Journal for this week.

C. Crook.—The crystalline deposit referred to was normal carbonate of ammonia. We should imagine that either the distillate was not perfectly mixed, or else the spirit of wine was deficient in strength. Did you determine the specific gravity?

J. H.—We should recommend 'Pereira's Elements of Materia Medica,' by Bentley and Redwood, or 'Garrod's Materia Medica' (latest edition), and 'Attfield's Manual,' or 'Roscoe's Elementary Chemistry.'

"*Spes.*"—Apply to the Secretary, 17, Bloomsbury Square, for a copy of the pamphlet entitled, "Hints to Students."

Dr. Charles Kidd certainly does not fail in the Quixotian desideratum that every knight should have a grievance, but we are constrained to inform him that we cannot undertake to discuss subjects of such purely medical character as the relative anæsthetic merits of chloroform and ether, and in reference to his repeated attempts to make this Journal a medium for the publication of his opinions and arguments on this topic we must again refer him to the medical press as the proper channel for him to have recourse to. As regards our criticism of Dr. Kidd's grammar (see p. 359) we are really sorry he appears to have been unable to smile at it, though we fail to understand the reason he assigns. We may take this opportunity, however, of informing Dr. Kidd that there is no novelty whatever in the ether which he terms "new," nor anything unknown as to the specific gravity he refers to; but his supposition that perhaps not one London chemist is aware of such an ether is a delusion we hope peculiar to himself.

The Half-Yearly Abstract.—Dr. W. Domett Stone writes in reference to our brief notice of this work (p. 359) a letter which we presume he desires us to regard as a reclamation, but as he abstains from pointing out "all the errors" he supposes we have fallen into, we must be equally reticent in our reply as to the objection he raises to the statement in the first line of the notice, which he says "is at variance with fact"; we can only say that in that case there is the less excuse for the blunders we pointed out. The array of names quoted as having borne testimony to the virtues of "chlorozone" in no way alters our opinion that Dr. Domett Stone's admiration of that nostrum is not shared by competent chemists.

Mr. Bourne.—Your advertisement and enclosure have been handed to the publishers, to whom all similar communications should be sent.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Benger, Dr. Burchardt (Berlin), Mr. Baynes, Mr. J. Young, Mr. Hart, Secretary of the Carlisle Chemists' Association, Mr. Horncastle, Mr. Twemlow, Mr. Knapman, F. W. S.

THE TEACHING OF VEGETABLE MATERIA MEDICA.*

BY PROFESSOR PLANCHON.

Among the characters which are useful in determining the identity of a substance, there are some which are very easy to recognize ; which are exterior and appeal immediately to the senses, without previous preparation : these characters may be called *easy*. There are others which require, before they can be put in evidence, a certain amount of preparation, because they are more internal and belong to the disposition and arrangement of the tissues ; they are *more difficult* to establish, and generally, because of this difficulty, they are neglected, and the exterior characters employed by preference. To this there would not be any great objection if these "easy" characters were as sure, as constant, and consequently as important, as the others ; I will say more, if they were sufficient. But it is in this matter as it has been with the various methods of classification of plants. In the last century botanists followed the Linnean system ; but since the time of the Jussieus, De Candolles and others, they have classed plants according to the natural system. And yet it is much more easy to recognize that a plant belongs to a Linnean class,—it being for this frequently only necessary to count the stamens or styles,—than to allot it to one of the natural families since established by botanists. Why then has a convenient system been laid on one side in order to accept a method much more difficult ? The answer is, because the characters of the natural families have an importance and scope very different to those of the artificial groups of Linnæus. And the same course ought to be taken with the materia medica. The *important* and not the *easy* characters ought to be sought ; and it may be shown, not merely by theoretical considerations, but by a series of examples, that the structural characters predominate over all others in value.

In teaching this subject the more natural means would evidently be to place the various preparations required for a demonstration upon the object glass of a microscope, and thus enable the student to seize the salient characters. But this method, excellent for two or three persons, would be absolutely impracticable even for a small assembly ; and it becomes necessary to find some way of placing before all the auditors at the same time the peculiarities to which it is desired to call attention. With this object the following plan was adopted by Professor Planchon, in the course of lectures delivered by him last winter at the Paris School of Pharmacy.

The instrument used, and which was contrived by M. Van Heurck, of Antwerp, was a kind of lantern, with a dark chamber, and containing the necessary arrangements for producing the oxyhydric lime light. Upon the anterior side of the lantern there was a large round opening, to which was adapted, according to circumstances, a large lens, or a Ross's objective, of remarkable clearness. Between the magnifying glass and the light the object to be exhibited was placed, and an image was thus projected upon a white surface, placed at a little distance from the apparatus. In this manner a very exact idea of the general structure of a substance may be rapidly given. It suffices for that purpose to have a skilfully prepared thin section of the substance. Take, for example, a transverse section of turpeth (*Ipomœa turpethum*) : the cortical portion and the large resinous lacunæ that it contains are clearly seen ; then the ligneous tissue, remarkable for the large vessels, the opening of which gives it the appearance of lace work. It will be noticed that this tissue is not all entirely concentrated at the middle of the root, but that isolated fragments appear here and there about the circumference, amongst the cortical tissue.

Such a projection of a microscopic preparation by means of a Ross's objective will give a good idea of the general organic structure ; but the magnifying power is not sufficient to show certain details which sometimes it is necessary should be observed. Potato fecula, for example, is formed of small grains, of which it is impossible, especially at a distance, to appreciate the exact form and peculiar structure. In such a case, in order to supply the deficiency of the magnifier, the microscopic projection can be photographed, by which means an image already magnified is obtained, and this photograph may afterwards be further magnified by means of a large lens. In this manner a considerably developed image of the microscopic preparation can be obtained. Pending the preparation of such photographs, another but much more imperfect method has been adopted at the Paris School of Pharmacy. Upon a sheet of ground glass, which will readily take a crayon mark upon its rough surface, a drawing of the object is made. A coat of varnish over the design renders the ground glass transparent, and allows of the projection of the image on to the screen. By means of these methods combined, it is possible to exhibit a series of preparations showing the utility of the study of the anatomical structure for the determination (1) of the true characters of simple drugs, (2) of their botanical origin, and (3) of the seat of certain principles which they contain.*

1. *The Anatomical Examination of Substances as a Means for the Determination of their True Character.*

Whilst the characters of dimensions, colour, odour, and taste are sometimes not very constant in the same substance, the structural characters are identical in various specimens of the same species. Take a microscopic preparation of Vera Cruz sarsaparilla, a transverse section, for instance, and the following layers will be found ranged from the exterior to the interior :—(1) A very thin primary zone, formed of cells with thick walls, much crowded one against another ; (2) A second and much broader zone, composed of cells containing a quantity of small starch grains ; (3) A third zone, remarkable for the number of orifices that render it porous, which are the openings of the large vessels characterizing the ligneous portion of the roots ; (4) A kind of central pith, of analogous structure to that of the second zone. Between the second and third zone may be remarked also a thin circular line of a darker colour than the rest. Examined under considerable magnifying power, this layer appears to be composed of very special cells. Their form is elongated in the direction of the ray, and their walls are unequally thickened in such a manner that the wall furthest from the centre

* Abstract from a lecture delivered at the General Meeting of the Pharmacie Centrale of France (*L'Union Pharmaceutique*, xiv., 305).

* During the remainder of the lecture each point was illustrated by microscopical sections, magnified and projected upon a screen in the manner previously described.

remains thin, while the lateral walls enlarge in proportion as they approach the internal wall, which becomes very thick. It results that the interior cavity of the cell appears, in transverse section, in the form of a triangle, with the base towards the exterior, and the apex turned towards the centre of the root. At whatever point Vera Cruz sarsaparilla may be cut it presents the same characters, both in general arrangement of the structure and in the details of the layer of cells that has just been described. If this sarsaparilla be compared with other commercial varieties, it will readily be seen that (1) All the commercial species present general structural characters that are quite analogous, they being found equally in transverse sections taken from Brazil, Honduras, and Caracas sarsaparillas ; (2) That each sort presents specific characters which can assist, and indeed suffice, for their determination. Compare, in fact, the relative thickness of the ligneous zone in Vera Cruz sarsaparilla with that in Caracas sarsaparilla, and it will be seen that whilst the one is considerable, the other is very much narrower. Besides, if the cells of the characteristic layer be examined attentively it will be found that the cells of the Caracas sarsaparilla are square and the cell walls equally thick in all directions, whilst the cell walls of the Vera Cruz variety are, as has been said, very unequal in thickness. By combining these two characters—the relative thickness of the different zones and the various forms of the characteristic cells—the differences between the several kinds of sarsaparilla may be sufficiently defined, although it would be very difficult to distinguish them by a simple examination of the exterior.

This very important fact—that the various species of the same natural group of substances present at the same time characters in common which allow of their being united as a genus, and also peculiar characters by which they can be distinguished as species—is not special to the sarsaparillas, but may also be shown in a certain number of very natural groups of products. Take, for example, the cinnamons yielded by the genus *Cinnamomum*—China cinnamon, Ceylon cinnamon, cassia lignea, etc. In all of these will be found—(1) A layer of suberous cellular tissue, with fibrous bundles scattered here and there ; (2) A zone of sclerogenous cells, with thick walls, more or less continuous and regular ; (3) A liber zone, containing large cells of mucilage, and the liber fibres disposed regularly. The common characters are obvious, and distinguish very clearly the barks of the Lauraceæ from those of different families, which have been designated as cinnamons, such as *Canella alba*, Winter's bark, etc. On the other hand, the development and greater or less regularity of certain zones, and particularly that of the sclerogenous cells, present sufficiently marked differences to distinguish between the species.

These same structural characters clearly indicate that the substance frequently found in French pharmacies under the name of Winter's bark, does not answer at all to the characters of the genus *Drimys*, to which the true Winter's bark belongs, but to those of the Canellaceæ, recalling rather those of *Canella alba*. And, in fact, it is now known that this false Winter's bark is the product of a Canellaceous plant, the *Cinnamodendron corticosum*, Miers.

Another example, that of the roots of the genus *Aristolochia*, also shows the constancy of the characters in the various substances of a single group. The root of *Aristolochia cymbifera* presents to the naked eye a very special structure, especially in the disposition of the ligneous bundles, with large vessels, which spread like a fan from the centre of the root towards the cortical portion.

These same characters will be formed in the rhizome of *Aristolochia serpentaria*. They can also be recognized, though reduced and distorted, in *A. Clematitis*, *A. longa*, and *A. rotunda*. There results from this an excellent method for distinguishing Virginian serpentary from substances that resemble it—the Maryland spigelia, for example, which has all the elements of the ligneous zone arranged regularly in concentric layers around a medullary canal.

From what has been said it will be evident that an anatomical study of the roots, barks, etc., which are met with in our pharmacies, would furnish very constant characters for the determination of species as well as of natural groups, which would be much more trustworthy than purely exterior characters.

2. *The Value of the Anatomical Method of Investigation in Recognizing or Confirming the Botanical Origin of a Substance.*

There are some simple drugs which, although widely diffused, are of doubtful origin. In this case the officinal rhubarb was, until recently, to be found. It was well known that it was yielded by a plant of the genus *Rheum*, but to what species could it be referred ? It was there that uncertainty commenced. As soon as a new plant of this genus was discovered, the officinal substance was usually attributed to it. In this manner it has successively been considered to be the product of *Rheum undulatum*, L., *R. compactum*, L., *R. palmatum*, L., *R. Emodi*, W., etc. Lastly, Guibourt thought, from some experiments in cultivation, that the *Rheum palmatum* was certainly the mother plant of rhubarb, an opinion that has passed into many works on materia medica, and was unanimously accepted in France. Nevertheless, there is a considerable difference of structure between the roots of *Rheum palmatum*, which Guibourt had taken for a type, and the rhubarb of the pharmacy. Whilst the first showed medullary rays regularly diverging from the centre to the circumference, the true rhubarb has an extremely complicated tissue, in which it is very difficult to follow the course of those rays ; besides, it is marked by numerous very special stars, which may be projected on to the screen in their natural colours. They are formed of yellow (medullary) rays, starting from a common centre and diverging into the midst of the white ligneous tissue.

Such a difference of structure appeared to indicate a corresponding difference in origin. Already I had expressed a doubt as to the true rhubarb being a product of *Rheum palmatum*, when a new species, obtained from fragments of rhubarb, nearly rotten, but still containing some buds, came to confirm that supposition. This *Rheum*, which M. Baillon has described under the name of *Rheum officinale*, produces, in fact, stems presenting all the structure of rhubarb. Everything proves that we have now to do with the veritable mother plant of the substance of which China has so long monopolized the production. Anatomical study had, therefore, in this case, foreshadowed that which events have shown to be true, namely, that the species of *Rheum* hitherto known might produce the home-grown rhubarb, but were none of them the source of the true officinal product.

Another example will show how anatomical investigation will assist at the same time in distinguishing between neighbouring species and determining their true origin. Under the name of striated ipecacuanha until recently had been confounded two roots rather similiar in their external appearance, but in reality very distinct: these are the ipecacuanhas that I have recently named the "major" and the "minor" striated ipecacuanhas.* Images of transverse sections of these two roots, thrown upon the screen, will show considerable differences of structure between them. In the "major" kind—which, under the name of "violet ipecacuanha," I first met with at the Pharmacie Centrale—the cortical layers contain not a trace of starch, but a substance which strongly reduces the cupro-potassic liquor; the ligneous tissue contains vessels with very small openings, scarcely to be distinguished from the surrounding liber tissue. In the other ipacacuanha the bark is gorged with starch, and the ligneous portion has large vessels with openings that render those layers quite porous. These characters would be sufficient to distinguish clearly between the two roots.

This point ascertained, it remained to determine the origin of these products. Now, the striated ipecacuanha had been attributed by authors to the *Psychotria emetica*, Mutis, and it was presumable that, in fact, that plant did yield one of the forms of the striated ipecacuanha. But which of the two? To resolve this question, there remained but to procure roots of *Psychotria emetica*, and see if their structure agreed with that of either of the two ipecacuanhas. This I have been able to do, thanks to the kindness of M. Triana, who has sent me authentic roots of *Psychotria*. An examination of a transverse section of one of these roots shows that it is easy to recognize in it the structure of the "major" striated ipecacuanha, and it may thence be concluded that it is this commercial variety which is really yielded by the New Granada plant. As to the "minor" striated ipecacuanha, it is impossible, at present, through want of sufficient materials, to determine its origin. These examples will demonstrate sufficiently the method by which, in a great number of cases, we might proceed to discuss or confirm a doubtful or contested botanical origin.

3. *Value of the Study of the Structure in the Determination of the Seat of Certain Active Principles.*

It is easy to understand that when the active principles are contained in special reservoirs, the true method of ascertaining their seat is to seek in what layers those organs are placed. It is thus that even by the naked eye it is possible to see that the most active portion in the rind of an orange is the outer zone of the pericarp, which is filled with large glands containing essential oil.

That which in the preceding case may be recognized without employing any magnifying power, may be easily recognized by means of a glass or a microscope in a great number of substances—roots, bark, etc., which owe their activity either to resins or essential oils. Take, for example, transverse and longitudinal sections of angelica root. The glands containing oleoresin—nearly circular in shape in a transverse section, and fusiform and elongated in the longitudinal section—can be very easily distinguished, and it can be seen that these cavities occur nearly exclusively in the bark. Take, again, a section of elecampane root. Still larger glands are seen, and they occur scattered through both the cortical and ligneous portions. In jalap root the cavities which contain the resin—the active principle of that substance—can be seen very distinctly, and it will be observed that these reservoirs form pretty regular concentric layers around the centre of the root. In a fragment of squill bulb there may be seen the large crystals which resemble veritable barbs arranged one against another, in such a manner as to produce upon the skin, when struck with a piece of fresh bulb, small excoriations which allow the acrid matter to penetrate and exercise its irritating action.

These examples might be multiplied, but I will use only one more, because it is at the same time very clear and very curious; it is a section of a leaf of *Aloë socotrina*, showing that it is the seat of the bitter juice that yields aloes. At first sight there appears a central mass, formed of a loose cellular tissue; this portion is full of a kind of inert mucilage, which it is desirable as far as possible to remove in the preparation of the aloes. On the other hand, there will be seen at the exterior a thin layer of epidermis which also contains no active matter. It is between these two portions, and in the midst of the fibro-vascular bundles, that may be seen the special cells which contain the coloured bitter juice sought for in the leaves.

Here I will stop, in order not to fatigue the attention with too many details. My object will have been attained if by this rapid exposition I have demonstrated not only the interest of these studies from a theoretic point of view, but also, and especially, the necessity of bringing them down from the domain of pure science into that of daily practice. The difficulty is less than it appears, and the results are of the first importance. I should be happy if employers, convinced of this truth, would support these methods of study by the authority of their personal experience, and would encourage their young pupils, over whom they may so legitimately exercise their influence, to enter into so fruitful a field.

* See PHARM. JOURN. [3], vol. iii., pp. 521 and 642.

THE MODERN PROGRESS OF CHEMICAL INDUSTRIES.*

BY AIMÉ GIRARD.

(*Concluded from page* 388.)

Search the coasts of France and there will be found a source of potash of incomparable beauty. This source is the sea, by which on three sides France is surrounded, and which offers in abundance its industrial as well as its alimentary riches. It is an inexhaustible mine. The saline compounds that it holds in solution are numerous. To speak only of the more important, each litre of sea-water, taken either from the ocean or the Mediterranean, contains at least 25 grams of chloride of sodium and one gram of chloride of potassium.

Imagine those vast flat areas known as salt marshes covered with sea-water, which is left to evaporate spontaneously; gradually concentrating, the time arrives when the chloride of sodium, incapable of remaining longer in solution, is deposited in a solid crystalline state. Formerly, this concentration was never carried to extreme limits; at the end of a few weeks, when the deposit had acquired a thickness of ten to twelve centimetres, the salt was

* Abstract of a lecture delivered at Lyons upon the occasion of the visit of the French Association for the Advancement of Science. (*Moniteur Scientifique*, vol. iii., p. 851.)

removed, and the water not yet evaporated—the "caumère" as it is termed,—was rejected, without a thought as to the riches it might contain—riches amongst which naturally figured the potassic compounds. It was thus that from time immemorial affairs passed upon the Mediterranean coast, and each year enormous quantities of potash, lost to industry, were returned to the sea from which they had proceeded a few months previously.

Was it then a difficult matter to collect these salts of potash, and to store up these lost riches? Truly, it was, and it required nothing less than the science of a master, M. Balard, and the tenacious skill of one of those manufacturers who do honour to their country, M. Merle, of Salyndres, to accomplish it. The process of M. Balard for treating the "eaux mères" of the salt marshes consisted in a series of double saline decompositions of extreme delicacy, the accomplishment of which required the assistance, not, as usual of heat, but on the contrary of an energetic cooling, of a true congelation. Refrigeration of this kind was hardly known on the coasts of the Mediterranean, and the method of M. Balard would very probably, in spite of its elegance, have been confined to the region of scientific experiment, if in the first rank of modern discoveries the machines for the artificial production of ice had not appeared. The refrigeration that the climate of the Mediterranean refused was quickly demanded from these machines. At an enormous expense powerful apparatus were constructed and set up in Camargue, at the great salt works of Giraud, and the manufacture was at once commenced. Twenty-five years of study had been necessary to ensure success, but the success was complete. Attempted in 1835, by M. Balard, and followed up with indomitable courage, about 1860, the extraction of potash from sea water was accomplished, and the product was successfully introduced amongst the products of chemical manufacture.

But the success was only to be ephemeral; to the efforts already made it was necessary to add still greater, and at the moment that it was thought the new industry had reached port it came into violent collision with an unknown rock, from the shock of which it is wonderful that it did not founder. A marvellous discovery, one crushing in its effects to all producers of potash, came suddenly to enrich their neighbours across the Rhine. At Stassfurt, enormous mines of rock salt were being explored, and above the thick beds of which those mines were constituted, were found, disposed regularly in successive layers, all the saline compounds yielded by the "eaux mères" of the salt marshes, as though in this bed, hitherto unknown, some immense sea had deposited, first, the marine salt, then the magnesian compounds, and finally the salts of potash which it originally held in solution. How terrible a blow was thus dealt at the new French industry may easily be divined. At Stassfurt, in fact, neither large evaporating surfaces to separate the salt, nor powerful refrigerators to cause the double decomposition, were required; it was only necessary to dig up from the mine the potash ore,—carnallite,—and boil it with a little water in order to obtain the chloride of potassium nearly pure. The appearance of the Stassfurt potash in the European market worked a complete revolution; chloride of potassium worth previously 55 francs the 100 kilograms fell at once to 22 francs, or more than 50 per cent. But the men who had brought the new manufacture to the point of success were not discouraged; they had fought so long that still to fight appeared to them only natural. M. Merle and his colleagues set to work, bravely took up again the economic study of their processes, and modified them in accordance with the necessities of the situation. To the primary action of cold they added the secondary action of well-applied heat; they called to their aid skilful mechanical contrivances, and advancing slowly but surely in the path of reform, they reconstituted their processes, and a second time saw success smile upon their efforts. And thus, after ten years of fresh struggles, the French potash industry is again set on foot; potash is manufactured regularly at Camargue, not far from Lyons, and already not less than ten or twelve hundred tons of potash compounds are delivered annually, which neither in quality or price have anything to fear from foreign competitors. A new source of wealth has been definitely acquired by the country; and this conquest once more teaches that in pacific industrial fights, as well as in others, it is necessary never to despair.

Many other evidences of progress might yet be described in pursuing the study of the manufacture of chemical products. We might note the manufacturer on the watch to collect ammoniacal compounds wherever they present themselves; or point to the working of the enormous beds of calcareous phosphates discovered on all sides in France, in the Lot as well as in the Ardennes, at Bellegarde as at Boulogne-sur-Mer, and which, converted into more easily assimilable phosphates, and mixed with the ammoniacal salts just referred to, become in the hands of agriculturists powerful fertilizing agents. There is also the manufacture of alum—sulphate of alumina—in France by the utilization of the bauxite of Tarascon, in England by the employment of the recently discovered native phosphate of alumina. Finally, there are those innumerable industries which all, as was said at the commencement, revolve around sulphuric acid as around a common centre.

A DISCOURSE ON MOLECULES.*

BY J. CLERK MAXWELL, M.A., F.R.S.,

Professor of Experimental Physics in the University of Cambridge.

An atom is a body which cannot be cut in two. A molecule is the smallest possible portion of a particular substance. No one has ever seen or handled a single molecule. Molecular Science, therefore, is one of those branches of study which deal with things invisible and imperceptible by our senses, and which cannot be subjected to direct experiment.

The mind of man has perplexed itself with many hard questions. Is space infinite, and if so in what sense? Is the material world infinite in extent, and are all places within that extent equally full of matter? Do atoms exist, or is matter infinitely divisible?

The discussion of questions of this kind has been going on ever since men began to reason, and to each of us, as soon as we obtain the use of our faculties, the same old questions arise as fresh as ever. They form as essential a part of the science of the nineteenth century of our era, as of that of the fifth century before it.

We do not know much about the science organization of Thrace twenty-two centuries ago, or of the machinery then employed for diffusing an interest in physical research. There were men, however, in those days, who devoted their lives to the pursuit of knowledge with an ardour worthy of the most distinguished members of the British Association; and the lectures in which Democritus explained the atomic theory to his fellow-citizens of Abdera realized, not in golden opinions only, but in golden talents, a sum hardly equalled even in America.

To another very eminent philospher, Anaxagoras, best known to the world as the teacher of Socrates, we are indebted for the most important service to the atomic theory, which, after its statement by Democritus, remained to be done. Anaxagoras, in fact, stated a theory which so exactly contradicts the atomic theory of Democritus, that the truth or falsehood of the one theory implies the falsehood or truth of the other. The question of the existence or non-existence of atoms cannot be presented to us this evening with greater clearness than in the alternative theories of these two philosophers.

Take any portion of matter, say a drop of water, and observe its properties. Like every other portion of matter we have ever seen, it is divisible. Divide it in two, each portion appears to retain all the properties of the original

* Lecture delivered before the British Association at Bradford, September, 22, 1873.

drop, and among others that of being divisible. The parts are similar to the whole in every respect except in obsolute size.

Now go on repeating the process of division till the separate portions of water are so small that we can no longer perceive or handle them. Still we have no doubt that the sub-division might be carried further, if our senses were more acute and our instruments more delicate. Thus far all are agreed, but now the question arises, Can this sub-division be repeated for ever?

According to Democritus and the atomic school, we must answer in the negative. After a certain number of sub-divisions, the drop would be divided into a number of parts each of which is incapable of further sub-division. We should thus, in imagination, arrive at the atom, which, as its name literally signifies, cannot be cut in two. This is the atomic doctrine of Democritus, Epicurus, and Lucretius, and, I may add, of your lecturer.

According to Anaxagoras, on the other hand, the parts into which the drop is divided are in all respects similar to the whole drop, the mere size of a body counting for nothing as regards the nature of its substance. Hence if the whole drop is divisible, so are its parts down to the minutest sub-divisions, and that without end.

The essence of the doctrine of Anaxagoras is that parts of a body are in all respects similar to the whole. It was, therefore, called the doctrine of Homoiomereia. Anaxagoras did not of course assert this of the parts of organized bodies such as men and animals, but he maintained that those inorganic substances which appears to us homogenous are really so, and that the universal experience of mankind testifies that every material body, without exception, is divisible.

The doctrine of atoms and that of homogeneity are thus in direct contradiction.

But we must now go on to molecules. Molecule is a modern word. It does not occur in *Johnson's Dictionary*. The ideas it embodies are those belonging to modern chemistry.

A drop of water, to return to our former example, may be divided into a certain number, and no more, of portions similar to each other. Each of these modern chemists calls a molecule of water. But it is by no means an atom, for it contains two different substances, oxygen and hydrogen, and by a certain process the molecule may be actually divided into two parts, one consisting of oxygen and the other of hydrogen. According to the received doctrine, in each molecule of water there are two molecules of hydrogen and one of oxygen. Whether these are or are not ultimate atoms I shall not attempt to decide.

We now see what a molecule is, as distinguished from an atom.

A molecule of a substance is a small body such that if, on the one hand, a number of similar molecules were assembled together they would form a mass of that substance; while, on the other hand, if any portion of this molecule were removed, it would no longer be able, along with an assemblage of other molecules similarly treated, to make up a mass of the original substance.

Every substance, simple or compound, has its own molecule. If this molecule be divided, its parts are molecules of a different substance or substances from that of which the whole is a molecule. An atom, if there is such a thing, must be a molecule of an elementary substance. Since, therefore, every molecule is not an atom, but every atom is a molecule, I shall use the word molecule as the more general term.

I have no intention of taking up your time by expounding the doctrines of modern chemistry with respect to the molecules of different substances. It is not the special but the universal interest of molecular sciences which encourages me to address you. It is not because we happen to be chemists or physicists or specialists of any kind that we are attracted towards this centre of all material existence, but because we all belong to a race endowed with faculties which urge us on to search deep and ever deeper into the nature of things.

(To be continued.)

THE ARCHBISHOP OF CANTERBURY ON EXAMINATIONS.

The prizes and certificates won at the recent Oxford Local Examinations for the Margate Centre were distributed to the successful competitors by the Archbishop of Canterbury at Margate on Tuesday afternoon. After congratulating the recipients and their masters and mistresses, he proceeded to deliver an address, in the course of which he said:—

"We live in an age of examinations. He did not know where they were to stop. He did not know that even civic authorities would not, in course of time, be subjected to a kind of competitive examination. Some of them might live to the time when such positions as he had the honour of holding would be advertised as vacant in the public newspapers, and all the world would be invited to come forward at a specified day to compete for the vacant post. Though it was true that a thing might be overdone, yet no man who, like himself, had had practically to do with education could doubt that a really good examination was a necessary part of the preliminary education which fitted youths for manhood. Unless they had these tests, the boy might be going on in a dream during the whole time of his work, fancying he was working when he was making no progress; and the examination was a wholesome stimulus during the work, and a wholesome test at the end. We were, he thought, greatly indebted to the Universities—of Oxford especially, and both Oxford and Cambridge—for having established those strict and real examinations throughout the land. He believed that those who were preparing for competitive examinations were very well acquainted with a system, now too common in the country, which went by the name of "cram," and that a great deal of what appeared as most successful results in many examinations now held throughout the country was of very little value. He had been told, for example, of an eminent tutor who had a vast number of pupils, because his pupils were almost sure to be successful in some of these examinations, who had this mode of enabling his pupils to exhibit before the examiner the writing of essays on any subject of history. The tutor, from long experience and careful study of the questions set in past times, ascertained with almost mathematical precision that one of ten subjects would be set for an essay at the coming examination. He in his study carefully prepared ten essays on ten subjects; one, the history of Queen Elizabeth; another, the influence of the French Revolution on the civilization of the world, and other subjects. Having prepared these day by day, he required his pupils to commit those ten essays to memory. They entered the competition, and, to their delight, they found a familiar subject in the essay proposed, and in a moment a beautifully prepared essay, such as filled the examiner with surprise, was prepared by the youth of fourteen, and he was awarded the required number of marks. Those who were engaged in preparing young men for examinations were acquainted with this system. He was not going into the question of preparing young people for examination. He thought, fairly conducted, it produced a good result. He regretted to hear the remark continually made by our great teachers in public schools—that very often those boys who were most distinguished in their career in these great places, and were carrying on a really good and vigorous system of education under their care, were obliged to leave them, in order to be subjected during a month or two to some system of "cram" before they were produced before the examiners in these competitive examinations; and if that was the case, he thought it showed that they had great reason to be obliged to those who, in the present examination, sent us really good examiners who would be able at once to sift the wheat from the chaff, and to see what was "cram" and what was knowledge really and carefully acquired by hours of labour, such as, he had no doubt, had been bestowed on the subjects of these exa-

minations by the youths who had been fortunate enough to obtain prizes. But they should altogether deceive the young men and young women who had obtained prizes that day if they taught them that their education ended when they were prepared for the business of life. Everyone knew the almost hackneyed expression that the best education was that which a man got himself, and the highest education must be carried on throughout the whole of a man's life. They knew very well that the flowers which bloom early might be the first to fade, and it was quite possible that those who had been most carefully prepared in the previous part of their education might fail altogether in the business of life, and not only in the business of life, but might relax those efforts which every thinking human being was bound as long as life lasts to be making in order to carry on his education when he had attained to manhood. He would advise the young persons who had obtained prizes, as well as those who had failed, to remember that the real second part of their education was that day only beginning, and it might well be that those who had been least successful in the preliminary struggle which had been decided on that day might be the most successful in the struggle of life, and not only in the struggle in the business of life, but in that high education of the human soul which every man desired to give to himself while he was doing his part among his fellow men. They should take care that their education was conducted carefully by their own efforts; that business did not so entirely engross them but that they should find time also for higher pursuits. Above all, he would advise every young man and young woman always to have in reading some really good book, not to be satisfied with the trashy productions which issued continuously from the press, but to see, every one, that he was reading the works of some author whose name was known by the benefits he had conferred on mankind, and to live in whose society was one of the greatest privileges which could be vouchsafed to them. But he had said also that their education must be conducted by great efforts of their own. He had said that no one would succeed in life who considered his education ended when he finished boyhood. He need not speak of those great subjects connected with material science, a knowledge of which was amply rewarded in the present day, which offered so very ready a road to distinction and to wealth; but he would remind them rather of those other subjects with which they could not cease to be familiar without losing a great vantage-ground for the business to which they were called in life. Were some of those who had obtained prizes or had passed through this examination going to be teachers of others? How was it possible for anyone to acquit himself well as a teacher unless he was every day a learner? and how could he teach those great subjects connected with the literature of their country and other countries unless he was adding daily to his own stores in his acquaintance with that literature? How was a man to perform his part well as a citizen unless he was cultivating his mind? How were they, as employers of labour, to learn to influence those over whom God had placed them unless they understood those subtle feelings by which one man was able to guide the will of another man; and how should they ever study with real advantage those subjects unless they were to a degree acquainted with poetry, eloquence, and history, and other kindred arts by which man had been raised in the generations which were passed."

THE CITRATE OF MAGNESIA QUESTION.

Trade Conference of Chemists and Druggists.

A meeting of chemists and druggists, convened by the National Chamber of Trade, for the purpose of considering the late prosecution under the Adulteration of Food and Drugs Act, 1872, and taking such steps as might be found expedient for procuring an amendment of that Act, was held on Wednesday evening, Nov. 15, at the offices of the Association, Duke Street, Piccadilly. The chair was taken by Mr. A. F. Haselden.

The chairman, in opening the proceedings, said that the recent penalty was imposed for the use of a certain name. Its imposition was contrary to the third section of the Adulteration Act, which provides that any person who shall sell any article of food or drink, or any drug, knowing the same to have been mixed with any other substance, with intent fraudulently to increase its weight or bulk, and who shall not declare such admixture to any purchaser thereof before delivering the same, *and no other*, should be deemed to have sold an adulterated article under the Act. Notwithstanding this provision, it had been held in the courts that the seller was bound to know the composition of the article he sold. It seemed to be therefore a matter for consideration whether an effort should be made to amend the Act, or to secure its repeal altogether. The object of the Act was not to harass the tradesman, but to protect the public, and this protection, he considered, was fully provided for in the Pharmacy Act. He thought that the Government would listen to any proper representation of the subject, and Lord Eustace Cecil, who had taken charge of the Bill during its passage through the House of Commons, had stated at a meeting of the Association of Medical Officers of Health that if any amendment of the Act was found necessary after a trial had been given to it, he would use his best efforts to secure it.

Mr. McDermott, who was present, said, in answer to a question that the order for the citrate of magnesia was written in imitation of a prescription, but evidently not by a medical man.

After a very desultory conversation, it was moved by Mr. Breton, seconded by Mr. Bristed, and resolved:—

> "That it is the opinion of this meeting that the late proceedings which were taken under the Adulteration of Food and Drugs Act, 1872, against Mr. Philip McDermott, of 155, Abbey Street, Bermondsey, a chemist and druggist, for selling the citrate of magnesia of commerce were not justifiable, and that the judgment was contrary to equity; and also that, as far as it refers to the analysation of drugs and chemicals, the said Act in its present shape is mischievous and ineffective, and ought to be repealed."

It was moved by Mr. T. Donald Watson, seconded by Mr. Chubb, and resolved:—

> "That Parliament be petitioned to repeal that portion of the aforesaid Act which relates to drugs and chemicals, the clause in the Pharmacy Act being sufficient for the protection of the public."

It was proposed by Mr. Breton, seconded by Mr. Johnson, and resolved:—

> "That a committee of chemists and druggists be appointed to act with the Committees of the National Chamber of Trade to give effect to the foregoing resolutions, and to adopt such measures as shall to them seem desirable; and that the committee be composed of the following persons: Messrs. Carteighe, Haselden, Howden, Lloyd, and Wood, with power to add to their number."

Mr. Mann, of New Hampton, then called the attention of the meeting to the irregularity which existed in the rates at which the licenses for dealing in patent medicines were charged. He said persons residing within the London postal district were charged £2 per annum, those in towns and corporate boroughs, 10*s*., and those in rural districts were charged only 5*s*. It was sometimes very hard for a man in a small way of business to be called upon to pay £2, whilst another a short distance off, but outside the postal district, only paid 10*s*. or 5*s*., although perhaps doing a larger trade. He suggested that the meeting should pass a resolution asking the Council of the Pharmaceutical Society to take the matter up, and endeavour to secure a uniformity of rate, say 10*s*.

The chairman, however, expressed an opinion that it was then too late to discuss the question; and, after a vote of thanks to him for his services, the meeting broke up.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 22, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

"CITRATE OF MAGNESIA."

IT is now five years since the late Mr. DYMOND brought before a meeting of the British Pharmaceutical Conference an illustration of the way in which he conceived the first principles of sound morality were frequently set at defiance by pharmaceutists.* The particular case to which he referred has now been forced on the consideration of the trade by the recent magisterial decision under the Adulteration Act; and though his contention that the welfare of true pharmacy was jeopardized by such practices did not at the time meet with any great concurrence, it is evident, from the correspondence of the last few weeks, that there is now a very general recognition of the necessity of taking some step to prevent the annoyance and damage attendant upon a prosecution under the Adulteration Act.

Though we do not hesitate to express the opinion that, as regards the ostensible objects of the Adulteration Act, the recent prosecution was an utter absurdity, we think there is so little good to be gained by discussing whether or not the sale of "citrate of magnesia" comes within the scope of the Act, that this question may be at once dismissed. In like manner, though the infliction of a fine on Mr. MCDERMOTT may command our sympathy, it would do so only in the same degree that sympathy would be extended, under similar circumstances, to any other tradesman who became the victim of a harsh or strained interpretation of the law. The important question is what to do as regards articles that are commonly sold under names which do not represent them.

Opinions evidently vary much as to this question, and the influence of habit is in some cases evidently strong enough to have established so intimate an association between the term "citrate of magesia" and the preparation sold under that name, as to lead to the idea that the absence of magnesia should prevent a conviction under the Adulteration Act! Some of the modified designations proposed recommend themselves as precautionary measures; but regarding the matter from a pharmaceutical point of view, none of them appear quite to satisfy the requirements of the case. It is thoroughly well known that the preparation referred to is not properly magnesian at all. In some instances it is totally destitute of magnesia, and is at the same time none the worse.* When magnesia is present it is not as citrate; and then again the amount of magnesia is often so small that it can only be regarded as introduced to swear by.

Why then retain the word magnesia at all? The same question might well be asked as regards the term "citrate," for even with those manufacturers who use citric acid at all it is only a subordinate ingredient to the tartaric acid.

But in order effectually to meet the objection raised to applying definite chemical names to substances which bear no resemblance to them, would not the public be as well satisfied with some trivial name, such as "effervescing powder," which is commonly used in Germany for this preparation and for seidlitz powders, of which it is merely a more elegant form?

We believe that the adoption of such a course would be beneficial in many ways, besides fulfilling the obligations of the pharmacist to keep faith with scientific truth.

Before leaving this subject it may be well to recall to our readers the remarks made by Mr. HANBURY when it was discussed at Dundee. While strongly objecting to the use of definite chemical names for things of which it was intended to conceal the composition, he said that it appeared to him medical men were chiefly responsible for this sort of thing, since strange compounds, such as granular effervescent bromides or iodides were introduced by the makers to their notice, and by prescribing them they create the demand for substances of whose real nature they knew very little.

TRADE IN DRUGS, ETC., WITH BRITISH INDIA.

OFFICIAL statistics giving the trade of British India in drugs, medicines, etc., are not without features of interest to the readers of this Journal. Such statistics have just been compiled, and bring to light some facts of importance. The imports of drugs into British India are not large. In 1863 they amounted only to the sum of £113,436, while in 1872 they were £236.424, it being pointed out that this latter amount "includes medicines." It will be perceived that there is a slight increase in recent years. The figures referring to the exports are more interesting than those referring to the imports. Thus we find that in the year 1863 drugs and medicines were exported from British India to the value of £83,314, and in 1865 the amount was £101,043. Latterly, however, this branch of the export trade appears to have languished to a very great extent, the exports of the articles having considerably diminished. Thus in 1867 they only amounted to £31,182, although in 1872 they were £75,328. Opium is honoured with a separate classification of statistics, from which the position of the trade may

* PHARMACEUTICAL JOURNAL, 2nd Series, vol. ix., p. 167.

* The formula authorized by the British Pharmacopœia for this preparation comes under this category.

be clearly perceived. The exports of this article do not appear to fluctuate much, a large aggregate being annually maintained. In 1863 opium was exported from British India to the value of £12,494,128, while in 1872 the largest amount was exported than for many years, the value then being £13,365,228. Opium is one of the principal articles of export from the country, in fact being second only to cotton wool. The exports of saltpetre from British India have decreased of late years. In 1863 they amounted to £897,228, and in 1872 to £397,251, thus indicating that the trade has considerably fallen off. The exports of oils show little fluctuation. In 1863 they amounted to £372,107, and in 1872 to £414,918. So far we have given the exports in sterling value only, but it will be interesting to give shortly the actual quantity. Thus with regard to opium the exports were in 1863 82,216 chests, while in 1872 they were 93,364 chests. In 1863 oils were exported to the quantity of 3,928,191 gallons, and saltpetre to the amount of 684,250 cwts.; in 1872, the exports were—oils, 2,733,162 gals.; saltpetre, 432,210 cwts. From a statement showing the Customs' tariff of British India, we find that the rates of duty on drugs and medicines imported are 7½ per cent., the export being free.

ALLEGED PRESENCE OF IRON FILINGS IN TEA.

In several cases of prosecution under the Adulteration Act which have recently been reported, the analyst has been able to demonstrate that a magnet thrust into a specimen of tea would attract certain particles which were stated to be iron filings; and held to be indisputable proof of a fraudulent admixture. That this inference is necessarily correct has, however, been disputed in more than one quarter. Mr. Treffry, of Exeter, writing to the *Grocer*, asserts that the mineral matter found in tea is not iron filings but a native magnetic oxide of iron, and he states that "it is probably titaniferous iron-sand, which is very abundant in China." Mr. Alfred Bird, F.C.S., of Birmingham, says that he has separated particles of mica and quartz from the magnetic oxide of iron found in tea, his inference being "that as magnetic oxide of iron forms part of the soil of China, it would rise with the dust of the country, and coming in contact with the damp leaves would adhere to them when they are dried, and thus make the dried leaves stick to the magnet as if there were iron filings mixed up amongst them." Speculative, to say the least, as this may seem, it would appear to receive some support from an experiment made by Mr. Bird upon some French bean leaves grown in his own garden. One hundred grains were dried, and upon testing with a magnet were found to be attracted by it in a similar manner to that reported of some specimens of tea leaves. A closer examination of the matter adhering to the leaves showed that it was magnetic oxide of iron, and 0·02 of a grain was obtained from the 100 grains of bean leaves. An investigation of the black mould of the garden in which the plants were grown showed that it contained an abundance of magnetic oxide of iron.

If all that the opponents of the Adulteration Act say against it were true, it would be but little to be able to reply that it is not an unmitigated evil; but still it is a fact that the Act has given a great impulse to the investigation of food substances, the benefit of which must appear in an acquisition to our store of knowledge respecting this important subject. For even should Mr. Bird's speculations prove correct, it would not be the only instance that has recently come under our notice where the presence of a gross adulterant has been alleged upon insufficient grounds.

FLOWERING OF THE JALAP PLANT IN ENGLAND.

Mr. W. Terry, of Peterborough House, Fulham, has written to the *Gardeners' Chronicle* to say that he has had the jalap plant in flower in his garden this season for the first time. There were about thirty flowers and buds on his plant.

We have before alluded to the use of bullocks' blood in France as a remedy for anæmia, pulmonary phthisis, and other diseases. (Vol. iii., p. 67.) We learn now from the *Medical Press and Circular* that Dr. Pascal gives it in the form of powder, the blood being reduced to that condition by drying. It is said that the repugnance which patients might otherwise have to its use is overcome, and the administration of the various constituents of blood—fibrin, albumen, salts of iron, and manganese is thus secured.

The *Répertoire de Pharmacie* states that a natural deposit of sulphate of soda has been discovered recently in the mountains of the Caucasus. The experimental boring showed first marl off the depth of one foot, then two feet and a half of damp clay, next nine inches of bituminous clay impregnated with salts, and finally the Glauber salt, forming a layer five feet thick. It is estimated that the deposit is equal to at least 15,500,000 cubic feet. In certain places the compound is nearly pure, containing only about 9 per cent. of foreign matter.

The discovery has been announced of a deposit of bismuth in the department of Corrèze, France. The bismuth is said to be found in its native state as well as well as in combination as oxide and sulphide the most abundant mineral being the oxide, which contains 70 per cent. of bismuth. The method of extraction consists in exhausting the mineral by means of hydrochloric acid and precipitating the metal from the solution by bars of iron. The bismuth, already fairly pure, is then treated in the ordinary way, to purify it from a little lead and arsenic. The deposit contains also molybdate of lead, tungstate of lime, and mispikel. This is said to be the first bismuth mine that has been worked in France.

Provincial Transactions.

CARLISLE CHEMISTS' ASSOCIATION.

This Association held their first Annual Meeting in the rooms of the Association, Barwise's Court, on Friday evening, Nov. 7th, Councillor Thompson, President, in the chair.

The Secretary read the following Report and Financial Statement :—

"The first year's labour of the Carlisle Chemists' Association having drawn to a close, your Committee present their report, showing what has been done, and how we stand financially.

"The Association was formally opened by an address, delivered by Mr. Hallaway, on the 15th November, 1872, and since then there have been four monthly meetings, at which papers were read, viz. :—'On Water and Water Analysis,' by Mr. Jos. Pattinson; 'On Glycerine as a Means of Preserving Infusions,' by Mr. Robson; 'On the Human Heart,' by Mr. Sawyer; and 'An Evening with the Microscope,' by Mr. Walker; Mr. E. Prewst gave a lecture upon Chemistry, and also treated upon Arsenic and its tests.

"Your Committee are sorry to say that the attendance of members has been very poor, and, as it is really of importance in associations of this kind that there should be an interest taken in them by their members, they earnestly and respectfully press upon you the necessity of attendance, believing that were the members of this Association to attend more numerously and more frequently, it would not only be conducive to the welfare of our Association and harmony amongst ourselves, but would also tend to create and foster an interest for and in it by our apprentices and assistants.

"During the past year we have lost by death one member, our Secretary (the late Mr. Moss), to whom we were always much indebted—he always gave his services cheerfully, being very anxious that the Association should succeed—and whose loss we regret very much, and four associates, from removal and other causes, thus leaving our numbers at the present time to be nineteen members and nine associates.

"The attendance upon the classes,—chemistry and materia medica,—under the care of Mr. Jos. Pattinson and Mr. Little, to whom we all owe much for the time and attention they have given, has not been large, but we have great pleasure in saying that it has been very regular, and the young men attending appear to appreciate very much the advantages the Association affords, and have taken great interest in preserving, labelling, and arranging the specimens of materia medica, and forming the beginning of a museum.

"Several very handsome donations have been presented to the Society during the year, viz. :—Specimens of materia medica, by Messrs. Southall, Son, and Dymond; Barron, Harvey, and Co.; Howard and Sons; and Clarke, Bleasdale, Bell, and Tollington—Bentley and Redwood's 'Materia Medica,' by Mr. W. Martindale of London—Shelving, etc., by Dr. Barnes—Books and bottles by Messrs. Thompson, Sawyer, Hallaway, Robson—and 'The Dispensary.'

"This being as we might say the only real effort that has been made in Carlisle to establish on a sound basis a chemists' association, your Committee think that it is a matter for congratulation that it has succeeded so well, and trust that as years roll on it will improve and become one of the permanent institutions of our city.

"The Committee now hand in the financial statement, and, as the term for which they were elected has expired, their resignation also."

THE CARLISLE CHEMISTS' ASSOCIATION IN ACCOUNT WITH MR. HALLAWAY, SEC.

RECEIVED.

	£	s.	d.
19 Members' Subscriptions	9	10	0
12 ,, Donations	14	12	0
11 Associates' Subscriptions	2	2	6
Clarke, Bleasdale, and Co.'s Subscription	2	2	0
	£23	6	6

PAID.

	£	s.	d.
For Furniture and Utensils	3	14	11½
,, Coals, etc.	0	6	4½
,, Gas	0	11	10
,, Cleaning, etc.	0	9	9
,, Printing and Postage	0	18	7
,, Carriage	0	2	10
,, Half-Year's Rent	4	0	0
,, Shelving	0	19	0
,, Cash in Bank	15	0	0
,, Cash on Hand	2	4	0
	£28	6	6

Nov. 7, 1873. To Cash on Hand and Balance in Bank, £17 4s.

It was moved and seconded that the report be approved of and sent to the PHARMACEUTICAL JOURNAL for publication.

The old Committee, Messrs. Thompson, Robson, Walker, and Hallaway, were re-elected, and in addition Messrs. Taylor and Pattinson.

Mr. Jno. Atkinson was admitted as an associate.

A vote of thanks was moved and seconded to Dr. Barnes for his present to the Association, as also to Messrs. Little and Pattinson for their conducting the classes of materia medica and chemistry.

It was resolved that a microscope suitable for students be bought for the use of the classes.

Upon the table were fourteen specimens of rare and new chemicals, kindly lent by Messrs. Hopkin and Williams, which were much admired.

BRIGHTON ASSOCIATION OF PHARMACY.

The opening meeting of the present session in connection with this Association took place on Friday evening, at 150, North Street. Several only of the fifty members were present. Mr. W. D. Savage, the President of the Association, read the following paper :—

"Gentlemen,—

"Last year it was my privilege to address you on the reorganization of our Association, and following the time-honoured custom (as you have been pleased again to place me in the same position), as your President, I will endeavour to take a review of the work done during the past year, and to make such suggestions for the future as circumstances may seem to indicate. As soon as suitable accommodation was obtained, and after some of our friends had favoured us with their papers, we engaged Mr. Pankhurst to give a course of lectures on chemistry. These were, on the whole, well attended, and gave satisfaction, but as the season advanced our numbers attending the meetings diminished, and this seems to be the case in most places, although there are few towns like Brighton that have their season so late in the year; when other towns are comparatively quiet we are in the midst of bustle, and after the physical and mental work of the day, prefer a little repose and quiet. At the same time, our meetings are well calculated, from the friendly interchange of thought in discussion, to dissipate any weariness, and effect a change that cannot be otherwise than beneficial. When the appeal was made to the chemists of the town to sustain the efforts about to be made on behalf of those connected with the Association, it was most satisfactory to find how generally they responded to it, and this favourable beginning augured well for the future. If all the hopes of the committee have not been realized, sufficient success has been accomplished to give confidence for the future. I would here venture to suggest that the young men attending our meetings should take a more active part in the proceedings. Previous intimation is given of what is to be read or discussed, and they should come and be prepared to give their *confrères* the benefit of their views. A degree of diffidence or reticence frequently pre-

vails, so that unless the seniors take more than their share of prominence a silent meeting would be the result. This should not be, and if the presence of the principals is the cause, the sooner they leave matters in the hands of the assistants the better—rather let us all endeavour as far as we can to break through this state of isolation. Allow me to suggest that as the subject for discussion is previously known, that each person present should come prepared, and, if necessary, to take part, so that good results would follow, as each views the subject from his own standpoint. The principals are not quite free from blame. Some of the gentlemen who attend our evening meetings are eminently qualified to confer a benefit on the members of the Association, by giving them papers on subjects with which they are familiar. I am afraid to say more on this topic, lest you should, in the language of Sidney Smith, dub me a lemon juice squeezer, but I could not, in reviewing the past, avoid adverting to these circumstances. However, I look hopefully to the future, as several members have kindly intimated their intention of contributing papers during the ensuing session. The early closing movement in connection with our trade, so far as it applies locally, originated and was promoted by the members of this Association, and although it has not been strictly adhered to by all, yet the result has been beneficial to many, and it is a subject of regret that its adoption was not unanimous, and that *all* did not avail themselves of the opportunity of diminishing the hours of labour, which are unnecessarily long. A further diminution is proposed to take place on the 1st of November, for the winter months. I do hope that all those who have the interest of those in their employ at heart will feel it incumbent on them to act in concert and make the movement as general as possible. In the spring, Mr. W. H. Smith kindly undertook to give a course of instructive lectures on botany, but the lateness of the period was unfavourable for securing a good attendance, and after the seventh lecture they were postponed. I hope however they will soon be resumed. In accordance with the wishes of the donor, and by the kindness of the Pharmaceutical Conference, the Association received the Bell and Hills valuable gift of £10 10*s.* worth of books, selected by the committee of the Association. These added to what they previously had, and additions subsequently made, form the nucleus of a capital library of reference, available for every member of the Association, and no doubt the younger members will take advantage of the opportunity that they may keep pace with the growing necessities of the age and the requirements of the Pharmaceutical Society. Every year must develop more and more a desire among our apprentices to become worthy of the efforts made on their behalf, and we must endeavour to meet their wishes by adding from time to time such books as circumstances may indicate and necessity require. Recent discussions will have shown you that in some quarters a strong desire exists for centralization, that the present method adopted for conducting the local Preliminary examinations should cease, and that for the future the certificate of one or other of our recognized educational institutions should be the door of entry. This may be a very proper suggestion for the distant future, but for the present the project cannot be entertained. The letters of Messrs. Reynolds and Haselden convey my views—they point out many reasons why the present plan should be continued. The proposed alteration seems to me unnecessary and arbitrary, inasmuch as local university centres, as compared with local secretaries engaged in examinations, are very few, and consequently the distance that young men would have to travel would be greatly increased, and instead of occupying as at present three hours, it would, if conducted according to the existing university arrangement, take five or six days, thus adding a serious item to the expense. Has anything occurred to justify so great an innovation? We are told that some isolated cases of irregular practices of local secretaries have occurred; but even if it were so in one or two instances, surely the whole body of our most respectable representatives are not to be so easily set aside, and their valuable services for the past to be ignored because from ignorance, or some other cause, efficient supervision has been wanting. It occurs to me that a much easier method of obviating the difficulty would be to appoint a local committee, the same as the local universities do in all towns sufficiently large, and in smaller ones—as proposed by our ex-President—another gentleman to be associated with the local secretary, so that in case of illness, absence, or other causes, there would be no difficulty in the way of the duty being efficiently performed. The duty of preparing the Preliminary examination papers now devolves upon one or more of the Board of Examiners—a very onerous duty, which occurs to me might be as well or better done by an educational body like the College of Preceptors, or by an individual member selected by them, not only to prepare the questions but report the result of the answers (subject to the approval of the Board of Examiners). This course would not only lighten the duties of the Board, but be on the whole more satisfactory. A subject of considerable interest to chemists is now occupying the public mind, and the adverse decisions given by different magistrates is perplexing and unsatisfactory. I allude to the Adulteration of Foods Act. It seems very important that some distinctive definition should be given as to what is an *adulterant;* for if we take the broad line of demarcation, *injurious to health*, as our guide, it does not apply. For instance, farinaceous preparations mixed with mustard absorb the oil in grinding, and cannot possibly be injurious to health. Farina and sugar, mixed with chocolate, makes cocoa very much more palatable, and by no means injurious. The excessive use of these things, like the 20 or 30 per cent. of water in milk, is not justifiable, and ought not to be allowed. But then comes the difficult question—what are the limits and how are the public to know them? As far as chocolate is concerned the same plan of indication as is adopted with coffee and chicory might do, but to place outside a milk can "This milk contains 20 per cent. of water" would not be satisfactory to any party, and would sanction a practice alike unnecessary and deceptive. For some time the appointment of analysts was a subject of doubt and uncertainty, arising from the difficulty of knowing what was meant by *medical, chemical*, and *microscopical* qualifications. Viewed by some of the local boards of health, the "medical officer" was appointed as the only person possessing the necessary qualification. However, the Pharmaceutical Council thought otherwise, and it was my privilege to move, and Mr. Hampson's to second, a resolution that a deputation wait on Mr. Stansfeld and ascertain from him what were the requirements of the appointment. The gentlemen composing that deputation explained to Mr. Lumley (in the absence of Mr. Stansfeld) the object they had in view, and whilst there was at first some misapprehension and misconception, the result has proved satisfactory, and many of our worthy *confrères* have been appointed analysts to large and important districts. Hitherto the duties have been exercised on the retailers of food. But we know not how soon our own stores may be overhauled, and similar scenes enacted to those of the Apothecaries' Company many years ago in London. We might find varied proportions of quinine in our citrates. Sulphur. precipitatum might not be the pure article of the B.P., neither might conf. sennæ. We all know the large quantity of salt in cayenne pepper, and without it the public would not recognize the article. Other things might be enumerated of a like character, and after all, unless they are articles of home manufacture, you must greatly rely on the antecedents of the firms with whom you deal. One thing seems pretty certain, that we are getting superlatively wise in our generation, and whilst no respectable man would object to healthy criticism on what he sells, there is the same fear of jealous rivalry and the unjust exercise of arbitrary power that existed when the Apothecaries' Company of London exercised supervision over London druggists. I may recall to

your recollection an instance which I mentioned in my paper on the 'History of Chemists and Druggists,' read at Exeter; it was to the effect that the Company having obtained an order to supply the E. I. Co. with drugs, on the condition of being *good and cheap*, and to enable the E. I. Co. to ascertain these facts, two eminent wholesale apothecaries were consulted, and they condemned both the quality and price. The Apothecaries' Company, in retaliation, went to a Mr. Lawrence's shop during his absence (he being one of the examiners), and took samples of his goods to the Hall for examination. Mr. L., foreseeing the result, got some of his friends to go to the shops of the managers of the Company, and purchase similar articles to those which they had taken from him; so that, when summoned, he pleaded that the articles taken were not finished making, but, said he, I have brought some by which I will stand. These they also condemned; when, being prepared by witnesses, he proved them to be their own. This evidence was too strong for them, and they gladly compromised the matter. It is not probable that such circumstances will occur again; at the same time it behoves us to carefully avoid any necessity for supervision. Self-interest, after all, if rightly appreciated, is the best monitor; sooner or later the public become acquainted with those shops that serve them best, and honest dealing gets its reward. Since writing the preceding passage, a case of some importance has occurred bearing on the subject. Probably, most of you have seen a case brought before a London magistrate of a druggist selling citrate of magnesia, which on the chemical evidence of Dr. Muter contained no traces of magnesia. His evidence, contained in a letter to the London *Times*, was: 'That it does not contain a trace of magnesia, but is a mixture of citric acid, tartaric acid, bicarbonate of soda, and a little sugar.' Although the person who sold the so-called citrate was in no way connected with the Pharmaceutical Society, the subject is one of great importance to all of us. The magistrate who inflicted the fine of £10 might as reasonably fine all of us for selling *Epsom* salts that never saw Epsom, soda-water that contains no soda. At the Pharmaceutical Conference, held at Dundee, 1867, Mr. Dymond, of Birmingham, called attention to the fact that the so-called citrate of magnesia was a misnomer, at the same time pointing out that a saccharated effervescing citrate of magnesia might be made by mechanically mixing equivalent quantities of carbonate of magnesia and citric acid, together with 15 per cent. of sugar. To obviate any misconception Mr. Sutton, of Norwich, adopts the following label:—'This preparation, so long known as citrate of magnesia, is in reality a citrocarbonate of soda. Mr. Sutton desires to give this explanation to prevent misconception as to the true chemical nature of the compound.' Although it does not really represent the compound usually sold, Mr. S. added that instead of diminishing it had increased its sale. One gentleman suggested the same label as Bishop's, another that it should be called "Granular Effervescent Aperient." It is obvious that we should adopt some course of protection against unprincipled informers or spiteful enemies, and use so far as we can appropriate names. Another subject of interest to all of us is the recent alterations suggested by our professors—*i.e.*, a course of ten months' lectures should be so condensed as to embrace all that was necessary in five months, or what used to be designated half a session, and that instead of, as previously, the professors being paid so much a year by the Council, they should receive a certain sum, and take all the proceeds of lectures and laboratory fees, which have been raised to meet the altered circumstances. The Council, by a majority, decided to adopt the new regulations, although it was not without opposition, for one distinguished member of the Council said the students got half the material, for which they were required to pay double price. We can only hope that the results will prove the wisdom of the alteration. At present appearances are not encouraging. I am afraid that I have exhausted your patience, but I hope that some of the circumstances named may be suggestive, and lead to discussion mutually advantageous."

A discussion followed the reading of the paper, in which Messrs. Brew, Cornish, Mathews and W. H. Smith took part, the President replying to numerous questions addressed to him. A hearty vote of thanks was accorded to Mr. Savage for his paper, and it was very much regretted that the young members of the Association did not attend the meetings.

HULL CHEMISTS' ASSOCIATION.

The annual meeting of this Society was held on Thursday evening, November 13, at the Cross Keys Hotel, the president (Mr. Anthony Smith) in the chair. The report was read by the Secretary, Mr. C. B. Bell, and the members present seemed especially gratified at the great success which has attended the educational endeavours of the committee. From the reports of Messrs. Pearson and Niven, the lecturers to the Society, both the chemistry and botany classes appear to have given results of a most satisfactory character. Prizes were awarded for chemistry to Mr. Roberts (senior), Mr. Morley (junior); for materia medica to Mr. Roberts (senior), Mr. H. T. G. Wood (junior); for botany to Mr. W. H. Hammond (senior), Mr. H. T. G. Wood (junior). The treasurer announced that the balance in his hands was most satisfactory.

A ballot took place for the election of officers for the ensuing year, when Mr. Anthony Smith was re-elected president; Mr. F. Earle, vice-president; Mr. C. B. Bell, secretary and treasurer. Messrs. Myers and Pickering were also re-elected on the committee, with Messrs. Oldham and Grindall. The officers of the Society received the hearty thanks of the members for their services during the past year.

In reference to the arrangements for pharmaceutical education during the session 1873-4, the committee of the Hull Chemists' Association announce that the fifth winter course of twenty-four lectures, comprising elementary chemistry, materia medica, pharmacy, etc., will be delivered by Mr. H. J. Parson, in the Society's Room, at the Church Institute, Albion Street, commencing on Thursday evening, October 23rd, at 8.15 precisely, and continued weekly at the same place and hour. Fee for the course, £1 1*s.*, due in advance. Intending students are requested to send in their names as early as convenient to the honorary secretary, who will be happy to furnish further information if required.

The course of instruction will have special reference to the requirements of the Minor examination of the Pharmaceutical Society, which it is now incumbent on all chemists and druggists to pass before commencing a business. Each lecture will be fully illustrated by experiments. The committee earnestly request members of the trade living in Hull and its neighbourhood to use every effort to induce those in their employ to attend these lectures. At the close of the session it is intended to offer four prizes for competition, viz., senior and junior materia medica and pharmacy, and senior and junior chemistry.

MANCHESTER CHEMISTS' ASSISTANTS' ASSOCIATION.

The first ordinary meeting of the session was held on Monday evening, Oct. 27th. The President, Mr. William Lane, read an able and interesting paper "On Opium." After an animated discussion, a hearty vote of thanks was awarded to Mr. Lane for his exhaustive treatment of the subject. Fifteen gentlemen were elected new members of the association. The meeting was very well attended.

The second ordinary meeting was held on Wednesday evening, November 12th. The Secretary, Mr. A. J. Pidd, read a paper on "Phosphorus and its Compounds." He explained at great length by equations on the black board the phosphites, hypophosphites, metaphosphates, and pyrophosphates. He also described the method for detecting phosphorus in poisoning cases. A hearty vote of thanks was awarded to Mr. Pidd for his excellent paper. The attendance was very good.

Proceedings of Scientific Societies.

CLINICAL SOCIETY.

Cases of Poisoning by Homœopathic "Concentrated Solution of Camphor."

(*Abstract of a Paper read Nov.* 14, 1873.)

BY GEORGE JOHNSON, M.D., F.R.S.,

Professor of Medicine in King's College, and Physician to King's College Hospital.

Miss T., aged 20, having a cold, took in water twenty-five drops of "Concentrated Solution of Camphor," She went to bed, and in a short time was found foaming at the mouth, black in the face, and violently convulsed. Mr. Drake, of Brixton, was sent for in great haste. For several hours she was unconscious. She vomited blood-tinged fluid, smelling strongly of camphor, and had severe pain in the stomach. For several days she was partially paralysed, and six months afterwards she was still suffering from symptoms of nervous disorder. The preparation which caused these serious results is a saturated solution of camphor in spirit, in the proportion of an ounce of camphor to an ounce and a quarter of spirit. It is therefore stronger than the spiritus camphoræ of the Pharmacopœia in the proportion of 7·2 to 1.

Case 2.—The Rev. W. R. was advised to take for a cold three drops of the same preparation every five minutes for an hour. After taking the eighth dose, he was seized with intense headache, which confined him to bed for forty-eight hours, and he was afterwards so weak and ill that he was unable to enter his pulpit for two months.

Case 3.—A third case was communicated to Dr. Johnson, by Mr. Delamark Freeman. A young lady, aged 19, took for diarrhœa a teaspoonful of the same concentrated solution. The result was, that she was rendered unconscious for several hours, and then she had a variety of nervous symptoms, which did not pass away for several days.

Dr. Johnson remarked upon the notorious fact that many of the disciples of Hahnemann have passed from the irrational and ludicrous extreme of infinitesimal dilutions to the dangerous extreme of the greatest possible concentration of active and poisonous drugs. There is an obvious risk that this concentrated solution of camphor may be mistaken for the much weaker solution of the British Pharmacopœia, or the yet weaker essence of camphor which is often used to make camphor julep, a mistake which, in spite of the printed directions on the bottle, was probably made by both the young ladies who suffered so seriously for their error.

SOCIETY OF ARTS.

On the Energies of the Imponderables, with especial reference to the Measurement and Utilization of them.*

BY THE REV. ARTHUR RIGG, M.A.

Lecture V.

On the Energy of Electricity, with especial reference to the Measurement and Utilization of it.

(*Concluded from* p. 217.)

The promise to let you have proof that there are currents of electricity passing through the atmosphere of this room may now be redeemed. Here is a circular wooden ring, with wire round it as before. You may notice that it can be turned as a looking-glass in its frame. The ends of the wire coiled round it are now connected with the wires of the galvanometer, the mirror of which reflects that speck of light on the screen. The looking-glass mounted ring is placed in reference to the (so called) current of electricity always passing through the atmosphere, that were there a glass in the frame the current would beat upon that glass. If the frame be turned one-fourth round, then the current will pass parallel to the face of the frame. Or thus :—If the frame of the wire-enclosed ring be placed parallel to the direction of this magnetized needle, then the current of electricity through the atmosphere of this room is passing parallel to the ring. To move it, therefore, from this position to one at right angles to it, it is clear that the circumferential wire must, as it were, cut the stream of electricity, if there be one. Now, so cutting it, there will be a disturbance in the electrical condition of the wire, which may be manifested by a motion of that speck of light. Observe, now, that every motion of the frame causes a motion in the needle of that galvanometer, which is placed on a stand far removed from the table on which the motion of the frame takes place.

The two experiments now made may satisfy you :—1st. That there is what, for want of another name, we may call a current of electricity passing through the air ; 2nd. That disturbance of the uniform quiet flow of this current may be caused ; 3rd. That this needle is sensitive to such a disturbance ; and 4th. You will perhaps accept my word for that which time alone prevents being illustrated, viz., that the amount of this disturbance may be measured by the needle ; that is to say, the greater the disturbance the further will the needle be moved from its original position.

It will be obvious to all that the amount of motion in the needle for any given disturbance will depend upon its sensitiveness. Hence, two needles may, or may not move equally from the same cause. A mode of measurement, therefore, which depends upon an artisan's capability to make either unit jars or needles equally sensitive cannot be one to be much relied upon. There is, however, a relationship between the motion of the needle and a totally different mode of absolute measurement of the quantity of electricity that may pass in a unit of time, which solves the difficulty now expressed.

The usual apparatus for the decomposition of water by an electrical current is standing here. It is in consequence of completing the wire circuit from this combination of four cells that decomposition takes place. The bubbles are rising regularly and rapidly. Patient and watchful experimenters have established this—viz., the amount of water thus separated into its constituent elements of oxygen and hydrogen is always in exact proportion to the quantity of electricity that passes. If, then, it were convenient to be thus always decomposing water, a measure might be had. Thanks, however, to the mathematician, we have a much more simple mode of gaining this knowledge.

Suppose one end of the wire from these four cells is connected with the decomposing apparatus—this apparatus connected to the ring already explained—then from the ring to the other end wire of the cells. With such an arrangement, observations can be made both on the decomposing apparatus and the deflections of the needle, when each is under the influence of the same current. If the quantity of electricity in circuit varies, the amount of gas produced and the position of the needle vary also. These have been so frequently observed, that by looking at the needle the mathematician could always tell the amount of gas obtained ; in fact, he could lay down a very simple rule for guidance. The application of this rule enables a person at all times to state what quantity of electricity is passing, even though he look to the needle only.

An arithmetical illustration may make this clear. Suppose that in one minute these gases, which may be seen coursing up the tube, filled a space in the tube marked ten cubic inches—observe where the needle pointed. Let us assume that it is pointing to 45°. Suppose on another and future occasion the needle is observed to point to 60°, now, either from memory or from tables, we find that the tangent of 60° is entered as 1·73.

* Cantor Lecture, delivered March 3, 1873; reprinted from the *Journal of the Society of Arts*.

Then, if 10 be multiplied by 1·73, the result would be that 17·3 cubic inches of gases might be evolved. As there are in chemistry laws connecting the composition of bodies, such a result as this would enable a manufacturer to know how much silver, for example, this current of electricity would cause to be deposited in any fixed space of time. Thus may be measured the *quantity* of electricity passing in a unit of time.

But the deposition of gold and silver or other metals is not the only utilization of electricity, and as other results of a different kind are obtained from this "imponderable," it is time to turn to illustrations of another form.

Telegraphy seems at present to have taken the most important position in the manifestation of the energy of electricity. Telegraphists, therefore, naturally consider how they can measure the energy with which they deal. If there are any connected with telegraphy present, perhaps they will remember that this is not a lecture on the present advanced state of telegraphy nor on modern instruments, it is simply an attempt to make as clear to a general audience as is in the lecturer's power the principles which govern the uses and measurements of electricity in relation to telegraphy. To enter into details in reference to those laws which the electrician and mathematician have been enabled to propound, would be not only very injudicious, but very unsatisfactory. A sketch of the broad principles on which they are founded, and an illustration of the application of them, may prove more useful than an attempt to show how details of measurement have been accomplished.

The first question that presents itself is what may be called the measure of resistance. It was soon observed that electricity passed along certain metal wires more freely than other metal wires of the same size and length. The observation admitted of a very important utilization. For example, suppose the wire now stretched from one end to the other of this room was one mile in length, and that the little apparatus with which electricity is being produced at this end could produce a certain result at the other end. Now, let us take another metallic wire of the same length, and suppose the result produced in this case is much less than in the first. It will be admitted, without any detailed experiment, that by shortening again and again, the second wire may be reduced to a length which permits the phenomenon at the end of the first wire to be repeated at the end of the second. Now measure the second; it is only one quarter of a mile. Try a third and a fourth wire; perhaps they are respectively reduced to one-eighth and one-tenth of a mile. Evidently there is some property in these wires which hinders, retains, or resists the progress of electricity. The property is called "resistance," and is available for very useful purposes. The British Association for the Advancement of Science were so conscious of this that in 1861 and 1862, there were grave considerations as to what steps should be taken in order to assign a value to this resistance. You have seen how the quantity of electricity may be measured, but then that measured quantity had not to convey itself to a distance. It quietly, as it were stayed at home and worked. When telegraphy entered then electricity had to travel to or act at a distance. This state of affairs rendered it very desirable to determine "resistance" from what is called first principles, that is to say, to deal only with the three units of measurement—mass, space, and time. It was needful, by some means or other, to get this resistance into the form of mass, space, and time. It was considered that if we could regard it as velocity we thereby involved both space and time, because velocity is measured by space and time. If one runs a mile in an hour, then it is only needful to divide one mile by sixty minutes, and the space run in one minute is known. That would be the measure, assuming the minute to be the unit of time. The British Association appointed a committee. The chief gentlemen concerned in the committee, and who had the designing of a mode of grappling with one of the most critical tasks of science, were Mr. Clerk Maxwell, now Professor of Physical Science at Cambridge, Mr. Balfour Stewart, of Kew Observatory, now at Manchester, and Mr. Fleeming Jenkin, now Professor of Engineering in the University of Edinburgh. Their experiments were carried on in King's College, and the scheme now to be very briefly described is found in the report of the British Association for 1863.

It may here be remarked that perhaps there have been no lectures ever given in this room of a more important and scientific character than a course of Cantor lectures on electricity by Mr. Fleeming Jenkin. This course commenced in January, 1866, and will be found reported in the Journals published between 2nd February and 2nd March, 1866 (inclusive). It is well to make this further statement, that those lectures have frequently been appealed to by writers on electricity who regarded the phenomena thereof in the light of an accurate science.* The question, then, is, how are we to measure in velocity this resistance? How are we to convert that which is resistance in a wire into an electrical measure of velocity? [The lecturer here, by apparatus and diagrams, illustrated the principle upon which this mode of measurement was based, and in so doing referred to the currents passing through the room, as already described.] At Kew there is a record of these currents kept continuously night and day, and it is found that they are changing every minute. The main object, then, of the committee of the British Association, was to devise a plan by which they could ascertain the resistance that a given wire offers measured by comparison with the velocity of these currents. You may remember that Kater could not measure the law of gravity, owing to the fact that it was rapid in its actions, and he felt that he must have some means of causing that law to repeat itself. Kater adopted the pendulum, and recorded the number of times it oscillated in twenty-four hours, and thereby got at the law. If, instead of having a long wire and three others running along the bar, as in the apparatus before you, we had a ring of this kind, and caused that to revolve rapidly, say at the rate of 100 or 200 or even a thousand revolutions a minute, we still get the laws of the magnetic force in the same way as described, similar to when the bar passed along the rods before you. This causes the magnetic force to act upon the needle, and in reality, in the experiments which determined what is called "the British Association unit of resistance," these currents acted upon a very small needle carefully suspended, so that they were enabled to estimate the resistance of this wire in an absolute measure of space and time. That led to the adoption of what is called the "ohm," or "British Association's unit of electrical resistance." This term "ohm" is a name given in compliment to one who suggested an important relationship among the elements of current, force, and resistance. Indeed, that table of electrical measurements which may some day be placed in books of arithmetic, with corresponding tables of weights, measures, and money, will be found to contain the names of men who have investigated special departments of electrical science, such, for example, as Ohms, Farads, Volts, Webers, etc.

In this little glass cylinder there is a coiled length of German silver wire, German silver being used because it possesses great resistance to electrical currents, and that resistance does not change much with change of temperature. This coil constitutes what is called half a British

* Since the commencement of the publication of this course of Cantor lectures, a volume has been issued, entitled 'Electricity and Magnetism,' by Fleeming Jenkin, published by Longmans and Co., price 3*s.* 6*d.* In this volume the author has treated the subject in a novel and a practical manner, very different indeed from ordinary text-books on electricity. It will be found to contain matter of great value and interest to the thoughtful student of electricity.

Association unit, which becomes the measure of electrical work, just as the standard pound becomes the measure for weight, or the foot is the standard measure for length. Being possessed of this measure, we have all that is needful for the measurement of resistance, and therefore for measuring electrical work connected with telegraphy.*

To show the way in which a knowledge of this measurement can be utilized, rather than to enter upon those investigations by which it was obtained, seemed likely to win so much more attention and interest, that these arrangements before you are for this purpose. The intention is to show how electricians determine the distance at which a deep sea cable is broken, so that they can tell how far the fracture is from the shore. Let it be understood that it is the illustration of a principle, and not the nature and modes of dealing with different kinds of "faults" that are to be our concern.

There is a wire, which may represent a cable, round the room. In this box there is placed a number of "ohms," arranged in three sets of nine each, so that by moving these pegs a current of electricity can be caused to pass through either one or more of them. Assuming each "ohm" in the first set to represent one resistance, each in the second set ten, and each in the third set one hundred, the consequence is that if a current of electricity passes through all it would meet with a resistance of 999. If it passed through one of the first set it would only be one resistance; so that with the moving of these brass pegs there is the power of bringing in any number of "ohms" required. This flat board, about 3 ft. 6 in. long, with a German silver wire and broad bands of copper divided at intervals, but capable of being put into electrical connection by the insertion of pieces of metal, constitutes what may be called the beam of electrical scales. Resistance, however, is to be measured instead of weight. Along a wire at the back electricity can pass, and when connected with the galvanometer the speck of that instrument serves the same purpose as the pointer of a pair of scales. If the galvanometer speck points to nothing, we assume that there is equilibrium between the resistances at each end of the scale beam. If I put 999 "ohms" in what we may call one scale, and other resistances into the other scale, or that which we may consider as such, then if the current of electricity arranged as provided can pass one of these groups of resistances more freely than the other, the speck of light will be moved. This is the same as though one end of a scale beam were "kicked up." Therefore, resistances which in this case act the part of weights on ordinary scales must be taken out or added as may be required.

This wire running partially round the room represents a cable. The two ends of this cable are in my hand. Let us assume that we want to measure the resistance the cable opposes to the energy of electricity, and to ascertain the value of its opposing power. Here is what is usually called a battery, consisting simply of a little salt and water, in a very small tumbler glass. "Battery" is a very misleading name in these days. This, with all its belongings, is really not worth sixpence, and it certainly seems a piece of pedantic magniloquence to call it a "battery."

The wires from this battery are so arranged that the current may divide itself between the cable that is round the room and this box of "ohms."

It may perhaps make the illustration more intelligible to those who have not familiarized themselves with terms of electrical science if for a while this current be regarded as consisting of passengers. Let it be represented by 100 passengers setting out from this battery, and having the choice of two routes, viz., one by the cable, and one by this box of ohms.

If the two routes are equally free, *i.e.*, offer equal resistances, then fifty of these passengers will pass by one way and fifty by the other. Suppose that the resistance of one route (say the cable) is greater than that by the other route. Then that other route, or the way through the box of ohms, will be available for some of those passengers who cannot readily pass by the cable. Here is a wire connecting these two routes; indeed the large letter A may convey a clear idea of the plan. Consider what is likely to happen if fifty of these electrical passengers set off from the top of the A down the thick stroke, and fifty down the thin stroke. We may say that those passing down the thin line cannot pass so freely as those down the thick one. Hence finding the course down the thick line clear, some of these delayed passengers by the thin line may avail themselves of this cross-wire bridge, viz., the stroke in the A, and go to the place appointed for them by passing down the thick stroke. In this homely illustration the thin stroke is the cable—the thick stroke is the box of ohms. Clearly by moving these brass pegs, the resistance in the box of ohms is increased; that is, the thick stroke of the A is made more nearly the same as the thin stroke. Now introduce into this cross-way—this bye-path, as it were—the galvanometer. Then if any electrical passenger avail himself of this bye road, the bright speck of light will tell the tale, and by noticing whether the speck moves to the right or left, the direction in which the passenger travelled is known, and therefore the electrical pathway which offers the greatest resistance is also known. By moving the pegs in the box of ohms, an equality of resistance may be established, and then passengers will not pass along the bye-way through the galvanometer; therefore the speck of light will not move.

Nor is this indication of an electrical traveller the only use which may be made of the galvanometer speck. You are aware that the extent of deviation of this needle is the measure of the quantity of electricity in transit; therefore the extent of deviation tells the number of passengers; in fact, the galvanometer becomes an electrical tell-tale turnstile for counting the number passing through, and so indicating or measuring the difference in resistance between the two courses.

Let us leave this figurative mode of expression. In the experiment before you the pegs in the box of ohms read 505; the speck of light is steady; therefore we know that the entire length of cable, of which the two ends are here, also offers a resistance of 505. Before this cable was laid a comparison with those ohms had been instituted, and it was found (say) that one mile of the cable offered a resistance to the passage of electricity equal to one ohm, therefore there are 505 miles of cable, because there are 505 ohms.

Now let us break the cable by cutting the wire. There! one end has fallen to the bottom of this large pan of salt and water. This pan must, for the present, be looked upon as an Atlantic Ocean; one end of the cable is at the bottom of it, and we wish to know how far from the end in my hand the separation has taken place. To compensate for the portion of the cable hitherto used, but now detached, the earth is available, this sheet of copper, in and on the shore of our Atlantic Ocean, is buried. Soldered to the copper is a wire, of which the end is in my hand.

There are therefore in my hands the ends of two wires; one, that of the broken cable—the other, that connected with the buried sheet of copper. Let us deal with them as we did with the complete cable. [After various trials the pegs in the box of ohms were so arranged that the speck of the galvanometer was steady.] The speck is now steady, and the pegs read 350. This means that there are 350 miles of cable, or its equivalent. Now, the cable and the earth are the only elements on the one side; and since the earth is as a large reservoir of electricity it offers no appreciable resistance; hence the only resistance is that of the broken cable. The length of this is pointed

* Those who are disposed to give the thought and application requisite for a clear comprehension of these principles of electrical measurement may refer to chapters ix. and x., extending from page 147 to page 165 in Jenkin's 'Electricity and Magnetism.'

out as 350 miles; this, therefore, is the distance of the fracture from the shore.

It is perhaps superfluous to state that many circumstances arise differing from those described, and many precautions have to be taken to which no allusion has been made. If, however, the general principles be made clear, that is accomplished which was intended to be done and those who are desirous of further information may consult the higher class of books which treat on practical telegraphy. It may be of some interest to let you see how delicate and perfect a test even this loaded galvanometer speck is. One or two illustrations will show how electrical currents are set in action when we are least aware of them.

Here is a small piece of zinc, like the blade of a penknife, attached to one end of a wire passing round the galvanometer; and here is a piece of copper attached to the other end. The zinc is now pushed into this apple. Observe, the speck moves so soon as the copper enters the apple. Repeat the experiment with a potato; the same phenomenon takes place. The potato forms a very good battery. There is another mode that is really more extraordinary still. If the galvanometer was sensitive, it is no fiction to say you can send a kiss across the Atlantic. Here are two little bits of zinc and copper attached to the ohms and cable combined as one length, and the galvanometer is now in circuit with them. If I kiss these two ends the speck moves. Therefore that mysterious something which is called electricity, and which has its origin at the lips, has exerted an energy sufficient to move the needle; indeed, sufficient to travel by the cable from one side of the Atlantic to the other, and move a needle when it arrives there.

Again, here is a small beef-steak and a knife and fork. These latter are connected by two thin copper wires with the galvanometer. One wire is attached to the blade of the knife and the other to the prong of the silver fork; by watching the speck you see that even one mouthful of meat cannot be cut without causing a current of electricity quite sufficient to manifest itself on the other side of the Atlantic.

Thus, surrounded by ever-active phenomena, which seem to have escaped the notice of men until the present age, he would indeed be more bold than prudent who ventures to speak confidently of what may or may not be done by one or other of the energies of the imponderables. How novel and delicate are the instruments employed, how accurate are the measurements obtained, and how marvellous are the uses to which electricity has been applied; yet these are not consequences of a blind rule-of-thumb following of that which has been long known. Patient research, persevering labour, and much thought have not only "put a girdle round the earth," but they promise fair to enter upon and possess electrical territories of vast extent and luxuriant social fertility. When will the people of England recognize this? Echo answers, "When!"

Parliamentary and Law Proceedings.

Prosecutions under the Adulteration Act. The "Facing" of Green Tea.

At the Central Police Court, Glasgow, on Tuesday, Nov. 11, John M'Kim, grocer, was charged with having sold a quarter of a pound of green tea, which was adulterated with turmeric and other ingredients.

A food inspector deposed that his attention having been drawn to some green tea in Mr. M'Kim's shop window, because of its particularly bright colour, he had purchased some of it, and handed it to the analyst. Dr. Thorpe deposed that he found the sample of tea to be adulterated with a mixture of turmeric, Prussian blue, and some silicate of alumina and magnesia, which he believed to be soap-stone or French chalk. The aggregate amount of these ingredients was about three per cent.

On behalf of the defendant, evidence was given that the tea sold was a genuine green tea, and that the facing was not an adulteration.

Bailie Hamilton (after consultation with the Assessor in private) said that having taken this case into consideration, the Court had come to the conclusion that the practice of selling faced tea as genuine green tea was very apt to deceive the public, and came properly within the meaning of the Act preventing articles from being sold which were different from what they were represented to be. Dealers who wished to sell this dressed green tea were quite at liberty to do so by labelling and selling it as such. The Court held the case to be proven, but considering the universality of the practice, the fine should be reduced to the minimum. The decision was that Mr. M'Kim be fined in 10*s.* 6*d.*

The Fiscal: I move for expenses.

Bailie Hamilton said that this being the first case, he thought it would be improper to give expenses. They did not wish to make Mr. M'Kim the victim for the trade. He had just been doing what the trade had been doing, but the Court trusted that this decision would put an end to the practice.

Mr. Lang, for the defendant, said that as this was a matter of principle which they wished to test to the utmost, he would give notice of appeal.

On the following day, Mr. Henderson, grocer, was charged with selling tea containing the same adulterants as those in the preceding case, with the addition of iron filings. The offence was admitted, but it was urged that the tea had not been adulterated since it came into the defendant's hands.

The Assessor: I look upon this case as a very different one to that which was before us yesterday. In it there were only the usual elements necessary to accomplish what is called "facing," but here we have the presence of a foreign article, which any trader without difficulty could detect if he chose to take the trouble. That is a serious element in this case, which the Court cannot overlook. The simple insertion of a magnet among the tea would have disclosed the presence of these iron filings at once.

The Bailie: The penalty must be in proportion to the amount of adulteration. I should have liked if this case had gone on, that we might have seen exactly the amount of adulteration. Seeing that you have pleaded guilty, we must assume that there is a considerable amount of adulteration, and, as the Assessor has remarked, it is quite a different case from that we had yesterday. The penalty must be very different. The decision of the Court is that Mr. Henderson be fined £5, with £2 3*s.* 6*d.* of expenses.

Review.

Reports on Forest Management in Germany, Austria, and Great Britain. By Capt. Campbell Walker, F.R.G.S., Staff Corps, Deputy Conservator. With Extracts from Reports by Mr. Gustav Mann, Mr. Ross, and Mr. T. W. Webber, and a Memorandum by D. Brandis, Ph.D., Inspector-General of Forests to the Government of India. London: Eyre and Spottiswoode, for Her Majesty's Stationery Office. 1873. 8vo. pp. x, 200. With cuts.

The subject of the preservation and improvement of forests is one of great and increasing interest and necessity. In all civilized countries the great demand for wood for fuel and for building, and also the requirements of space for building and agriculture, have much reduced and in some cases almost extirpated forests. In newly colonized countries this indiscriminate destruction of forests has been very rapid, and has not only created a difficulty in obtaining a sufficiency of supply of forest products, but has in some instances had a marked effect on the climate of the country, and turned fine pastures

into wildernesses. To guard against the repetition of such acts, and to repair the injury already done, recourse must be had by Governments to conservation and cultivation of forests, and the protection of collective rights against individual aggression.

"The main object," says Capt. Walker, "aimed at in any system of scientific forestry is, in the first instance, the conversion of any tract or tracts of natural forest, which generally contain trees of all ages and descriptions, young and old, good and bad, growing too thickly in one place and too thinly in another, into a closed or compact forest, consisting of trees of the better descriptions, and of the same age or period, divided into blocks, and capable of being worked—*i.e.*, thinned out, felled, and reproduced or replanted—in rotation, a block or part of a block being taken in hand each year. In settling and carrying out such a system, important considerations and complications present themselves, such as the relation of the particular block, district, or division, to the whole forest system of the province; the requirements of the people, not only as regards timber and firewood, but straw, litter, and leaves for manure and pasturage; the geological and chemical formations and properties of the soil; and the situation as regards the prevailing winds, on which the felling must always depend, in order to decrease the chances of damage to a minimum; measures of precaution against fires, the ravages of destructive insects, trespass, damage, or theft, by men or cattle; all these must be taken into consideration, and borne in mind at each successive stage."

The German forests, particulars of which are given as to the extent and kinds of trees grown, are divided into three classes, viz. (*a*) Those which are entirely the property of the State, but which in some instances are burdened with communal or individual rights; (*b*) Forests which were formerly church property, but which by particular Acts of Parliament are placed under a special department, which applies the profits arising from their working to educational and charitable purposes, and (*c*) Communal forests, which, like the preceding, are managed by Government forest officers; their annual yield, after deducting working expenses, being the entire property of the commune to use or sell as they please. The Government also takes up all extensive waste tracts and brings them under cultivation. The general way in which the forests are managed is as follows. The forest is first carefully surveyed and valued, and a plan prepared as to what trees are to be planted and what trees to be cut down annually, and detailing other items of management. These working plans are so well drawn out that they last with little or no revision for from twenty to even a hundred years. A register is also made of all rights of firewood, pasturage, etc., claimed by the inhabitants, and these rights in many cases are bought up by the State. It is found that when sums of money are given in commutation of such rights the successful working of the forest is much less hampered. In the case of communal forests the head inhabitants are always consulted as to their wishes, and they have the power of appeal against any working plan of which they do not approve. Such appeals are, we are told, very rare, as the people have learned that it is to their advantage in every way that the forests should be well managed, and such pains are taken to educate forest officers in their duties that their skill and knowledge create confidence.

In England much is done by private enterprise, and people do not look, as on the Continent they do, for Governments to do everything. Still we think that it is high time that our own Government should take the management of all communal forests in this country into their own hands, and thus guard the community against suffering from individual caprice. If this had been done with regard to the Epping Forest one would not have been scared by the unhappy ghosts of decapitated or "lopped and topped" trees one now sees.

The whole of the reports are full of interesting matter, but are of too technical a character to quote here. The suggestions of Dr. Brandis on the professional studies of forest officers on leave are exceedingly good. He warns any one from supposing that professional skill in the management of forests can be obtained in any other way than by hard work, and that "to work in a *dilettanti* sort of fashion" is of no good whatever. The suggestions are on the peculiarities of various European forests—what forests they should visit, and the best methods of study, and the literature of the subject.

These reports are the result of certain arrangements made in 1866 by which Indian forest officers who came to Europe during their furlough might have it in their power to increase their professional knowledge by studying forest management, and other subjects connected with forestry, in this country or on the Continent of Europe, and we trust they will not be the last of such reports. The Forest Department is now a very important one, as in India there is an increasing demand for building and firewood, and to provide the railways with sleepers and fuel, not only for the present time, but also to provide for the future. From India, too, we obtain many of our most valued medicinal and other vegetable products, and it devolves on the Forest Department to guard against any failure in such indigenous supplies, and to supplement supplies obtained from other countries. For the latter purpose careful meteorological observations are highly necessary.

The various points connected with the collection of forest products form also an important branch of forest study—such as the best time of the year for collection, the best kind of tools to use, and, where any preparation is necessary, the best method should be ascertained. Native collection is at the best of times wasteful, and such waste ought to be guarded against. Even where the tree has to be cut down, the bye-products should be utilized. The number of instances too in which the life of a tree has to be sacrificed might be considerably lessened, as, for instance, in the case of cinchona, where the coppicing system or lopping answers well. We are glad to find such an authority as Dr. Brandis speaking of this as probably the mode of cultivation to be followed in the future, for it is too often forgotten that a large timber tree is not grown as quickly as rice or corn.

The subject altogether is a highly important one, and we trust that the Government will not, from any false ideas of economy, prevent Dr. Brandis from making the Forest Department of India a highly organized and model establishment.

BOOKS RECEIVED.

How to Make Money by Patents; or, Hints and Suggestions to Inventors and Patentees. By Charles Barlow. Third Edition. London: Marlborough and Co. 1873. From the Author.

Milk Analysis: A Practical Treatise on the Examination of Milk and its Derivatives, Cream, Butter, and Cheese. By J. Alfred Wanklyn, M.R.C.S., etc. London: Trübner and Co. 1874. From the Publishers.

The following journals have been received:—The 'British Medical Journal,' Nov. 15; the 'Medical Times and Gazette,' Nov. 15; the 'Lancet,' Nov. 15; the 'London Medical Record,' Nov. 15; 'Medical Press and Circular,' Nov. 15; 'Nature,' Nov. 15; 'Chemical News,' Nov. 15; 'Gardeners' Chronicle,' Nov. 15; the 'Grocer,' Nov. 15; 'Journal of the Society of Arts,' Nov. 15; 'Grocery News,' Nov. 15; 'Produce Markets Review,' Nov. 15; 'Carlisle Patriot,' Nov. 15; 'Leicester Journal,' Nov. 15; 'Practical Magazine,' for November; 'Educational Times,' for November; 'British Journal of Dental Science,' for November; 'Journal of Applied Science,' for November; 'American Journal of Pharmacy,' for November; 'Pharmacist,' for November; 'Canadian Pharmaceutical Journal,' for November.

Notes and Queries.

[367.] INSECTICIDE.—If *W. Rudd* will try the insect poison recommended by M. Cloez (PHARM. JOURN., 3rd Series, i., 6) he will soon get cleared of ants.—J. TULLY.

[368.] POMADE.—Powdered gamboge is a nice colouring ingredient for pomade, and is unaffected by sunlight. —J. T.

J. W. Y. will find that gamboge digested in olive oil forms an excellent colouring for pomade—far superior to palm oil, etc., so frequently used.—T. F. H.

[371.] MORPHIA SOLUTION FOR HYPODERMIC INJECTION.—I wish to know how to make a neutral solution of Acetate of Morphia that will keep without any sediment. Strength, gr. j morphiæ in ♏ xij. —H. J. DAVIES.

[372.] FLEXIBLE VARNISH.—*R.* asks for a recipe for making a pliable varnish for fly-fishing lines.

[373.] BROWN BOOT-TOP LIQUID.—Can any reader inform me of a good recipe for *Brown* Boot-top Liquid (without anatto colouring) ?—A SUBSCRIBER.

[374.] BOOT VARNISH.—Can any one give a recipe for varnish for dress boots, which will stand moisture ?—T. P. C.

RESEDA ALBA.—Your reply to "*Pharmacist*" on p. 340 of the Journal induced me to think that another locality for *Reseda alba* might not be altogether unwelcome. I found two specimens growing in a turnip field about two miles from Northampton, near a village called Upton, only a short distance from the Ironstone Quarries, where *Reseda luteola* grows in great profusion. *Reseda lutea* I have not as yet found in Northamptonshire, though my collection of flowering plants this year reaches 500 species.—G. C. DRUCE.

[*** The specimen of *Reseda alba* referred to was interesting, on account of its having six sepals and petals, and being therefore the *Reseda alba*, L. of continental botanists. The white flowered *Reseda*, with five petals and sepals, is usually regarded as a variety of *R. suffruticulosa*, L. Watson, in his 'Cybele Britannica,' states that the number of petals and sepals varies on the same specimen.—ED. PHARM. JOURN.]

ESTIMATION OF ALCOHOL IN COMMERCIAL CHLOROFORM.—A. C. Oudemans recommends (*Zeitschr. anal. Chem.*, xi., 409) that for the purpose of detecting and estimating the quantity of alcohol present in a specimen of chloroform, ten to fifteen grains of it should be placed in a glass flask with excess of dry pure cinchonine and kept for an hour at 15° C. by means of a water-bath and constantly shaken. The liquor is then filtered, 5 c.c. of the filtrate evaporated on the water-bath, and the residue weighed.

The following amounts of residue have been obtained with chloroform containing varying proportions of alcohol :—

Per cent. of Alcohol in Chloroform.	Milligrams residue left by 5 c.c.
0	21
1	67
2	111
3	152
4	190
5	226
6	260
7	290
8	318
9	343
10	346

GLYCERITE OF LIME.—The New York *Druggists' Circular* states that a glycerite of lime is recommended by Mr. De Bregne to be used in burns to soothe the pain and to prevent inflammation or diminish its intensity. It is prepared from—

Recently Slaked Lime	1 part.
Glycerine	50 „
Chlorinated Hydrochloric Ether	1 „

SOLUBILITY OF ARSENIOUS ACID IN WATER.—Buchner reports (*Neues Rep. f. Pharm.*, xxii., 265) that amorphous arsenious acid is more soluble than crystalline. The experiments were made by shaking with cold water, and allowing to stand for twenty-four hours, when it was found that the solubility of the amorphous variety was 1 in 108, and of the crystalline 1 in 355. Treated with boiling water and allowed to stand for twenty-four hours at 15° C., their respective solubilities were,—Amorphous acid, 1 in 30 parts of water; crystalline acid, 1 in 46 parts.

ACTION OF AMYLIC ALCOHOL ON POLARIZED LIGHT.—MM. Pierre and Puchot, in a paper read before the French Academy (*Comptes Rendus*, lxxvi., 1332), amongst other details as to the rotatory power exercised by amylic alcohol and its derivatives upon polarized light, state that the action of amylic alcohol is equal, though in an opposite direction, to that of a solution containing 1·4 per cent. of cane sugar, and that this rotatory power is increased one-third by the addition of about six per cent. of water. O. Popoff has found (*Deut. chem. Ges. Ber.*, vi., 560) that amylic alcohol which has been treated with an alkali or a solution of a calcium chloride does not yield the powerfully polarizing alcohol upon fractional distillation.

ANALYSIS OF JUNIPER BERRIES.—E. Donath gives the following (*Ding. Polyt. Journ.*, ccviii., 300) as the result of an investigation of the constituents of the berries of *Juniperus communis* :—

Water	29·44
Essential Oil (obtained by distilling the berries with steam)	0·91
Formic Acid	1·86
Acetic Acid	0·94
Malic Acid (combined with a base)	0·21
Fat resembling wax	0·64
Green Resin	8·46
Hard Brown Resin	1·29
Juniperin (found not to contain nitrogen)	0·37
Pectin (extracted from dried berries by water, and precipitated with alcohol)	0·73
Protein Substances	4·45
Sugar	29·65
Cellulose	15·83
Mineral Constituents	2·33

The wax was extracted with ether, and purified by successive treatments with water and boiling alcohol. From this alcohol, after the wax had deposited, was obtained, upon evaporation, the "green" resin, which had acid properties and resembled fir resin. The "brown" resin was obtained from the berries after being treated with ether by means of alcohol, and was soluble in alkalies.

CORKS SATURATED WITH PARAFFIN are, according to the *Apotheker Zeitung*, sometimes used for corking bottles containing alcoholic or caustic liquids. They are prepared by fusing paraffin in a suitable vessel, and immersing the dry corks in the paraffin by means of a perforated cover or dish. After about five minutes the corks are removed and cooled. Thus prepared, they may be cut and bored like wax, are easily driven into the necks of bottles and readily removed, retain their smoothness, and are air-tight throughout.

Correspondence.

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

"Citrate of Magnesia."

Sir,—During the past summer I required a new supply of "citrate of magnesia" labels, and bearing in mind a discussion, at which I was present, as to the propriety of calling any article by a name not strictly correct, I adopted the following addition to the ordinary label—"Granular Effervescing Aperient, usually known as," etc. This may interest some of your readers during the present discussion on the subject.

Chester, Nov. 11th, 1873. John Mills.

Sir,—The recent decision in the "magnes. citras" case has not only taken myself by surprise, but, I am sure, the whole trade in general; it is really something marvellously astounding (even though the case may have been proved to be an infringement of the Adulteration Act) to find the magistrate should not only fine in the case, but fine so excessively, which to my way of thinking is most outrageous. I certainly think an appeal should be taken, and if perchance the decision cannot be reversed, it will the more satisfy us that the case in point really does come under the Adulteration Act, and that it is illegal to sell that preparation by its present name. Under any circumstances, I think we ought not, as a body, to allow Mr. McDermott to be under the expense of the fine and costs himself. I for one shall be most happy to give my mite, and I am quite certain many others will join me in paying off any expenses that are already incurred and which may be incurred, providing an appeal be taken, seeing that we, each one individually, are equally guilty—if guilty we may term it—in selling "sodæ citro-tartrate effervescens," B. P., with the addition of sugar and lemon, under the title of "granular effervescent citrate of magnesia." Your kindness in inserting the above brief remarks will greatly oblige,

Manchester, Nov. 13th, 1873. Richard Twemlow.

[*** If Mr. Twemlow will refer to the report of the discussion at the Evening Meeting of the Pharmaceutical Society (*ante*, p. 372), he will find that Mr. Bishop said he would take care, with the aid of a few friends, to see that Mr. McDermott was not out of pocket. To this promise we would also direct the attention of another correspondent—Mr. Nottingham, of Shadwell,—who has kindly offered to subscribe 10*s*. towards the same object.—Ed. Pharm. Journ.]

Sir,—It seems to me that the absence of magnesia in the effervescing compound sold as citrate of magnesia should have prevented a conviction under the Adulteration Act. Could a grocer who sells a pound of salt when asked for a pound of sugar be fined for selling adulterated sugar? He might be sued for damages if any arose from the substitution, but certainly not for adulterating it.

Ipswich, Nov. 11th, 1873. H. C. Chapman.

Sir,—I have adopted the simple plan of putting a pen through the words "of Magnesia," when supplying the so-called "Citrate of Magnesia."

It seems to me that "Granular Effervescent Citrate" is not a bad name for the preparation. It is sufficiently definite, and sufficiently indefinite, to protect chemists and the public from the misapplication of the Adulteration Act.

Glastonbury, Nov. 17th, 1873. T. Mayhew.

Sir,—I see in to-day's Journal many suggestions relative to "citrate of magnesia."

I think a good and simple plan to adopt will be to have two additional lines printed to our accustomed style of label, but in smaller type, as under:—

Effervescing Saline,
usually called
Effervescing Citrate of Magnesia.
Etc., etc.

T. F. Hudson.

Holt Place, Birkenhead, Nov. 15th.

Sir,—Without adding much to the already voluminous correspondence upon the subject, I would remark that there is no longer need for a full definition of the nature and composition of the material upon the labels of the so-called citrate of magnesia. I would suggest that it be henceforth called simply:—

"Magnesian Citrate"
instead of
"Granular Effervescing
Citrate of Magnesia."

The public, when once told, will soon learn that it is simply a new and more comprehensive way of expressing the nature of the article, presuming, of course, that there will be in future some magnesian salt with citric acid in all that is sold.

I think the name will answer all practical purposes, and not involve the risk of a penalty.

Should any of your readers think otherwise, I shall be glad to hear their objection.

John C. Pooley.

8, *George Street, Bath, Nov. 18th.*

Sir,—Upon seeing the notice regarding the sale of "Granular Citrate of Magnesia," as being under the Act illicit, we sent a sample of our manufacture to Professor Stevenson Macadam for analysis, and beg to enclose his report.

Sang and Barker.

Edinburgh.

"Analytical Laboratory,
"Surgeons' Hall,
"Edinburgh, November 12th, 1873.

"I hereby certify that I have made a careful chemical analysis of a sample of 'Granular Effervescent Citrate of Magnesia,' manufactured by Messrs. Sang and Barker, Pharmaceutical Chemists, Edinburgh, and find such to contain 1·52 per cent. of magnesia, which is equivalent to 8·81 per cent. of the acid citrate of magnesia.

"I am therefore of opinion that this sample is of excellent quality, and is entitled to be regarded as 'Granular Effervescent Citrate of Magnesia.'

"Stevenson Macadam, Ph.D.,
"F.R.S.E., F.C.S.
"Lecturer on Chemistry."

Sir,—The delay in my communicating with you after the discussion at the Society's house, has arisen from my desire to secure the advice of the Attorney-General and Mr. Poland, and the difficulty which I have had to get their opinion. Consequent on the opinion which I have at last received, it is plain that the proper course is for the name to remain as it is; and to explain my course I have made a statutory declaration, and prepared a circular, with a view to sending a print of each to every gentleman on the register of chemists and druggists, and others who buy of me. One will of course reach you. It would have been a pleasure to me to have carried out what I know would have been, from a pharmaceutical point of view, a desirable object, viz., a change of name, but I feel that by long usage the name which has been used has become the only name of my article, and that whilst a change would have been understood by the educated body of chemists and druggists, it would not have been understood by consumers generally either at home or abroad.

Alfred Bishop.

17 *and* 18, *Speck's Fields, Mile End New Town, Nov. 20th.*

Sir,—In order to avert further proceedings in connection with the so-called "citrate of magnesia," and to protect its extensive sale, I would suggest that all manufacturers of it should hereafter adopt Mr. Bishop's system of preparation—that of the addition of magnesia—when the seller could with all safety designate it as "Compound Granular Effervescent Magnesia," thus avoiding as much as possible an apparent difference in the label. Allow me at the same time to draw attention to another misnomer, extensively used, and by which it appears to me we are equally as much exposed to danger—viz., the so-called "soda water." It is well known that the larger quantity of this preparation sent out does not contain a particle of bicarbonate of soda, I believe on account of the addition of that salt rendering the water less agreeable as a beverage. The remedy I would suggest for this is

to see that soda is present, and if the water be preferred without the alkali, to have it labelled "Aerated Water," which I think the public would not much object to. Hoping these suggestions may be of some little service, I am, etc.,

AN ASSOCIATE.

Edinburgh, Nov., 1873.

THE ADULTERATION ACT.

Sir,—Citrate of magnesia is a subterfuge, and it has always been so considered by the trade, and some, if not all, of the public. How is it that it comes under the provisions of the Adulteration Act?

How can a preparation sold as a certain article be an adulteration if the article is not contained in it at all?

I hope this subject will now be thoroughly discussed, in order that something definite may be arrived at.

F. W. S.

Walworth, Nov. 12th, 1873.

WHO'S PHILIP?

During the discussion which took place on the citrate of magnesia question, when it was stated that the Adulteration Act prescribed for the second offence imprisonment with hard labour, one of the speakers remarked that the sentence would involve a change of residence, but not of occupation.

This observation indicates the prevalent feeling that the daily routine of a dispenser of medicine is considered to be one of continuous labour as well as responsibility. Dog Latin and bad Latin, errors and excessive doses, equally demand the most careful attention to every prescription. His mental faculties are in a state of tension from the time that he takes his stand behind the counter until he retires to rest; but when to this is added the occasional appearance of such a prescription as the one now before me, it is the last straw that breaks the camel's back.

℞

Pil. Philip. vj.
St. j hora somni semel hebdom.
Sig. Specific Liver Pills.

Rufus we know, and Plummer we know, but who is Philip? A little alteration in the heading of the paper read before the Liverpool Chemists' Association by Dr. Edmund Alleyne Cook would supply an equally good subject for another occasion. I would suggest that the reading be "Some practices of the profession, the abandonment of which would benefit the trade."

The practice of prescribing a preparation, the formula for which has not been published, and the composition of which is not indicated by its name, and the only merit of which is its novelty, is bad enough—and in all conscience troublesome enough—but when to this is added the practice of supplying a chemist with private formulæ, obliging patients to go to one particular shop, and that only, to get the prescription dispensed, it is beyond quiet endurance. To take the usual professional fee from a patient, and then to give that patient a prescription which can be dispensed only at the particular establishment which is in possession of the formula is unprofessional and indefensible. It implies a compact and cannot be too sharply condemned. Perhaps in some future opening address at one of the medical schools, when discoursing on the ethics of the profession, this subject may receive some attention. It is my intention on all future occasions when a prescription of this kind comes under my notice to ask for information through the medium of the PHARMACEUTICAL JOURNAL, giving the name of the prescriber, and also that of the chemist who has previously dispensed it. The practice of prescribing from secret formulæ is now quite exceptional, but it should have no existence, and then it would be unnecessary to ask the question, Who's Philip?

THOMAS GREENISH.

20, *New Street, Dorset Square, N.W.*
Nov. 8th, 1873.

MUSTARD.

Sir,—As a lover of what is true and genuine, and a disliker of all "*shoddy*," under whatever pretext or disguise it may be offered, I was extremely glad to observe Mr. Greenish's paper on Mustard in your last week's Journal.

Mr. Greenish's quotation as to the purposes served by mustard as a condiment, if accepted as true, should brush away, as the merest rubbish, all the alleged arguments used in favour of its admixture with other ingredients. I would put it thus: For what purposes is mustard employed by its consumers? That question being answered, I want to know whether even "the finest wheaten flour" (as it was lately termed in a court of justice by a representative of one of the most respectable of our mustard manufacturers) will promote these ends? Does turmeric do it? If not, then comes on the question brought out in recent discussions on the subject, and asserted by advocates of the present "use and wont" system of manufacturing mustard, or, as I lately found one eminent public analyst terming it, "mustard condiment"!!—viz., the keeping powers of the true article. It is broadly asserted that it won't keep when made up for table use as long as the adulterated article does. On this point I can only state that, for more than twenty years, my firm has sold no other mustard than Dewar's (Newcastle) pure brown, and that, during that period, it alone has been in use at my own table, and that no complaint of its not keeping has ever reached me. Besides, supposing such were the fact, does everybody not know that mustard ought to be mixed for use daily, just as our coffee has to be made every morning, and not once a week; the first operation takes a minute or less, the latter at least a dozen times as long.

I further hold that it won't do, at this time of day, for makers or for sellers, wholesale or retail, to cast the blame of their selling adulterated articles on the "*public*." The public are quite helpless in the matter. If the manufacturer won't *manufacture*, and the trader won't *sell*, anything but the genuine article, then the poor, much abused, but really, in such matters, helpless "public" must *buy*, and must pay for the genuine article. They are quite as helpless in this as they are in regard to railway travelling. If the great railway companies say they will run no fast trains, then the public must just be content to travel by slow ones. So with us traders and all our commodities *and* our customers.

DANIEL FRAZER.

Glasgow, 18th Nov., 1873.

P.S.—As an odd coincidence with the writing of this letter, I am tempted to add these two facts that occurred this very day in my own shop: 1st. We were asked to supply one of our public bodies, on the footing that they "knew ours to be pure," with a sample of our mustard, that it might be used as a standard for comparing other so-called mustards by under the microscope. 2nd. We were asked by a druggist in a neighbouring country town for another small sample, to assist him in his illustrations of a lecture on the subject, we understand, of adulterations, he was to deliver last night. These little incidents testify that the public somehow find out where a genuine article is kept, and that they can appreciate it when found.

UNUSUAL DOSES IN PRESCRIPTIONS.

Sir,—The subject of unusual doses has special prominence in your last issue, and also in that of your trade and medical contemporaries, by reason of the publication of the resolutions passed at the Pharmaceutical Conference at the Bradford meeting, and of the resulting circular to the heads of the medical profession. This, with your expressions of the opinions taken from the *Practitioner* and the *Druggists' Circular and Chemical Gazette*, coupled with your trust that a means may be devised of protecting prescribers, patients, and dispensers from possible disappointment, inconvenience, and perplexity, has prompted me to suggest that the method in use by some of our continental neighbours might be taken as a complete solution of the question, and that such method, or whatever may be adopted, should have the official stamp of a place in the next Pharmacopœia. In the seventh (1871) edition of the Pharmacopœa Suecica there are certain canons laid down for the dispensing of medicines, the seventh of which runs thus:—"7. Si ad internum usum præscripta fuerit major medicamentorum vehementium dosis, quam quæ in Tabula A indicatur, ea ne dispensetur, nisi vel signum exclamationis! vel verbum *sic* a medico adscriptum sit." I may add "Tabula A" is described as "quantitatem maximam medicamentorum vehementium adultis interne prodosi dispensandam exhibens." Then follow the articles and doses. Whether in the above way or by bracketed initials of the prescriber is a matter of detail, but in any way let it be as much on authority as in the Swedish Pharmacopœa, or as the nature and purity of the medicines themselves in our own. When in the Pharmacopœia it will have the force

of law, and from its obvious utility in defining the position of prescribers and dispensers, it will, I feel sure, gain the approval and support of all concerned.

I hope that you and your contemporaries and the interests represented will agree with me.

A Drug Traveller.

London, November 17th, 1873.

Phosphorus Pills.

Sir,—In your "Notes and Queries" for Nov. 1, 1873, you publish a formula for making ¼ grain phosphorus pills which I supplied to a neighbour requiring such. My original letter contained a caution that ¼ grain doses were exceptional.

My attention has just been drawn to the absence of this caution in your note, from the circumstance that a young pharmacist who had been under treatment with phosphorus capsules containing one-thirtieth of a grain each, desirous of preparing his own medicine, substituted pills by the published formula, and suffered disagreeable irritation in consequence.

Phosphorus requires caution, no less in its admistration than in its manipulation, and will not allow of its dose being increased fourfold with impunity.

Barnard S. Proctor.

Grey Street, Newcastle,
Nov. 14th, 1873.

[*** We published the extract from Mr. Proctor's letter just as we received it from our correspondent, in which state it was unaccompanied by any remark as to the dose. We agree with Mr. Proctor that ¼ of a grain of phosphorus is a large dose, though we happen to know that such doses are prescribed, and in publishing the formula we took it that Mr. Proctor's object was to assist pharmacists in manipulating that quantity of phosphorus into a pill rather than to help them in deciding when such a dose should be taken.—Ed. Ph. J.]

Local Secretaries and their Duties.

Sir,—Judging from what is said in the Council and out of it, local secretaries are receiving scant praise for the way in which the duties devolving upon them have in many instances been performed.

The Council has on many occasions given broad hints that there is room for improvement as regards these functionaries, and as a means to bring it about they have pressed the subject on the attention of members at the annual election of the Council. The result, I imagine, has been rather disappointing.

There are two or three phases of the subject deserving notice. In the first place, the office is one that is not coveted by many, and in the second place, few people care to propose any change so long as the present occupier expresses no desire to resign; and thirdly, some persons hold so tenaciously to the honour because it is supposed to distinguish them in particular, and they have no inclination for less distinguished men in the town to hold it. Now this ultra-Conservatism is bad, and acts as a dead weight on the energies of the Society. The remedy I would propose for this would be to pass a bye-law that local secretaries be elected for two years only, and not be eligible for re-election. By this plan an interest in the affairs of the Society is spread over a larger number, and the duties of the office fulfilled for so limited a period with zeal. New brooms sweep clean.

F. M. Rimmington.

Nov. 15th, 1873.

Chemists' Assistants' Association.

Sir,—Some time ago a society for chemists' assistants was hinted at in the pages of this Journal by some well-wisher, but no steps appear to have been taken at present in the matter. It is generally known amongst us assistants that our remuneration is much about the same as that given to those who require very little mind for their business. Most certainly it is very little, if *any*, more, and yet *we* must rack our brains night after night, when (as stated by Mr. Heynes) we should be taking bodily exercise, after the long toilsome hours of business, in order to pass our examinations. Surely the instance of payment that he quoted was low enough in the scale. Out of £25 per annum how much is a young man likely to save towards his Major examination expenses, after deducting no small amounts for clothing, washing, railway travelling, etc.? Such a salary would be fair enough for an improver, or even a junior assistant, but to a Minor man, and in honours, too, the offer was an insult.

At a foreign pharmacy, not a hundred miles away from Soho Square, I was expected to speak French and take entire charge of the business (the proprietor being a surgeon) for the munificent recompense of £30 per annum. The rising pharmacists of the day overlook their assistants. They do not consider them, but were they to do so more I think that they would find that their young men would take much more interest in business, and strive to forward their employers' ends to the utmost. But at present the employer appears only to think to himself: "I was once an assistant, and had to put up with the same hardships that others do now; if it did not hurt me, it cannot injure them." There he stops, but he does not consider that when he was a young man he had not the difficulties to cope with that one has now. Then the examinations were not obligatory, then the law was not so severe as to hunt down every luckless chemist who had commenced business without having first presented himself for examination. Our employers, now-a-days, don't seem to think of any of these things. They think if their assistant is well fed, and comfortably lodged, their duty towards him ends there, and he must do *his* duty by them. If he complains that his salary is insufficient, the answer he receives is that he can go elsewhere and seek for more. But most young men don't like chopping and changing, neither do *many* employers.

Far be it from my thoughts to wish to raise discontent amongst my comrades at their hard lot. My desire, and that of others also, is merely to form an association for chemists' assistants, in which their interests would be forwarded in many ways.

Will no benevolent employer come forward, and with heart and hand take the lead in this scheme? I will warrant that plenty of young men will be found ready to enroll themselves members.

Let assistants all unite together in endeavouring to persuade English employers to copy the liberality of their American brethren in this particular, and to study their assistants a little more, doing unto others as they would men should do unto them.

Minor Associate.

Nov. 10th, 1873.

"*Cleopatra.*"—There is no known acid that will dissolve a diamond, but it may be dissolved by oxygen at a sufficiently high temperature.

E. J. Davies.—We have inserted your query, though we do not think it will be possible to prepare a solution that will keep more than a limited period.

"*Henricus.*"—We have sent on your query to a veterinary friend, and upon receiving his answer will forward it to you.

A. Stringer.—The answer to your first question would depend upon whether you mean what is vulgarly known as a "patent medicine," *i.e.*, a proprietary article. We should recommend you to consult a solicitor respecting your second question.

Dr. Domett Stone is thanked for his information.

Mr. Kinninmont is thanked for his communications.

Catchpenny Advertisements.—A correspondent informs us that observing recently an advertisement in our columns offering a good position to an experienced man, he sent in an application for it. After a few days he received a letter stating that the vacancy in question was filled, but that by sending 5*s.* in stamps to the writer, "to defray little expenses," etc., the applicant could be assisted in getting a first class appointment. We are glad to say that our correspondent was "one who values five dozen stamps" too well to part with them in that way, for the transaction has the appearance of a trick which is neither new nor peculiar to pharmacy, and which we therefore regret to infer is not unprofitable.

Communications, Letters, etc., have been received from Messrs. McNeile, Dittmar, H. J. Davies, Stringer, E. Davis, "Dolomite," "Spero," "Edina," "An Associate," "Gradibus," F. F. H., S. X. N., A. P. S.

AFRICAN TEA PLANTS.

BY JOHN R. JACKSON, A.L.S.,

Curator of the Kew Museums.

It is interesting to note the numerous British plants that are used by the peasantry in rural districts in this country for the purpose of making an infusion which is commonly called tea, and which is often given for the cure of various disorders of the human system. A more extended interest is attached to the numerous plants which are used in different countries for a similar purpose, as well as for a refreshing beverage which is drunk as we drink the Chinese article. Thus we have Labrador tea, the leaves of *Ledum latifolium;* Faham, or Orchid tea of Madagascar (*Angræcum fragrans*), and, above all, Paraguay tea, the leaves of *Ilex paraguayensis*, which occupies as important a position in South America as the leaves of *Thea chinensis* do with us. Its use is said to have been derived from the aborigines, and has been continued for a long period of time. It is estimated that the quantity consumed in the country comes to nearly or quite 8,000,000 lbs. annually. The mode of preparing the leaves for use differs from that adopted by the Chinese, inasmuch as the leaves are not gathered separately, but whole branches or twigs are cut off and placed on hurdles over a fire until properly dried or roasted, when each branch is beaten and the leaves which are thus removed are reduced to a powder. To drink this tea an infusion is made in a small pot formed of a gourd, and the fluid is drawn into the mouth through a small tube.

The names Tea plant and Tea tree are sometimes applied to large timber trees, as in the case of the Australian tea trees, species of *Leptospermum* and *Melaleuca*. It is, however, of some of the African tea plants that we have now more especially to speak. *Cyclopia*, *Borbonia*, *Cliffortia*, and *Catha* are genera whose species are known in certain localities as tea plants. The first two belong to the Leguminosæ. *Cyclopia* consists of nine species, mostly shrubs or bushes, natives of South Africa. The leaves are alternate, sessile and trifoliate, the leaflets linear, smooth or pubescent, their margins frequently revolute. The flowers are yellow, papilionaceous, stalked and bracteate, and are mostly borne in the axils of the upper leaves. Round the pedicel at the base of the calyx is a circular depression, a character by which the species may be recognized from their allies. The fruits are compressed oblong pods, bearing numerous seeds.

C. genistoides, Vent., is known at the Cape as bush tea, the leaflets being used for that purpose. It has a strong aroma resembling Chinese tea, and a sweetish astringent taste. It is used in medicine for assisting expectoration in chronic catarrh, and also in consumption. Though the present species is that generally spoken of as yielding bush tea, the leaflets of other species no doubt are used for a similar purpose, *C. Vogelii*, Harv., undoubtedly being one of them. Another South African leguminous genus, the leaflets of which are used for making a medicinal infusion, known to the colonists as "Stekelthee," is *Borbonia;* the genus consists of thirteen species all natives of South Africa. They are shrubs with compressed, angular, winged branches, and alternate, many-nerved leaves. The flowers are papilionaceous, yellow, and are borne in terminal or axillary racemes. The pods are linear, somewhat flattened, and are mostly covered with long soft hairs. *B. parviflora*, Lam., is the species mostly used, the leaves of which are given as a diuretic in the form of decoction.

Cliffortia is a genus of Rosaceæ, and is composed of about forty species. They are bushes, all natives of South Africa. They have small alternate leaves, composed of two or three leaflets; in the species in which the three leaflets occur, the two side ones are small and united more or less to the centre one, thus giving the leaf the appearance of being a simple, instead of a compound one. The flowers are small, diœcious, and produced in the axils of the leaves. Both the male and female flowers have the calyx tube contracted at the top, the former containing about thirty stamens, and the latter with one or two achenes, each surmounted with a bearded or feathery style. *C. ilicifolia*, L., is the species the leaves of which are used at the Cape under the name of Doorn-thee as an emollient and expectorant in coughs.

The leaves of two or three species of *Helichrysum* —a well-known genus of Compositæ—are used at the Cape under the several names of Caffre tea, Hottentot's tea, and Duinen-thee. The first-named is procured from *Helichrysum nudiflorum*, Less., a common herbaceous plant of the colony, with stalked, amplexicaul, ovato-lanceolate radical leaves, and narrow, lanceolate, sharp-pointed cauline leaves. The flower heads are terminal, corymbose, and the flowers yellow. The plant is demulcent, and an infusion made from it is recommended in phthisis, catarrh, and pulmonary complaints generally. *H. serpyllifolium*, Less., furnishes Hottentot's tea. It has an agreeable smell, and is a favourite amongst the natives. It is said to possess demulcent and emollient properties, and is used for similar purposes as the last-named species. The leaves of *H. imbricatum*, Less., constitute the Duinen-thee—literally tea from the Downs, in reference to the plant being common on the Cape Downs. This is likewise used in coughs and chest diseases, as are also the leaves of *H. auriculatum*, Less.

Methyscophyllum glaucum, E. and Z., an amyridaceous shrub, with opposite, lanceolate glabrous leaves, recurved at the margins, and flowers borne in axillary panicles, furnishes what is known as Boschjesmansthee; from the leaves is made an infusion which has a very pleasant flavour, and besides being used for coughs, asthmatic, and similar diseases, is a favourite drink with the bushmen and others.

Catha edulis, Forsk., a celastrineous shrub, the leaves of which are largely used as tea in Arabia, under the name of Kât, is, so far as its African habitat goes, confined to the eastern part of the continent. In Arabia the twigs, with the young leaves remaining, are very extensively collected, and form an important article of trade among the Arabs, large quantities being annually brought to Aden from the interior. The twigs are made up into bundles, varying in size according to quality. The use of this tea is said to produce effects somewhat similar to those produced by the Peruvian coca (*Erythroxylon Coca*), namely, extreme wakefulness and capability of bearing extra strain with a minimum of fatigue. Taken in decoction, in moderate quantity, its effect is exhilarating, nearly analogous to that of Chinese green tea.

THE ACTION OF THE CINCHONA ALKALOIDS AND OTHER SUBSTANCES UPON BACTERIA AND COLOURLESS BLOOD CORPUSCLES.

In an exhaustive and interesting paper printed in the *Practitioner* for November, Dr. E. Buchanan Baxter gives the results of numerous experiments upon the action of the cinchona alkaloids and their congeners on bacteria and colourless blood corpuscles. Referring the reader to the original article for the details of Dr. Baxter's numerous experiments, it is proposed to give here a short abstract of the general conclusions drawn from them upon points likely to be of interest to the pharmacist.

Cinchona bark and quinine are generally considered to possess antiperiodic, antiseptic, and antiphlogistic properties, terms which the author defines respectively as indicating their specific influence over morbid states caused by the paludal miasm, their curative virtues in septic conditions of the blood, and their power to restrain the migration of the colourless corpuscles of the blood, and thus to control the violence of suppurative inflammation. The author deals mainly only with the latter properties. The antiseptic action of the four principal cinchona alkaloids, and some other substances whose relation to them is not yet understood, are compared with their power to control the migratory movements of the blood corpuscles. The question of their antiperiodic virtues is only indirectly touched upon, in so far as their power to destroy the vitality of bacteria and other microscopic organisms bears upon the doctrines advanced as to the spread of specific fevers, and other forms of disease, by living germs.

The subject cannot be said to be a new one, and the author, in the few paragraphs which are here quoted, rapidly sketches the probable origin and form of the inquiry.

"The singular freedom from decay enjoyed by all the varieties of cinchona bark must have been noticed by pharmaceutists from a very early period. The permanence of decoctions and infusions of bark, as compared *e.g.* with those of quassia, forces itself on the attention of the most careless dispenser. It was not till the middle of the last century, however, that the antiseptic qualities of bark were experimentally investigated. In the *Philosophical Transactions* for 1750, there is a paper by Sir John Pringle, entitled 'Some Experiments on Substances resisting Putrefaction,' giving a series of observations on the comparative antiseptic power of a variety of substances, including 'the Bark.' The author exposed bits of meat, steeped in solutions or decoctions of the antiseptics employed, to a temperature of 94°—104° F. for several days, and noted the kind and degree of putrefactive change which they underwent. His observations are reduced to a common standard, viz., the antiseptic power of a solution of common salt of known strength.

"These experiments laboured under several disadvantages; the true nature of putrefactive decay was still unknown, more especially as regards the part played by bacteria; the substances employed were not chemically pure; and the sense of smell, as a test of decomposition, is neither wholly trustworthy, nor capable of quantitative expression. Notwithstanding these drawbacks, however, the results obtained were, upon the whole, singularly correct, and have been corroborated by the more exact researches of later inquirers. With regard to cinchona bark, Pringle makes the following statement: 'The common neutral salts, however powerful in resisting putrefaction, are inferior to some resinous substances, and even some vegetables, which I have tried. Thus myrrh, in a watery menstruum was found at least twelve times more antiseptic than sea-salt.' After alluding to camphor, Virginian snake-root, and chamomile flowers, he goes on to say: 'the Jesuit's bark has the same extraordinary quality' (*i.e.*, that of hindering putrefaction); 'and if I have not found it so strong as the two substances last-mentioned, I impute that in part to my not being able to extract its embalming parts in plain water.' The experiment is described thus: 'I made a strong decoction of the bark, and infused a piece of flesh in two ounces of it strained; which flesh never corrupted, though it remained two or three days in the furnace after the standard' (flesh steeped in brine) 'was putrid. In this time, the decoction became gradually limpid, whilst the grosser parts subsided; by which it appears that a most minute portion of the bark, intimately mixed with water (perhaps less than of the snake-root or chamomile flowers) is possessed of a very extraordinary antiseptic force.'

"His theory, as may be expected, falls short of his observations; he is inclined to attribute the antiseptic virtue of the bark to its astringent properties. 'By the success of the bark in so many putrid cases, it should appear that astriction had no small share in the cure, and indeed the very nature of putrefaction consists in a separation or disunion of the parts.'

"Pringle's observations lay forgotten for upwards of a century. Even Briquet, in his elaborate and valuable monograph, refers very briefly to Pringle's results, and obviously confounds the antiseptic with the astringent properties of the bark:—'Ces tentatives montrent seulement l'influence de l'action chimique du tannin sur la putréfaction, mais elles ne prouvent rien sur la prétendue propriété antigangréneuse attribuée au quinquina' (p. 40). It was not till the researches of Professor Binz and his pupils that the high place of quinia among antiseptics became generally recognized. And this recognition has already thrown much light on the efficacy of quinia in cases where its use had previously been ascertained by clinical trials, and is likely to extend the sphere of its future application.

"No really adequate conclusions as to the antiseptic power of the cinchona alkaloids were possible so long as the intimate nature of the putrefactive process remained unknown. The circumstance that it depends on the evolution of a multitude of extremely simple organisms, narrows the area of the inquiry very materially. The question as to the antiseptic properties of quinia and other substances resolves itself into the question of their action upon microzymes."

In estimating the effect of drugs on the vitality of microzymes, the author took the power of spontaneous locomotion and of undergoing unlimited multiplication in suitable media as reliable criteria in deciding whether the microzymes were alive or dead. The entire absence of all but passive movement does not afford conclusive evidence of death; it may result from a rigidity or torpor, lasting only as long as the cause to which it is due continues to operate; but not destroying the reproductive power of the microzymes. The fertility of the microzymes was tested by introducing a drop of the liquid into a tube containing 4 c.c. of Pasteur's or Cohn's solution; the solution being previously boiled and the tube and pipette superheated. The tube was then plugged with cotton wool and kept at 65° to 75° F. for two or three days, when, if the microzymes retain their vitality, an examination of a drop of the liquid under the microscope revealed them in swarms.

We may note in passing that the degree of heat required to destroy the vitality of microzymes is variously given by different observers. Bastian concludes that the temperature of 70° C. suffices to completely destroy all germs, whether in saline or organic infusions; Cohn says that 62° C. for one hour is fatal

to bacteria; Lex found 127° C. insufficient to kill them, and Calvert requires 204° C. for their complete destruction. The author found that at from 20° to 40° C. the locomotive activity of microzymes increased with the rise of temperature; above this it gradually decreased, and at 60° C. they became motionless. Experiment showed however that their reproductive power was not impaired by the temperature that rendered them motionless; but Dr. Baxter thinks that a temperature of 100° C., and probably much less, abolishes both the locomotive and reproductive powers; and in no case did he find that microzymes were ever developed when the liquid had been boiled for a few minutes in a superheated tube and guarded from subsequent contamination by keeping the mouth of the tube plugged with cotton wool.

Turn now to the author's experiments with the quinine alkaloids and other substances that have been reputed to have antiseptic properties. One part in 400 of hydrochlorate of quinine was found to considerably reduce the motion of microzymes, and when the proportion of quinine salt was raised to 1 in 250 locomotive particles could no longer be detected. As soon however as the microzymes were liberated from the inhibitory influence of the quinine they resumed their vital powers and multiplied almost as rapidly as usual. Life was however destroyed by the addition of mercuric chloride (1 in 133), liquor sodæ and hydrochloric acid. The sparing solubility, even of the hydrochlorate, prevented the accurate determination whether quinine in larger proportions would produce similar fatal effects.

The hydrochlorates of quinidine, cinchonidine, and cinchonine were next experimented with. They were found very nearly equal in antiseptic power; arranged in the strict order of their efficacy, quinine and quinidine are equal, next comes cinchonidine, and last, though at no great distance, cinchonine. It is remarkable that this is the precise order in which febrifugal powers are attributed to these alkaloids in the reports of the Bombay and Madras Medical Commissions, quoted in a recent number (p. 396.) It is also interesting to note that of these four alkaloids cinchonine is the only one which is not fluorescent, and this suggested to the author whether that physico-chemical property was in any way correlated with antiseptic power. The question was answered by an experiment with æsculin,—the active principle of the horse-chesnut bark,—which, although more fluorescent than quinine, possesses no antiseptic property comparable with that of the cinchona alkaloids.

Besides comparing the cinchona alkaloids with each other, the antiseptic powers of the following substances were compared with those of a standard solution of quinine:—

1. Mercuric chloride, sodic sulphocarbolate, and strychnia—substances to which antiseptic properties are ascribed.

2. Berberin, beberia, picrate of potassium, quinidine, cinchonine, cinchonidine, æsculin—substances credited with antiperiodic virtues.

3. Sodic sulphite, and hyposulphite—to which both antiseptic and antiperiodic properties are attributed.

The following inferences were suggested by the results of these comparisons:—

"1. Quinine is doubtless excelled by other antiseptics, but there is no substance equal to it in antiseptic power which can be introduced into the blood in the same proportions without risk of fatal effects, if we except the other cinchona alkaloids and the sulphate of beberia.

"2. Quinine, in such fractional doses as are capable of being introduced into the circulation, exerts an inhibitory, not a toxic, action upon microzymes. It *may* check septic changes; it cannot destroy the organisms to which such changes are due.

"3. The four cinchona alkaloids are very nearly equal in antiseptic power.

"5. Among reputed antiperiodics, the sulphate of beberia seems to equal quinine in antiseptic power.

"6. Among reputed antiseptics, sodic sulphocarbolate and strychnine have a decided value, though they stand some way below quinine.

"7. Sodic sulphite has a feeble, though decided, antiseptic power; sodic hyposulphite little or none.

"8. Berberin and æsculin are hardly, if at all, antiseptic.

"9. Potassic picrate is a strong antiseptic, almost, if not quite, equal to quinine. It is doubtful, however, whether it can be administered in sufficient doses without danger to life.

"10. The action of inhibitory drugs on the vitality of microzymes affords no clue to their action on *Penicillium*. Substances like mercuric chloride, which are immediately fatal to the former, arrest the growth of the latter when employed in the same minute proportions."

The toxic action of quinine upon the colourless corpuscles of the blood was first noticed by Binz, and this effect of the alkaloid acquires a special significance in view of recent theories concerning inflammation and suppuration. It seemed desirable to the author to ascertain whether the other cinchona alkaloids, and also some other substances, resembling them in antiseptic or antiperiodic properties, were endowed with similar properties, and if so, in what degree. Comparative experiments were therefore made upon the blood corpuscles of the newt, the drugs employed being the hydrochlorates of the four cinchona alkaloids, potassic picrate, æsculin, sulphate of beberia, and nitrate of strychnia. The solutions were all neutral to test paper, and the temperature of the room varied between 65° and 75° F. The four cinchona alkaloids, in the proportion of 1 in 1500, were found to speedily arrest the migratory movement of the colourless corpuscles, quinine appearing to stand first in order of power. Sulphate of beberia, which approached them so closely in antiseptic power, rivalled them also as an antiphlogistic. Strychnine had some influence upon the corpuscles, but very much less than the cinchona alkaloids or beberia. Potassic picrate, almost equalling the cinchona alkaloids as an antiseptic, exerted a comparatively feeble influence over the movements of the colourless corpuscles, indicating that the antiseptic and antiphlogistic properties of a drug are not necessarily connected with each other. Æsculin exerted no very marked influence upon their activity.

EXTRACTUM AURANTII CORTICIS FLUIDUM.*

BY MONROE BOND.

Owing to the highly aromatic and somewhat tonic properties which the rind of sweet orange possesses, it is extensively used in the form of a fluid extract as an ingredient in the multiform tonics and elixirs now so much used

* *American Journal of Pharmacy*, Nov., p. 483.

in the United States. No formula for such a fluid extract is, however, given in the United States' Pharmacopœia, and the author having been called upon frequently to prepare it, and knowing of no published formula, has made numerous experiments to ascertain the most appropriate menstruum. He states that he has found the following formula to furnish a most satisfactory preparation :

Take of—

Sweet Orange Peel, in moderately fine powder	℥ xvj.
Glycerin	fl. oz. iij.
Alcohol,	
Water, each a sufficient quantity.	

Mix fourteen fluidounces of alcohol with two fluidounces of glycerin ; moisten the orange peel thoroughly with twelve fluidounces of the mixture in a large Wedgewood mortar, or any convenient vessel, and having covered it carefully, let it stand for twelve hours ; then pack moderately firm in a suitable percolator, and proceed as directed in the U. S. P. officinal directions for preparing fluid extracts. Finish the percolation with a mixture of two parts of alcohol and one part of water, reserving the first fourteen fluidounces, add one fluidounce of glycerin to the remainder, carefully evaporate to two fluidounces and mix with the reserved portion.

The author states that fluid extract of orange prepared in this manner has a heavy rich appearance, is permanent, and possesses all the aroma of the orange peel, if a fresh and good article of the drug has been employed. One fluidounce, added to fifteen fluidounces of simple syrup makes what he considers a stronger and better "Syrupus Aurantii Corticis" than the officinal. The resulting syrup is entirely destitute of any opaqueness.

Four fluid drachms of the fluid extract and a few drops of solution of citric acid mixed with one pint of syrup, make a syrup unsurpassed in delicacy of flavour and unfermentable for use at the mineral water counter.

THE TESTING OF GLYCERINES.*

BY MM. CHAMPION AND PELLET.

The following methods of testing the purity of glycerines are recommended by the authors as being convenient in application, and yielding exact results :—

Qualitative Test.—The glycerine diluted with twice its weight of water is treated in the cold—

(1) With tribasic acetate of lead. If an abundant precipitate be formed, and rapidly deposited, the presence of a proportion of foreign matters may be assumed which would make it unsuitable for use in various applications, such as the manufacture of nitro-glycerine, etc. The crude glycerine obtained in treating fats with sulphuric acid is frequently thus contaminated. These foreign matters result from the action of sulphuric acid at a high temperature (about 110° C), upon the fatty matter itself, or on the impurities it may contain.

(2) Glycerine obtained by calcareous saponification, also, may contain oleate of lime. This may be detected with oxalate of ammonia, which throws down the lime as a clearly perceptible precipitate.

The colour of glycerine is in no way an index of the purity of the product. In all cases it is useful to be assured of the neutrality of the glycerine. The preceding tests are suited for glycerines more or less impure, but not adulterated. According to the author's experiments, the tribasic acetate of lead separates all the foreign substances due to normal impurity of the product or alteration in the glycerine during its manufacture. Any addition of glucose may be detected by Fehling's solution.

Quantitative Test.—This test should comprehend the determination of the water, the foreign organic matter, the lime, and the glycerine. In France commercial transactions in glycerine are generally based upon the results given by the areometer. This, however, is undesirable, in consequence of the variations in graduation adopted for that instrument. These variations have recently been the subject of investigation, and a report on the verification of the areometer of Baumé has been drawn up by Berthelot, Coulier, and d'Almeida ; but whilst acknowledging the value of their labours the authors prefer trusting to the hydrometer. In the following table the authors have given the densities of various mixtures of water and glycerine, comparatively with the degrees Baumé (as indicated in the above-mentioned report), and also the proportions of water corresponding to the densities. These determinations have been verified by means of pure anhydrous glycerine, prepared by keeping glycerine for several hours at a temperature of 160° C., and terminating the operation *in vacuo*. The density found was in accord with that given by Berthelot, namely 1·264. The hydrometer used was specially constructed, and indicated one-tenth of a degree between 25° and 35°. When water is added to concentrated glycerine, a rise in temperature takes place, but the authors ascertained that the chemical action manifested did not interfere appreciably with the results. The density was calculated according to the formulas $1000 \times \delta + x \times 1 = (1000 + x)\delta'$; where $\delta =$ density of the glycerine, $x =$ volume of the water ; $\delta' =$ density of the mixture determined directly. The densities were taken at 15° C. ; but a range of a few degrees above or below does not notably influence the result.

Hydrometer. Weight of litre.	Areometer Degrees Baumé.	Water. Per cent.	Hydrometer. Weight of litre.	Areometer Degrees Baumé.	Water. Per cent.
1264·0	31·2	0·0	1235·0	28·6	11·0
1262·5	31·0	0·5	1233·5	28·4	11·5
1261·2	30·9	1·0	1232·2	28·3	12·0
1260·0	30·8	1·5	1230·7	28·2	12·5
1258·5	30·7	2·0	1229·5	28·0	13·0
1257·2	30·6	2·5	1228·0	27·8	13·5
1256·0	30·4	3·0	1227·0	27·7	14·0
1254·5	30·3	3·5	1225·5	27·6	14·5
1253·2	30·2	4·0	1224·2	27·4	15·0
1252·0	30·1	4·5	1223·0	27·3	15·5
1250·5	30·0	5·0	1221·7	27·2	16·0
1249·0	29·9	5·5	1220·2	27·0	16·5
1248·0	29·8	6·0	1219·0	26·9	17·0
1246·5	29·7	6·5	1217·7	26·8	17·5
1245·5	29·6	7·0	1216·5	26·7	18·0
1244·0	29·5	7·5	1215·0	26·5	18·5
1242·7	29·3	8·0	1213·7	26·4	19·0
1241·2	29·2	8·5	1212·5	26·3	19·5
1240·0	29·0	9·0	1211·2	26·2	20·0
1239·0	28·9	9·5	1210·0	26·0	20·5
1237·5	28·8	10·0	1208·5	25·9	21·9
1236·2	28·7	10·5	...	...	...

Estimation of Organic Matter.—50 grams of glycerine diluted with water are treated with an excess of tribasic acetate of lead, and the precipitate collected on two tared filters, and the lead compound weighed. The whole is then calcined, the residue treated with nitric acid, and then with sulphuric acid ; and from the sulphate of lead is calculated the quantity of oxide of lead that was in combination with organic matters, and consequently the proportion of the latter, which rarely exceeds 1 to 1·5 per cent.

Lime may be estimated in the usual manner by oxalate of ammonia.

The authors consider that industrially the tribasic acetate of lead might be used for the removal of organic matter from crude glycerine. After separation of the precipitate, excess of the lead salt could be removed by a

* *Moniteur Scientifique-Quesneville*, [3], vol. iii. p. 1033.

current of sulphuretted hydrogen, and during the concentration of the glycerine the acetic acid set free would be volatilized without injury to the product. The lead salt might be regenerated by calcination, and again converted into acetate.

A DYING FAITH.

The following remarks appeared in the last number of the *British Medical Journal* in reference to the paper read at the Clinical Society, of which we published a report last week :—

"We had occasion lately to point out that homœopathy, which had begun as a delusion, is now ending as a fraud, This also appears to be the verdict of the Clinical Society of London, delivered on the occasion of an interesting paper by Dr. George Johnson. Dr. George Johnson has the art of provoking interesting debates ; both the Clinical and the Medical and Chirurgical Societies owe to him some of their "best nights." The clinical lectures and the papers of this accomplished physician have always the quality of novelty and sterling thought. It is always either a new fact or a new thought which Dr. Johnson contributes. His paper on "Homœopathic Poisoning by Camphor" was one of the least elaborate of his contributions to medicine ; but he rightly judged that it had considerable collateral interest, and it made the Society the scene of an interesting debate. It has long been known to practitioners in London that persons practising pseudo-homœopathy, and catching the sunshine of whatever fashionable notoriety attaches to that as to other delusive innovations, have in fact long since abandoned all scientific claim to be considered as the apostles of a theory, and have been in the habit of administering the time-honoured medicines in time-honoured doses, and on the ordinary common-sense principles embodied in the maxims, *Contraria contrariis curantur*, and *sublatâ causâ tollitur effectus*. We have all of us heard of, and most of us have seen, patients who, under "homœopathic treatment," have been leeched, poulticed, fomented, and even blistered ; who have had opiates administered to relieve pain, purgatives to remove constipation, iron to remedy anæmia, strychnia and phosphorus to cure nervous paresis or neuralgia, and so on through the whole pharmacopœia and through the whole range of disease. It is less generally known, but it is still known to a great many, that homœopathic pharmacy has undergone a corresponding transition. No doubt there are staunch homœopaths to be found of the old deluded sugar-plum school ; and there are amateur homœopaths, deluded unprofessional persons, to whom nothing stronger than sugar-plums can be entrusted for their zealous and misguided ministrations. But these are the neophytes. Ministrants behind the veil practise other mysteries. Harmless sugar-plums, of absolutely neutral character, and chemically innocent of anything but starch, sugar, and dextrine, are the pellets with which the public are encouraged to play. The enlightened homœopathist of the present day takes the drugs of rational medicine and concentrates them to the furthest extent to which modern chemical skill can furnish the means, and administers them in single drops, apparently in order to maintain the appearance of practising the old delusion after the old seeming method. Great precautions are taken to prevent neophytes from cutting their fingers with these sharp weapons. Persons now asking for the "strong tinctures" and the mother tinctures of nux vomica and belladonna, are politely told that they cannot be furnished without a doctor's order. Reason enough there is for this precaution. Dr. Stewart mentioned at the Society, in the course of the discussion last Friday, that he had occasion to order "tincture of strychnia" for a lady who mentioned that she had some in the house. He suggested, accordingly, that she should take ten drops at stated hours. She mentioned, however, that it was "homœopathic tincture," and so strong that three drops was a dose. Cases in which severe twitchings have followed the domestic use of one-drop doses of a homœopathic tincture of strychnia, in which belladonna-poisoning, with mania lasting for several days, followed the use of a homœopathic tincture of belladonna, and in which dysentery followed the use of a homœopathic aperient drop (probably croton oil), are within our own knowledge. The epoch of dynamisation, of cure by the imperceptible action of inappreciable doses, has merged into a period of concentration and of return in secret to the ancient paths of medicine, trodden over under the disguise of the old war-paint, and with the old outcry.

"There is no question that the homœopathist is a much more dangerous person under his new than in his old disguise. Alkaloids are more dangerous weapons than sugar pellets. The most strenuous efforts will not very long suffice to keep the amateur homœopathist in the dark, and induce him or her to rely for mild domestic ailments on starch and dextrine in globules, put up in variously labelled bottles. The course of nature will do much for anxious relatives. The study of the natural history of disease, and of the tendency of disease towards spontaneous cure, has been largely aided by the earlier homœopathic efforts ; and for this, as for their earnest though overstrained and delusive protests against anything like polypharmacy, we owe them thanks. But this is a vein which may be worked too freely. It cannot, as they and their patients have found to their cost, be followed with invariable success. Mothers will sigh for the mother tincture ; for the tincture of aconite, of which a drop every hour allayed fever ; for the nux vomica, the belladonna, and the jalapine ; and, confounding the plaything with the poison, accidents will happen and the fraud will appear. Mr. Brudenell Carter told, at the Society, an amusing story of the customary practice of a wholesale homœopathic purveyor of globules and his ways, which were dark. The story not long since appeared in print, without authority, and we are glad to have his authority for a statement which is of great value when so authenticated. We are favoured by Dr. Alfred Swaine Taylor with a further communication to the like effect, and of an extremely decisive and weighty character. He has many times examined homœopathic globules, and, in general, has found them to be composed of sugar and starch only—the sugar, sometimes cane or sucrose, and sometimes sugar of milk or lactose.

"In Dr. Smethurst's case, Drs. Taylor and Odling examined sixty-four small tubes of homœopathic globules, averaging fifty-two globules to a grain, and including, as would appear from the attached labels, every variety of mineral and organic poisons and medicines—arsenic, antimony, charcoal, sulphur, arnica, strychnia, morphia, etc. They satisfied themselves of the absence of any trace in the globules of the substances mentioned ; for all the most delicate tests gave negative results. They then mixed up some thousands of the globules with distilled water, and drank off the mixture between them. No effects followed. They used hundreds of the globules in testing, and could easily have found in them the 1·4000th part of a grain of arsenic or mercury. As their tests gave no indication, it was quite obvious that if labels dropped off, or bottles were jumbled together, or the manufacturer put, by mistake, the arsenic label on the strychnine bottle, or *vice versâ*, no one could find out the mistake. In those days, no homœopathist, unless he himself prepared the globules or powders could be sure of what he really was giving to a patient ; and we have yet to learn that there is greater security for the community at the present time. Perhaps the public analysts will look to the matter. There is here an obvious source of public danger which needs to be guarded against. Homœopathists have, in the words of Dr. George Johnson, "passed from the irrational and ludicrous extreme of infinitesimal dilutions to the dangerous extreme of the greatest possible concentration of active and poisonous drugs." Hampered by their partiality for

infinitesimal doses, they usually prescribe none but powerful medicines. As Dr. Stewart expressed it, "being identified in the mind of the public with their own absurdity of infinitesimal doses, and being unwilling publicly to renounce it, they have recourse to concentrated tinctures, in order to produce an appreciable effect by very minute doses." Evidence was adduced before the Clinical Society, of this concentration of strength in modern homœopathic tinctures, solutions, powders, and globules—but especially in the tinctures. The public are kept ignorant of this change, and are using the potent poisons as though they were the original trillionths, which might be either charcoal or arsenic, and might be taken with equal impunity, in doses varying from a globule to a malt-shovelful. Already serious results, even death itself, have arisen from this ignorance of the changed conditions of the case. It were a charity to warn the deluded disciples of this fraud of the dangers they run. Homœopathic medicines, made according to the old plan, can be of no use; when manufactured after the modern fashion, they are the most dangerous (because the most concentrated) medicines which can be handled. The one is a fool's bauble; and the other is a double-edged sword.

It will, of course, be urged by the advocates of homœopathy, that these charges were advanced at the Clinical Society by practitioners interested in the overthrow of the system. We reply, that they were made by men who have the discovery of truth for their object, and who would practise any mode of cure could they ascertain that its principles are based upon sterling facts, capable of standing the test of experiment. They fulfil their duty now in denouncing the fraud, as they fulfilled their duty before, in contemning the delusion which is known as homœopathy.

THE DETECTION OF SOLANINE AND SOLANIDINE.*

BY PROFESSOR FRANCOIS SALMI.

The author, in a memoir presented to the Institute of Bologna, demonstrates that solanine, in an acid solution, and at a temperature beyond 10° or 11°C. is in twenty-four hours decomposed partially into solanidine and other products. After remarking that this decomposition would nearly always take place in the viscera, he points out that although toxicologists are acquainted with some characteristic reactions of solanine, they are as yet unacquainted with the means for detecting solanidine. This has led Professor Salmi to investigate the subject, and to publish in his memoir what he considers to be the most characteristic tests for the presence of solanine and its derivative. The principal reagents for solanine are—

1. Brominated hydrobromic acid, which gives a violet colouration.
2. Dilute sulphuric acid reduces it by eremacausis, giving a violet red colouration.
3. Nitric acid and an alkali give a pale yellow colour.
4. Sulphuric acid and arsenic or phosphoric acid, added successively, give a red colouration.
5. Traces of chloride of platinum give a purple colouration.
6. Phosphoric acid and traces of molybdic acid give the same purple colour.
7. Brominated hydrobromic acid gives rise to long acicular crystals if the combination be treated with water and evaporated to dryness.

Solanidine may be recognized by—

1. The special form of the crystals of its hydrochlorate.
2. The form of the crystals of its hydrobromate.
3. The bright yellow colour which results from the action of nitric acid, and a caustic alkali.
4. The red colour caused by phosphoric acid, and traces of molybdic acid.
5. By the orange-yellow colour produced by brominated hydrobromic acid when the mixture is evaporated to dryness.

Professor Salmi states, that by operating with the care required in such experiments, small quantities of either of these substances may be indubitably detected that would escape observation with any of the processes indicated in treatises on toxicological chemistry.

* *Annali di Chimico applicata alla Medicina.*

THE ROSE HARVEST IN ADRIANOPLE.

The following report on the Rose Harvest for 1873 in the vilayet of Adrianople has been received from Mr. Vice-Consul Dupuis:—

Although the rose harvest in this province does not take place at any precise period, still, it is generally expected to commence early in the month of April; but, owing to wet weather and a cloudy spring, this year harvesting operations did not begin till near the end of May. It is also to be remarked that a high temperature in April will cause the rose-buds to develop early, chilly weather retarding the blossoming of the flowers until milder and softer weather sets in.

In cloudy or wet seasons the rose plants blow gradually, and harvesting lasts about a month, when the gathering of the flowers is rendered easy, and operations of distillation are conducted with care and attention; whereas when the weather is dry, only half that time is occupied, and distillation is more rapidly proceeded with. The advantage of a damp season over a dry one consists in a greater yield of oil in the former, when about 8 to 9 okes or 22 to 24 lbs. of the blossoms are required to produce one miscal or 1½ drachm, whilst in the latter 14 to 16 okes or 38 to 44 lbs. of the flowers will barely suffice to produce the same quantity.

In low and sheltered localities the rose tree comes to perfection sooner than in high lands, owing to the greater power of the sun than in elevated positions, where harvesting is naturally more backward.

The harvest this year has, on the whole, been more remunerative to cultivators, and the crop, it is said, will yield in quantity some 500,000 miscals, or about 93,750 ounces of otto or attar of rose, and is valued at about £70,000; but as the weather throughout last spring was moist, distillation was profuse, consequently it is less strong than last year's produce. The best quality of otto varies in price from 17 to 18 piastres the miscal, or from 15*s.* 4*d.* to 16*s.* 10*d.* per ounce; whilst inferior qualities realize from 14 to 15 piastres the miscal, or 13*s.* 1*d.* to 14*s.* the ounce.

The mode adopted for testing the purity of the different qualities of these oils is to put the essence into flasks, which are afterwards immersed in water at a temperature of 63° to 68° F., when if the quality be good it will freeze; this oil is preferred to all others as being of the purest kind. These oils will also greatly differ in quality, according to the nature of the soil. A stony, sandy ground, impregnated with oxide of iron, is said to favour the growth of the plant, and produces oil of the very best quality; while hard, unmixed land will only yield oil of an inferior kind, which will not freeze at 52° F.

Manufacturers also frequently adulterate these oils by an admixture of a substance likewise produced by them from certain kinds of grasses.

Otto of rose is mostly exported to Germany, and buyers and agents from that country annually resort to this province, and make extensive purchases for firms to the amount of upwards of 61,800 ounces, the remainder finding ready markets in the East and Constantinople.

The principal localities where this valuable article is manufactured are in the districts of Kizanlik, Karlowo, Kalofer, Eski-Saara, Jeni-Saara, Tschirpan, and Philipopoli, on the southern slopes of the Balkan mountains, the first-named places being chiefly renowned for their extensive plantations of roses of the most esteemed varieties, viz., the damask rose, sempervirens, and musk rose.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 29, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ADULTERATION ACT IN ITS RELATION TO DRUGGISTS.

Now that attention is being so much directed to the subject of Adulteration it may be useful if we refer to the opinion which has been frequently expressed in this Journal that the Adulteration Act was likely to become a source of unnecessary annoyance to chemists and druggists. Hitherto, with the exception of the citrate of magnesia case, there has however been little immediate cause for uneasiness on this score; but, as we are informed that several prosecutions of druggists are about to be instituted for the alleged sale of adulterated drugs, there can be no doubt that much anxiety will soon be felt throughout the trade, and it is probable that many will experience the inconvenience and detriment always attendant on a prosecution even when it fails to terminate in conviction.

We think, therefore, that attention should be seriously directed to this danger, and that individually every possible means should be taken to prevent such results. As regards the case of palpable misnomers, we refer our readers especially to the advice offered by Mr. SANDFORD in the letter we publish this week and to the unmistakable tendency of the opinion given by the ATTORNEY-GENERAL and Mr. POLAND in the "Citrate of Magnesia" case.

Over and above this we should urge our readers to institute for themselves systematic examinations of their drugs and chemicals, with the object of ascertaining their quality and purity. Such a course, generally adopted, would contribute towards affording apprentices and assistants that scientific knowledge of their business which it is essential they should give evidence of possessing when they present themselves for examination, and it would conduce much to lessen the number of failures we now have to report from time to time.

We would also strenuously urge the impropriety of relying upon the plea that articles are sold as obtained from wholesale houses or manufacturers, as an extenuation of any deficiency in quality or actual adulteration. Apart from the undignified character of such a defence in a general way, it must be borne in mind that in the case of the grocers magistrates have refused to listen to it, and it may readily be imagined that disinclination to admit such a line of defence would be even more decided in the case of pharmacists who claim to be recognized as the possessors of scientific qualifications.

Even as a matter of expediency, therefore, it is undesirable to adopt such a course, and if it be necessary to illustrate the danger attending it, we could not do better than refer to the 24th section of the Pharmacy Act, which provides that the Act for Preventing the Adulteration of Articles of Food or Drink shall extend to all articles usually taken or sold as medicines, and that every adulteration of any such article shall be deemed an admixture injurious to health; and that any person registered under that Act who sells any such article adulterated shall, unless the contrary be proved, be deemed to have knowledge of such adulteration.

A very brief consideration of the scope of this section will, we believe, be sufficient to convince everyone of the necessity of exercising caution as to the character and purity of the drugs they sell, and of the obligations it imposes in regard to the interests of the public, and to self-protection on the part of the trade.

Some tendency has been manifested in various quarters to move for a repeal of the Adulteration Act, but with such stringent legislative enactments already in force as regards chemists and druggists in the Pharmacy Act, we cannot think there will be any disposition to support such a movement, which, if successful would only facilitate the sale of inferior and adulterated drugs outside the trade, and augment the competition of this kind which they now complain of with too much reason.

PROFESSIONAL REMUNERATION.

IN these days of high prices, increasing general prosperity, and luxurious living, it is not surprising that the medical press should discuss the subject of professional fees. Pharmacy is so intimately associated with the practice of medicine, that whatsoever affects the interests of the doctor, tells more or less on those of the dispenser.

Remembering with a sigh the days when patients swallowed their daily draughts as regularly as they took their meals, we sympathise with the hard-working physician who points to RADCLIFFE'S days, when the prices paid for the necessaries of life were but a fraction of what they have now become; RADCLIFFE consoled himself at the loss of five thousand guineas by saying, that he would be recouped by going up and down an equal number of pairs of stairs, and his neighbour, Dr. GIBBONS, received £1000 per annum from the overflow of patients who were unable to gain admission to the great physician of that time.

There can be no manner of doubt as to the great disproportion between the purchasable value of a guinea now and in the time of Queen ANNE; and if, in the 19th century, this sum be regarded as a comparatively small amount for a physician to receive in his quiet consulting room, how insignificant does the

five shillings fee of the general practitioner appear, especially when we remember that he has to include in his charge nsually either a bottle of mixture, or pills, or both.

It is suggested, that consultation fees shall be increased, at all events, by the leading physicians in large practice to two or three guineas, according to circumstances, and that one fee should cover one consultation only. The latter stipulation is insisted on to prevent injury to the general practitioner, and the degradation of consulting practice. Further, that greater circumspection ought to be exercised as to the class of persons to whom gratuitous advice is given.

It may be doubtful, perhaps, if any benefit would accrue directly to the pharmaceutical chemist or chemist and druggist should these or any other like propositions be adopted by the physician, but should this principle be carried out by all classes of practitioners we think it highly probable that an important indirect gain will result to all engaged in pharmacy. To us it may be a matter of little moment whether the physician receive two guineas or one at a consultation, but the case is otherwise when the general practitioner can obtain a distinct fee of ten or even five shillings for each visit. Will he not under such circumstances be disposed to discontinue the practice of dispensing?

By many, if not the majority, of medical men engaged in active practice, the compounding of medicines is regarded as irksome and objectionable, if not in some respects degrading, and we feel confident that they would gladly welcome such an alteration of fees and professional relations with their patients as would enable them to abandon the custom. During the past few years there have not been wanting signs of the desire of some sections of the profession to sever the connection between medicine and pharmacy; and if an amended scale of fees be agreed upon we may anticipate that this feeling will become general.

Meanwhile we may contemplate the possibility of increased fees to prescribers with a sense of satisfaction and prepare the way for the auspicious times which have been foreshadowed, by discouraging all encroachments on the province of the medical man, and seeking to cultivate with him, without sacrificing our independence, those friendly relations which will conduce most materially to the honour and advantage of the art of healing as well as pharmacy.

THE PROPOSED UNIVERSAL PHARMACOPŒIA.

The question of the introduction of an International Pharmacopœia was discussed at the Third International Medical Congress recently held in Vienna, when the following resolutions were agreed to:—

I. *a*. That the Third International Medical Congress recognizes the necessity for an International Pharmacopœia. *b*. That it should contain the most important and generally accepted medicines, and the more necessary excipients and correctives, together with a precise scientific description and precise declaration of their qualities; that for the text the Latin language should be used; that for denoting proportionate quantities for the compound medicines the decimal system should be used.

II. The Congress recommends that in future the metric system should be used by the prescriber.

III. The Congress entrusts the office bearers of the Fourth International Congress with the organization of an international commission for the Pharmacopœia.

WORKING MEN'S COLLEGE NATURAL HISTORY SOCIETY AND FIELD CLUB.

This Society has now been established, under the Presidency of Professor Flowers, F.R.S., five months, and during this period has had fourteen lectures and papers and thirteen field days. It was formed to enable its members, by means of walks, etc., to study practically the sections of the geological strata to be seen about London, and to learn practically the distribution, habits, and structure of the plants and animals which are found in easily accessible localities.

Lectures are delivered every month upon scientific subjects calculated to interest and inform the members, and papers are read by which members record their observations in the several branches of the Natural History Sciences: in this, as well as for special stndy, the Club has the advantage of being able to use valuable microscopes, an excellent museum of geological and other specimens, and a small library for reference, which the executive of the Working Men's College have placed under their care.

The meetings are held in the College Museum, 45, Great Ormond Street, W.C., and the terms of membership may be obtained on application to Mr. John Fotheringham, the Honorary Secretary. A lecture on the "Dead Nettle and its Alliances," by Mr. C. J. Savage, is announced for Tuesday, Dec. 2.

We are informed by the *Athenæum* that, at a sale in Mincing Lane, a few days since, a lot of mossed Crown bark (*Cinchona officinalis*), from the Nilgheri plantations fetched the "prodigious price" of 5*s*. 9*d*. per lb. Altogether 23,646 lbs. of Nilgheri cinchona bark were sold on that occasion, the total sum realized being £3350, or an average of 2*s*. 10*d*. per lb. The same journal states, that the total cost of the introduction of the cinchona into India, including the expenses of Mr. Clements Markham's expeditions to Peru and India, has been £70,000, and that the annual sales now realize a net profit of from £4000 to £5000 per annum.

The Royal Society has this year awarded the Copley medal to Professor Helmholtz, of Berlin. One of the two Royal Medals usually given has been awarded to H. E. Roscoe, F.R.S., Professor of Chemistry in Owens College, Manchester, and the other to Dr. Allman, Professor of Biology in the University of Edinburgh.

Mr. C. R. C. Tichborne, Ph.D., F.C.S., has been appointed Professor of Chemistry in the Carmichael School of Medicine (Richmond Hospital), Dublin.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

November 19th, 20th, and 21st, 1873.

Present—Messrs. Allchin, Barnes, Carteighe, Corder, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Southall, and Umney.

MAJOR EXAMINATION.

Four candidates were examined. *One* failed. The following *three* passed, and were declared duly qualified to be registered as Pharmaceutical Chemists :—

*Bird, Matthew Mitchell .....King's Lynn.
Wood, Alexander .....Brentford.
Gardner, James Richard .....Devonport.

MINOR EXAMINATION.

Seventy-seven candidates were examined. *Thirty-eight* failed. The following *thirty-nine* passed, and were declared duly qualified to be registered as Chemists and Druggists :—

*Spencer, James Hampson .....Manchester.
*Strongitharm, William George Birmingham.
Princep, Philip .....Uppingham.
Marlow, Frederick William.....Coventry.
Balchin, Edwin Samuel .....Devizes.
Higginson, Alfred..... .....Manchester.
Stamford, Frederick .....St. Austell.
Equal. Macaulay, Joseph John .....Manchester.
Equal. Wright, Conrad William .....Tewkesbury.
New, Thomas Cheney .....Evesham.
Hucklebridge, James Marwood London.
Equal. Swinbank, John.....Heighington.
Equal. White, Robert .....Durham.
Watson, Joseph Henry .....Halifax.
Jarvis, Abraham .....Kingsbridge.
Ellis, Thomas Wokes .....Hull.
Bradwall, John Heald .....Sheffield Moor.
Jones, Walter .....Carmarthen.
Lewis, Samuel Edward.....Liverpool.
Morris, Thomas Henry Vaughan Dorchester.
Equal. Evans, John ....Bishop's Road, W.
Equal. Equal. Smith, William .....Norwich.
Equal. Equal. Williams, Richard .....St. Clear's.
Equal. Masters, Henry James.....Bath.
Equal. Sawden, Alfred..... .....Filey.
Purse, Alfred Dodds .....Sunderland.
Hayton, John William..... ...Wigton.
Equal. Crang, Walter .....Bath.
Equal. Harrison, James ....Sunderland.
Griffiths, Griffith .....Barmouth.
Hindson, James Alfred .. ..Hull.
Maxey, John Thomas .....Wisbeach.
Equal. Compton, Arthur .....Reigate.
Equal. Hall, Henry Stacey ..... Doncaster.
James, Joseph .....Hanley.
Sutcliffe, Edward West .....London.
Brooks, Charles.....Wandsworth Road.
Fisher, Sidney .....Wolverhampton.
Casely, Thomas.....Liverpool.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

A certificate of the Apothecaries' Hall of Ireland was accepted from

McDermott, Philip .....Bermondsey

in lieu of the Society's examination.

* Passed with Honours.

Provincial Transactions.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

At a special meeting held in the College Street Room, on November 12, 1873, Mr. A. J. Lance read a paper on Light, describing the corpuscular and undulatory theories, the solar spectrum, the chemical and heat rays, the effect light has upon vegetative life, how by its agency plants form chlorophyll gums, oils, etc., the effect produced upon animals by the deprivation of light, and the practical application of the power possessed by chemical rays in photography. The discussion was taken up with much interest.

An adjourned meeting was held on November 19 ; Mr. H. J. Masters in the chair.

The Secretary, Mr. Druce, read the minutes, and said Mr. Osborne had given them a very ingenious apparatus for operating with sulphuretted hydrogen.

Mr. Masters trusted the members would show their appreciation of "the really excellent programme of classes," by coming as early and as frequently as possible to those classes.

Mr. Masters delivered a very interesting and instructive paper on Iron, giving its history, how it is found in nature, meteoric iron, and the different ores and their composition. Having noticed the ancient use of iron, the speaker instanced the Forest of Dean, in which the iron was worked by the Danes, but in such a wasteful manner that the refuse furnished sufficient work for twenty blast furnaces during many years. He then described the blast furnace, the smelting and puddling processes, the Bessemer process, the difference between wrought and cast iron and steel. Having alluded to the works going on in their own neighbourhood, where the ferrous carbonate was worked, and to the strength and ductility of a mixture of that and the Welsh argillaceous ore, he concluded by explaining the manner in which iron was rolled, welded, turned, converted into steel, and to the multifarious uses to which it was put.

The lecture was copiously illustrated by some handsome specimens kindly lent by Samuel Sharp, Esq., F.S.A., of Dallington Hall, which included Brown Hematite $Fe_4H_6O_9$, Red Hematite Fe_2O_3, Iron Sand from Africa containing 93 per cent. of metallic iron, Specular Iron Ore Fe_2O_3, Bog Iron, and the Northamptonshire Ore $FeCO_3$; also some handsome Pyrites FeS_2, containing belemnites, ammonites, and other fossils. One very fine specimen exhibited showing a most beautiful radiating section.

Messrs. Harrison and Clayton also sent samples of pig iron, cast and wrought iron, turnings and filings, crude and polished steel. J. W. Wood, Esq., lent iron ores, fossiliferous pyrites and selenite (sulphate of lime) from the Northamptonshire beds ; and Mr. Druce, native metallic iron from trap rock, and cubical iron pyrites from the slate in Westmoreland and Carnarvonshire.

A vote of thanks was proposed by Mr. Wallis to Mr. Masters, and which, with one to S. Sharp, Esq., and the other exhibitors, having been most cordially passed, the meeting terminated, the lateness of the hour precluding discussion.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The second general meeting of the present session was held at the Bristol Museum and Library, on Friday, Nov. 14, 1873, Mr. G. F. Schacht, President, in the chair. Mr. Louis Siebold, of Manchester, delivered a lecture on "Volumetric Analysis," of which the following is an abstract :—

VOLUMETRIC ANALYSIS.

BY LOUIS SIEBOLD.

After commencing with a few general observations on quantitative analysis and the comparative merits of

the ponderal and volumetric methods of determination, the lecturer pointed out that it could not be his intention to explain all the numerous instances of volumetric testing, but that he would confine himself to the illustration of a small number of instructive and very useful instances of that kind, calculated to show their practical value, and to convince the students of pharmacy that quantitative analytical operations do not present such difficulties as many suppose.

Having shown and described the various instruments used for volumetric estimations, he proceeded to show the determination of chlorine in chloride of sodium by means of a standard solution of nitrate of silver. To mark the end of the reaction, a few drops of a strong solution of yellow chromate of potassium were added to the solution of NaCl before applying the test. The nitrate of silver then added gradually from the burette produced a white precipitate of AgCl, and the first drop used in excess after the complete precipitation of Cl caused the mixture to turn red from the formation of Ag_2CrO_4. The use of K_2CrO_4 for the end reaction requires that the solutions must be neutral.

The application of a standard solution of $AgNO_3$ for determining the strength of hydrocyanic acid was explained next. The HCN used for the experiment is mixed with sufficient solution of NaHO to produce distinct alkaline reaction, and to this mixture, containing NaCy, the silver solution is added drop by drop until a permanent white precipitate of AgCy is formed. At first, a soluble double salt, $NaAgCy_2$, is formed, thus :—

$$AgNO_3 + 2NaCy = NaNO_3 + NaAgCy_2.$$

This action proceeds until one half the Cy contained in the HCN is used up; the next drop of solution of $AgNO_3$ causes the formation of a permanent precipitate,

$$NaAgCy_2 + AgNO_3 = NaNO_3 + 2AgCy.$$

To make the end of the reaction more distinct it is useful to add some solution of NaCl after the addition of NaHO to the HCN. The permanent precipitate forming then is AgCl, which shows more distinctly than the AgCy.

Mr. Siebold then explained how a standard solution of $AgNO_3$ might be used for the determination of K and Na in a mixture of their chlorides, or of others of their salts convertible into chlorides. The dry chlorides of K and Na must be weighed, then dissolved in water, and the chlorine estimated by $AgNO_3$, with the aid of K_2CrO_4, as above. Now, if m were to represent the weight of the two chlorides, and n the quantity of Cl found by volumetric analysis, and if we call the quantity of KCl x, and the quantity of NaCl y, we need only remember that one part of KCl contains 0·4756 Cl, and that one part of NaCl contains 0·6066 Cl, in order to get the two following equations :—

$$x + y = m.$$
$$0{\cdot}4756\,x + 0{\cdot}6066y = n.$$

From which the values of x and y or the quantities of KCl and NaCl may be easily calculated.

In a similar way, the standard solution of $AgNO_3$ might be used for the analysis of a mixture of KCl and KI, or of KI and KBr, showing the extent to which KI may be adulterated with KBr or KCl.

From this the lecturer turned to the determination of iron in ferrous solutions by permanganate of potassium, showing this as an instance in which the substance to be determined was not precipitated, and in which the end of the reaction was indicated by a change of colour in the solution. A solution of ferrous sulphate, acidulated by H_2SO_4, was used, and the solution of $KMnO_4$ added drop by drop as long as the colour of the latter still disappeared. After all the ferrous sulphate had been completely converted into ferric sulphate, a single drop more of the permanganate sufficed to impart a purplish tint to the mixture.

$$10feSO_4 + 8H_2SO_4 + 2KMnO_4 = 5fe_2(SO_4)_3 + 2MnSO_4 + K_2SO_4 + 8H_2O.$$

Mr. Siebold said he much preferred the permanganate to the red chromate recommended in the B.P. as being more exact and easier for recognizing the end of the reaction. The B.P. process was explained by the following equations :—

$$6feSO_4 + K_2Cr_2O_7 + 7H_2SO_4 = 3fe_2(SO_4)_3 + K_2SO_4 + Cr_2(SO_4)_3 + 7H_2O.$$

Owing to the formation of $Cr_2(SO_4)_3$ the mixture assumes a green colour, and as soon as a drop of the mixture ceases to turn blue with a drop of a solution of ferrocyanide of potassium (united with it on a plate by means of a glass rod) the experiment is finished.

The next determination performed by the lecturer was that of the strength of sulphurous acid by a standard solution of iodine (a solution of I and KI in water). The H_2SO_3 is mixed with a little thin starch paste, and the iodine solution then added until a permanent blue colour is produced. At first the iodine does not act on the starch, as in converting the sulphurous acid into sulphuric acid, it forms hydriodic acid which has no action on starch, but as soon as this process is completed the further addition of iodine produces the deep blue iodide of starch.

$$H_2SO_3 + 2I + H_2O = H_2SO_4 + 2HI.$$

The change from colourless to blue was brought about by a single drop of the solution of iodine.

The estimation of available chlorine in chlorinated lime formed the subject of the next experiment. The lecturer explained that the entire quantity of chlorine contained in that preparation is liberated by mineral acids, provided that its two constituents, calcium hypochlorite $CaCl_2O_2$ and calcium chloride $CaCl_2$, are present in equivalent proportions, as is generally the case.

$$CaCl_2O_2 + CaCl_2 + 4HCl = 2CaCl_2 + 2H_2O + 4Cl, \text{ or}$$
$$CaCl_2O_2 + CaCl_2 + 2H_2SO_4 = 2CaSO_4 + 2H_2O + 4Cl.$$

A weighed quantity of chlorinated lime was then dissolved, mixed solution of KI in excess and the mixture acidified with HCl.

The available chlorine present would thus liberate its equivalent amount of iodine, forming KCl and I and the quantity of free iodine was now determined by means of a standard solution of sodium hyposulphite $NO_2S_2O_3$ which was added drop by drop until the solution became colourless, showing that the free iodine had been completely converted into NaI.

$$2Na_2S_2O_3 + 2I = Na_2S_4O_6 + 2NaI.$$

One molecular weight of $Na_2S_2O_3$ thus indicates one atomatic weight of iodine, liberated by one atomatic weight of available chlorine contained in the chlorinated lime.

Penot's method of estimating the quantity of Cl in chlorinated lime was also mentioned. It is based on the fact that arsenious acid in alkaline solution is converted into arsenic acid by chlorine.

$$H_3AsO_3 + 2Cl + H_2O = H_3AsO_4 + 2HCl.$$

The arsenious acid with the requisite quantity of Na_2CO_3 is dissolved in water so as to obtain a solution of known strength which is added from a burette drop by drop to the solution of a weighed quantity of chlorinated lime until a drop of the mixture placed on a piece of iodized starch paper ceases to turn the latter blue, showing that all the Cl has been consumed for converting the H_3AsO_3 into H_3AsO_4.

An experimental illustration was then given of the estimation of silver, and particularly of small quantities of that metal, by means of a standard solution of iodide of starch, whose strength was previously ascertained by a standard solution of $AgNO_3$.

The quantity of silver present in a solution of $AgNO_3$ was now determined by mixing the latter with some precipitated calcium carbonate, and then adding the standard solution of iodide of starch. Iodide of silver being thus

formed, the deep-blue test solution could not impart any colour to the mixture before all the Ag had been precipitated as AgI, but this being accomplished, the further addition of iodide of starch turned the mixture greenish blue. The $CaCO_3$ was required to prevent the formation of free HNO_3.

Mr. Siebold strongly recommended this method for determining the amount of silver in coins, and in alloys of silver with copper generally :—0·5 gramme of the alloy is to be dissolved in $AgNO_3$; sufficient water added to make up 100 c.c., and the quantity of silver estimated in 5 c.c. of this solution by mixing with $CaCO_3$, and adding the standard solution of iodide of starch.

Having thus shown a number of instances of volumetric testing, in which the end of the reaction is recognized by a visible change of colour, or by the formation of a permanent precipitate, the lecturer then alluded to cases in which repeated filtrations were necessary in order to see whether complete precipitation of a substance had taken place or not, and as an instance of this kind he selected the determination of phosphoric acid in phosphates by means of a standard solution of ferric chloride. A solution containing sodium phosphate was mixed with a solution of sodium acetate and some acetic acid, and the fe_2Cl_6 added from a burette. After all the phosphoric acid is precipitated in the shape of white ferric phosphate, the filtrate would form a blue precipitate on the addition of ferrocyanide of potassium. The latter can only be added to the filtrate, and not to the unfiltered liquid, as the precipitated ferric phosphate would also turn blue with the K_4FeCy_6, but in order to avoid great loss in filtering, and to be able to filter and test a single drop at a time, a piece of paper is soaked in a solution of K_4FeCy_6, spread upon a china slab or plate, and drops of the liquid under examination are brought by means of a glass rod on small pieces of doubled filtering paper placed upon the paper saturated with ferrocyanide. The ferric phosphate will thus be left on the small pieces of doubled filtering paper, whilst a clear liquid will pass through and produce a blue spot on the ferrocyanide paper as soon as fe_2Cl_6 has been used in excess. A second determination may be needed to assure a perfectly accurate result. The action of the Fe_2Cl_3 was explained by the following equation :—

$$Fe_2Cl_6 + 2Na_2HPO_4 + 2NaC_2H_3O_2 = Fe_2(PO_4)_2 + 6NaCl + 2HC_2H_3O_2.$$

Mr. Siebold thought that the experiments which he had the pleasure of performing would convince all students present that quantitative analyses by the volumetric methods were quite within their reach, and if fairly studied and practised would enable them not only to test the strength of the various chemical preparations used in pharmacy, but also to test the correctness of the many new volumetric methods proposed and published in the journals, and to render good service to science by assisting in this important process of sifting. He had even known students succeed in discovering new analytical methods, and this might be more generally the case if they (the students) would devote themselves with greater energy to the practical and theoretical study of chemical science.

The lecturer concluded his remarks by expressing a hope that by the end of this memorable century the records of its scientific labours would include the names of many who are now students of pharmacy.

HALIFAX CHEMISTS AND DRUGGISTS' ASSOCIATION.

A meeting of the above Society took place on Friday, Nov. 21, Mr. Jessop, President, in the chair. After the minutes of last meeting had been confirmed, the President brought under the notice of the meeting the recent conviction under the Adulteration Act. While he thought that a change of label, as had been suggested, would place members of the trade in safety, yet there were so many drugs and preparations in the same category as citrate of magnesia, and they were at the mercy of wholesale druggists to so large an extent, that he thought it was important to discuss the subject, and he would be glad to hear the opinion of members with respect to it. Eventually, on the motion of Mr. James Farr, seconded by Mr. Blade, the following resolution was carried unanimously, viz. :—

> "That, as regards the recent conviction, and penalty of £10, for an alleged infringement of the Adulteration Act, against a London druggist, for the sale of the so-called citrate of magnesia, this meeting is of opinion that the said conviction was unjust, and the penalty excessive, and is further of opinion that it should be the duty of the Pharmaceutical Council, representing the trade, to take such steps for the future as may be deemed advisable, to prevent so flagrant a decision, with respect to the sale of drugs, being given; and failing this, to endeavour to obtain an amendment of the said Act."

The Honorary Secretary then read the balance sheet of the finances, showing a surplus in favour of the Society of £5 3*s*. 6*d*. After arranging for future meetings, and appointing Mr. Hebden as a delegate to represent the body at the annual dinner of a kindred society, Mr. Farr moved, and Mr. Brierley seconded, the following resolution :—

> "That a photographic album be purchased for the reception of the *cartes de visite* of members and of eminent pharmaceutical chemists, and that Messrs. Brook and Hebden be appointed to collect and arrange the same."

Mr. J. B. Brierley then gave notice that he would call the attention of the members at the next meeting to the desirability of supporting and assisting any member who may be prosecuted under the provisions of the Adulteration Act, subject to certain rules and regulations, a copy of which shall be sent to each member prior to the meeting.

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

A pharmaceutical meeting in connection with this College was held on Tuesday, October 21, under the presidency of Mr. Dillwyn Parrish.

Mr. Clemmons Parrish having tendered his resignation as Registrar, Mr. Joseph P. Remington was elected to succeed him in that office.

Adulterated Oil of Gaultheria.

Dr. W. H. Pile called attention to a sample of adulterated oil of gaultheria, which seems now to be pressing on the United States' market. The adulterating substance he found to be chloroform, and the means adopted for detecting the fraud were, first, by taking the specific gravity, and, secondly, noting the boiling-point. The specific gravity of true oil of gaultheria is 1·18, whilst that of the sample in question was 1·24. The boiling-point of the true oil is 400° F., whilst the adulterated oil boiled actively at 200° F. By shaking the adulterated oil in a test-tube, after slightly warming, the odour of chloroform is distinctly apparent. He ascertained that this impurity existed in the oil in the proportion of 1 part of chloroform to 4 parts of oil, and his mode of arriving at the quantitative estimation consisted in mixing certain proportions of chloroform and oil together until he obtained the same specific gravity as the adulterated sample had.

Mr. Charles Bullock stated that he had met with two cans of the oil, which he thought probably belonged to the same lot as that mentioned by Dr. Pile, and he exhibited a very neat and convenient little apparatus for detecting and separating the mixed liquids by fractional distillation.

It consisted of a small glass flask, into which the oil was poured; a bulb-like stopper, having a tubulure at the top, which had a rather long tube leading from it at a similar angle to that usually seen in alembics, and a thermometer, which passed through the tubulure and into the bulb of the stopper. If heat be now applied to the flask, the temperature of the vapour which fills the bulb, and is being condensed, can easily be read off. By this method Mr. Bullock was able to separate the chloroform from the oil, and he also found that it contained a very large portion of oil of sassafras. The manner in which the oil had been made seemed to have been: Take 4 or 5 lbs. oil of sassafras, 1 lb. oil of gaultheria, and chloroform sufficient quantity to bring up the specific gravity to the right point.

Professor Maisch, speaking of oil of gaultheria adulterated with oil of sassafras, said that when oil so adulterated is treated in the cold with commercial nitric acid, a deep red resinous mass separates, whilst the pure oil of gaultheria is not coloured by it.

Mr. Charles Bullock reported that, having some suspicions that the heavy lubricating coal oils were used for the purposes of adulteration, he took the specific gravity of one of the most dense in the market, and found it to be only ·883; he regarded them on this account unfit for the purpose.

Pareira Brava.

Professor Maisch exhibited three samples of Pareira Brava, two of which differed from the kind usually seen in commerce of late years, and a sample of the real Pareira, which has been proved by Mr. Daniel Hanbury to be produced by *Chondodendron tomentosum*. The three spurious Pareiras, all of which were mentioned in Mr. Hanbury's paper, were the usual commercial variety, with the layers of wood in more or less excentric layers. a sample of a bright yellow colour internally, with the wood developed almost altogether in one direction, and a sample nearly tasteless, the wood of which is in more concentric layers. The sources of these three kinds are unknown, but all are derived from plants of the order Menispermaceæ.

Spurious Quinine.

Mr. Gaillard spoke of having received a sample of what purported to be French quinine, from a friend in the South, who had been offered the article at a very low price, and had sent him a portion to ascertain why it could be sold so low. It proved to be the old fraud—muriate of cinchonine.

This fraud was brought before the American Pharmaceutical Association at Richmond by Professor Maisch, when Dr. Squibb said that some of the quinine manufacturers were in part responsible for it, as they disposed indiscriminately of the large quantities of cinchonine salts obtained in their operations. This has led to a disclaimer in the *Circular of the Philadelphia Drug Exchange*, which was read to the meeting by Professor Maisch, to the following effect:—

"We take occasion to say that, so far as *American* manufacturers of sulphate of quinine are concerned (1), they do not dispose of the cinchonine salts indiscriminately to any who apply for them, but only to regular customers who pay for them; and (2), so far from being responsible for this attempt to defraud the people, they purposely avoid handling *muriate of cinchonine*—they do not make the article.

"We consider that this statement is eminently due to our friends who make sulphate of quinine here, for they have not only declined making, but refuse to deal in, the article of *muriate of cinchonine*, on account of its close resemblance to *sulphate of quinine*.

"*Muriate of cinchonine* is largely sold in *Europe*, but not in this country, so far as sulphate of quinine manufacturers are interested."

It was suggested that advantage might be taken of the condition of affairs to ascertain what virtues muriate of cinchonine possesses as an antiperiodic.

Diluted Phosphoric Acid.

Mr. Joseph P. Remington introduced the subject of Diluted Phosphoric Acid, and gave the results of an experiment based on a fact mentioned to him by Professor Maisch, in which it was shown that diluted phosphoric acid, made from the phosphorus direct, according to the U. S. Pharmacopœia, would make a clear solution when mixed with an equal quantity of tincture of chloride of iron, whilst that made from the glacial phosphoric acid produced a precipitate when similarly mixed.

Professor Maisch stated that it required repeated treatment with nitric acid in the manner laid down in the second formula of the U. S. Pharmacopœia, in order to convert thoroughly the monobasic into the tribasic variety.

CHEMICAL SOCIETY.

Thursday, 20th November, 1873. Dr. Odling, F.R.S., President, in the chair. The names of visitors having been announced, and the minutes of the previous meeting read and confirmed, a paper, "On the Co-efficient of Expansion of Carbon Disulphide," by J. B. Hannay, was read by the Secretary. Dr. Russell then communicated his researches "On the Action of Hydrogen on Silver Nitrate," giving an account of the precipitation of metallic silver in the crystalline state by means of hydrogen. There were also a "Note on the Action of Zinc Chloride on Codeine," by Dr. C. R. A. Wright; "On the Chemical Properties of Ammoniated Ammonia Nitrate," by E. Divers, M.D.; and "On the Analysis of a Meteoric Stone, and the Detection of Vanadium in it," by R. Apjohn. The meeting was finally adjourned until Thursday, 4th December.

Parliamentary and Law Proceedings.

Prosecutions under the Adulteration Act.

The Alleged Presence of Iron Filings in Tea.

At the Birmingham Police Court, on Thursday, November 20, before Mr. Kynnersley, the hearing of summonses against several grocers for selling adulterated tea was resumed. In one case several scientific men were called upon to give evidence as to the alleged presence of iron filings in a sample.

John Smith was charged with selling a quarter of a pound of black tea that had been adulterated. Mr. Young prosecuted and Mr. Rowlands was for the defence.

Evidence having been given as to the purchase of the tea, Dr. Hill said he received a sample of tea marked 52 from Mr. Woolley. He first of all inspected it with his eye. He saw that it was adulterated with particles of matter which were not tea. They were broken up masses of leaves and stones, more or less irregular in shape, bound together by some adhesive material. He observed on looking at the tea that it was faced with plumbago; such a facing was very easily discovered with the naked eye. He was not aware that plumbago was injurious to health. He next incinerated five grammes. The ash weighed 11·74 per cent. of the tea, or 5·4 per cent. above the normal weight of tea ash. He tested the ash with the magnet, and found it largely attractive. He separated the attractive particles from the ash, and dissolved them in hydrochloric acid, when he obtained a solution of iron, and estimated the quantity of iron by means of a solution of bichromate of potash of known strength. The weight was determined by volumetric analysis. The particles consisted partly of metallic iron, and partly of a crystalline iron mineral. He was able to say they were metal because they effervesced under the hydrochloric acid. He tried the particles with ferrocyanide, and ferricyanide of potassium and found indications of iron. He came to the conclusion that it was iron first when it effervesced under the acid. Carbon would not effervesce; carbonate

would. Carbonate of lime would effervesce, but not in the same way as the iron. The lime would effervesce much quicker than the iron. Common oxide, in connection with some carbonate, would cause effervescence. He would not say the particles were iron filings only because they adhered to the maguet. It was highly improbable that particles of matter drawn up by the magnet from the dry tea would contain carbonate. Peroxide was found in the ash of genuine teas. He did not think it would come from the pans in which the tea was dried; he thought it would be taken up by the plant from the earth in its vital processes. He felt sure that the tea was not dried on red-hot iron pans. He did not find pieces of quartz in the particles that adhered to the magnet. If iron filings were filed off malleable iron they would be malleable, if off cast iron they would not. He had not a sufficient quantity of them to test whether they were malleable or not. There was no doubt that iron-filings would grate between two pieces of glass if rubbed; they would not be pulverized. Magnetic iron would decompose bichloride of mercury; magnetic oxide would not. Metallic iron would precipitate copper, when treated with sulphate of copper. That was a capital test of the presence of metallic iron, but it was not an incontestable test, because other things would throw down copper. Zinc would do so. He was aware that there was a large quantity of magnetic oxide in the earth, but he did not think that it would adhere to the leaves of the tea when they were growing. He believed that pure tea might be bought for 16*d.* a pound. He thought the leaves gathered from the tea plant within a foot of the ground would not be splashed with dirt from the rain. The genuine tea in such a case would be as liable to become splashed as the adulterated tea. He found the sand in these teas rolled up in the leaves. If sand was thrown into a chest of tea in bulk it would be liable to fall to the bottom of the chest, but some of the leaves would retain pellets. He believed that in this tea the sand had been put in in two ways, by being rolled up in the leaves and by being put into it in bulk. He found lye tea in every one of the samples in regard to which action had been taken. The supposition that such large particles of quartz sand as he found adhered to the tea-leaves by being splashed up by rain, or when blown upon by the wind, was an absurdity. The percentage of sand and silica in this tea was 4·74 above the normal quantity.

Mr. Wentworth Lascelles Scott said he received a sample of tea on 16th September. He first tried it with the magnet. A few small particles adhered. These he mixed with the tea, and then weighed 100 grains of tea from the sample, and tried them with the magnet a second time. Out of the 100 grains he got magnetic particles weighing 0·341, by means of the magnet. Next he burned off at a low temperature anything there might be of an organic character about the particles. The weight of the remainder amounted to 0·57. This residue was very magnetic. In his opinion, the magnetic particles contained no portion of metallic iron whatsoever, but were some magnetic form of combined iron.

Mr. Kynnersley: The question was asked the other day whether burning would not convert the iron into oxide.

Witness said it would convert into oxide only superficially. It would continue to be magnetic in a great measure. There would be a portion of iron unoxidized inside the outer crust of oxidized iron and retaining its metallic character. He examined the particles with a microscope, and was confident that they were distinct from iron filings. They presented no marks of tools, such as iron-filings did. They had no torn appearance or "pulled-bready" look which iron filings had. Some of these particles when magnified looked like ordinary pebbles—some of them presenting a smooth, rounded, water-worn surface, others presenting a flattened, cindery appearance, like iron scales, and a third variety presented the appearance of perfect octahedral crystals. He had frequently observed the octahedral form amongst particles of magnetic oxide. He had examined several magnetic minerals and sands with the microscope, and found similar appearances to those presented by the particles from the tea. He tried the tea with bichloride of mercury, and next with sulphate of copper, without any result. This showed him that they were not iron filings. With dilute hydrochloric acid there was no effervescence, but he had taken the precaution to damp the particles first of all with pure water, in order to divest them of any little adherent air bubbles that might rise up when the particles were put into the acid, and be mistaken for effervescence. Iron filings when rubbed in an agate mortar threw off a bright lustre. They were more or less malleable, whether from cast or wrought iron, provided the pressure was sufficient. On the contrary, magnetic oxide or iron, from whatever source derived, was capable of being ground into a fine powder, and did not give any metallic or bright-looking lustre streak. Iron filings were incapable of being ground to powder in that way. Rubbed between surfaces of plate glass, iron filings would be carried along the glass without cutting the glass, or being themselves broken up, whereas magnetite or magnetic oxide of iron would themselves grind, and in many instances, more especially where they were in a crystalline form, such as those small octahedral crystals, they would cut the glass and scratch it. He could reduce the magnetic particles which he found in the tea to a powder, by grinding them between pieces of unglazed porcelain. It was almost impossible to gather vegetables without magnetic oxide. To do so, the weather would have to be extremely favourable. He had found larger particles of sand on several kinds of leaves—strawberry leaves, beech leaves, etc.—than those produced by Dr. Hill.

Mr. William Phillips Horn said he received a sample of tea from one of defendants' shop assistants on the 14th instant. He found magnetic particles in it. He took three samples of 100 grains each, and burned them. The ash weighed in each case respectively 9·738, 9·339, and 8·438, giving a mean of 9·171. The amount of magnetic particles present was 1·130, 1·000, and 1·312; mean, 1·147. Upon treating the remaining ash, which was silica, with hydrochloric acid to dissolve any earthy matter, the results were—2·471, 2·671, and 1·840; mean, 2·327. It was a most difficult thing to get three samples of tea alike, even from the same bulk, and this accounted for the differences in his results. He believed the magnetic particles were derived in part from the iron pans in which the tea was treated; and were partly attached to the leaves mechanically, being derived from the soil in which the tea grew. He had tried the particles in a steel mortar, and they became powder, whereas iron filings, when tried in the same way, became flattened iron plates. He had tried several other tests, all of which led him to the result that there was no metallic iron in the tea, except in combination, and in the shape of magnetic oxide.

The Court adjourned till the next day.

On the following day—

Mr. Alfred Bird, chemist, said he received a sample of tea from one of Mr. Smith's shop assistants. He burned 100 grains, and found the ash to be 10 grains. He washed the ash, when it lost 4 grains. The remaining 6 grains showed 0·22 magnetic oxide of iron, silica 1 grain, leaving a net residue of 4·78 of earthy matter. When tried with hydrochloric acid the 0·22 magnetic oxide threw off no hydrogen gas, nor was there any effervescence. He also tried the sulphate of copper test, and no copper was precipitated. He tried some rusty iron filings with the sulphate of copper, and they precipitated copper. He believed the magnetic oxide in the tea had been wafted upon the leaves when the tea was growing, and had been collected along with the tea. He believed it was possible for magnetic oxide to become attached to the leaves in the course of their vegetation. The amount of silica in the ash of a great many plants

which he had examined was from 3 to 7 per cent. Senna contained about 6 per cent. Although the difference between his result and that of Dr. Hill in regard to magnetic oxide was as 0·22 and 1·46, the samples might be taken from the same bulk. He believed that if twenty persons were to take samples of tea from the same chest, the analysis of three of them would not agree.

Dr. Wrightson said he had analysed a sample of tea brought to him by one of Mr. Smith's assistants. He took 50 grammes of the leaves and mixed them in cold water, in which he allowed them to remain for three days. This allowed the sandy matter to subside. Having decanted the tea leaves, he weighed the residual matter—the dirt—and found it to be 1·15 per cent. On examining this with his eye and a glass, he observed quartz, talc, and apparently some ferruginous particles, and also a portion of coaly matter or ash—a heterogeneous mixture, in fact, such as he should not have expected to be used as an adulterant. He next examined a second portion of the sample with the microscope, and did not discover any metallic particles. From a ¼lb. of tea he extracted 15½ grains, or about 1 per cent., of magnetic particles, which were readily soluble in not very dilute hydrochloric acid. He tested the magnetic particles first by mixing them with a small quantity of nitric acid in a tube—adding a little sulphuric acid. The absence of smell or appearance of brown fumes showed the absence of metal. Secondly, he took a little of the substance, and placed it in a dish. He put hydrochloric acid upon it, and warmed the mixture. The substance dissolved readily, without the slightest evolution of gas, and in the solution he detected iron in the state of protoxide by means of red prussiate of potash. Peroxide was discovered in it by yellow prussiate. That the peroxide and protoxide were chemically combined in the substance was proved by its being magnetic. The substance was therefore magnetic oxide of iron without any metallic iron. This showed that there were no iron filings present. Witness thought that magnetic oxide was the last thing in the world that a Chinaman would use to adulterate tea. He incinerated a portion of the tea, and found the ash to weigh 8 per cent. of the tea. Upon analysing the ash, he found it contained 19·6 per cent. of silica, 9 of phosphoric acid, 7 of lime, 4·58 of magnesia, and 5·65 of peroxide. There was about 40 per cent. of potash and soda also in the ash, and the remaining 15 parts were made up of sulphuric acid, chlorine, traces of manganese, and other things. All these were proper constituents of the tea ash, with the exception of a little excess of sand or silica—perhaps to the extent of 3 or 4 per cent. The analyses of plants varied very considerably according to the character of the soil in which the plants grew—whether sandy, loamy, or alluvial; so did the character of the ash. The older the plant the greater the amount of ash. There was no more sand in the tea than he could conceive to be accounted for by natural or accidental causes.

Mr. Martin Murphy said he had received a sample of tea from Mr. Smith. He did not notice any plumbago facing upon the tea. He had put a portion of it into water, and let it stand until the earthy matter fell to the bottom. Out of 50 grammes of tea he got 0·9 gramme of sediment, which he dried. He found oxide of iron or rust in the sediment, but no metallic iron. He explained other tests which he applied, showing that there was no metallic iron present.

Mr. W. Phillips Horn was called. Witness said that since the previous day he had examined his sample of tea very minutely for lye tea. He found a number of spherical masses in the tea, and produced twenty-five of them. (Those produced were pretty similar to those brought forward by Dr. Hill.) He found fifty of these masses altogether, in about half-a-pound of tea. He examined twenty-five of them. His opinion was that they were not the so-called lye tea. The greater part of them consisted of whole leaves, and the remaining portion consisted apparently of burnt or charred leaves. He found sandy and earthy matter and magnetic oxide of iron in them, the magnetic oxide being taken from the charred leaves. The amount of sand and iron filings alleged by Dr. Hill to be put into the masses of lye tea was certainly not present in these spherical masses which he found. He did not find any gum or starch in the masses.

Formal evidence was given to show that the tea supplied to the various chemists by the defence was from the same source as that supplied to Mr. Woolley.

Mr. Rowlands then addressed the Bench for the defence. It appeared to him that there were three questions raised in the case—first, whether this article was sold as unadulterated; second, whether it was adulterated; and third, what were the adulterants? With regard to the first question, to constitute the sale of an article as unadulterated there must be an express warranty that the article was not adulterated. As for the second question, the charge that the tea was adulterated with sand and earthy matter, and iron filings, he reviewed the evidence at some length, and said he was firmly convinced that there was no metallic iron in the tea.

Rebutting evidence was then produced by the prosecution, a protest on behalf of the defendant being overruled.

Dr. James Campbell Brown, borough analyst of Liverpool, said he received a sample of tea from Dr. Hill, and analysed it. He came to the conclusion that it was adulterated for two reasons; first, because it contained pellets of spurious tea, such as he had heard called lye tea in court, and on account of the total increase of weight of the tea especially by means of mineral matter. Aided by a lens he found pieces of caper tea, which appeared to be blackleaded like a grate. He also picked out pellets of spurious tea. He called it spurious tea because when boiling water was poured upon it instead of the leaves unrolling like tea-leaves, they became disintegrated, and were found to consist chiefly of sand and small stones joined to little bits of organic matter—tea-dust, he believed. The whole was cemented together. He picked out of the tea some small stones; some of them were so large as one-tenth of an inch. They were composed of a white rock, probably quartz, but were blackened on the surface like a black-leaded grate. By means of the magnet he picked out portions of what looked like broken up lye tea, and which consisted of mineral particles adhering to the tea-dust. The majority of these particles were not magnetic, although they were attracted by the magnet. He believed that the majority of the particles attracted by the magnet were pieces of chopped or crushed iron ore; some were metallic iron. He washed the particles carefully, so as to remove carbonate of lime, etc., from the iron particles. He put a portion of the washed particles into diluted sulphuric acid, and a second portion into diluted hydrochloric acid. In both cases he saw at first no effervescence—not for the first half minute or so. Had there been carbonate of lime present the effervescence would have been immediate. He watched the test-tubes, and noticed that in a short time the iron, which had been rather passive at first, began to dissolve in both cases. Small bubbles of gas began to rise, and continued to be evolved from some of the particles for many minutes. He tested the substance further by means of permanganate of potash, which was rendered colourless by the hydrogen gas evolved from the iron while under the acid. He burned some of the tea, and found the total ash, including all the mineral particles, to be 13·4 per cent. He had analysed tea which was practically free from impurities. He had examined such pure tea sold at prices from 1*s.* 2*d.* upwards. The maximum of ash in unadulterated tea was 6 per cent., inclusive of accidental dust. He believed that the tea in the present case had been designedly adulterated. He would not swear that it was plumbago with which the tea was faced. The pellets handed into the Court were not, in his opinion, leaves scorched up. There was nothing adhesive in

scorched leaves. He considered that iron ore was more objectionable in the tea than iron filings.

Dr. Arthur Hill Hassall was then called, and examined by Mr. Kynnersley: Witness read the results of his analysis of sample 52 sent to him by Dr. Hill. It was a black tea, with leaf much broken. It was highly magnetic, containing nearly 6 per cent. of "lye" tea. The ash of the whole tea amounted to 12·54 per cent.; the ash of the lye tea to 20·3 per cent. The former contained 4·07 parts of matter which consisted chiefly of sand and stony particles, and 0·83 parts of iron over and above the amount of iron found in genuine teas. There was separated by means of the magnet 1·64 per cent. magnetic iron; the matter in the tea amounted to 10·01; the extractive matter to 30·27; and theine to 1·50 per cent. One or two leaves not tea were detected. The result of the analysis showed that the tea was adulterated with lye tea, sand, and magnetic iron. It was so highly magnetic that it adhered very freely to the magnet. It was impossible that the large quantity of foreign matter contained in this tea could have been introduced into it through any allowable accident. The lye tea was a specially fabricated article, and could only have been introduced by design. The mineral matter present could not have consisted of mere ordinary dirt and soil, into the composition of which a great many other things enter. The iron found in soils was chiefly in a state of ferrugo or peroxide, the quantity of magnetic oxide being very small in comparison to it.

Mr. Kynnersley: You have heard all the evidence of both sides of the case; do you still remain in the same opinion as when you wrote that paper you have read?

Witness: Yes; but I think I had better add something which will come out in other ways. I have no desire to keep anything in the back ground. In my first report I mentioned freely the words "iron filings." That circumstance occurred in this way. We have seen constantly in analyses of tea in the papers "magnetic tea" and "iron filing tea." I accepted that fact as a fact that this tea which was magnetic owed its magnetic properties to iron filings without question. No question arose in my mind until the hearing of the cases, when I was present on the last occasion. On my return home, of course, I felt it necessary to investigate for myself that matter, and the conclusion at which I arrived was that these magnetic particles consisted, in the main, of magnetic oxide of iron. I say "in the main," because there is a little reservation founded on the following circumstances. I tried this hydrochloric test with some magnetic matter which I extracted from sample 45. I took care to cleanse the particles thoroughly by means of liquor potassa before applying the test.

Mr. Rowland said he did not wish to interfere with the doctor, but this was what he did in another case.

Dr. Hassall: I want to show you what steps I took. I mentioned in my former examination that I had not performed the hydrochloric test. Subsequently, I did so in several instances. In the case of sample 45, I obtained an effervescence, after having taken great precautions. In sample 50 I tried the reduction of the copper by placing some of this magnetic matter in a solution of sulphate of copper. I got a small reduction, and that was placed in a filter to get rid of a portion of the copper. The particles in the filter were dissolved in the droppings of nitric acid, and then ammonia itself was applied. In two instances I got a slight discoloration. With regard to this present sample—No. 52—I performed the same experiment, that is to say, for the effervescence and reduction, and I got no result.

The Clerk: You have arrived at the conclusion that the particles are magnetic oxide partly?

Witness: Yes; that is in accordance with the experiments shown by the witnesses for the defence.

To Mr. Kynnersley: He could not account for the presence of so much oxide as he found in this sample by any natural causes, or by the ordinary preparation of tea.

To Mr. Rowlands: He thought it was something more than an oxide in degree. These magnetic particles had a very appreciable size, and corresponded with the description given by Dr. Brown as to their being broken up ore. He had not analysed China soil, but he certainly should not expect to find in 100 parts of it more than 23 parts of magnetic oxide. In the present case he should certainly not describe the particles found as iron filings. Asked to describe lye tea pellets in the sample in question, he said he would not say the leaves in them were not tea leaves, as the sample was too small to make a minute analysis. Lye tea consisted usually of tea-dust and sand, made up into little pellets or masses, with some adhesive material. The pellets were faced in imitation of black tea or green tea, as the case might be. He had no opportunity of examining what the adhesive matter in the present case was. Damp disintegrated the pellets. He could not think that the pellets would be made in the process of drying or manufacturing the good tea, because of the broken leaf and large proportion of inorganic matter they contained. It was a well-known fact that lye tea was constantly found in tea, and he preferred to accept the theory that it had been put in in this case. He did not find that because tea was cheap it contained sand.

This concluded the evidence in the case, which was then adjourned till Wednesday, when the decision will be given.

Is Rowland's Odonto a Patent Medicine?

At the Wandsworth Police Court Mr. Joseph Delayen, a hairdresser at Wimbledon, appeared on Tuesday, Nov. 24, to answer an adjourned summons for selling a box of Rowland's Odonto toothpowder without a licence. The question was whether toothpowder was a medicament. On the first hearing of the summons Mr. Bridge expressed an opinion that it was no more a medicament than a piece of soap which was used for washing purposes, but he adjourned the summons for a month, in order that the supervisor of Excise might communicate with the Board of Inland Revenue on the subject of taking a case or not. Mr. Dwilly now pointed out that the Act mentioned toothpowder. Mr. Bridge said he had not noticed this before. The defendant's son wished to know whether Rowland's Odonto was mentioned in the Act. Mr. Bridge said it was not. Probably it was not known at the time the Act was passed. The Act included all things of a similar nature to those mentioned in it, and therefore he must convict the defendant. The fine, however, would be the lowest he could impose—£5.—*Times*.

Review.

A Manual of Botany. By Robert Bentley, F.L.S., M.R.C.S. London: Churchill and Co.

As fresh means of acquiring knowledge increase, our study of plants can no longer be merely "a culling of simples," and considering the progress which has been made not only in horticulture generally, but also in all that pertains to systematic as well as structural botany, any work which shows an advance will be received with pleasure by all those who have taken up this branch of scientific pursuit. We most heartily welcome this third edition of a work which has already stood the test of more than twelve years' trial, and stands so high as a text book amongst students. It has been well observed "that so much depends on the art of putting things:" this holds especially true in the work before us, and although hard words will intrude, yet as a whole this work must be considered as "put" in as simple a manner, and taking into consideration the magnitude of the subject, in as concise a form as possible. We could have wished that a little more had been written on the morphology of plants, a subject which is now engrossing the thoughts and attention not only of botanists but also of almost all thinking men—a subject which in time bids fair to solve problems

hitherto baffling our utmost endeavours to determine. Although fossil botany may be considered foreign to the subject, yet it is so intimately connected with it that we think Balfour was right in setting aside a chapter to it in his manual, and we could have wished that Mr. Bentley had done so in his present edition.

The enlarged type in the present work is a great improvement, making it much more readable. The illustrations have been considerably increased in number; a step has also been taken in the right direction in placing cells and cell structure at the end of the work; the dreary routine of tissues has often frightened the young beginner at the outset. In learning botany an early application should be made to the practical examination of flowers, leaving the structural portion as much as possible to the latter part of the course. As a whole we can fully recommend this work to all those who, either from love of nature or from dire necessity, have taken up this pursuit; a pursuit, by the way, which once fairly appreciated will be more and more followed, not only from duty, but from its own intrinsic merits.

BOOK RECEIVED.

QUANTITATIVE CHEMICAL ANALYSIS. By Dr. C. REMIGIUS FRESENIUS. Sixth Edition. (Reprinted from the Fourth Edition). Translated from the Fifth German Edition. By A. VACHER. London: J. and A. Churchhill. 1873. From the Publishers.

Obituary.

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

On the 17th November, 1873, Mr. Samuel Booth, Pharmaceutical Chemist, of East Greenwich. Mr. Booth had been a Member of the Pharmaceutical Society since 1865.

On the 19th November, 1873, Mr. James Margetson, Chemist and Druggist, of Old Market Street, Bristol. Mr. Margetson was a Member of the Pharmaceutical Society.

On the 6th September, 1873, Mr. Aaron Whitfield, Chemist and Druggist, of Biggar, N.B.

Notes and Queries.

[369.] AQUARIUMS.—The aquarium should have a layer of fine sand covered with shingle at the bottom, in this the weeds should be planted. The best for this purpose are *Valisneria spiralis*, *Anacharis* and *Chara vulgaris*. A few water snails should also be put in; the best are *Planorbis*, *Paludina*, and *Amphibia glutinosa*. These may all be otained at the Bedford Conservatories, Covent Garden Market, for a small sum. One plant and two or three snails should be used for each gallon of water put into the aquarium.—*F. G.*

[370.] HOMINY.—A correspondent in a recent Journal, whose initials I cannot quote, not having the Journal before me at this moment, asks what is hominy? In reply, allow me to inform your correspondent that hominy is a name given in America to a kind of meal prepared from Indian corn or maize (*Zea Mays*, L.). There appears to be several sorts of different degrees of fineness, some almost as fine as ordinary "corn flour" and others composed apparently of the finely broken but not pulverized grains.—JOHN R. JACKSON, Museum, Kew.

[370.] HOMINY.—If *J. T. H.* will write to Messrs. Horsnail and Catchpool, Liverpool Road, London, N., they will supply him with American hominy meal, and can no doubt tell him how to cook it. I believe it is made into a kind of pudding.—*F. G.*

A similar answer has been received from Mr. Wm. Bradley.

[371.] MORPHIA SOLUTION FOR HYPODERMIC INJECTION.—By using meconic, instead of acetic acid, Mr. H. J. Davies will be able to prepare a neutral and stable solution of the strength desired, or much stronger. A neutral meconate of morphia is pre-eminently adapted for hypodermic treatment.—T. and H. SMITH, Edinburgh.

[373.] BROWN BOOT-TOP LIQUID.—

Saffron.	15 grains.
Boiling Water . . .	2 ounces.

Infuse and strain. Add

Tinct. of Rhubarb . .	1½ ounce.

Concentrated Infusion of ditto to make up 4 ounces. —*F. G.*

CITRATE OF MAGNESIA (Citras Magnesicus).—$Mg_3C_6H_5O_7$, $7H_2O$. The following extract respecting the neutral citrate indicated by the above formula is taken from Ferrand's *Aide Mémoire de Pharmacie*:—

"It is prepared by saturating a solution of citric acid with magnesia and evaporating. But when thus obtained it soon loses its solubility in water, so that if required for medicinal use it should not be prepared until wanted, or else the following plan should be adopted:—

Citric Acid, in crystals	200
Calcined Magnesia	29

"Fuse the acid in its water of crystallization by means of a water-bath, and incorporate the magnesia carefully. The mixture, which is at first pasty, solidifies, and is pulverized and preserved (*Dorvault*). This citrate is very soluble, and its solution is permanent when eight or ten times its weight of water is employed. The 29 parts of calcined magnesia may be replaced by 64 parts of carbonate of magnesia; the carbonic acid is driven off and there remains a pulverulent mass resembling bicarbonate of soda. Thus prepared the citrate is insipid, and it requires the acid to be augmented by 4 parts to give it an agreeable acidity.

"This salt is a gentle purgative, without disagreeable taste, and is taken by the most difficult patients without repugnance. It is employed especially under the form of 'limonades sèches' or 'limonades liquides.'

REMOVAL OF NITROGEN FROM ALKALOIDS.—Bocke states (*Deut. chem. Ges. Ber.*, vi., 488) that by distilling quinine with zinc and zinc sodium a distillate free from nitrogen and resembling cumin oil in odour may be obtained, sodium cyanide being left in residue. Previously to this statement, Weidel had been reported (*Ann. Chem. u. Pharm.*, clxvii., 88) to have split up cinchonine ($C_{20}H_{24}N_2O$) by oxidation into two nitrogenous products, one of which was a well-crystallized acid, which yielded its nitrogen to nascent hydrogen to form ammonia, leaving a crystalline tribasic acid resembling the vegetable acids in general character. The other nitrogenous product has not yet been examined. The results appear to indicate that cinchonine is composed of a C_{11} and C_9 group; the examined acid being obtained from the former.

DETECTION OF ARSENIC IN COLOURED PAPERS.—Hager saturates the paper with a solution of nitre in a mixture of alcohol and water, and after drying burns it upon a plate. The ashes are then boiled with water and a few drops of potash solution, the liquor filtered, acidulated with sulphuric acid and permanganate until this is no longer decolorized with heat. The cold filtered solution is then introduced into a small flask with a strip of zinc and a few drops of sulphuric acid, and at the orifice are held two bands of paper, one impregnated with nitrate of silver, the other with acetate of lead. The latter is used only to establish the absence of sulphur; if arsenic be present the silver paper blackens immediately.

Correspondence.

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

Citrate of Magnesia.

Sir,—I have watched with some interest the remarks and letters published in the Pharmaceutical and other journals on the recent conviction of Mr. McDermott under the Adulteration Act. In the main, I find the general opinion to be that he was unjustly convicted, because, although the article he sold assuredly was not citrate of magnesia as its label purported, there was no fraud intended or committed either by Mr. McDermott or the manufacturer, inasmuch as it was the article known both by the public and the profession under that name. If that which we call unwritten law be not sufficient exoneration, there is in the sixth edition of Squire's 'Companion to the British Pharmacopœia' of 1867, p. 235, this foot-note to "Sodæ Citro-tartras Effervescens":—

"*Fr. Limonade sèche au Citrate de Magnésie. New preparation; vulgo, Granular Effervescent Citrate of Magnesia.*"*

There is one extraordinary exception to this fair judgment on the case in the *Medical Press and Circular* of Nov. 19th, in the opening of an article, p. 461, headed "Fraud in Drugs," but as the editor expressly contradicts himself at p. 463, in another article entitled "The Adulteration Act," I need not remark further on that.

My object in writing is to urge my brethren, on this most fitting opportunity, to abolish once for all a discreditable misnomer. I may be told that our shops are full of misnomers. Yesterday I was asked, "What is your dragon's blood? Who killed the dragon?" To-morrow I may be examined on crab's eyes and hartshorn. The thing seems absurd, but I take it there is a great difference between using a name handed down to us by the ancients for a simple substance and launching a compound preparation under a false name on the world in these days of advanced chemical knowledge and pharmaceutical honesty—the granular effervescent powders are scarce fifteen years old.

I remember that when the names of carbonate and subcarbonate of potash were exchanged for bicarbonate and carbonate, it was thought the public would never buy them under the new terms; but we find no difficulty now, and I believe there would be no greater difficulty with these granular preparations.

I know my desire to see this change effected is shared by the best pharmacists in the kingdom, and I would venture to remind all that it is our only means of safety so long as the Adulteration Act exists. Without going into the question of what observation might fairly have been expected to accompany Dr. Muter's report in guidance of the magistrate, I venture to say that no analyst would have pronounced the powder handed to him to be citrate of magnesia, and in confirmation of my opinion that we shall not be safe in selling it under this false name I give you, from a circular just received from Mr. Bishop, an extract which he quotes from Her Majesty's Attorney-General and Mr. Poland.

They advise that in the sale of citrate of magnesia to a customer, "*care should be taken to inform such customer that the article sold is not pure citrate of magnesia, but is the preparation called 'Granular Effervescent Citrate of Magnesia'*"; and that even if it be sold with Bishop's label on the bottles, the customer "*should be asked whether he requires the preparation called Granular Effervescent Citrate of Magnesia, which is, in fact, not Citrate of Magnesia.*" Those who have to retail these articles will appreciate the difficulty of putting such questions, and making such remarks, better than the learned gentlemen who declare them to be necessary always.

Sir, I find no fault with Mr. Bishop for endeavouring to protect that which is doubtless a valuable property; but we have a higher duty to perform, from which I trust we shall not shrink, and I have the greater hope that we shall not, because in performing it we shall remove a blot from pharmacy, and undoubtedly ensure our own safety. I enclose two labels which I have adopted; one for the Pharmacopœia preparation, the other for the magnesian compound.

George W. Sandford.

Citro-Tartrate of Soda,
Of the British Pharmacopœia;
Commonly known as
CITRATE OF MAGNESIA.

Effervescent Saline Aperient;
Commonly known as
CITRATE OF MAGNESIA.

Sir,—Does Mr. Alfred Bishop consider that the presence of a certainly very small percentage of magnesia (probably existing as sulphate and in that case not citrate of magnesia at all) can justify him or anybody else in ignoring an overwhelming proportion of other ingredients, upon the presence of which the properties of the preparation depend? But, I observe that he does not lay claim to its being "citrate of magnesia" but "granular effervescent citrate of magnesia."

Now, with all due deference to him, I apprehend that by adding two adjectives to express properties pertaining to a substance, you in no way deny that it is really what it pretends to be; granular effervescent citrate of magnesia cannot (or ought not to) be the less citrate of magnesia in that it possesses granular and effervescent properties.

Mr. Alfred Bishop may reply that it is impossible to make a true granular effervescent citrate of magnesia. That may be so; I have never tried to do it; but it was not impossible for him to call the preparation by its proper name in the first instance. Of course, as he says, it is now too late, and I have known cases parallel to his, in which an initial departure from strict veracity has borne consequences impossible to foresee.

It is only charitable to suppose that he did not contemplate the possibility of a tradesman being fined for selling an article under a name the vendor never gave to it and which he had no power to alter; yet this is the way in which our hands are tied, and for which we have to suffer.

But, surely it cannot mend matters to call in the aid of a thing of fogs, fictions, and mysteries like English law, which its own professors do not pretend to understand and can only offer an opinion on, in order to solve a question quite capable of apprehension by anyone possessing some knowledge of chemistry and a fair share of common sense.

The distinction between "citrate of magnesia" and "granular effervescent citrate of magnesia" is well worthy of the Attorney-General, Mr. Poland, *et id genus omne*, but such subtleties are not quite satisfactory to the non-legal mind of a layman like myself.

If instead of the eleven paragraphs contained in his statutory declaration, Mr. Bishop could have made only two as under, namely, that:

1. Magnesia formed an *essential* part of the preparation and was present in an important quantity, not as sulphate but as citrate;

2. That it was really a citrate and not a compound containing tartaric acid,

it would have sufficed; but, Sir, in that case no statutory declaration would have been necessary.

H. C. W.

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* Mr. Sandford's quotation is quite correct as such; but it involves an error committed by Mr. Squire in describing the Limonade sèche au citrate de magnésie of the French Codex as a preparation corresponding to our effervescent citro-tartrate of soda, as will be evident from the following formula:—

Limonade sèche au citrate de magnésie.

Pr.	Magnésie calcinée	6,50
	Hydrocarb. de magnésie . .	6
	Acide citrique	30
	Sucre blanc	60
	Alcoolature de citron . . .	1

Pulv. grossièrement ensemble le sucre et l'acide; mélangez les autres subst.; enfermez dans un flacon à large ouverture.

En bouchant la bouteille où l'on fait la dissolution, et maintenant le bouchon à l'aide d'une ficelle, on a une limonade gazeuse.—Les doses ci-dessus représentent 50 gr. de citrate de magnésie. (Cod.).—Ed. Pharm. Journ.

Sir,—The recent "National Chamber of Trade" Conference furnished proof to an onlooker of the helplessness of the ordinary London druggist. Accustomed as he is to have everything "managed" for him, he is a sheep without shepherd when deserted by his guardians. It is otherwise with his brethren in little provincial towns, where business does not tie them to the counter all day long and a good bit of the night; they are able to take their part in local affairs—frequently a leading one—which is due to the superior intelligence and education among Pedlingtonites, and spare time enables the country man to read more widely and solidly, and so expand his mind with general and classic literature.

The object of this letter is, not to advocate the remedy, viz., the short-hour movement, with its concomitant opportunities, but it is most important that the Council should not construe the apathy of the trade (for the "effervescent" affair is already going flat) into an excuse for their own inaction, having allowed themselves to be placed in position to watch over the interests of pharmaceutists, and furnished with every requisite means for conducting influential corporate resistence to injustice.

They have allowed a dangerous precedent to pass unchallenged, and though every one is resigning himself to the fools' paradise of hoping himself will not be "dropped on," it is certain that others will be so, and shortly, too; then there will be another panic, and so that will have to be done with a bad grace which might have earned the gratitude of their constituency. If they persist in doing nothing there is only one alternative that I can think of (until next election)—Is there not plenty of administrative ability among the wholesale firms?—and they are not the least interested in this matter.

The resolutions at the Chamber of Commerce met with the support they deserved, the wonder is that only three individuals seemed to see the incongruity of *chemists* pleading to be excused from the penalties for impurity that have been inflicted (with such general approval by the public) on grocers and milkmen. They would be more suspicious than ever of physic. The desperation of the "resolvers" must have been extreme to wring out an appeal to "Dr. Redwood, in the corner," to help them, *i.e.*, to repeal the Act which provides him a little salary. This is *too* much even for a public officer's self-denial.

We have seen how an analyst can disregard his private interests, however considerable, when public duty runs counter to it; but it is scarcely part of such a one's duty to try to repeal the Adulteration Act; it requires an Irishman to commit such a suicidal blunder. The victim on whose account these proceedings were undertaken voted with the gentleman who moved that the meeting be adjourned *sine die!* Did he construe it into "never say die?" He is evidently game for a fight, defiantly keeps the mag. eit. conspicuously in his window. By-the-way, it *is* an orthodox pharmacy, notwithstanding the uncongenial neighbourhood, and should teach a lesson to more pretentious shops that compete with fancy bazaars. And that most disagreeable sort of Job's comforter, the "Candid Friend," in speaking of the "unknown neighbourhood" (of Bermondsey) might be reminded that Shakespere immortalizes the "tanners of Bermondsey," in words which will survive when the Prince Regent is unknown to history.

Again, if the inspectors of South London are more active there than those of the West-End, it is unreasonable to insinuate that he who selected Mr. McDermott is afraid to "inspect" the great men of the west; they are (fortunately for them) out of the zealous one's district. Doubtless, the selection was purely chance; it would hardly be thought so if well-known shops were picked out.

Many points remain to be touched on, but this is too long already; so I leave the subject in worthier hands than

J. P. C.

Nov. 20th, 1873.

A Provincial on the "Citrate" Question.

There are four points on which it is imperatively necessary there should be a distinct understanding throughout the whole "drug trade" regarding the article sold under the name "Gran. Eff. Cit. Magnes.", and the position it occupies amongst other articles designated in a similar manner. Those points are—first, its composition; second, its analysis; third, its name; fourth, its sale.

First, its composition. Every chemist is fully aware how it was first brought into existence, and every chemist is or ought to be fully aware that its supposed composition as at first made public has not been adhered to. Even to those tradesmen so unequal to the requirements of the profession as not to be able to analyse, the well-known fact that an article bearing the name can be bought at less than half the price at which the first manufactured was sold, affords sufficient information. There are few, however, aware of how the article is manufactured so as to sell at an extraordinarily low price, and at the same time bearing sufficient resemblance to the "genuine" and far more valuable kind, as to entitle it to the original name.

Moreover, the Bermondsey case can only mislead retail purchasers on this very point.

Ask a "wholesale" representative the reason why such cheap preparations of the citrate can be manufactured, and he will generally say that "larger quantities of sugar are used." A chemist accustomed to analyse his samples, however, knows better; the true reason being that tartaric is generally substituted for citric. But even this reason only reaches to a certain extent.

Forms have frequently been given for its manufacture differing materially from each other in quantities and qualities, though not in principle. Now invariably in the forms for the common kinds the ordinary magnesian sulphate enters very largely.

Dried epsom salts, it is well known, possess a great avidity for moisture. It is also well known that the commoner kinds of effervescing citrate attract moisture a great deal more rapidly than those higher priced.

Putting these facts together, and weighing them in connexion with the character of Bermondsey sample as given by analysis, the probability is that the purchaser got full value for his money and a comparatively good article into the bargain.

For, if magnesia was not found in it, and I presume there is no reason for doubting the analyst's accuracy, then there must have been employed in its manufacture chemicals of higher value than the magnesium sulphate. Possibly, however, as magnesia was not found there, sodium sulphate had been used. That, however, is almost as expensive as the former, at least the difference, except in especial instances, would not make it worth while to substitute one for the other, when the gain by so doing would be counterbalanced by the loss of prestige in the entire omission of magnesia from the article sold. But again, I believe the analyst's certificate does not say that he found sulphuric, therefore it is quite evident that the Bermondsey sample could not have been of the very commonest kind. Also in the face of this it is quite within possibility to believe that if the analyst had found only the slightest quantity of magnesia, he would have given a more satisfactory certificate. This, however, I repeat is only a possible eventuality. Although seeing the results of analysis lately placed before the public, it is deserving of notice by people whose commercial prosperity and commercial morality are at stake.

Second, analysis. An exact quantitative process is needed by the chemist in very few cases. The quantitative indication afforded by the qualitative method being generally sufficient for all ordinary purposes. What he actually requires is the knowledge of two or three tests that will give him an idea of the adulterating constituents, if any. For this the usual qualitative processes in analytical practice will answer. Barium chloride and hydrochloric acid for sulphate, and sodium phosphate in ammoniated solution for magnesia. Absence of citric acid by calcium chloride, alcohol, hydrochloric acid and ammonia. This is Fresenius' teaching, which the writer has found more satisfactory than that of others.

However, should there be a necessity for a somewhat accurate quantitative analysis, more especially for the determination of the magnesia, then for the separation of the alkali precipitation with potassium antimoniate will succeed pretty accurately, and the further employment of the qualitative method quantitatively will suffice. Of course the whole process is only indicated very roughly here.

Third, name. None of the names suggested as substitutes for the original one will answer to the nature of the article. Besides, if any of them actually represented, that is chemically, the nature of the compound, they are all decidedly objectionable because of their being very cumbersome.

Previous experience has proved it certain that whatever name be adopted that name will eventually get into common use only if it be short and pointed. Who, therefore, will

ever ask for "granular effervescent citro-tartrate of soda with magnesia"?

But the compound is not what this title indicates. According to none of the forms published will the article formerly sold as the "citrate" be found chemically analogous to what this title properly describes, neither as sold, nor after being dissolved. In the former case it is not a citro-tartrate of sodium with magnesia; in the latter case it is not in a "granular effervescent" condition.

Still more, in either case where is the sugar taken accoun of?

The condition to be observed in searching for "a name" is that the name must be in accordance with the substance.

Probably, all things considered, the label that would come nearest to a true designation of the article, that would not cause doubts to arise in the minds of purchasers, and that would settle the question once for all, both with competent and incompetent analysts, would be

Compound
CITRATE OF MAGNESIA,
Formerly called Effervescing Citrate of Magnesia.

There is no actual necessity, however, for the latter part.

Fourth, sale. After the previous remarks very little requires to be written on this point. However, as it is not very probable a quantitative analysis of what is sold as the "effervescing citrate of magnesia" will be made in the interest of the "Adulteration" Act, in consequence of the indefinite nature of the composition, when "genuine," and in the want of a recognized definite formula for its preparation it is useless to enter into the legal question. Still, this can be safely put on record, according to the received notion of its constitution, any article containing citric acid and magnesia, only in moderate proportions, with sugar, and in mechanical combination, is fully entitled to be considered as an "effervescing citrate of magnesia." Therefore, despite the "Food and Adulteration Act" the unprincipled tradesman and manufacturer can escape its penalties with impunity.

E. D.

[*** We cannot agree with the opinion expressed in the concluding paragraph of our correspondent's letter. So far as we are able to speak as regards a proprietary article, we should say the composition of the article sold as "citrate of magnesia" is the same now that it was when that article was first introduced. Both as regards magnesia and citric acid, it is a case of misnomer; but though it must be admitted that the article sold under the name of "citrate of magnesia" is not correctly represented by that name, still we fail to recognize any circumstances which justify the opinion that the sale of this article under the familiar name it has acquired—wrongly, it must be granted—should be treated as a case of adulteration for the purposes of the Act.—ED. PH. JOURN.]

Sir,—As unusual interest appears to be taken by your correspondents on the late conviction of Mr. McDermott for the sale of so-called "citrate of magnesia," and as all unite in condemning the Adulteration Act as applicable to the sale of drugs, etc., may I call your attention to the facts?

The summons was originally taken out under the second section of the Adulteration Act of 1872, but at the hearing was amended by the magistrate, and the conviction took place under sec. 24 of the Pharmacy Act (Amendment) of 1868.

The Adulteration Acts are without doubt very faulty, but if amendment be necessary in respect to this case attention should be turned to the Act, of which I believe your Society were the promoters.

Though absent through illness from the court, I believe you will find my statement perfectly correct.

THOS. PAYNE, *Sec.*

The Anti-Adulteration Association, Limited.
Offices—Adelphi Chambers,
6, John Street, Adelphi, Strand, W.C.,
Nov. 24th. 1873.

[*** Mr. Payne is in error in supposing the Pharmaceutical Society in any way promoted the Adulteration Act. The only action taken by the Council in reference to that Act was in obtaining an amendment of the Bill by the introduction of the third section, so as to restrict the application of the Act to those only who sell a drug knowing it to have been mixed with any other substance, with intent fraudulently to increase its weight or bulk (*see* PHARM. JOURN. iii., 129).

We think also that Mr. Payne is wrong in stating that the conviction of Mr. McDermott took place under sec. 24 of the Pharmacy Act, 1868—at least, we have never seen the case so reported.—ED. PHARM. JOURN.]

Sir,—There has been much correspondence on the citrate of magnesia case, but there are two important points which I have not seen noticed.

As you report the case on p. 376, a parcel of cit. magnesia was bought at the same time that a prescription was dispensed. There appear to have been two distinct transactions. But the magistrate, in his remarks, speaks as if he thought the citrate was used in the prescription.

Surely this is an essential point, and if the circumstances were what your short report implies, the penalty inflicted was decided under a wrong impression, and therefore the case is far from a decisive one.

But it is stated on p. 373 that Mr. McDermott is not a chemist and druggist. Was he not, therefore, liable to a penalty for dispensing a prescription? If so, in this case, although justice seems to have been blind, she was by accident just.

W. SYMONS.

Barnstaple, 24th Nov., 1873.

[*** We took some pains at the time the report was published to clear up the question as to the prescription and the simple sale of 4 oz. "citrate of magnesia," but could not do so satisfactorily, though we inclined to the opinion that the case was one of ordinary retail sale. Since then, however, we have learned, on the authority of Mr. McDermott himself, that the 4 oz. of effervescent citro-tartrate of soda were supplied by him to meet the terms of a prescription, written in the usual manner, ordering—

Magnes. citratis effervescentis . . . . . ℥iv

with directions in Latin how this was to be taken.—ED. PH. JOURN.]

WHO'S PHILIP?

Sir,—I think I can tell Mr. Greenish who Philip is, and where he is to be found; but I very much fear that if I were to divulge the secret of his whereabouts, I should bring a nest of hornets about my ears. He must be satisfied to know that he is not be found this side of the Edgware Road.

Mr. Greenish's excellent letter opens up so wide a field for discussion that I almost hesitate to encroach on your space, and fear that I shall lay myself open to the charge of having an attack of "*Cacoëthes Scribendi.*"

The prescription he alludes to was evidently intended to be sent to a particular chemist, and I imagine the prescriber would scarcely consider any chemist was justified in questioning his right to get his formulæ dispensed wherever he might choose. My impression is that whenever an invalid consults a medical man, the doctor's first duty is to his patient (after himself.) I have no doubt it is to his interest to send his prescription to his own particular chemist, and most probably he thinks that it is to his patient's interest also, but is it just to the general body of pharmacists? Most of us can trace the loss of old and valued customers to the fact of a new physician being called in who insists on the medicines being procured from a particular establishment; and, as a rule, patients readily fall in with what their medical adviser desires. I know however of one very notable exception, in the person of an old baronet, who does me the honour to bring me his prescriptions when he is in town. He tells me that whenever he consults a medical man, and he is told to go to one particular pharmacy for the medicine ordered, he says: "That is the very shop I shall *not* go to; why am I to leave my own chemist to go to a man I know nothing of?" When he is told that the particular remedy prescribed can only be procured at the establishment recommended, his answer is: "Then my own chemist may send and get it for me."

A medical man is perfectly justified when a patient *asks* him to recommend a good chemist in naming the man in whom he himself has confidence; in the case of strangers coming up from the country this is indeed very advisable, and most of us have to thank some kind medical friend for such

recommendation, but it is the impertinent interference with the established relationship of a chemist and his customers that is so much to be reprehended. When a doctor is called in to attend a family, before he advises them to change the chemist, let him ascertain that the man (who has probably been employed for years and years, and that with every satisfaction) is not a reliable man, and that he does not supply good drugs, and then is the time to put in his friend.

Another phase of the subject presents itself to me. The legion of new preparations continually introduced is rapidly getting an abominable nuisance. As a rule, they are also made the excuse for sending the prescription to a particular establishment. Where one is a reliable and valuable chemical or pharmaceutical product, ninety-nine are but senseless varieties of recognized Pharmacopœia preparations. How much valuable time is wasted, and that not unfrequently at the busiest time of the day, in running about to find out where they are to be procured! To provincial and suburban chemists the nuisance must be simply intolerable, and the expense of sending to London and elsewhere for these things must surely be a great item in their current expenditure. If medical men, when they order these preparations, would but put the name and address of the chemist who prepares them against the acticle ordered, it would save much time and trouble. I well recollect when the late Dr. Marshall Hall prescribed his "Pilula aloes diluta," since introduced into the London Pharmacopœia under the name of "Pilula aloes cum Sapone," he went to the expense of having the formula printed on a small gummed label, which he invariably affixed to the prescription when he ordered this particular pill. In these days of keen competition one can scarcely expect from brother pharmacists so much consideration as the publication of their formulæ; it would be too much on the "*Sic Vos non Vobis*" principle, but I think a doctor ought to do so when he gets a guinea for his prescription, and I most earnestly hope that when my friend Mr. Greenish next gets an order for some "Pil. Philip." he will find that Dr. Marshall Hall's sensible little plan has been adopted.

"'Tis a consummation
Devoutly to be wished."

JOHN TAYLOR.

13, *Baker Street, Portman Square, W.*
Nov. 22nd, 1873.

Sir,—The letter of Mr. Greenish in the last issue of the Journal is well worthy the notice of the trade. The grievance to which he draws attention, though happily less prevalent now than it was some years ago, still retains a not inconsiderable vitality in many provincial towns, and is productive of much inconvenience to the patient and the chemist, the latter not unfrequently suffering in reputation as well as pocket. So far as the ethics of the matter are concerned, it is to my mind at least somewhat questionable honesty for a medical man to tender in return for a fee a prescription which is of no service, but at some particular establishment, thus serving his own interest only, and treating with indifference that of his patient, who pays with the tacit understanding that he will receive, *not* a cipher, the key of which is in the possession of some privileged individual, but a prescription, clear and intelligible, which can be dispensed without let or hindrance in any part of the kingdom to which in the ordinary course of business or pleasure he may have occasion to remove. Now as most of us are supporters of the principle of free trade, the question arises, How is this monopoly to be broken through? and to this end I, for one, think Mr. Greenish has touched the right key-note in his determination to publish every such case that comes under his notice. I would therefore suggest that this plan be adopted, wherever practicable, by chemists at large. I venture to predict that it would yield results of a most salutary kind, and go very far towards completing the downfall of a system that is manifestly unjust in its operation and pernicious in its results. Trusting that the subject will not be shelved until some practical good is accomplished, I am, etc.,

G. MASSON, Ph. Chemist.

Mere Street, Diss, Norfolk.
Nov. 24th, 1873.

Sir,—Mr. Greenish's pertinent question in last week's issue will provoke, I have no doubt, some few replies. As, some few years since, "Philip" came frequently under my notice, I venture so throw some light on the difficulty experienced by Mr. Greenish. "Philip" is the putative production of a well-known practitioner in "Tyburnia," and is one of many brethren filling important places in that gentleman's private compilation, some of whom, notably, "Linim. Scorpio.," "Embroc Camphor. Co.," "Tinct. Sumbuli Co.," Mist. Calumbæ. Eff.," bidding defiance to prescriptive limits, are occasionally met with, straying from their native region.

Descending from a respectable and well-tried family, "Philip's" actual composition is (or was):—

Hydrarg. Submur . . . . gr. j.
Pil. Hydrarg. . . . . gr. iij.
Pro Pil. j.

And, judging from his therapeutic effect, I can easily understand his "derivative" was assumed for a twofold purpose, viz., commercially, to perplex the uninitiated; and professionally, to convince the sceptical.

Who will say he has failed in either respect?

ROBERT A. JOHNSON.

45, *Westbourne Grove, Nov. 26th*, 1873.

"*An Apprentice.*"—The object of an apprenticeship is to enable the apprentice to acquire a thorough practical knowledge of his business, and he is bound to perform whatever duties may be required of him in pursuance of that object. For further details we must refer you to the terms of your indentures.

A. P. S.—Duncan's preparation is still sold and dispensed by some houses of good repute, and is the one strictly entitled to the name. We should use it whenever chloric ether is ordered.

W. W.—First convert the calomel into perchloride, and then into ammoniated mercury in the usual way.

St. Mungo, W. B. (*Egham*), 2 *Alpha*, are referred to the rule respecting anonymous communications.

"*Gareloch.*"—(1) The substance mentioned is not included in Schedule A. of the Pharmacy Act, 1868. (2) The necessity for a patent medicine licence would depend upon whether it is represented in any way as a remedy for the cure or relief of disease.

B. A. Laing.—Recipes for carboy colours were given in vol. i., pp. 477, 497, 516, 517, 536, and vol. iii., p. 678.

"*Inquirer*" (Liverpool),—See pp. 59 and 79 of the present volume.

"*Gradibus.*"—The 'Grammaire des Grammaires,' by De Fivas.

"*Edina.*"—Boiled oil, thickened with yellow ochre, and reduced to the finest possible consistency. It is thinned by oil of turpentine.

"*Henricus.*"—'Our Domestic Animals in Health and Disease,' by Professor Gamgee (1863). The London publishers are Simpkin, Marshall, and Co.

"*Citrate of Magnesia.*"—*R. Drury* sees no objection to the adoption of the simple title "EFFERVESCING MAGNESIA," which he and several others have used for years

D. J.—(1) *Thymus serpyllum.* (2) *Hyperieum elodes.* (3) *Thalictrum flavum.* (4) *Bartsia Odontites.*

J. W. S.—*Tinct. Pareirœ Comp.*

℞
Tinct. Pareiræ . . . . 3 parts.
Vin. Colchici. . . . . 1 part.

A. P. S.—Any medicine that is a secret preparation, said to be prepared *only* by a particular person, or which is recommended on the label or in any other way as a remedy for the cure or relief of any disorder, is liable to the stamp duty, and the vendor must take out a patent medicine licence.

Leeds Chemists' Association.—The report of the meeting, kindly furnished to us by the honorary secretaty, Mr. J. W. Longley, did not reach us until after the Journal had been made up for press, but will appear in our next number.

COMMUNICATIONS, LETTERS, etc., have been received from Professor Balfour, Messrs. Baker, Robinson, Ingham, Lunn, C. Crook, W. Bradley, J. Leay, Johnson, Dolomites, Cymru, Euxesis, E. J. P., K., H. C. W., A. E. M.

A NEW SOLVENT OF PHOSPHORUS; ITS PREPARATION AND PHARMACEUTICAL USE.

BY A. W. GERRARD,

Dispenser and Teacher of Pharmacy to the University College Hospital.

The principal known and most generally adopted solvents of phosphorus for pharmaceutical purposes are bisulphide of carbon, chloroform, ether, alcohol, oil of almonds, oil of theobroma, and mutton suet.

The power of these bodies to dissolve this element varies from any proportion to less than half per cent.; the most powerful being bisulphide of carbon, the least, alcohol.

Most of the above solutions of phosphorus, when dispensed, are of an unsatisfactory and unstable character. Those which are fluid and miscible with water in the presence of mucilage—the manner in which it is usually prescribed—are rapidly decomposed and become inert; they are likewise nauseous and objectionable to the patient in an extreme degree. The solid forms are but little better and are exceedingly troublesome to manipulate.

Bisulphide of carbon has been recommended by Mr. Proctor, of Newcastle, as a means of dispensing phosphorus in the pill form, and it answers the purpose very well, with the exception that the pills retain a compound smell of phosphorus and bisulphide of carbon, which is repulsive in the utmost degree.

The new substance which I propose to add this evening to the list of solvents of phosphorus is resin, that body described in the Pharmacopœia as the "residue of the distillation of the turpentine." This substance suggested itself to me amongst others as a probable solvent, and the result of my experiments upon it is that I have found it capable of dissolving four or more per cent. of phosphorus; the limit of its solubility is a question for further experiment.

I would call this substance phosphoretted resin. The method of preparing it is thus:—Take a strong wide-mouthed well-stoppered bottle and weigh it, then melt a quantity of resin sufficient to fill the bottle; let the bottle be warmed, then pour in the resin to nearly but not quite fill the bottle, reweigh, and for every ninety-six parts of resin take four of phosphorus. Now observe that the resin is in a fluid state; if so, add the phosphorus, and fix the stopper tightly. Place in a sand-bath previously warmed, and apply heat to 200° C. or 392° F.; digest at this temperature, and shake frequently until the phosphorus is dissolved.

The kind of resin to be used in this preparation is the black translucent variety, known in commerce as rosin, not that pale yellowish kind usually met with in chemists' shops, unless it has previously been deprived of its water, of which it contains a varying amount, sometimes ten per cent.

In conducting the process, it is necessary to observe the following precautions:—In adding the phosphorus, if possible let it be in one piece, and take care that the resin is previously in a fluid condition, as then the phosphorus readily sinks below the surface, and is covered by the resin; otherwise, if the phosphorus were in small pieces and the resin semi-fluid, the phosphorus would rest on the half-hot resin, and speedily take fire; but by observing the above precautions, this accident may be prevented.

A bottle full of the preparation should be made at a time, as I find there is great risk of accident (having had one myself) if the vessel is only partly filled. The phosphorus is also volatilized, and deposited in the upper portion of the bottle.

Keep a thermometer in the sand-bath during the process, and maintain the temperature between 200 and 210 C. At higher temperatures the resin boils, and the heat is liable to change the phosphorus to the red amorphous state.

When the prepared resin has cooled it is difficult to remove it unless the bottle be broken; the method I have adopted is to draw it from the bottle, when partly cooled, under hot water.

It is a pharmaceutical process which, like many others, requires care and attention to ensure success, but whatever difficulties may arise, to a practical person a remedy will suggest itself.

I will here mention a curious change which takes place if this phosphoretted resin be reheated. When it reaches a certain temperature it becomes of a whitish cream colour throughout, if the temperature be raised still higher it again becomes transparent; this phenomenon does not occur in the cooling. It is probably due to the influence of molecular change.

The formula I would suggest for its exhibition is the following:—

Take of—

Phosphoretted Resin, 4 per cent. .	25 grains.
Powdered White Sugar	75 „
Tincture of Tolu, a sufficient quantity.	

Pulverize the resin, mix with the sugar, and form into a mass with tincture of tolu,—eight to ten drops are sufficient; then divide into twenty pills, each pill will contain one-twentieth of a grain. This forms a mass of an excellent consistence, and pills made therefrom retain their form and present an elegant appearance without the addition of any coating; they have but a faint odour of phosphorus, and that may be completely removed by the addition of oil of peppermint.

The experience gained from the administration of these pills in the in- and out-patients' departments of the hospital to which I am attached proves that the theurapeutic properties of the phosphorus are in no way injured or modified by this combination, but that it is fully equal to any that had been previously used.

In conclusion, I consider the advantages of this preparation to be that it is inoffensive to the tastes of the patient, definite and reliable for the prescriber, ready and convenient to the dispenser, and I believe judging from its nature it has unlimited keeping powers.

[*The discussion on this paper is printed at p.* 451.]

NOTE RESPECTING GLYCERINE OF GALLIC ACID.

BY SAMUEL GALE.

It is well known that glycerine has the property of dissolving most salts in greater proportion than water.

It also exerts a power on certain salts (as ferric chloride) in preventing their precipitation by the alkalies.

It combines with certain organic and inorganic acids to form definite compounds, as with sulphuric and phosphoric acids.

Most of the salts when dissolved in glycerine will bear dilution, even if much less soluble in water.

In the Pharmacopœia the authors have given us some very useful preparations of glycerine, and it is to one of these I wish to draw attention for a minute.

When the glycerine of gallic acid is diluted with an equal bulk of water (after a short time) the gallic acid crystallizes out, and there appears a solid mass.

[*The discussion on this paper is printed at p.* 451.]

BITTER WINE OF IRON.*

BY CHAS. L. MITCHELL.

This preparation, so much in demand amongst practitioners in the United States at the present time, is, when rightly made, a most elegant tonic and stimulant. As often sold, however, it is of an inky colour and taste, and quite repulsive to the patient. Taking advantage of the property which the hydrated sesquioxide of iron possesses of removing the tannic acid from the different vegetable astringents and tonics, I have succeeded in making a preparation which is handsome, efficient, and pleasant to the taste. The formula is as follows :—

Grd. Cinchona Calisaya	192 grs.
,, Gentian Root	128 ,,
Soluble Citrate of Iron	192 ,,
Sherry Wine	13 f. ozs.
Brandy	1 f. oz.
Alcohol	1 fl. ,,
Oil of Orange	12 minims.
Sugar	2 ozs.
Solution of Tersulphate of Iron . .	2 f. ozs.
Water of Ammonia	q. s.

Dissolve the oil of orange in the alcohol, and mix with the sherry wine and brandy. With this menstruum percolate the ground drugs, recovering 15 f. ozs. tincture by pouring on water. Dilute the iron solution with twice its bulk of water, and add ammonia until in slight excess. Wash the precipitate until the washings are tasteless, and drain thoroughly. Mix this precipitate with the percolated tincture, and allow to stand, shaking frequently, until a portion filtered off has a light yellow colour and does not blacken with tincture of chloride of iron. Then filter, dissolve the citrate of iron and the sugar, and bring up the measure with a little water to 16 f. ozs.

Each fluid ounce contains 12 grs. cinchona calisaya, 8 grs. gentian root, and 12 grs. of soluble citrate of iron.

THE PRODUCTION OF METHYLAMINES FROM ACETONE.†

BY C. VINCENT.

The author, having noticed the presence of methylamine, dimethylamine, and trimethylamine in methylic alcohol, was induced to investigate the conditions under which those bodies were formed. He found that they were not produced directly in the carbonization of wood, but that the ammonia which is first formed, and which accompanies the lighter products, gives successively methylamine, dimethylamine, and trimethylamine, according as it is a longer or shorter time in contact with these matters under such conditions. He therefore tried to ascertain what was the reaction which gave rise to the various methylamines during the distillation of the alkaline methylic alcohol. With this object, he placed pure methylic alcohol and aqueous solution of ammonia together in a flask furnished with Liebig's condenser, which he heated first in a water-bath, and then in a closed vessel to 100° C. After twenty-four hours, however, he was in neither case able to detect a trace of methylamine.

* *American Journal of Pharmacy*, Nov., p. 483.

† *Comptes Rendus*, vol. lxxvii., p. 898.

As crude methylic alcohol contains considerable quantities of acetone, the author thought that the ammonia reacting on that body might engender successively the various methylamines and aldehyd, according to the following equations :—

$$C_3H_6O + NH_3 = C_2H_4O + NH_2(CH_3)$$
$$C_3H_6O + NH_2(CH_3) = C_2H_4O + NH(CH_3)_2$$
$$C_3H_6O + NH(CH_3)_2 = C_2H_4O + N(CH_3)_3.$$

He therefore placed acetone and aqueous solution of ammonia in a flask heated by a water-bath, and connected with a Liebig's condenser. At the end of twelve hours the liquid was saturated with oxalic acid, and evaporated to dryness in a water-bath. The residue treated with absolute alcohol gave a solution which was evaporated to dryness to drive off the alcohol. The matter so obtained, treated with a boiling solution of potash, disengaged a gas which was dissolved in water.

This solution was strongly alkaline, and when boiled gave off an inflammable gas that burned with a yellowish flame. It precipitated the salts of cadmium white, and the precipitate was insoluble in an excess of the reagent. By these characters it was recognized as methylamine.

The presence of aldehyd in the products of the action of ammonia upon acetone was manifested by saturating with acetic acid the first product of the rectification, and passing through it a current of sulphuretted hydrogen ; sulphydrate of hydride of sulphacetyl was formed, the odour of which is characteristic.

It may be concluded from these reactions, that the methylamines met with in methylic alcohol have their origin in the action of ammonia upon acetone during the repeated distillations to which crude methylic alcohol is necessarily submitted in order to purify it. Similarly the simultaneous formation of aldehyd in this reaction explains the presence of that product in methylic alcohol.

QUANTITATIVE ESTIMATION OF EMETINE, ACONITINE, AND NICOTINE.*

BY O. ZINOFFSKY.

To estimate emetine, the author treats 15 grams of powdered ipecacuanha with sufficient 85 per cent. alcohol, to which a few drops of sulphuric acid have been added, to measure altogether 150 cubic centimetres. This is filtered, and 100 cubic centimetres are taken, from which the alcohol is removed by distillation ; to the residue is added a titrated solution of iodo-hydrargyrate of potassium, until a portion of it is no longer rendered turbid by that reagent after filtration. The number of cubic centimetres of the solution of iodo-hydrargyrate required, multiplied by 0·0189, or one ten-thousandth of an equivalent of emetine, gives the quantity of emetine contained in ten grams of the root. The normal solution of emetine is prepared by mixing aqueous solutions of 13·546 grams of bichloride of mercury and 49·8 grams of iodide of potassium, and completing to one litre with water. One cubic centimetre of this solution precipitates one ten-thousandth or one twenty-thousandth of an equivalent of alkaloid. Ipecacuanha wine can be estimated in the same way.

Aconitine is treated in a similar manner; but the number of cubic centimetres of solution of iodo-hydrargyrate of potassium required to precipitate the alkaloid is multiplied by 0·02665, or one twenty-thousandth of an equivalent.

In order to estimate nicotine, 15 grams of tobacco are digested for 24 hours with a sufficiency of 85 per cent. alcohol, to which fifteen drops of sulphuric acid have been added, to bring the volume up to 150 cubic centimetres. Fifty cubic centimetres of this solution are filtered and evaporated, and the solution of iodo-hydrargyrate of potassium added to the residue. The number of cubic centimetres required, multiplied by 0·00405, or one ten-thousandth of an equivalent of nicotine, gives the quantity of alkaloid contained in five grams of the tobacco.

* 'Bulletin de la Société Chimique.'

The Pharmaceutical Journal.

SATURDAY, DECEMBER 6, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ADULTERATION ACT IN ITS RELATION TO DRUGGISTS.

THE report we publish this week of the proceedings at Westminster Police Court last Saturday will no doubt be read with much interest, and it is so full that there is no need to recapitulate the details here.

The case will serve to illustrate the possible oppressive application of the Adulteration Act, and to demonstrate the want of some proper means of regulating the action of the local authorities with whom rests the obligation of carrying out the provisions of the Act. Such bodies are very generally in the same state of disability indicated by Mr. ROGERS, who, representing the Westminster Board of Works, said that the position they were placed in was that they scarcely knew what they were to do.

Under these circumstances, it is not surprising that uninformed excess of zeal should, as we have already had occasion to point out, run riot in promoting prosecutions for which there is no kind of foundation in fact.

It is in this way that dangerous and expensive experimental prosecutions are instituted, with no other results than those of wasting public money, harassing tradesmen, and possibly damaging their credit, as well as wasting their time. No wonder, then, that the magistrate should have expressed himself in such strongly condemnatory terms in regard to the course taken by the Westminster Board of Works; and we trust that his decision will have a wholesome influence in preventing the perpetration of such abuses in the future.

Out readers may congratulate themselves that the result of these prosecutions has turned out in the way it has, when they consider the perils with which even a sound defence is surrounded in a court of law, whenever the questions at issue are of a scientific nature. Anyone who reads through our report of the case now referred to will readily perceive that both the magistrate and the lawyers acting for the several parties were under great difficulties in endeavouring to comprehend the real merits of the case. The principal witness for the prosecution was throughout his evidence at cross purposes with his cross-examiner as to the several scientific details which it was necesary to deal with, and, although no exception can be taken to the evidence he gave as an analyst merely, it was quite apparent that he laboured under serious misapprehensions, arising from a want of practical pharmaceutical experience. On no other foundation could he have formed the opinion that the sale of sweet spirit of nitre was an infringement of the Adulteration Act, or even of the Pharmacy Act, which is so much more stringent in its provisions as regards registered chemists and druggists. We venture to think that had he known that sweet spirit of nitre was an old established and popular remedy, and a preparation distinct from the spirit of nitrous ether of the British Pharmacopœia, we should never have heard of the prosecutions which received such signal defeat last Saturday.

In passing, we may note that the trial of this case incidentally brought out some points of importance, and among these the opinion expressed by Mr. ARNOLD that the provisions of the Adulteration Act relating to drugs do not in any way apply to pharmaceutical preparations or compounded medicines. So likewise the fact is worth noticing that though the Pharmacopœia is the authority by which pharmacists are to be guided in the compounding of medicines ordered by physicians, that work is not to be regarded as operating in any way as a restriction of trade or manufacturing industry in respect of preparations required for other purposes than those contemplated by its prescriptions.

We are glad to find that the medical journals generally acknowledge the impropriety of these prosecutions. The *British Medical Journal* regards them as being equally as ill-judged and oppressive as the recent prosecution for the sale of "citrate of magnesia." It rejoices in their failure, and adds that, while proceedings so harsh and ill-founded are quite contrary to the public interest, they can only tend to bring a useful Act into public odium.

The *Medical Times and Gazette* says that at a time when adulteration is being carried on to a large extent in articles of every day use, it would be better to look out for cases of some utility to the public to be exposed, rather than to raise a legal question as to the manufacture of an officinal preparation which by the most liberal stretching cannot after all be called actual adulteration.

In a like spirit the *Medical Press and Circular* considers that a great mistake was made at Westminster in dragging several respectable pharmacists and a qualified medical practitioner before the magistrate on a charge of selling adulterated spirit of nitre, when it appeared from the evidence that those persons sold as spirit of nitre an article known by that name for more than a century.

The *Lancet*, while admitting that it was rather harsh to make the charge of adulteration at all, is at the same time somewhat incorrect in its remarks on this case. In the first place, it is negatively incorrect in omitting to state that the "unfortunate" attempt to obtain a conviction was directed against a medical practitioner as well as against "a number of druggists." The case actually tried was that of a surgeon, although of course we do not think that fact affects the merits or demerits of the case. Secondly, it is positively incorrect in stating that the prosecution was instituted "for selling 'adulterated' sweet spirit of nitre," inasmuch as the adulteration alleged was that of spiritus ætheris nitrosi, B.P., it being contended that the sale of sweet spirit of nitre—another thing entirely—constituted an offence under the Adulteration Act. Again, the well-known fact of the instability of spiritus ætheris nitrosi was not urged as an "excuse" for selling the old-fashioned preparation; the demand for the latter, not only by the public, but also by medical men, being the sole reason for doing so. We doubt whether that demand will be materially influenced by the information to the public, now volunteered by the *Lancet*, to the effect that sweet spirit of nitre "possesses absolutely no value whatever."

An opinion is also expressed by the *Lancet* that it is very desirable the motives of the Westminster authorities, and of their analyst, Dr. DUPRÉ, should not be misrepresented as it is assumed they have been by the reports in the papers. We have not as yet seen any such misrepresentation, and if we may take the statement of Mr. ROGERS the solicitor for the Board of Works, this body seems to have had no motives; but merely to have proceeded on the analyst's certificate as a matter of obligation. As regards Dr. DUPRÉ, we imagine he would not desire to be credited with "motives" at all. They would certainly be very inconsistent with the function of the analyst, and we have his own distinct assurance that he had nothing to do with the institution of these proceedings.

But while we express satisfaction at the issue of the spirit of nitre case, we must guard ourselves against being supposed to have any tendency towards defending practices that are really objectionable, either as regards the quality of drugs and pharmaceutical preparations or otherwise. It has always been the policy of the Pharmaceutical Society to discountenance anything of that kind, and to promote to the utmost the sale of genuine articles, and it is only by pursuing such a course that pharmacists can hope to secure the recognition and public confidence which appertain to their calling. It is from such a feeling that we have thought it our duty to suggest in regard to the "citrate of magnesia" question the advisability of abandoning the use of the misnomer which has been so long current. That Mr. BISHOP, as the manufacturer of a proprietary article, should seek to continue the name he has hitherto used, is very intelligible, and though we cannot give concurrence to the reasons he assigns for so doing, we prefer leaving the discussion of this point to himself and those correspondents whose letters he replies to this week.

Our argument for the abandonment of the term is urged from the point of view of the interest of pharmacy, and we hold that in this light it would even be better to resign the trade in this article to the grocers than to incur the possible prejudice arising from the use of so palpable a misnomer as "citrate of magnesia."

While speaking of this subject we must take the opportunity of expressing our dissent from the opinions expressed in Mr. GILES' letter. To those who know him it will not be a novelty to find him taking a chivalrous part; but the suggestion he puts forward as to the late case of conviction for the sale of "citrate of magnesia" seems to us impracticable, inasmuch as the defendant in that case was not a registered chemist and druggist, and it would be as reasonable for the trade to take up the defence of any grocer fined in like manner under the Adulteration Act.

A NEW catalogue of the books contained in the library of the Pharmaceutical Society is now ready for distribution. On the motion of Mr. SANDFORD, it was resolved by the Council at its meeting, on Wednesday last, that a copy of this catalogue should be supplied to every Member of the Society and Associate in Business who makes an application for one. It is desirable that such applications should be made as soon as possible to the SECRETARY, in order that an estimate may be made as to the number that will be required.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

Wednesday, December 3rd, 1873.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Brown, Frazer, Greenish, Hampson, Mackay, Owen, Radley, Robbins, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick, and Williams.

The minutes of the previous meeting were read and confirmed.

NEW BYE-LAWS.

The SECRETARY read a letter to the effect that the amended Bye-Laws had been received and approved by the Privy Council.

ELECTION OF EXAMINERS.

In accordance with the new Bye-Laws, sec. 10, cl. 2, the Council then proceeded to appoint examiners for the year beginning January, 1874.

The VICE-PRESIDENT suggested that only twelve examiners should be elected on the present occasion, although under the new Bye-Law they had power to elect fourteen; the matter not having appeared on the agenda, and members not being prepared with names.

The present examiners were thereupon formally re-elected by ballot.

Seven members of the present Scotch Board were also re-elected. One examiner having retired, Mr. Mackay stated that the North British Branch were not at that moment prepared with another name.

ELECTIONS.

PHARMACEUTICAL CHEMIST.

Sant, George .....Woodstock.

ASSOCIATES.

The following having passed the Minor Examination were elected Associates of the Society :—

Balchin, Edward Samuel.....Devizes.
Compton, Arthur .....Reigate.
Evans, John .....Bishop's Road, W.
Hucklebridge, James Marwood.London.
Johnstone, Thomas Francis.....Dumfries.
Masters, Henry James.....Bath.
Maxey, John Thomas .....Wisbeach.
Morris, Thomas Henry Vaughan.Dorchester.
Princep, Philip .....Uppingham.
Smith, Charles .....Sleaford.
Williams, Richard.....St. Clears.
Wright, Conrad William.....Tewkesbury.

LOAN OF SPECIMENS.

Mr. SCHACHT, as President of the Bristol Pharmaceutical Association, had been requested to ask permission for the collection made by Dr. Porter Smith in the Museum to be sent down, in order to illustrate a lecture which Dr. Porter Smith had kindly offered to give. The specimens were not such as would be likely to be injured by carriage, and of course the Society would be put to no expense.

The PRESIDENT said he was quite sure the Council would authorize him to give the requisite permission; they were always desirous of aiding the cause of education in any way.

Mr. SANDFORD preferred a somewhat similar request on the part of Mr. Claypole of York Town, Blackwater, for certain chemical and electrical apparatus to illustrate a lecture on water.

This request also was acceded to.

FINANCE.

The report of this Committee was read and confirmed, and sundry accounts ordered to be paid.

Benevolent Fund.

The Committee of this Fund recommended a grant of £10 to the widow of the member to whom a grant had been recommended last month, but who had died before the grant could be made. Also a grant of £20 to the widow of a member in straitened circumstances who was desirous of emigrating. These grants were now made by the Council, as also a grant of £10 to the widow of a member into whose case inquiries had been made by Mr. Atherton, but too late for consideration by the Committee.

Report of Special Benevolent Fund Committee.

The Committee appointed to consider what means could be adopted for increasing the income and usefulness of the Benevolent Fund, presented a report recommending that a letter asking for further donations be forwarded to every chemist and druggist whose name was on the register, and also that in future every subscriber of 5*s.* should be entitled to one vote, and so on in proportion, one vote for every 5*s.* subscribed.

Mr. Williams thought it worthy of consideration whether a circular should be issued, or whether an advertisement in the Journal would not be sufficient.

Mr. Robbins suggested that the consideration of this report should be deferred to another meeting. He thought if the Committee discussed the matter a little further some still better method might be adopted.

Mr. Brown moved

"That the consideration of the report and recommendations of the Special Committee be postponed."

He thought it had been arrived at a little hastily. He also took the opportunity of correcting a misapprehension either on his part or on the part of Mr. Robbins, in expressing himself at a former meeting. He certainly understood that Mr. Robbins advocated the purchase of annuities with the invested capital of the fund, and against that he entered his strongest protest. Since then, however, he had arrived at a more definite idea of the course Mr. Robbins would advocate. They had hitherto confined the granting of annuities to the amount of interest on their invested capital, but after considerable thought on the matter he had arrived at the conclusion that they might fairly take a further step, and proceed at least to consider, if not to resolve, upon granting two classes of annuities, the first class payable out of the interest of the accumulated funds invested, and a second class payable out of the annual subscriptions. He believed when the Committee came to consider the means that should be adopted to increase the annual subscriptions this might be found more effectual than any other which could be adopted. It was very desirable, of course, that every case should be relieved, and he believed that was done, but clearly it would be very desirable if they could have a larger number of deserving and necessitous persons in receipt of small annual incomes from the Society. He believed the time had now arrived when, having nearly £14,000 invested, they might grant some annuities out of the annual income, and although they might not be so absolutely secure as those paid out of the invested funds, still he believed they would be found sufficiently secure, and would be the greatest encouragement to increased subscriptions on the part of the members. He therefore hoped the matter would be again remitted to the Committee.

Mr. Betty seconded the motion.

Mr. Baynes supported the views of Mr. Brown, and proposed that that gentleman's name be added to the Committee.

The resolution was unanimously adopted, and Mr. Brown's name was added to the Committee.

Library, Museum and Laboratory.

The report of this Committee was read, stating the arrangements which were being made for lighting and furnishing the Library, etc., and also with regard to the custody of the specimens and apparatus belonging to the Society.

The Committee also recommended the purchase of the following books for the Library:—

Drury's 'Useful Plants of India;' Wanklyn's 'Milk Analysis;' Tyndall's 'Six Lectures on Light;' Babington's 'Flora of Cambridgeshire,' and Brewer's 'Flora of Surrey.'

It was reported that 42 pupils were at present at work in the Laboratory; 20 attending the botanical lectures, and 32 those on chemistry and pharmacy.

The report and recommendation were received and adopted.

Parliamentary.

The following letter from the solicitor was read with respect to the mode of carrying on the business of a deceased chemist and druggist:—

[Copy.]

"3, East India Avenue,
Leadenhall Street, London, E.C.,
"*October* 20*th*, 1873.

"Elias Bremridge, Esq.

"Dear Sir,—

"We advise, as requested, upon the three questions submitted to us by a member of the Council at the Committee Meeting, those questions being:—

"'1. Can the trustees of a deceased chemist and druggist carry on business in the name of the late proprietor only, or must the names of the trustees, or the words "Trustees of the late," etc., appear on the sign, prescription envelopes, labels, etc.?

"'2. If a P.C. or M.P.S. by subscription, can the title be used either with or without "subscription"?

"'3. If a P.C. by examination, can the words "Pharm. Chemist" be affixed?'

"The whole law on the subject of question No. 1 is contained in the Pharmacy Act, 1868, and the exception in favour of executors, administrators, or trustees is limited to that created by the words in section 16:—

"'And upon the decease of any pharmaceutical chemist or chemist and druggist actually in business at the time of his death, it shall be lawful for any executor, administrator, or trustee of the estate of such pharmaceutical chemist or chemist and druggist to continue such business if, and so long only as, such business shall be *bonâ fide* conducted by a duly qualified assistant.'

"We regard the exception as one to be construed strictly, and as enabling 'executors, administrators, and trustees' only to continue a business actually conducted by the deceased at the time of his death, and so to continue it only so long as they are doing so in the capacity of 'executors, administrators, or trustees'—that is to say, for the benefit of the deceased's estate, and not for their individual benefit.

"The continuance of the business will not be in exercise of any personal qualification in the 'executors, administrators, or trustees,' and will not confer upon them any degree of qualification to carry on business on their own account, or open any new business as 'executors, administrators, or trustees,' and the exception in the Act of Parliament will not delay the erasure of the deceased's name from the register, or entitle the 'executors, administrators, or trustees' to be placed upon the register, and it follows, as we consider, that the proper style for the conduct of a business under the exception is—

The { Executors, Administrators, or Trustees } of A. B. { Pharmaceutical Chemist, or Chemist and Druggist. } deceased.

"With regard to the sales of poisons under clause 17 of the Pharmacy Act, 1868, we consider that the intention of the Act of Parliament is that there shall be a personal responsibility to the purchasers and the public, and that

the 'executors, administrators, or trustees' continuing the business are the persons or 'sellers' liable to the purchasers and the public for the fulfilment of the conditions imposed by clause 17, and therefore that it will be the proper and safe course that on every sale of a poison the conditions of section 17 shall be complied with by the full names of the 'executors, administrators, or trustees,' with the address at which the business is conducted, being placed on the label used for the poison, in addition to, and before the above suggested style of the business.

"Regarding the questions Nos. 2 and 3, we consider that there are not any pharmaceutical chemists 'by subscription,' or any pharmaceutical chemists 'by examination,' and that all pharmaceutical chemists are such by one qualification, namely, that of being on a common register, and not otherwise, so that the words 'by subscription,' or 'by examination,' applied to a pharmaceutical chemist or chemist and druggist, are words of misdescription. The words 'by subscription' we have never seen in use. 'By seniority' would appear to be the more accurate expression, if either could be accurate.

"We suggest for consideration whether it is desirable for the Society to encourage the use of the words 'by subscription,' 'by seniority,' or 'by examination,' or other words whereby the public may be led to regard the great body of pharmaceutical chemists as subdivided, and so also with regard to the more numerous body of chemists and druggists.

"We are, dear sir,

"Yours truly,

"FLUX AND CO."

Mr. SAVAGE said the letter they had heard, was very important in connection with the question of the widow of a chemist and druggist, carrying on business. It appeared that the trustees had power, so long as they were trustees, to do so. But no matter how soon the trusts expired, the widow could no longer carry on the business. Now, that seemed an anomaly, and he thought it ought to have been so arranged that with a properly qualified assistant, the widow should have had power to carry on the business. It was quite certain that trustees were not in ordinary cases pharmaceutical chemists; they might be totally ignorant of the business, and still they had the privilege of carrying it on as long as they were trustees, and he thought the widow should have the same advantage.

Mr. STODDART thought this was a very serious question; suppose, for instance, a man died, leaving a widow and children. Of course he ought to make a will, and to appoint his wife sole executrix, or to appoint an executor; but supposing that any accident took place, in point of law the person would be asked, are you on the register? The question was, who was to be on the register.

Mr. FLUX said that on the death of any pharmaceutical chemist, or chemist and druggist, his name would be expunged from the register, and in respect of the business there would be no name on the register. The executors or trustees carrying on the business, must carry it on by reference to the register which was in existence at the date of the death of the deceased; they would point to that register and say we are carrying on a business which was carried on by that gentleman at the date of his decease. But neither the dead man, nor the living man could be on any present register.

Mr. STODDART said there was the difficulty.

Mr. FLUX: There is no provision for putting executors on the register. If any mistake is made, a civil action must be brought against the person who actually committed the mistake, that is to say, the executors; and if the executors take upon themselves a responsibility of that kind, it is just the same as in the case of debts. If an executor carries on a business, he is personally responsible in respect of every purchase made by him; it is a personal debt, although he may indemnify himself against it out of the estate of the deceased. So with regard to any liability to an action for damages, he would be personally responsible, because the carrying on is a personal act, although he might in respect of it be entitled to indemnity out of the estate of the deceased. The executors carry it on by force and virtue of a right which they acquire through the deceased consequent on his having had a personal right at the time of his decease.

Mr. SAVAGE said if the widow were left without any trustees, he supposed the business must necessarily be sold.

Mr. FLUX: That is not so, because she would be entitled to letters of administration as the widow, and so long as she carried on the business *quâ* administratrix she would be protected by force of the Act of Parliament. But from the moment that she ceased to carry it on *quâ* administratrix, and by any means became possessed of the business as her personal property, and thenceforward carried it on for her personal benefit, she would infringe the law.

Mr. SAVAGE said that seemed about the same thing.

Mr. FLUX: It is not the same thing, for although the law gives the widow a right to administration, it is only for the purpose of administration. If the deceased left children she is trustee of the business to the extent of two-thirds for the children. She has first to pay all the debts, and until that is done she is trustee for the creditors. From the moment that the debts are paid she is then trustee for the children, if there are any, to the extent of two-thirds. If there are no children, then she is trustee of a moiety for the next-of-kin. Then a day would come when she ceased to hold that position of trustee, but that day would only come by force of some act of her own terminating the position, or by force of some act of the children, or the other next-of-kin which brought about a settlement of the accounts, and thus terminated the administration by force of some contract then entered into, not by force of being the widow; the business then would change hands, and if by the change of hands she in her own capacity becomes the proprietress of the business she commits a breach of law.

Mr. OWEN: Is there any limit of time?

Mr. FLUX: No; it is a question of fact to be determined in every instance. I have known trusts continue for half a century.

Mr. SAVAGE: Suppose a man dies intestate?

Mr. FLUX: Then the widow is the first person entitled to administration.

Mr. BOTTLE asked whether clause 1 in the Act would override clause 16, the first stating that no person, not on the register, could carry on business; and clause 16 stating that nothing hereinbefore contained should extend to the executor of the deceased registered pharmaceutical chemist or chemist and druggist.

Mr. FLUX said that neither clause must be taken to override the other, but they were to be taken and read together. If read together they become consistent.

Mr. GREENISH said he thought they were not yet all quite clear with regard to the case of a widow, and it was very important they should be; for instance he should like to know whether—supposing anything happened to him, and he left his business to his wife for the support of the younger children—could she carry on the business, not being on the register?

Mr. FLUX: Certainly, so long as she does so in execution of the trusts of your will; but at the moment when she puts into her own pocket all the profit so made, and takes out of her pocket all the losses she may sustain, at that time she begins to break the law.

Mr. BROWN said this was a most interesting question to gentlemen who were married. Supposing he made a will simply leaving everything to his widow, and leaving her sole executrix. If he left no children she would have no trust to fulfil and therefore he presumed she could not carry on the business after his decease.

Mr. FLUX said he was clearly of opinion that Mr. Brown's widow would be in no better position than

another man's sister. Still in the abstract case put by Mr. Brown there would be a period during which the widow clearly would carry on the business *quâ* executrix, because she must have time to look around her, and see that all the debts were discharged. And even though she feel conscious that there was ample to pay her debts, yet as her first duty was to pay the debts of the deceased, no lawyer would hold, until that was done, and a fair period had been allowed for the purpose, that there was any breach of the law.

Mr. GREENISH said a man might have some children grown up, and some very young, who required a good deal to be spent on their education. Could his widow carry on the business for the education of those children?

Mr. FLUX: Certainly, because although every mother is bound, as every parent is, to maintain her offspring so long as that offspring requires maintaining, that being a distinct personal obligation created by the law of the land, and therefore if a widow is left with the business, as a widow or otherwise not distinctly charged with the trusts of maintaining the children, she is not a trustee, but a beneficiary; still, if the will said: I leave to her that business upon trust, that so long as any child of mine is an infant he shall share in the proceeds to a certain extent, or upon trust that the widow shall maintain that child, then there is an active trust, and the widow could carry it on *quâ* trustee, for the purposes of the trust, and the trust would be capable of being enforced.

Mr. BAYNES said he believed this matter had arisen out of certain questions which he had brought before the Parliamentary Committee, arising out of a case actually present to his own mind. He himself had no doubt of the power to leave trustees to carry on the business for the benefit of children, and the question put by him was in what form that business should be carried on. As he understood the answer was that it should be carried on in the names of the trustees. But beyond that there was this difficulty: that if the names of two or three, or more trustees appeared it would undoubtedly damage the business; with that however they had nothing to do, but simply to obey the law. In the particular case to which he referred he had suggested that the business should be carried on in the name of the deceased proprietor, only until this question could be settled. He understood now that that would not be legal, but that it must be carried on in the name of the trustees. He apprehended however in all cases there must be a duly qualified assistant to conduct the business.

Mr. FLUX: Certainly.

Mr. MACKAY said he had listened very attentively to all that had been said, and if he understood the matter thoroughly it was this, that the law had provided a certain mode of procedure in the event of a man dying leaving a trust to put the widow in a proper position; but supposing he died leaving a widow without children, and no deed of any kind, nothing except law gave her the power of administering to his effects, those effects consisting chiefly of the druggist's business. Was he right in understanding that that widow might for a time retain the business whilst she looked around her with a view to determining the best means of disposing of it; but that certainly she could not continue to carry on the business even with a qualified person?

Mr. FLUX said to the general question he should answer affirmatively, as he thought the lady would not carry on the business *quâ* widow, but that *quâ* widow she would exercise the right given to her by law by taking out letters of administration, and then *quâ* administratrix carry on the business for the purpose of the administration.

Mr. BROWN said whilst they were informed that a widow could carry on the business so long as she had trusts to fulfil, and that trust might exist for a definite period, there was no obligation to wind up the affairs of the trust within any specific time. He would put this case:—Supposing a widow left the absolute possession of the business (no trust to fulfil, except to take out letters of administration and to wind up the affairs in connection with the business), could she carry it on for any time beyond that necessary to wind up the affairs, get in the assets, and turn the business into cash?

Mr. FLUX: No.

Mr. BROWN asked if, supposing a man left no family, it would be sufficient to constitute a trust if he left a provision in his will that the trust should be to pay a guinea to the Pharmaceutical Society for 20 years, could the widow carry on that business in order to execute such a trust?

Mr. FLUX: I would ask you not to put me to a clear definition of a trust, because trusts are very multifarious, and it is impossible to say what does constitute in strictness a trust. There is a limitation with regard to trusts fixed by what is called the *Thellusson Act*, that is to say, that a trust can only continue for the life or lives of a person or persons in being, and twenty-one years afterwards; that is to say, during the life of any person existing at the date of the decease, and sufficiently long for that person to come of age. That, I believe, is quite sufficient for conducting the business of a chemist. You would meet the matter generally by making a will and associating another trustee with the widow. But then I apprehend trustees generally look a little to this, and do not like to incur personal liabilities. Most gentlemen who are trustees look forward with some anxiety to the day when their trusts shall end, because so long as they continue they are under a personal liability. However, any gentleman may be quite sure that so long as he can get a trustee, not a beneficiary, to *bonâ fide* carry on the business as his trustee, so long it can be continued.

Mr. BROWN: Then in the case of a widow left sole executrix with no trusts to fulfil, she would not be allowed to carry on the business for any definite period.

Mr. FLUX: No; but there would be no disposition on the part of anybody to strain the law against her. Allow me to add that it is an old saying with lawyers that hard cases make bad laws, and that though it might be desirable to extend mercy to widows, yet the general principle is for the benefit of chemists and druggists in general—that is to say, that no person shall by force of being appointed executor or administrator carry on a business for his or her personal benefit. That would give rise to no end of evasion of the law; and with respect to any hardship, it is no harder for chemists and druggists than for any other persons who have to get their daily bread by their personal qualifications. If you look to medical men, clergymen, or lawyers, in all these cases the personal qualification dies with these persons, and there is no such merciful provision in their case as is contained in the Pharmacy Act.

Mr. MACKAY said the whole might be summed up in this, that they could not remedy what they felt to be rather unfair without making a change in what it was quite evident was a very imperfect Act of Parliament.

Mr. GREENISH asked if it were the case that, supposing he left a wife sole executrix, with no children to educate until they attained the age of twenty-one years, must she then dispose of the business which might be her only means of support.

Mr. FLUX: Certainly, there is no difference between a widow and any other relation you might leave, your child or your grand-grandchild. In fact, if you once start with the personal exception there would be no limit to it. It might extend to uncles, cousins, and all other relations. Therefore, it stops short, and on the death of the deceased person all personal qualification ceases. From that moment no qualification exists except a representative one, and at the moment when that representative qualification ceases there is none at all.

Another letter from the Solicitor was read, with relation to the Adulteration of Food and Drugs Act, and the following resolution was unanimously carried:—

"That the Solicitor being present to advise the Council on a question of law, this Council do now resolve

itself into a committee for the purpose of communicating with him."

After a somewhat lengthy discussion in committee the Council meeting was resumed, and the following resolution was passed unanimously :—

"That the recent action of the analysts under the Adulteration of Food, Drink, and Drugs Act be referred to the Parliamentary Committee for consideration, and that they be instructed to watch any future proceedings."

PROVINCIAL EDUCATION.

The report of this Committee was read recommending that a grant of £15 be made to the Sheffield Pharmaceutical and Chemical Association. The report and recommendation were adopted.

SPECIAL.

The report of the "Special Committee appointed to consider the proposals of the Board of Examiners, in reference to the Preliminary and Prize Examinations, and the Jacob Bell Memorial Scholarships," was read, which stated that the Committee had came to the conclusion to recommend a reduction in the number of centres, and a list of towns was appended at which they proposed the Preliminary examinations should be held. Also that persons should be specially appointed to superintend the examinations who should be called "superintendents," and should receive a fee of one guinea for each examination ; such persons to be appointed by the Council. Also that a special room, suitable for the purpose, should be hired for each examination. The Committee also adopted the recommendation of the examiners with regard to the examination for the Pereira Medal and the Prize of Books ; but they recommended that the Jacob Bell Memorial Scholarships should be competed for in the country. They did not object to the recommendation of the examiners that medical Latin should be discontinued after 1874. Lastly, the Committee desired, if their recommendations should be adopted, that the subject should be again referred to them for consideration of the details.

Mr. HAMPSON said he supposed by adopting the report they would not be prevented from adding to the prescribed number of places, of which a list had been read.

Mr. SANDFORD said certainly not. They simply said that for the present the centres should be so-and-so.

Mr. WILLIAMS moved, and Mr. SANDFORD seconded :—

"That the report of the Special Committee appointed to consider the proposals of the Board of Examiners in reference to the Preliminary and Prize examinations, and the Jacob Bell Memorial Scholarships, be received and adopted, and that the matter be again referred to the Committee for arrangement of the details and to report to the Council at the January meeting."

Mr. FRAZER said he was very unwilling to trespass on the time of the Council again, but he felt so strongly on this question that he was obliged to do so, and he must propose an amendment as follows :—

"That believing it to be inexpedient and unwise to reduce the number of centres for conducting the Preliminary examinations, this Council whilst accepting the arrangements, recommended by the Special Committee, for holding the Bell and other Prize Examinations, are of opinion that the change in the method of conducting the preliminary examinations suggested by the Board of Examiners, and recommended by the Committee in their report, ought not to be adopted until it be shown that the regulations for the same, when duly given effect to, are insufficient to meet the necessities of the case."

His reason for bringing forward this amendment was the difficulty which had been experienced all over the country in getting assistants. He had been told that this was peculiar to Scotland, but since he had been in London that day he had received evidence that it had extended even there, and he knew that all over England the same thing was true. He maintained that this restriction of the number of centres would be a great step in the same direction, for the class of persons from whom their apprentices were taken could not afford to go these distances. He also objected to it as being a restriction on the mode in which they should carry on their trade. As he had already stated, he considered they were the custodians of the existing trade, and it was not for them to throw any obstacle in the way of its being carried on. He believed this to be a serious step in the wrong direction, which would bring about a reaction which all would regret. Besides that, it was indirectly, or rather directly censuring the local secretaries, whereas he maintained that up to the last there had not been any evidence brought before the Council to warrant such charges. They had heard of some cases being mentioned in committee, but the parties concerned, the local secretaries, had had no information from the Council, and were really condemned unheard. Further than that, he considered that the Board of Examiners were in a great measure answerable for the irregularities through having, no doubt out of kindness, not insisted upon the strict carrying out of the regulations which were made. He objected to these constant and revolutionary changes, and held that this was the most serious blunder the Council had committed since he entered it, and therefore he trusted the Council would refuse to accept it. He ventured to say most distinctly that they would have to get a class of men inferior to the present, unless another Act was brought in to compel them to conduct their business with men who had passed the examinations. He could assure the Council that at the present moment many gentlemen were conducting the business with porters, instead of getting apprentices. Whatever might be the ultimate prospect of the business, for the present he thought the proposed change would act injuriously on their constituents.

Mr. WILLIAMS thought it was a little irregular to hear the amendment moved before the mover of the resolution had had an opportunity of speaking to it, which he would now ask leave to do. They were really now acting under the advice of the Board of Examiners, and they would be taking a great responsibility if, when a certain course was recommended, evidence having been given to prove that that was a good course, they were to stand in the way of carrying it out. He thought they were bound to pay great attention to every suggestion made by the Examiners, and at any rate not to do anything to prevent them doing their work in an efficient and proper manner. Of course, under the present condition of things, where there were so many centres for examination, many of the superintendents who were appointed found it a great hardship to have to attend to them. The idea therefore had been entertained of reducing the number of the centres, and the Board of Examiners suggested that about thirty should be fixed upon, but the Committee had suggested about sixty, but they were not limited to that number. It would be most advantageous if they could afford to pay a small fee for the superintendence, and they would then be able to speak more authoritatively to the superintendents, and keep them to the strict performance of their duties. The idea was not to make these examinations more stringent or difficult, but simply that they should be fairly conducted, so that each candidate should stand upon an equal footing. Mr. Frazer's objection really seemed to be to examinations altogether, not to this or that system, and no doubt having any examination at all was disadvantageous in Scotland, and perhaps also in England, as far as regarded the getting of apprentices, but they had no option in that matter ; they were under an Act of Parliament. They were bound to examine, and to see that the examination was reasonable and just to all.

Mr. SANDFORD, in seconding the motion, said he need scarcely give his reasons at any length, having so often stated them. Mr. Frazer said no evidence had been laid

before the Council of the necessity for a change, but he admitted it had been brought before the Committee, and he therefore admitted its existence, although it had not been made public. For his own part he should have thought it better if these examinations were got rid of altogether, and in this view he was supported by a letter then on the table from Mr. Randall, of Southampton, who suggested that they should be handed over, as were those of the Science and Art Department, to examiners specially appointed. He had seen one of the examiners of Apothecaries' Hall, who told him that they continued these examinations, but instead of conducting them themselves appointed three masters of arts to do it. He thought men of that class would really be much better examiners for lads just coming from school than their own board. They did not want any technical knowledge, but simply proof that a boy was sufficiently educated to take advantage of the opportunity he would have of learning his business, without having to spend the time of his apprenticeship in learning the Latin grammar and such things. He was very glad to accept the compromise which had been suggested, and had prepared a map on which forty or fifty centres had been marked, which the Committee had since extended to about sixty-three; other important alterations in the regulations had also been made; one being that the examinations should no longer be held at the houses of the superintendents, but in rooms hired for the purpose. Another was that in each centre there should be two persons authorized to superintend, not both to be employed at the same time, but in the event of one being unable to attend, then the other should be called upon to act. There were many things in the regulations which must be made more stringent and explicit; he should be very sorry to see candidates sent back simply from some informality on the part of the superintendents. According to the proposed arrangements no young man would have to go more than about twenty-five miles to be examined, and if they could not do that, the next thing would be that they would have to send examiners round the country to every village where a boy resided who wanted to be a chemist and druggist. He did not think the change would tend to keep out educated men or bring in uneducated men, but, on the contrary, would tend to bring in a better educated class of men, and would ultimately much improve the business. He hoped therefore the proposition would be accepted.

Mr. URWICK seconded Mr. Frazer's amendment, though he was sorry to differ from gentlemen who had given so much consideration to this subject. Still he felt it a duty to oppose taking from the country a privilege which they had hitherto possessed and making a change which he saw no necessity for. He distinctly understood from Mr. Carteighe that he did not advocate a change up to that time in the Preliminary examination, and until some faults or failures were placed before them to demand a change, he thought it was a false step to take. He maintained that the local secretaries, as a body, had conducted these examinations as well as they were conducted in that house. It had been said that sometimes they had to leave the candidates in a room whilst they were filling up their papers, but he had seen the same thing occur in Bloomsbury Square. He agreed that the secretaries ought to be paid, and then they could be more justly required to attend to their duties, but he objected to any kind of centralization, and thought the more secretaries they had the stronger would be the ramification of the Society throughout the country, and the more intimate the tie which united them to London. It was said that the list of centres might be changed, and at the present time examinations were not held in all the towns where there are secretaries, and therefore he saw no necessity for the change. Besides this, the new system would very probably create jealousy amongst the secretaries who were omitted, and who perhaps had done as well in the past as those who were to be continued.

Mr. SCHACHT felt it necessary not to give a silent vote on this matter, lest it should be considered he had changed his views upon it. As far as the question of principle was concerned, his opinion remained the same as before. The principle alluded to by the last speaker consisted in centralization *versus* diffusion; but they were not adopting any principle of centralization, as a few facts and figures would show. According to the existing principle, they had about three hundred centres at which examinations were conducted, and that to a certain extent required persons to travel, for they did not all live in the towns where the examinations were held. According to the proposed scheme, there would be sixty-three centres, and there was also a provision that the Council might add any others as it was found necessary. It was therefore only an extension, or rather a contraction of the present system. Now, he found that out of the three hundred centres, taking the average of the last twelve examinations, there were twenty-four centres at which there was an average of three persons and upwards attending per examination; forty-six at which there were two individuals and upwards; ninety-four at which there was only one; fifty-nine at which there was about half a person for examination; seventy-nine even less than that, and thirty-two in which there was no examination held at all. Then when they came to meet the demand in any way at all, and to improve the existing state of things,—and he must conclude it to have been made out that faults had been committed, partly due to an imperfect system,—it was necessary to frame good regulations, which was a comparatively easy task, and next to see that they were enforced, which was not so easy, when you come to deal with three hundred centres. It could only be done by placing superintendents over them, who would be in some degree responsible to the Council. Now if a fee of only £1 1*s.* were to be paid to three hundred individuals four times a year that would be a very serious charge, and putting that beside the fact that in many cases they had gentlemen presiding over one candidate, they could not but arrive at the conclusion that it was a wise thing to diminish the number of centres, and so secure a more efficient superintendence on the part of those which remained, remunerating the person placed in charge. They did not advocate centralization, but simply lessening the number of centres which at present existed, and it must be remembered that all further details were to be considered by the Committee, for it was evident the scheme was as yet by no means perfect. For instance, he saw no reason why the regulations should not be printed at the head of the papers on which the candidates had to write, informing them that unless these regulations were fulfilled, their work would not be accepted. With regard to the Jacob Bell Memorial Scholarships, he rejoiced to find that the Committee had agreed to allow this to remain, at any rate, for the present, without change, thinking, no doubt, that if the proposed alteration in the mode of conducting the examination were adopted, the objections to it would cease. He therefore thought, on the whole, that by meeting the suggestions of the examiners, they would be serving the object which they all wished to serve, the perfect fairness and *bona fides* of the examination, and that the provinces also would find they really had their rights preserved.

Mr. MACKAY also supported the scheme recommended by the Committee for the reasons which had been already given. He went on to make some objections in detail to the scheme as at present constituted with regard to the Scotch centres, but on the understanding that this would be reconsidered by the Committee, said he would not make any motion on the subject. He felt very strongly the importance of the suggestion that the examinations should be conducted in rooms hired for the purpose, and not on the premises of the superintendent, knowing that in some cases the examinations had taken place in rooms quite unfit for the purpose.

Mr. Shaw also expressed his cordial approval of the resolution.

Mr. Radley also supported it, but suggested that some improvements might be made in the details.

Mr. Brown said he should support the resolution, on the understanding that the list of centres read was not strictly adhered to, without further consideration.

Mr. Williams remarked that it had been suggested, that in some cases there should be double, or rather alternate centres, where there were two large towns pretty near together, holding the examinations alternately at the one and the other.

Mr. Robbins thought that a very good suggestion.

The Vice-President said he felt himself somewhat in an anomalous position on this question, having had the honour of taking the chair at the Committee which recommended this scheme to the Council, and then having to express his dissent from the conclusions they had arrived at. Still he felt it his duty to exercise his own private judgment, and the conclusion he had come to was, that it was inexpedient and unwise to make the change now proposed. He grounded this on the fact that the day was fast approaching when they would be compelled to abandon these Preliminary examinations, and hand them over to other societies. He felt that before many years were past the certificates of the universities, of the College of Preceptors, and of other examining bodies, would be accepted rather than their own. And so far as his own county was concerned this arrangement was actually forced upon them almost by the present scheme. The Committee, on his recommendation, had selected Canterbury as the centre of the county, and no better place could be selected, but the local examinations of the universities were held in Dover, Ramsgate, Blackheath, and he believed also in Tunbridge Wells; therefore it would be far easier for lads to go to those places than to come to their own centre at Canterbury. He also felt that much of the complaint made against the conduct of the examinations by the local secretaries arose from the action of the officials in London, the local secretaries not being properly informed as to what was required of them, and in some cases more being required than there was any necessity for. For instance, he thought it quite uncalled for to require the initials of the superintendent to all the papers of the candidates, when he had already certified that a certain thing had been done in his presence, and had sealed up all the papers himself, and forwarded them. He doubted very much if the local secretaries whose services were proposed to be retained had conducted the examinations any better than the two hundred and sixty who were rejected, and feeling that in a short time they must make another change, he asked them to seriously consider whether it was not better to leave matters as they were at present.

The amendment was then put and lost, the voting being as follows :—

For—Messrs. Baynes, Bottle, Frazer, and Urwick.

Against—Messrs. Betty, Hampson, Hills, Mackay, Radley, Robbins, Sandford, Sutton, and Williams.

Messrs. Brown, Greenish, and Owen were present but did not vote.

The original motion was then put and carried, the voting being as follows :—

For—Messrs. Betty, Hampson, Hills, Mackay, Robbins, Sandford, Sutton, and Williams.

Against—Messrs. Baynes, Bottle, Frazer, and Urwick.

Messrs. Brown, Greenish, Owen, and Radley were present but did not vote.

Library.

Mr. Sandford proposed the following resolution, of which he had given notice :—

"That, in order to render the advantages of the Library of this institution more accessible to members of the Society residing in the country, the Librarian be authorized to pay the carriage one way of books borrowed by country members and associates in business, and to charge the same to the Society.

"That the period during which books may be retained by country members and associates in business be extended to three weeks.

"That a catalogue of the Library be sent to each member of the Society and associate in business."

He said it had been suggested to him by a country member, and he thought it would be only just and proper, that country members should have every possible facility afforded them for enjoying the advantages of the Library. He found from the Librarian that only thirty-eight persons in the country applied during last year for books, and only twenty-one of those made two applications. If the applications did not increase the expense would be very trifling indeed, but he would be glad to see it much greater, for he thought that by encouraging this kind of thing they would only be putting the Library to a proper purpose.

Mr. Mackay thought the suggestion a very good one, but doubted the desirability of sending a catalogue to every member, which he thought would be putting the Society to a great deal of unnecessary expense. In very many instances they would only be treated as waste paper; and he would, therefore, suggest that the catalogue should only be sent to those who applied for it.

Mr. Greenish seconded the motion. He said that the Library Committee were adding most valuable books to the Library every month, and he thought that every facility should be afforded to country members to procure what books they required.

Mr. Sutton also approved of the proposal, saying that gentlemen in the country found great difficulty in procuring technical books for reference without purchasing them, which was very expensive. He also suggested that it might be well if country members were allowed more than one book at a time.

Mr. Sandford thought these details might be left to the Committee.

Mr. Brown doubted the desirability of paying the carriage of the books one way, though he thoroughly agreed in the principle of giving every facility for lending the books in the Library to all the members.

The motion was then put and carried unanimously, the last Clause having been altered as follows :—

"That a catalogue of the Library be sent to each member of the Society and associate in business *on application*."

Report of Examinations.

November, 1873.

England and Wales.

Examinations.	Candidates. Examined.	Passed.	Failed
Major	4	3	1
Minor	77	39	38
	81	42	39

Certificate received in lieu of the Preliminary Examination :—

Apothecaries' Hall of Ireland... 1

PHARMACEUTICAL MEETING.

Wednesday, December 3, 1873.

Mr. Thomas Hyde Hills, President, in the Chair.

The minutes of the previous meeting having been read, the following donations to the Library and Museum were announced, and the thanks of the Society were awarded to the respective donors :—

'Medico-Chirurgical Transactions,' vol. 56, from the Royal Medical and Chirurgical Society; 'Principles and Practice of Medical Jurisprudence,' 2nd edition, from Dr. A. S. Taylor; Fresh specimens of *Eucalyptus globulus*, in blossom, from Mr. J. Fuller, of Cannes, France, late of Ealing; a new powder-folder, from Messrs. Lynch and Co.

The Eucalyptus Globulus.

Professor Bentley drew attention to a remarkably fine specimen of the *Eucalyptus globulus*, a plant which was at present exciting a great deal of interest. He said that a great many statements had been made with reference to

its medicinal properties, some of which were doubtless exaggerated, as was generally the case when any new substances were introduced; but he believed there could be no doubt, so far as extensive trials were concerned that it would be a useful antiperiodic. Whether as a tree it might be as serviceable as it had been stated to be in promoting the healthiness of a district would of course admit of considerable doubt. It was impossible to say at present whether the stories told in regard to it were fabulous, or whether there was in them a certain amount of truth mixed up with fiction. The whole genus from which the plant was got was an interesting one. It was not only used as a febrifuge, but any one holding up the leaves to the light would see that they were filled with transparent dots, and it was in those dots that the eucalyptus oil was contained, and this oil was largely imported and used extensively in perfumery. This and other species of the same genus also yielded Botany Bay kino, which was used as a substitute for ordinary kino. The plants of this genus were natives of Australia. Independently of its uses, the plant was interesting botanically, as giving an illustration of a particular kind of calyx that was rarely seen. The top of the calyx came off like a little cup, similar to what took place in the fruit of the henbane, which opened in this manner, instead of opening as most fruits did from above downwards, or from below upwards. A similar opening also occurred in the case of the common eschscholtzia of the garden, the yellow flower introduced some years ago from California. Another peculiarity in the flowers of the species of this genus was the absence of a corolla.

Mr. HANBURY remarked, that the eucalyptus tree was not only said to cure fever, but was more remarkable in that it rendered localities that were feverish habitable. He received a letter a few weeks ago from a botanist in the south of France, giving a marvellous account of the advantage it had been in the low-lying districts around the Mediterranean and especially Algeria, and stating that the marsh fevers had entirely disappeared from some localities. The tree grew with extraordinary rapidity. The timber seemed to be extremely durable when buried in the ground, and would therefore probably be useful for railway sleepers.

Professor REDWOOD would like to hear from Mr. Hanbury whether he thought it possible that a tree could have any influence, in malarious districts, in destroying marsh fever. A friend of his had told him quite recently that where these trees were grown they produced an effect in drying the air. Was it not more likely that the effect should arise from the diffusion of a large quantity of essential oil contained in the foliage.

The PRESIDENT suggested whether it might not be from the oxygen it gave off. Nothing was a better preventative of fever than pure oxygen.

Mr. HANBURY asked why the eucalyptus should give off more oxygen than any other tree. His information with regard to the beneficial effects of this plant came from M. Naudin, living in the south of France, who was a member of the Institute, and one of the most eminent of French botanists. He (Mr. Hanbury) showed M. Naudin's letter a few weeks ago to Dr. Weddell, who said that the tree acted like a great sponge, and drew the moisture out of the ground. With regard to there being a diffusion of essential oil, that was a much more puzzling question. It had not yet been solved how these essential oils were locked up in the vessels of plants. Persons might pass over ground covered with odorous trees like these and not perceive the faintest smell, and it was not until the plant was bruised that there was any diffusion of the oil.

Mr. PRESTON corroborated what Mr. Hanbury had said as to the effect of the eucalyptus tree in clearing the air from malaria, and said that a gentleman had written to the newspapers suggesting its introduction at Ashantee and along the Gold Coast. Those who spoke with considerable experience of the tree were of opinion that the effect mentioned was produced by the enormous roots it threw out, which drained the ground. He did not understand that it took the water from the atmosphere so much as drained the soil.

POWDER-FOLDER.

Mr. UMNEY said that he had been requested to bring before the notice of the meeting a new powder-folder, introduced by Messrs. Lynch and Co., of Aldersgate Street, E.C. One point in which it varied and had great advantages over the ordinary folder was that instead of being adjusted by a thumb-screw, one of the supports could be fitted into either of a series of grooves, by which the instrument could be reset exactly to any desired length. Another point also worthy of notice was that each of the grooves was numbered, so that at any time a dispenser could register the number by which a powder was folded in his prescription book.

GLYCERINE OF GALLIC ACID.

A note respecting Glycerine of Gallic Acid was read by Mr. Gale, which is printed on p. 441, and gave rise to the following discussion:—

Mr. M. CARTEIGHE said it had been shown that these solutions in glycerine were really best combined in medicine when mixed with water. Mr. Brady alluded to this subject at the Bradford Conference. It was now a well known fact that if a greatly astringent effect were required, it was far better to take glycerine of tannin, and mix it with water, than to take the original strong solution in glycerine. So far as he could understand from practitioners in medicine, these solutions had not proved so satisfactory as they could have wished, due to the fact not generally known, that they required to be mixed with water before use. In cases of serious hæmorrhage, crystals of perchloride of iron had been dissolved in glycerine, and applied to the affected part without useful effect; but when the solution in glycerine was diluted with water, and applied to the part, it was at once effective.

Mr. MARTINDALE said he had sometimes noticed a similar occurrence to that mentioned by Mr. Gale with glycerine and gallic acid alone, the gallic acid crystallizing out of the glycerine when the temperature was much below normal.

Mr. CANDY said he had noticed in the case of carbolic acid in glycerine that the glycerine seemed to neutralize the carbolic acid. Certainly a solution in water was more caustic than when the carbolic acid was dissolved in glycerine.

Professor REDWOOD asked Mr. Gale whether he had made any experiment to indicate what the proportion of water would be.

Mr. GALE said that three times the quantity of water separated the crystals. He had tried the experiment with arsenious, boracic, and benzoic acids, and he found that benzoic acid acted in a similar manner, but the others did not.

GAS FURNACE.

Professor REDWOOD said he had been requested by Mr. Fletcher, of Warrington, to bring to the notice of the Society a gas furnace, which was well adapted for pharmaceutical purposes. The object of the furnace was to enable the operator to regulate the heat, so that it could be very slight or very intense, diffused over a large surface or concentrated, as might be required. It was an inexpensive gas furnace, which admitted of a number of useful applications. Mr. Fletcher seemed to imagine that it answered the purpose even of a drying closet, on a small scale.

A NEW SOLVENT FOR PHOSPHORUS.

A paper by Mr. A. W. Gerrard, describing "A New Solvent for Phosphorus; its Preparation and Pharmaceutical Use" was next, and gave rise to the following discussion. The paper is printed on p. 441.

The PRESIDENT said they were much obliged to Mr.

Gerrard for bringing this subject forward. It was very difficult to manipulate phosphorus for medicinal use. Mr. Gerrard had not only the advantage of making this preparation, but of hearing what medical men said, and they seemed to approve of it.

Mr. GERRARD added that he had asked medical men what was their experience of its therapeutical effects, and they had told him that it was equal to anything that had been previously dispensed.

Mr. GREENISH mentioned that Mr. Gerrard had put into his hands some of the phosphoretted resin a day or two before, upon which he had made several experiments, with the object of obtaining from it a preparation in a liquid form; he found that, mixed with mucilage, it gave a deposit after a time. If the resin were dissolved in chloroform, and the proportion of spirit required to make it spirit of chloroform added, a more satisfactory result was obtained. A little orange-flower water mixed with the solution concealed the taste of the phosphorus. He should prefer some method of sending out phosphorus in mixture rather than in pills. Mr. Greenish asked Mr. Gerrard whether his attention had been directed to a phosphorus pill which had been brought out, and which appeared to be prepared from some kind of resin.

Mr. GERRARD said that he had experimented on samples of the pills to which he supposed Mr. Greenish referred. He had placed one of them, as well as a pill prepared according to his own formula, to digest in a ten per cent. solution of hydrochloric acid. The latter, as might be expected from the quantity of sugar it contained, commenced to dissolve immediately, but the former was quite unacted upon at the end of twenty-four hours.

Mr. MARTINDALE thought Mr. Gerrard's form of making the preparation would be very useful. There were two or three preparations of phosphorus before the public at the present time worthy of note, especially those phosphorus pearls which contained about $\frac{1}{30}$ grain of phosphorus, and were coated with gelatine. These seemed to be most agreeable to the patient, because they had no smell of phosphorus at all, and they were, as a rule, very efficacious. It had been stated by a writer in the *Practitioner* that one grain of phosphorus was soluble in three fluid drachms of alcohol; this was true, so long as heat was applied, but when the alcohol became cold, it deposited nearly the whole of it—at least three-fourths were deposited. Such statements about its solubility would make the dose very different from what might be expected.

Professor ATTFIELD asked in what state the phosphorus existed in the resin—whether Mr. Gerrard had made any experiments with the view of getting the phosphorus back—whether the phosphorus was in a state of solution, or whether chemically combined? These were points which must be therapeutically as well as chemically interesting. As some present had inquired for a fluid preparation containing phosphorus it might be worth the while of those who were interested in these researches to try those bodies which were produced when phosphoric anhydride was made to act on the aldehydes found in many essential oils. A sort of resin and phosphoretted oil was said to be obtained in that way which would no doubt be soluble in alcohol, and which might be made into emulsion.

Mr. GERRARD thought that phosphorus was objectionable in the form of a mixture which would not keep after being made a day or two. Under the changes of composition a patient might on the third day take a dose not more than one-tenth part of that of the first day. If a little of the resin were taken and rubbed between the fingers it would be found that the phosphorus was evolved. He was inclined to think that if treated with alcohol, the alcohol would remove the resin, and the phosphorus would separate.

Mr. BLAND said, he had had an opportunity of examining one of the pills made by Mr. Gerrard, although he did not know exactly how long it had been made; but having burnt it, it was quite evident that the phosphorus existed in the pills in an uncombined state. He should judge, however, that it was rather a mechanical mixture than a chemical solution.

Mr. WILLIAMS said that what medical men wanted and were seeking for was phosphorus in the active state, or lower condition of oxidation. He had made large quantities of hypophosphites, and had lately turned his attention to phosphites. He had been gratified in discovering solid phosphorous acid, and had now got it in crystals, and a beautiful body it was. It was probably the terhydride of phosphoric acid, and he believed the phosphites would prove valuable salts for the use of the medical man, because the phosphorus was contained in the half oxidized or probably more active condition.

Mr. GREENISH said he forgot to mention that one tablespoonful of such a mixture as he had prepared and submitted to the meeting contained about one-twentieth of a grain, which should be a dose. He rubbed down some of the resin, and examined it under the strongest power of a microscope, and there were no indications of the presence of undissolved phosphorus.

A vote of thanks was given to Mr. Gerrard for his paper.

ADULTERATED DRUGS.

Mr. UMNEY said: I should like to call the attention of this meeting, and also of the whole trade, to a most important matter, which presented itself to me with additional force upon reading an article in the PHARMACEUTICAL JOURNAL, Nov. 8th, by Mr. E. A. Cook, entitled "Some Practices of the Trade which it would benefit the Profession to abandon." I cannot endorse all Mr. Cook there states, for from my own experience I know that, at any rate, as far as London is concerned, the same state of things does not wholly exist as he has described at Liverpool. *Still*, I do believe, and I say so with regret, that at the present time *undue value* is attached to the price at which drugs, chemicals, or pharmaceutical preparations can be purchased, rather than to their degree of purity when judged by the British Pharmacopœia or other standard works. Upon citrate of iron and quinine, instanced by Mr. Cook, there can be but one opinion. When made of any other strength than that of the British Pharmacopœia, it can only be with one object in view, and can only be called by one name—*deception*. I will not say that all manufacturers deceive their customers; *on the contrary*, some who are forced into the sale of such preparations by the demand from the trade affix labels stating the strength. But is it to be supposed that when the salt passes into the hands of the public that the same is represented to the consumer? Surely the time has now come, when manufacturers should decline to make, and druggists refuse to purchase this and any preparation which is its parallel. With opium, jalap, etc., instanced by Mr. Cook, I am afraid there is greater difficulty. A very simple method, however, and one which would at once strike at the very root of the evil, would be the appointment of an inspector of drugs in *bond*. We should then hear little of opium without alkaloid, and jalap with 2 per cent of resin.

Mr. HANBURY asked whether the jalap which was now being imported in such prodigious quantities, and which appeared to be unusually large and fine, was commonly defective in resin.

Mr. UMNEY believed that some of the jalap lately imported was of the finest quality, as far as resin was concerned, ever imported into the country. He had seen some of the tubercules containing probably 12 per cent.; they were however either imperfectly dried or slightly water-damaged.

Mr. WILLIAMS remarked that this was a most important question. It was perfectly notorious that these things were made of various strengths and qualities, according to price, and the ethical question was whether it was permissible for the manufacturer to do so, provided always he used genuine articles and stated distinctly on the label what the strength was. His opinion was that the manufacturer was perfectly justified in doing that; but if, as

Mr. Umney had hinted, the label might be removed that was no fraud on the part of the manufacturer, but of the person who removed it. If manufacturers were convinced that it was wrong to make a lower quality article they would cease to do it, but in the present state of the trade there was little chance of their doing it. As an individual he should be glad to give up the manufacture of lower qualities of citrate of iron and quinine, but at present he did not see his way to adopting that course. Only that morning he received from the country an offer for the lower qualities of citrate of iron, amorphus quinine, and strychnia, to be labelled *pure* citrate of iron, quinine, and strychnia, but his firm had refused to entertain the offer. The question of putting on a false label was one that he could not think of entertaining.

Professor ATTFIELD thought the suggestion of Mr. Umney, that there should be appointed an inspector of drugs in bond, was most important. During the past few months he had been pained to find that chemists and druggists in this country, after 25 years of public effort to improve the character of drugs, should be liable to be brought up in a common police court for selling adulterated articles. They had been trying by means of combination in this Society, and in other ways, to produce a right state of feeling amongst pharmacists with regard to the purity of drugs. This Society had scarcely ever held a meeting in which some paper or proposition had not been brought forward regarding some better method of manufacturing an article which had seemed to be weak in active principle, or some process by which possible adulterations might be exposed. Within the last ten years the British Pharmaceutical Conference, numbering about 2000 gentlemen, had united themselves under a certain code of rules, one of which was to "maintain uncompromisingly the principle of purity in medicines;" and after all this effort to produce pure medicines it seemed hard that they were liable to be prosecuted indiscriminately for adulteration. From what had recently taken place it was possible they would no longer be under that ban. It had been ruled, or at least a strong opinion had been given by an important personage, that druggists were scarcely liable under the Adulteration Act, except for drugs, and drugs had been held to be simple dry raw materials. But however that might be—and he would not then further allude to that matter—it was just in regard to raw material that pharmacists had the minimum of control. It was true pressure could be put upon the producers of articles abroad, but that was a slow process. If, however, an inspector of drugs in bond existed there would be a guarantee to the manufacturer or manipulator of these raw materials that the articles which might come into his hands were at least what the heads of the profession in this country through their Pharmacopœia had indicated that the respective substances should be.

Professor REDWOOD said it was desirable that these proceedings should not be reported to the effect that anything that had recently passed would exonerate chemists and druggists from the application of the Adulteration Act in reference to other substances than drugs. Every gentleman who would take the pains to look at the Pharmacy Act would see that every pharmacist was liable under the Adulteration Act, and that all the pains and penalties of that Act applied to him, if he sold any article of any description used in medicine that was found to be adulterated. The law was as clear as it was possible for any law to be, but the attention of the magistrate the other day was not directed to that particular point. Dr. Attfield had referred to the exertions which had been made for a long series of years to improve the state of pharmacy in this country, especially with regard to the supply of pure drugs, and it appeared to him (Dr. Redwood) that in proportion mainly as these objects could be efficiently carried out, the body of pharmaceutical chemists would rise in the estimation of the medical profession first, and ultimately in that of the public at large. They therefore saw the importance of attention being directed to this subject, and he felt grateful to Mr. Umney for having brought it under the attention of the meeting. He agreed to a great extent with Mr. Williams, in considering that they must not attempt to shackle the manufacturer too much in the production of various substances used in medicines—substances varying in composition and in the mode of production from those which were generally recognized by the names under which they were sold. But in reference to such an article, for instance, as sweet spirit of nitre, which had been used for ages and for various purposes by the public, he thought that some variation of the strength and quality might be excused to a large extent. But there were medicines which were far more important. He looked upon citrate of iron and quinine as a sort of sheet anchor to the physician, and he would class it almost with laudanum and prussic acid. The pharmacist ought to know exactly what the composition was, for as much evil might result from the use of a great variety of preparations of that description, all sold under the name of citrate of iron and quinine, as from tincture of opium being sold of all possible strengths.

Mr. GREENISH said that the importers of drugs were not the only sinners, for a few days ago he received a letter from abroad stating that large quantities of muriate of cinchonine had been sent out there in ounce bottles, labelled as quinine.

Mr. PRESTON thought it was only education that would bring about that higher state of feeling in the mind of men, which would ultimately lead them not to manufacture or sell articles of an inferior description. Professor Redwood had referred to the Adulteration Act, but one of the questions they wanted to have settled was what adulteration was. As spirit of nitre had been referred to, he might say that the question which lately arose was whether the spirit of nitre which was sold, and which was actually made according to the British Pharmacopœia, was an adulterated article or not, because it did not stand the test laid down in the British Pharmacopœia. That question was not brought before the magistrate. He (Mr. Preston) contended that even if it did not stand the test there was no adulteration. There was no doubt whatever that in this trade, as in others, there were frequently subterfuges, which could not be recognized as right by right-minded men. He should be glad if the Pharmaceutical Society would take up this question, and if it were possible to get an inspector of drugs in bond appointed, he believed it would be exceedingly desirable; at the same time there were great difficulties in the way. As Mr. Gladstone had pointed out, there was great difficulty even in appointing an inspector for the inspection of tea.

The PRESIDENT reminded the meeting that the Council had not forgotten this important subject, which had been before them that day in committee, and was referred to the Parliamentary Committee.

Mr. UMNEY said that the spirit of nitrous ether of the British Pharmacopœia could be made so as to stand the chloride of calcium test there given. By using the proportions prescribed in the British Pharmacopœia, and operating upon the quantity therein mentioned, a product could be obtained which would answer the Pharmacopœia test in every way. But when operating upon a large scale it was somewhat different. It was very difficult to condense all the nitrous ether, and the specified proportion of 10 per cent. was not present in the product if all the spirit ordered were added. But it would be remembered that the Pharmacopœia directions were very elastic on this point, namely, to mix "two pints of the rectified spirit, or as much as will make the product correspond to the tests of specific gravity and percentage of ether separated by the chloride of calcium." He had found that, if instead of adding the whole of the spirit (two pints) he had added it in proportion of one pint fifteen ounces, he could obtain, even when manufacturing large quantities, a product that would answer to the tests. He had also found that by redistilling the spirit of nitrous ether from an acid carbonated alkali, a beautiful colour

less product, was obtained, while a coloured residue was left behind the nature of which he had not yet investigated.

The PRESIDENT thought it was the most unstable and unsatisfactory preparation with which they had to deal.

Mr. PRESTON said his point was that it would not keep, and not that it could not be made according to the Pharmacopœia. He could produce evidence to prove that nitrous ether gradually lost its strength, and if kept in a bottle which was opened from time to time the nitrous ether would almost entirely disappear.

The PRESIDENT said that since this question had come before the magistrate he had consulted two physicians, fellows of the College, and one of them said it was the most unsatisfactory thing he ever had to deal with. It did not answer the purpose for which it was supposed to be given, and he would much rather give the spirit of chloroform, which answered very much better, and was a definite compound. He (the President) asked him whether he would give that opinion in evidence before a court of law in case it was wanted, and he said he would rather not, preferring that that should be done by one older than himself. He (the President) then went to another fellow of the College of Physicians and a member of the Medical Council, and he told him the same, and that he was ready to give testimony to that effect at any time, and that he never prescribed it. But so long as the public would have it, it was important to make it in the best possible way.

The PRESIDENT announced that the next meeting will be held on February 4th.

Parliamentary and Law Proceedings.

BLOOMSBURY COUNTY COURT,
December 4th, 1873,
Before G. L. Russell, Esq., Judge.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* PLANT.

The defendant was sued for a penalty of Five pounds incurred by him under the 15th section of the Pharmacy Act, 1868, in selling or keeping open shop for the retailing, dispensing, or compounding poisons, or a poison, not being duly registered.

Mr. Flux represented the plantiffs.

The defendant did not appear.

The Register was produced, and it was shown that the defendant's name did not appear therein.

Mr. Ward, clerk to Messrs. Flux and Co., proved that on the 12th day of August last he attended at the defendant's shop, No. 1, Frankfort Terrace, Harrow Road, and presented a prescription for a compound in which hydrocyanic acid was an ingredient, that the prescription was dispensed by the defendant's assistant in the defendant's presence, and that he paid 1*s.* 6*d.* for it, and on the following morning delivered the bottle containing the medicine to Dr. Redwood at the house of the Pharmaceutical Society.

Dr. Theophilus Redwood, Professor of Chemistry to the Pharmaceutical Society, proved that he received the bottle (which he produced) as deposed to by the former witness, and that he analysed a portion of its contents and found the same to contain hydrocyanic acid, namely, prussic acid—a poison in the schedule to the Pharmacy Act, 1868.

The judge gave a verdict for the £5 penalty, with costs, including attorney's fee and cost of witnesses.

PROSECUTION UNDER THE ADULTERATION ACT.

ALLEGED ADULTERATION OF SPIRIT OF NITROUS ETHER.

Westminster Police Court.

On Saturday, the 29th November, a surgeon and several chemists and druggists were summoned before Mr. Arnold under the Adulteration Act, charged with selling adulterated spirit of nitrous ether. The proceedings seemed to excite a considerable amount of interest, the small and inconvenient court being densely crowded during the hearing.

The summons against Mr. W. S. Saxby came first in order, but that gentleman was not in attendance at the moment.

Mr. Rogers, who appeared for the District Board of Works, said he had some other summonses, and he might therefore proceed with the next.

Mr. E. Draper said he believed there was some little misunderstanding with regard to some of these summonses. He was instructed in one case, and he understood that Mr. Poland was also instructed to appear for some of the defendants. He believed Mr. Poland was desirous that the case should be postponed, on account of his being engaged at Bow Street on behalf of the Government.

Mr. Arnold said he would go on with any case that was ready.

Mr. St. John Wontner said he was quite ready to go on with the case against Mr. Fenton.

Mr. Flux: I have been instructed on behalf of the Pharmaceutical Society of Great Britain to attend and watch these cases. They appear to involve an important question of principle, and if you will permit me, in due course, I think I can show upon the Acts of Parliament that, as regards the proceedings in this case——

Mr. Arnold: Do you appear for either of the parties?

Mr. Flux: No, sir, I appear for the Pharmaceutical Society to watch the cases.

Mr. Arnold: You may watch if you like, but you will have no right to address me.

Mr. Flux: I could only do so by the indulgence of your Honour.

Mr. Arnold: I could not do that. I cannot hear you; you have no *locus standi* at all.

The summons against Mr. George Fenton, a surgeon keeping a druggist's shop in Great Smith Street, Westminster, was then proceeded with.

Mr. Arnold: What section is this under?

Mr. Rogers: This will be under the second and third sections of the Adulteration Act.

Mr. Wontner: We are not summoned under the third.

Mr. Rogers: It is under the second section. I appear on behalf of the Board of Works in this case. The article was purchased by Mr. Williams, the Inspector, on the 12th of November, 1873. I will call the Inspector at once, and he will state the facts of the case to you.

Mr. Draper: I have to make an application in one of these cases to your worship which seems to me of very great importance. There are four summonses for precisely the same alleged offence. It might happen that after three of the cases have been tried, and the defendants convicted, Mr. Poland's acuteness might bring out a point on which we might all have got off, and I should therefore ask your worship if one case is to be adjourned for Mr. Poland's attendance, that ours may be adjourned also.

Mr. Arnold: I have not adjourned any case yet.

Mr. Draper: I understood there was a case adjourned.

Mr. Arnold: No. Mr. Saxby's case was called, but the party is not here, and I am taking another case. The summons is not adjourned.

Mr. Owen Williams was then sworn and examined by Mr. Rogers as follows:—

You are one of the Inspectors appointed by the Board under the Adulteration of Food and Drugs Act?—Yes.

Did you on the 12th November, 1873, purchase of Mr. Fenton, of Smith Street, some sweet spirits of nitre?—I did.

What did you ask for?—I went into the shop——

Mr. Arnold: What shop?—Into Mr. Fenton's shop, 28, Great Smith Street.

What sort of a shop is it?—A chemist and druggist's shop.

Mr. Rogers: What did you ask for?—I asked for four ounces of sweet spirits of nitre.

State to the magistrate what followed.—It was handed over to me, and then I told the assistant——

Mr. Wontner: What was handed to you? Show us what was handed.—The spirits of nitre was handed to me; at least, it was put into a bottle.

Mr. Arnold: Is spirits of nitre and sweet spirits of nitre the same thing?—I believe so.

Mr. Wontner: It is spirit of nitrous ether, according to the summons.

Mr. Arnold: The summons says spirit of nitrous ether. I do not know whether that is the same thing or not; do you know?

Mr. Rogers: Dr. Dupré will be able to give you further information as to the identity of the articles.

Mr. Arnold: You asked for sweet spirits of nitre, and it was handed to you in a bottle.

Mr. Rogers: What did you say?—When I received it, I told the assistant to give my compliments to Mr. Fenton, and say I had procured this for the purpose of having it analysed, and I mentioned my name.

Did he say anything to you?—He said he believed it was pure; he had every faith in it, that they had it from a first-rate maker.

What did you do with it when you received it?—I took it over to the office. This was the day before I had to send it over to Dr. Dupré.

Mr. Arnold: Where is the office?—Exactly opposite the office of the Board of Works. I put that label on.

You placed that label on the bottle?—Yes. I am not certain. I believe there is a label underneath this, but to prevent the name being known to Dr. Dupré, I put our own label on.

Mr. Rogers: To conceal the name of the person from whom you bought it?—Yes. I am not certain, but I think there is a label under it.

Did you take that to Dr. Dupré?—I locked it up until the following day.

Mr. Arnold: This rather looks as if another label had been removed.—I believe there is another label under that.

I do not think there is any other label under.—I will not be certain about that.

Mr. Rogers: Did you take it to the analyst?—I locked it up, and the following morning I gave the bottle to the analyst. He took a portion from the bottle.

Did you see him?—Yes. After he had taken what he wanted, he sealed it up, and initialled it. I have had it in my possession ever since.

Mr. Rogers: You took that in the same condition to the analyst in which you received it from Mr. Fenton?—Yes.

Was it marked in any way?—Marked No. 1.

Mr. Arnold: That is on your label?—Yes.

Mr. Rogers: Did you see it?—That was marked No. 1 in my presence.

Did you receive a certificate from Dr. Dupré?—I did; it was sent me.

Mr. Arnold: How did you receive it?—I received it from the inspector of St. Margaret's, Knightsbridge. He was ordered to go to Dr. Dupré's and he brought the whole of the reports.

Mr. Rogers: He is another inspector appointed by the Board. Dr. Dupré always signs his certificates in the presence of one of the inspectors. This is the one who attended Dr. Dupré when he signed the certificate.

Mr. Arnold: The certificate is made evidence, is it?

Mr. Rogers: It has been held by Mr. Woolrych that the certificate is not evidence where the Board is the prosecuting party. In cases where the private individual purchases an article, in that case the certificate is evidence, but where the Board is the prosecuting party, there the certificate is not evidence, and the analyst must be called as a witness to prove it.

Mr. Wontner: There is nothing in the Act of Parliament to prove that.

Mr. Rogers: I am only stating what has been held by the court here. You will find it referred to in the 9th section.

Mr. Arnold: I suppose Mr. Woolrych thinks the whole of that clause ought to be read together, that it applies only to the case where a private purchaser has an article analysed.

Mr. Rogers: That is Mr. Woolryeh's opinion, and therefore Dr. Dupré is in attendance to-day.

Mr. Wontner: We should have subpœned him if you had not.

Mr. Arnold: I suppose this man is a purchaser, is he not?

Mr. Rogers: No doubt.

Mr. Arnold: He has not said so.

Mr. Rogers: I asked the question of Mr. Williams, Did he purchase? He said he asked for 4 oz. of spirits of nitre, which he purchased.

Mr. Arnold: I have not got down that he said he paid for it.

The Witness: I paid for it.

Mr. Rogers: What did you pay?—I paid 1*s.* 4*d.* for the nitre and a penny for the bottle.

After obtaining the certificate you applied for the summons?—Yes.

Cross-Examined by Mr. Wontner.

You went by Dr. Dupré's instructions?—I did.

Did you ask for the sweet spirits of nitre?—I asked for sweet nitre, I believe.

Mr. Arnold: You said before you asked for sweet spirits of nitre.

Mr. Wontner: I should like to know which it was?—I will not be certain whether it was sweet spirits of nitre or whether it was sweet nitre; it is one and the same thing.

Whatever you asked for, or, at any rate, whatever was given to you, was given to you in the bottle you have there?—Yes.

Let me look at the bottle [handed to the learned gentleman]. It says "sweet nitre" on the label. Whose writing is that?—That is mine.

You covered the label over that was on it. Do you remember what was written on the label?—Mr. Fenton's name was there—that was the reason I removed it, and "sweet nitre" was written on it.

Sweet nitre, or sweet spirits of nitre?—I believe it was sweet nitre, I wrote it exactly as it was there.

Mr. Arnold: You copied it?—Yes.

Mr. Wontner: Not spirit of nitrous ether?—No, spirits of nitre, that was what I asked for.

How long was it before you sealed up the bottle?—Immediately afterwards, not ten minutes after I left Mr. Fenton's shop.

Do you mean immediately after you left the shop, or immediately after the analyst took some out?—I sealed it up at the office.

That is opposite defendant's shop?—Yes.

Mr. Arnold: I must say you are not very exact. You never said you sealed the bottle until after you had given Dr. Dupré a portion of it?—I took it to the office and sealed it up.

You did not say so?—But I did.

What you said was, that you locked it up, that the next morning you took it to the analyst, and gave him the bottle to take a portion from it, and then he sealed it up.—I sealed it up.

When did you seal it up?—At the office.

Before you locked it up?—Yes.

You never stated that before?—It was in the presence of one of the clerks.

Mr. Wontner: Why did you not seal it up in the presence of the assistant who served it to you?—In the presence of the assistant!

Is not it usual under the Act?—The assistant could have done that himself.

Is it not usual that a person in your position should

seal up the article in the presence of the party who is to be charged with adulteration?—If they require it.

Not unless they state their requirements, you would not do it of your own accord?—If I thought there was any doubt about it I should decidedly.

You personally know nothing about the merits of this case?—No, I merely handed it over to the analyst.

(*Dr. Dupré sworn. Examined by Mr. Rogers.*)

Your name is August Dupré, and you are the analyst appointed by the Board of Works, under the Adulteration of Food Act?—I am.

Did you on the 13th of November, 1873, receive from Owen Williams, the inspector, a sample of spirits of nitre?

Mr. Wontner:—What did he receive?—You call it spirits of nitre, but we are summoned for spirit of nitrous ether.

Mr. Rogers: Well, spirit of nitrous ether, then.

Mr. Wontner: It is not that which was sold to him.

Dr. Dupré: I believe I received it on the 14th, if I am not mistaken.

Mr. Arnold: On the 14th, was it?

Mr. Rogers: Yes, sir, on the 14th.

Mr. Arnold: Mr. Williams certainly said he bought it on the 12th, and on the following morning handed it to Dr. Dupré.

Mr. Rogers: That was my mistake, sir.

Mr. Arnold: It is what Mr. Williams said, at any rate.

Mr. Rogers: It is in the certificate of the analyst as being received on the 14th. There must be a mistake somewhere, either in Dr. Dupré's certificate or Mr. Williams'.

Mr. Arnold: Do you recollect the day of the week?—It would be on my certificate; I cannot now remember.

Do you recollect the day of the week when you received it?—It is some weeks ago now. I believe it was on the Thursday—I really do not remember. But here in the certificate it is the 14th.

Mr. Wontner: The date really is not material. There is a very much larger question involved in this than a matter of date.

Mr. Arnold: Just so; only it is just as well to be accurate.

Mr. Rogers: What took place next?—He handed to me this bottle, with the label on it, which is on at present. I put on my initials, and the date, November 14th, is on the bottle.

Mr. Arnold: That is the 14th, is it?—Yes, it is the 14th.

That is in your writing?—Yes, I took out a part of it to analyse. I then put a label over the cork with my initials on, and tied it over, and then Mr. Williams sealed it in my presence as it is at present.

Mr. Rogers: Did you analyse that portion?—I analysed it and wrote out a certificate.

Is that your certificate? [Handing a document to the witness.]—That is my certificate.

What was the result?—The result was that it was considerably adulterated with spirit—ordinary spirit—and to a slight extent also with water.

Cross-Examined by Mr. Wontner.

To what extent was it adulterated with water, Dr. Dupré?—Well, I think about 10 per cent.

Ten per cent?—Something like that; it is not possible to say within——

Does your certificate state that?

Mr. Arnold: I thought you said it was not evidence.

Mr. Rogers: No, but I bring it in as evidence by Dr. Dupré,

Mr. Arnold: If it is not evidence it does not become more evidence by his producing it.

Mr. Rogers: Dr. Dupré is here, and I have also handed up his certificate.

Mr. Arnold: If he is here he should state *viva voce* what is the amount. If it has been held that it is not evidence, it cannot be evidence at all.

Mr. Rogers: Dr. Dupré will be able to state that exactly.

Mr. Arnold: 10 per cent. of water; but he says it is not possible to say exactly.

Mr. Wontner: Give me the certificate please. Did you make a note at the time of your analysis?—Certainly.

Have you the note with you?—No.

Why not?—I did not think it necessary.

Did the note state how much water there was?—The note only gives the result of the analysis.

I suppose the result of the analysis would be to give the relative quantities?—No, it simply states the facts.

Do you mean that the note would simply give what is placed in the summons, and what is put upon the certificate, that it is largely adulterated with spirit, and to a small extent with water?—Neither.

It does not state that?—No.

Does it state the relative quantities of water and of spirit, and the relative quantity of nitrous ether?—No, it simply gives the analysis.

Mr. Arnold: Did you not state the relative quantities of ordinary spirit and of water?—No.

You, Dr. Dupré, are not a doctor of medicine?—No.

Are you a pharmaceutical chemist?—No.

You are a pure chemist?—Yes.

Have you an English degree?—No; a German degree.

Tell me the quantity of water you found. Was that in excess of the quantity you would expect to find from evaporation after the spirit had been kept for four or five months?—Certainly.

It was?—Yes. At least, I am assuming it was moderately well kept. I cannot answer if a man leaves the bottle for six months perfectly open, or puts it into a dish or anything of that kind. I am assuming that it is moderately well kept.

Mr. Arnold: In a bottle?—Yes.

Mr. Wontner: The idea, then, that you formed was that water had been added?—Yes.

That this was not the result of evaporation, but that water had been added to it?—Decidedly.

You cannot tell me in what quantity?—No, not exactly.

You will not pledge yourself that there was more than 5 per cent.?—Well, I should say, yes.

Would you pledge yourself positively to that, that there was more than 5 per cent.?—As I said before, assuming that it was moderately well kept, there was more than 5 per cent.—there was 10.

Mr. Arnold: Whether it was well kept or ill kept, it would not make any difference in what you found?—No, but it makes a difference in my interpretation of it.

What you are asked is, whether you will pledge yourself that there was more than 5 per cent. of water?—I pledge myself there was 10 per cent.

Mr. Wontner: You said you could not tell exactly.—I said I did not know that 10 per cent. was added.

Mr. Arnold: I understood you to say that you thought there was 10 per cent. of water, but it was not possible to give it so exactly?—There may be 11. But allow me to explain. The difference is, I cannot pledge myself that 10 per cent. was added, but I will pledge myself that 10 per cent. was present.

Mr. Wontner: You mean that 10 per cent. was the minimum. I should like to know how much it is. I do not much care, if you will tell me?—It is not really possible to pledge oneself.

Is it possible to say there was more than 5 per cent.?—Yes.

Well, if we run up the scale, you will be able to stop me?—If you will allow me to look——

Can you tell me what was the specific gravity of the whole?—Certainly. The specific gravity of the whole was ·867.

Will you pledge yourself professionally to the fact of its being more than ·853 ?—Certainly.

Would ·850 be about proper ?—·845 would be the proper specific gravity.

It is the Pharmacopœia you go by ?—Yes.

I may as well ask you is the Pharmacopœia the standard by which you go ?—Certainly.

And is it by the Pharmacopœia that you alleged this to be an adulteration ?—Yes.

You took that as your standard in judging what this should be ?—Yes.

I presume when you say the Pharmacopœia you mean the British Pharmacopœia, not the London ?—Yes, the British.

Not the Edinburgh ?—No, the British.

You know that there are London Pharmacopœias ?—Yes.

And Pharmacopœias of Dublin and of Edinburgh ?—Yes.

Do you know that the London Pharmacopœia existed long before the British Pharmacopœia had any existence at all ?—Certainly.

And that the British Pharmacopœia, the first one, was in 1867 or 1864 ?—I do not know.

There are two—1864 and 1867. I may take it that your contention, and the contention of the Board is that if the article in question is not made up in accordance with the Pharmacopœia that is an adulteration; is that it ?—Decidedly.

Mr. Arnold : That is according to the British ?—Yes.

Mr. Wontner : Can you tell me what the temperature was ?

Mr. Arnold : I have not got down what the adulteration with ordinary spirit was, yet.

Mr. Wontner : I will take this gentleman through it presently. That is the cardinal point in the case, as your worship will see presently. Just another step first. Do you call this a drug ?—Yes.

It is a liquid ?—It is a liquid.

Do you call it a drug ?—Yes.

Did you personally take the specific gravity of this ?—It was done.

Did you do it ?—I did not do it.

Then you do not know at what temperature it was done ?—Yes, I looked at the temperature myself.

You were not there, were you ?—Oh yes, I was.

You did not take it yourself, but you saw the temperature ?—Yes.

Did you give instructions to the inspector what to ask for ?—I did.

What did you tell him to ask for ?—I wrote it down on paper.

You remember what you wrote ?—Yes—*Spiritus ætheris nitrosi.*

Did you tell him what verbally to ask for ?—I do not suppose he would understand that. No.

Did you tell him to ask for sweet spirit of nitre ?—I did not see Mr. Williams at all.

Mr. Arnold : Did you tell him what to ask for or did you write it down ?—I wrote down what he was to ask for.

Who did you give it to ?—To Mr. Hughes.

Did you tell Mr. Williams to ask for sweet spirit of nitre ?—No, I did not.

You have heard of sweet spirit of nitre ?—Certainly.

Mr. Arnold : Is the paper here, or is it destroyed ?

Mr. Wontner : Mr. Hughes, have you got it ?

Mr. Hughes : I have not got it here. I do not know that I have it at all now.

Mr. Arnold : What you wrote down was not sweet spirit of nitre ?—The one is only the name of the Pharmacopœia, the other is the popular name. It is exactly the same thing.

You did not write down the words sweet spirit of nitre ?—No.

What did you write it in—Latin ?—Yes, in Latin.

Mr. Wontner : You say that is spirit of nitrous ether, and sweet spirit of nitre is the popular name ?—Yes. It has four or five names, these are two of them.

Mr. Arnold : Is spirit of nitrous ether and sweet spirit of nitre the same thing ?—Yes.

Mr. Wontner : That is what you say ?—That is what I say.

You found no mention of sweet spirit of nitre in the Pharmacopœia ? –[Referring to a book.] No.

You are obliged to look, apparently ?—No.

What is it called in the Pharmacopœia ?—It is called spiritus ætheris nitrosi—spirit of nitrous ether.

That I take it is not at all sweet, is it ?—Which ?

The spirits of nitrous ether ?—Oh yes ! If freshly prepared it would be slightly sweet.

As compounded according to this formula ?—Yes.

Is there not a quantity of copper in it ?—No.

And acid ?—No.

No copper or acid ?—No.

Do you really mean that ?—I really mean that.

To begin with the spirit of nitrous ether ; as compounded, it is not a drug that you can handle, but it is made by distillation, is it not, by distilling various compounds ?—Yes, it is prepared or manufactured.

Do you know, or is it that you as a pure chemist do not know, how it is compounded ?—Certainly I do, I should be sorry to be ignorant of it.

You do know ?—Certainly I do ; I not only do know, but I have manufactured it myself.

What are the ingredients in the distillation of it ?—You mean after it has been distilled ?

It has no existence before ?—Before it is distilled it is made this way. A mixture of sulphuric acid, and nitric acid, and spirit of wine.

Mr. Arnold : I thought you said there was no acid ?—This is only to begin with ; if you will please to wait you will see there is none in it.

Mr. Wontner : And copper ?—If you will wait a moment——

But I thought you stopped.

Mr. Arnold : You mix sulphuric acid, and nitric acid, and spirit of wine. That is what you call ordinary spirit, is it not ?—Yes.

Mr. Wontner : And what else ?—Then you introduce it into a retort, and fine copper wire is added.

There is copper, then ?—It is a mixture ; you distil it over a gentle heat ; I forget the exact temperature, but it is in there.

You forget the temperature ? I mean you need not turn to the Pharmacopœia. You should have your knowledge ready, not get it up here.—That is such a minor point. That has nothing to do with the matter at all.

That is a minor point, is it ?—Quite, except that it should be a slight heat.

This particular nitrous ether that you analysed, what has been added to that ?—I did not analyse the nitrous ether ; what I analysed was the spirit of nitrous ether.

What has been added to that ?—It has been adulterated with alcohol—with spirit of wine.

Before or after it became spirit of nitrous ether ?—That I cannot tell.

What ?—No.

What ! a public analyst cannot tell whether it was before or after ? Do not you know that the whole composition would be altered if it were added after ?—No ; I cannot tell that.

Mr. Arnold : Before or after what ?

Mr. Wontner : Before or after it became spirit of nitrous ether.

The Witness : Would you allow me to finish the mode of manufacture ? This mixture is distilled at a gentle heat, and the distillate is a strong solution of nitrous ether in spirit, or very strong nitrous ether. This is then examined, to see how much nitrous ether it contains—to see how strong it is.

You are telling us what you do ?—In the preparation.

What the Pharmacopœia says?—I am telling you the manufacture of spirit of nitrous ether.

You are telling us what the Pharmacopœia says. Is that so? Is it your own experience, or is it what the Pharmacopœia tells you?—Of course I have prepared it according to what is the best mode. After that, spirit is added to bring it down to the proper strength.

Mr. Arnold: Rather, to bring it down to the proper weakness?—Well, yes.

Mr. Wontner: You would hardly endeavour to bring it down to the proper weakness by adding spirit of wine, would you?—Certainly.

Is that a heavier or a lighter body, this spirit of nitrous ether?—Well, spirit of nitrous ether is very nearly the same specific gravity; it is a very little heavier than the spirit of wine.

Mr. Arnold: The ether?—Yes.

Mr. Wontner: So that you would not increase the weight by adding spirit of wine?—Certainly you would.

Of course, if you make ½ lb. into 1 lb. you increase the weight?—Water is also lighter than alcohol, but if we add alcohol to water, we do increase the weight.

You have told us already that spirits of nitrous ether is heavier than spirit of wine?—Slightly heavier.

So that to make a given quantity only, if you put more spirit of wine in, that would not increase the gravity, would it?—It would diminish the gravity.

So that if this has been adulterated, as you say, by the addition of spirit of wine, that is lessening the gravity instead of increasing it?—It is lessening the gravity of the first product.

Lessening the gravity instead of increasing it?—Of the first product.

I suppose if you went on adding *ad infinitum*, comparatively it would get smaller and smaller?—Certainly.

So that the adulteration you complain of is not an adulteration under the Act of fraudulently increasing the weight?—Certainly.

What! by adding a lighter spirit?—Of course.

Just to clear that up, as to the value of spirit of wine of the proper proof, is that dearer or cheaper than spirits of nitrous ether?—It ought to be cheaper.

Is it? Do not you know as a fact that they are exactly the same price, or that if anything, spirit of wine is rather dearer?—No, I beg your pardon, I think it is rather cheaper.

Will you pledge your professional experience to that fact, because I have evidence here?—That has nothing whatever to do with the question.

Mr. Arnold: I do not know. It has this to do with it—what motive the chemist would have to put a dearer ingredient into it?—If you will allow me I can explain that.

Mr. Arnold: You had better answer the question first?—I am not a retail dealer; I do not know.

Mr. Wontner: You do not know?—I only know that the wholesale houses sell spirit of nitrous ether for 3*s*. per lb., and no spirit of wine here is sold at 3*s*. per lb.

Mr. Wontner: Do you know the firm of Messrs. Herrings, who supplied this?—I have heard of them.

Do you know of any other firm superior to them in the country as people of respectability, and for the genuineness of their wares?—I do not.

You believe there are none? Do you know as matter of common knowledge that they have been established ever since the first or second year of the century?—I do not know.

You have not taken the trouble to inquire?—No, I did not know even where the articles came from.

In your analysis of this article do you find that sulphuric acid is wanting?—Sulphuric acid has no business to be present at all.

Do you find in your analysis of this that the sulphuric acid that you mentioned and the copper are wanting in the preparation?—You do not seem to understand the process, therefore it is difficult to explain.

I do understand the process—No, I beg your pardon, you do not.

I do understand your process, but you do not understand ours—The sulphuric acid remains all the time in the retort, and does not go into the product.

Mr. Arnold: Then there was no sulphuric acid in this sample?—Certainly not, at least I mean no appreciable amount.

Mr. Arnold: I shall have to go through a course of chemistry, I am afraid, in order to understand this case.

Mr. Wontner: I do not think you will, sir; you will understand it presently.

With respect to the formula, or whatever you call it, in the Pharmacopœia, did that first appear in 1864 or 1867?—I do not know.

Have you examined any of the London Pharmacopœias before that date?—No, I have not.

Do you know that the preparation up to the date of that formula, in 1864 or 1867, was completely different?—Yes, I know that. I may as well save you trouble by saying I take my stand on this. [Holding up the British Pharmacopœia.]

I know you do. Do you know that in the old Pharmacopœias down to 1864 there was the distillation of spirit of wine, nitric acid, and nothing else?—I do not know. I know that was a process. I know that was one of the processes.

Mr. Arnold: With no sulphuric acid and no copper.

Mr. Wontner: No sulphuric acid and no copper. Do you know from your own personal experience, taking it back as far as it will go, and from experience acquired by study that that was a mode of preparation that has been used for centuries?—Well, I do not know.

Of course not; but as far as your own personal knowledge goes prior to 1864, do not you know that as far as you personally can tell, as far as you remember, that was so?—I really cannot tell. I believe it was first made originally something like two centuries ago.

You say that in the Pharmacopœias before 1864 it is so set out as one of the means of preparation?—I do not know that.

You said so just now?—I beg your pardon; I did not say that.

I understood you to say so.—No.

You have not looked at these Pharmacopœias before?—No.

Mr. Arnold: I thought you said it was in some of the old formulas?—Yes, it used to be a preparation, but whether it was in any of these Pharmacopœias I do not know.

Mr. Wontner: Whether according to the British Pharmacopœia or not, are you aware that the preparation you condemn is found at least in the proportion of ten to one as compared with the preparation given by the British Pharmacopœia?—I do not know that.

Before taking these proceedings did not you think it well to inquire?—Inquire about what?

Inquire as to the ordinary mode of making this and the ordinary preparation that was sold.—No. I did not think it necessary.

Will you say that it is not so?—I will not say.

Will you say that this preparation which you condemn is not sold generally to the profession and to the public in the proportion of ten to one of the preparation in the Pharmacopœia that you take your stand by?—I am not aware of that.

However, you are aware, I suppose, that this preparation which you condemn, is very largely sold?—I am aware that nearly every specimen of spirit of nitrous ether that is bought in London is adulterated—that I am aware of.

Is what you call adulterated. But is it adulterated in the same way as you allege this to be adulterated?—In a similar way.

Have the preparations which you have examined been

similar to this?—Some of them are better and some are worse.

But are they all prepared in the same way?—That I have no means of telling.

As far as you can judge, is it so?—I do not know.

Let me help you. In the particular spirit of nitrous ether that the Pharmacopœia provides for is there a yellowish colour?—Yes.

Is there a strong scent?—Well, it smells.

Is there a want of the sweetness which you find in this which you have been analysing?—I do not know that I have ever tasted it.

Mr. Arnold: You have never had a cold?—Tasting is no evidence. I never go by taste, because tastes differ.

Mr. Wontner: Tastes differ, and the public tastes differ a great deal. Do not you know that the public tastes differ from yours so much that they prefer that which you condemn to that which you hold up, buying it in the proportion of ten to one? Do not you know that the public tastes differ so much as that?—I do not know that.

All you know is, that tastes differ, and your taste is the Pharmacopœia; you will not have anything else?—Exactly.

From the examination you have made, have you, as a pure chemist, the smallest doubt that the difference between your standard and that which you condemn is the omission from the still of the sulphuric acid and the copper; do not you know that?—No, I do not know that.

Instead of that, an addition of spirit of wine?—I take it——

Yes or no?—No.

You do not know that?—No.

Then your powers of chemical analysis are not sufficiently strong to enable you to find that out; is that so?—I will not say it would not, but I have not directed any attention to it.

You found it was not similar, but you have not endeavoured to find out in what way it differs?—Oh yes. I found that out; it is considerably less strong; it is adulterated. However the adulteration is perpetrated, it is immaterial; it is badly manufactured.

I thought we had got over that. We have got your 9 or 10 per cent. of water. Then, with the exception of the water, there is nothing to make it heavier so as to adulterate it, nothing to make it heavier, so that the article would sell better, and be more profitable?—I confess I do not understand this reasoning.

There is nothing at all that I can see difficult to understand.—It seems to me very difficult, because milk is heavier than water, and we all know that milk is very largely adulterated with water.

Mr. Arnold: Milk is a natural production, and you can easily find whether it is adulterated or not; but when you have a manufactured article it is very difficult to say.—It should be a manufactured article, according to a certain standard, if it be sold by a chemist.

This you say is adulterated because it is not made according to the Pharmacopœia?—It is not the strength of the Pharmacopœia.

Mr. Wontner: That really is the case.

Mr. Arnold: The Act does not say that drugs shall be sold as they are made up in the Pharmacopœia.

Mr. Wontner: Not at all.

The Witness: I always understood that a chemist who sells a drug is supposed to sell it according to the official standard.

Mr. Arnold: That may be; but that is not what the Act says. If I went and bought ground rhubarb, and was sold ground rhubarb mixed with sand, that would be adulterated; but in this Act I do not know whether there is anything which requires that the drugs are to be made up according to the Pharmacopœia.

The Witness: As long as they reach the strength.

Mr. Arnold: These observations ought to be addressed rather to Mr. Rogers, because it is a legal point.

Mr. Rogers: I can find nothing in the Act with reference to it.

Mr. Arnold: Is there anything in the Apothecaries Act?

Mr. Rogers: Your worship refers to the Pharmacy Act.

Mr. Wontner: I have the Pharmacy Act here.

Mr. Rogers: There is nothing there about it.

Mr. Arnold: Where the article is a natural production, such as milk, and many other things you might mention, one at once knows how they might be adulterated by adding extraneous substances to them, but it is very difficult to say when it is a compound, unless there is something binding that it shall be made up according to the Pharmacopœia. I do not know how one can say it is adulterated. Is there anything in these articles—in this sample which you have got which renders it unwholesome or prejudicial?

The Witness: No, I will not say that, except negatively.

Mr. Arnold: I do not wish to stop the case on that point, but it has occurred to me it is a very difficult question, unless there is an Act of Parliament or unless there is some obligation which says that all drugs shall be made up according to a certain standard.

Mr. Rogers: I am not aware that there is anything.

Mr. Arnold: The same difficulty might arise in the question of bread.

Mr. Flux: It was on this point I was specially desirous of assisting the court, if the court will permit me to do so. I would call your worship's attention to the 15th section of the Pharmacy Act as bearing on this point.

Mr. Arnold: Thank you. As *amicus curiæ* I shall be much obliged to you.

Mr. Flux: It is the 15th section of the Act of 1868 which points out the specific remedy for adulteration or errors in the matter.

Mr. Arnold: I do not wish to stop the case on that point, but I feel great difficulty about it.

Mr. Wontner: Dr. Dupré, let me understand you. Do I understand you to say that the adulteration is before this becomes spirit of nitrous ether, or whilst the preparation of spirit of nitrous ether is going on?

Mr. Arnold: He said he could not say whether it was before or not.

The Witness: I have no means of telling that.

Mr. Wontner: There is no such thing as spirit of nitrous ether until after the process of distillation which you have described has gone on?—No.

So that if the failure were before, the adulteration would be before the thing was made; if it is a failure, to put something in, if there be an adulteration, it would be before the thing is made?—Yes.

The drug has no existence—you call it a drug—until after distillation?—No.

So that if I am correct in putting the difference between your specimen and the other specimen as the absence of copper and sulphuric acid from the one, and their presence in the other, the adulteration you would charge would be the omission to put them in during the distillation? Is that so?—No, there is no sulphuric acid or copper in any specimen.

We already have it from you.—I did not say after the distillation copper and sulphuric acid appear.

I suppose they are put in for some purpose?—No, I beg your pardon, it would be an absurdity for me to tell you that copper or sulphuric acid are in the distillate.

Are they put in for nothing?—Oh no, certainly not.

I suppose if they are put in for some object that object makes itself shown when the compound is arrived at?—But they remain, after having done their work, uncombined with the spirit. They have no business whatever in the finished article; they remain behind in the retort.

Mr. Arnold: Do they have any effect?—They promote the action.

Mr. Wontner: In point of fact they bring out the nitrous ether more strongly than if they are left out. Is that so?—Yes.

That is the effect—they bring out the ether more strongly?—Yes, but they are not in.

And the nitrous ether is that which has the very strong flavour?—Yes.

And which gives a high colour?—Yes.

The nitrous ether and the spirit of wine, as we learnt from you, have the same specific gravity?—You did not learn that from me.

I thought you told us you would not say?—No, I stated distinctly that pure spirit of nitrous ether is rather more.

We were about a quarter of an hour trying to get at it, and you pledged yourself at last to nothing.—I beg your pardon, I most distinctly contradict that.

You said a little lighter, I think?—Yes.

Mr. Arnold: The spirit of wine is lighter than spirit of nitrous ether?—Yes.

Mr. Wontner: I was going to ask you, but the magistrate forestalled me; can you tell me any law which forbids the making of this preparation?—I cannot.

Mr. Arnold: There is a penalty for making up any medicine (it does not say "drugs" in the Act) excepting according to the formula in the British Pharmacopœia.

Mr. Flux: You observe, that is a penalty to be sued for in a civil action at the instanec of the Pharmaceutical Society.

Mr. Arnold: It also goes on to say that shall not interfere with any other penalty.

Mr. Flux: But there is not any other.

Mr. Wontner: That of course has nothing whatever to do with this case. We are not summoned here under the Pharmacy Act, nor if we were summoned under that section should we be within it. We have nothing whatever to do with the making up of medicine. This is simply selling a genuine compound. It is not pretended that is made up after the formula of the Pharmacopœia. We do not allege that at all; on the contrary, what we do allege is, that we are in no way bound by the Pharmacopœia. If the public taste is for such as we manufacture, in opposition to the Pharmacopœia, we fling the Pharmacopœia to the winds, and make what there is a trade for, and not what there is no trade for. I want to learn from this gentleman if he can tell me anything to prevent us from doing it?—No, I cannot tell you any law. I am not a lawyer.

You have told me you made an analysis: can you tell me how much nitrous ether this did contain, what proportion? (The witness looked at a piece of paper.) Is that what you made at the time?—This is a copy.

I object to your copy; put that in your pocket if you please. From your recollection can you tell me how much nitrous ether it contained?—I have just seen the copy, it contained ·36 per cent.

The rest is spirit of wine?—The rest is chiefly spirit of wine.

I do not very well understand it; will you kindly explain it again?—Explain what?

How much nitrous ether it contains?—·36 per cent., rather more than one-third per cent., $3\frac{1}{2}$ in 1000, or 36 in 10,000.

How do you estimate it?—Well, am I bound to answer that?

Mr. Arnold: Yes.—I have no objection at all; only it seems to me that some of the gentlemen here are rather ignorant how to do it.

Mr. Wontner: We are anxious to see you do it.—I shall be very happy.

Then they will learn.—I shall be very happy to teach them, if they will allow me. It is done very easily. You take a small glass flask, a small vessel of thin glass; into that is put a small amount of hydrate of potash. You then weigh in a given quantity of the sweet spirit of nitre; you cork up well, and let stand for twenty-four hours. At the end of that time all the nitrous ether has been converted into nitrite of potassium. You carefully evaporate the excess of spirit, dilute with water, acidify with sulphuric acid, and with a standard solution of permanganate you estimate the nitrite.

Mr. Arnold: I dare say Mr. Wontner follows you, but I do not.

Mr. Wontner: I confess I do not understand it, but I do not think it will affect the legal question much. Do you know the pharmaceutical test?—The test is that if spirits of nitrous ether is mixed with twice its volume of a saturated solution of chloride of calcium, you separate 2 per cent. of its volume of nitrous ether.

Did you test by that process. But you did not test at all yourself, your assistant did it?—I did that myself.

And your assistant did all the rest?—My assistant only took the specific gravity; he put the bottle on the balance, and I stood by to see that it was done correctly. I checked it.

I should like to know, Dr. Dupré, whether it was by your advice these proceedings were taken?—I have nothing to do with these proceedings.

Was it by your advice?—No, I have no advice to give.

Did you give no advice to the local authorities?—No.

Did not you suggest it?—I! No.

Did not you go before the board?—I do not suggest. What I do is simply to analyse the specimens brought to me, and give the inspector a certificate, I have nothing further to do. I know not where it comes from. I do not know what is to be done with it; all I do is to give my certificate.

There are sundry questions I should like to ask you with reference to the medicinal properties, but you are not a doctor of medicine?—No.

You would not appreciate it, you would not be able to tell me the medicinal qualities of spirit of nitrous ether?—No; I do not believe anybody can tell you.

Or of the spirit of wine?—The spirit of nitrous ether has been so shamefully adulterated all the time that no medical man in London could be able to tell you what would be the action if he had the real article, because he has not for many years obtained it.

Mr. Arnold: That is pleasant for those who take sweet spirit of nitre.

(The court adjourned for a short time.)

Mr. Wontner: Is there a property, Dr. Dupré, in the spirit of nitrous ether after it is produced which is known as aldehyde?—Yes, there is; but it is not exactly a property, it is a substance.

Do you know the medicinal properties of aldehyde?—I do not. As far as I am aware, it is not used medicinally.

Are you aware it is a very moot point whether of the spirit of nitrous ether the aldehyde is not really the active ingredient?—As I stated before, I think there are very few, if any, medical men who know the real properties because they never had the article.

Very few know what are the real properties of this compound; but do you know as a matter of professional knowledge that it is a moot point whether it is not the aldehyde that has the virtue?—I never heard that before.

Have you never heard that before?—No.

Have you never heard that it was a point much discussed?—No.

But you say as a fact, that it is not clearly ascertained what is the most active ingredient?—No, I beg your pardon, I did not say that.

I thought you did say so?—No, what I said was that it is not known what are the exact medicinal properties of the sweet spirit of nitre.

But aldehyde is largely present in it, is it not?—Aldehyde is present.

Is there more aldehyde in this preparation that you condemn, than in that of the Pharmacopœia?—I should say less.

Did you ascertain what quantity there was?—No, I did not; it is only a rough guess.

You left the aldehyde out of the question altogether?—Not quite.

Very nearly; you did not take the proportion of aldehyde?—No, I do not think that can be done, at least not readily.

Now as to this aforesaid aldehyde. You, as a pure chemist, would be eminently capable of telling one this. Is aldehyde a property that very rapidly decomposes?—No, certainly not; it is neither a property, nor does it decompose readily.

Does aldehyde, whether it is a property or not——?—If you wish me to give correct answers, you should ask me correct questions.

I dare say, but I am not a scientific man like you; I try to frame my questions as well as I can, and if you understand what I mean, perhaps, you will kindly give me the answer?—No, it is not what chemists called decomposed.

Does it turn into acetic acid?—It absorbs oxygen and becomes acetic acid—vinegar—acid of vinegar.

Is that acid heavier than water?—Yes.

So that the specific gravity of the article would be increased on its becoming acetic acid?—Certainly.

Would not it very readily become acetic acid, if the cork were left out?—Yes, I think tolerably readily.

If exposed to the action of the air in any perceptible degree it would become acetic acid, would it not?—Yes, no doubt.

Take a bottle like this half full, would not the air contained in the upper part of the bottle be sufficient to turn it into acetic acid?—Yes, no doubt, to a certain extent, it depends on the relative quantity of aldehyde that may be in.

And you say there is aldehyde in both these compounds?—Yes.

Sal volatile—have you made that your study, at all, have you analysed that?—Yes, I have.

Is that always made according to the British Pharmacopœia?—As far as I am aware it is scarcely ever made so.

The general trade in that is according to a formula not in accordance with the British Pharmacopœia?—At least the product is not in accordance.

Mr. Arnold: Would you consider sal volatile a drug?—Yes.

You think it is?—Yes, I think so.

Mr. Wontner: Is it as much a drug as this?—I am not here just now to define what a drug is.

But you ought to be prepared, because you summon us for adulterating a drug?—I take it every substance used medicinally may be called a drug.

Suppose you were ordered brandy medicinally, would that be a drug?—Yes, it would.

You have not taken any proceedings yet against the manufacturers of sal volatile?—No.

But that is produced by distillation, is it not?—Yes.

Mr. Arnold: Is there a formula for it in the Pharmacopœia?—Oh yes.

Mr. Wontner: I do not know whether you told me, but at the risk of repetition I will ask you again if you can tell me—I think you did tell me, that medicinally you could not say what were the qualities of spirit of wine as compared with spirit of nitrous ether?—If you were a medical man or a chemist you would know that for years past there has been a discussion going on what is their action.

That is what I want to get at?—There has been a discussion going on for years what is their action.

That is not yet decided?—No.

So that you cannot tell what would be the effect of putting more spirit of wine or more spirit of ether in this preparation?—It is not spirit of ether.

Well nitrous ether. You could not tell what would be the effect of there being an excess of the one over the other, which ever way it is, medicinally?—Well at least I can tell you what is the general supposition.

Whether supposition or not you say it is a point which has been under discussion for a long time, and is not yet settled?—Let me explain. What I stated was this, that it is a point of discussion how spirit of wine acts medicinally. It is another point of discussion how spirit of nitrous ether may act.

How it may act—how it does act?—How it acts, but how the one acts in relation to the other has nothing whatever to do with the question; they are very distinct matters.

Are you the sole analyst in this district?—As far as I am aware.

I mean public analyst?—I am the only analyst appointed by this board.

Dr. Redwood, is he one?

Mr. Rogers: There is only one analyst appointed immediately by the Board of Works for the Westminster District.

Mr. Wontner: For the other districts there are others?—Yes.

This is the first summons taken out?—In what respect?

With respect to an article of this description?—I believe so.

Mr. Arnold: The first summons taken out at all, or do you mean in this district?

Mr. Wontner: I mean with regard to such a kind of substance.

Mr. Arnold: Is this the first summons you know of at all, or the first summons in this district?—I do not know of any other.

Mr. Wontner: This is the first in the country?—I believe so.

It is taken out for the purpose of experiment. I suppose, to see whether it would succeed?—No, for the purpose of putting down what I consider is a shameful adulteration.

Do you seriously mean that?—Quite seriously.

Mr. Arnold: Is it your duty to advise the board.—No.

Is it merely your duty to analyse the matters that are submitted to you?—Yes.

Because when you use such a strong expression as that you consider this to be a shameful adulteration I presume from that that you are the person who advises the authorities as to what are adulterations?—No, I give them my certificate, that is all.

Mr. Wontner: Nothing but the certificate?—The Act directs it. I have no other communication with them at all. I gave them distinct directions to go and get so many samples.

That is not what I am asking. I am asking whether your communication with the board was confined to that certificate, or whether you did not personally recommend these proceedings? Certainly not. I have nothing to do with that at all.

Mr. Rogers: I may tell you, sir, that under the 6th section of the Act, the inspector, on receiving the certificate that the article is adulterated, is bound to prosecute.

Mr. Arnold: If this gentleman was merely called upon to give a certificate, and then uses such a strong expression as that he considers in his opinion it is a shameful adulteration, all I can say is it is a very improper observation for him to have made.

The Witness: I have been here submitted to a considerable amount of cross-examination, which I think in some respects is unnecessary, but if you decide so I am very sorry, and I will retract it if you will allow me.

Mr. Arnold: It is not a proper expression. Seeing that you have used that expression, I should like a definition of what you mean by "shameful adulteration." You say it is not deleterious to health?—No, but it is selling a compound under a false name, it is not the compound which it professes to be.

In what way, if it is not deleterious, and not mischievous in any way, do you consider it a shameful adulteration?—I do not say it is not deleterious to health; All I say is I do not know whether it is so or not.

You said so?—I do not say as a matter of fact it is not.

Mr. Wontner: To carry it further, can you say that this shameful adulteration does not cost quite as much as what you hold up as the standard?—I do not think it does.

Can you say positively, not being a tradesman, that it does not? We have the court full of people who produce it. In their presence, do you say it does not cost quite as much as the article you hold up as the standard?—I should say decidedly not.

What would you say would be the difference?—I do not think I am here to say that. I am not a tradesman; I am not a retail dealer nor a wholesale manufacturer.

You give your opinions, and I wish to test the value of them.

Mr. Arnold: You have voluntcered your opinion, and you are bound to say on what grounds you come to that conclusion.

Mr. Wontner: When you say this is a gross fraud, are you aware that the article is used in almost every hospital and dispensary throughout the country?—I think it is.

I suppose everybody using it, aiding and abetting in this fraud, you would consider to be acting fraudulently too?—Ignorantly.

The medical profession and the chemical profession are all acting ignorantly, and Dr. Dupré is the only wise man, is that it?—Not at all. If you will look into 'Percira,' which I think is the chief standard work on materia medica in the English language, you will find he calls it by almost as strong a name as I do. But I say I have apologized for using that expression, and I think you may fairly consider I have withdrawn it.

I am not saying anything about it; I am asking you as a fact whether it is not used in all the hospitals and dispensaries?—I think it is.

And, as a fact, it is an article which is not sold by the ignorant, but it is sold by medical men and chemists throughout the country—men who are supposed, as far as they can know, to know the properties of it?—They might be supposed to know, but they certainly do not know.

Not as you do, of course?—Not as they ought to.

You see they all have not the opportunity of being brought up in Germany; when we have education here as you have in Germany we shall be better?—I daresay you will.

There is one other question I want to ask, Have you received any samples of this spirit of nitrous ether which you have found in your opinion to be pure?—Yes, I have found it, at least so that I should be sorry to say it was adulterated. I was not sufficiently certain, therefore I cannot say it is adulterated.

Mr. Rogers: You would not give your certificate?—I would not give my certificate as to its being adulterated.

I suppose you could test two ounces as well as any other quantity?—Yes, I could do it by $\frac{1}{10}$th of that.

Mr. Rogers: That is my case.

[*Examined by the Magistrate.*]

I understand you to say you consider this to be adulterated because it is not made up according to the British Pharmacopœia formula?—Yes, because it does not come up to the standard.

Mr. Wontner: I do not know whether you will allow me to ask one question which I omitted.

Mr. Arnold: Perhaps you will let me put a few questions first. You say that you consider every subject that is used medicinally is a drug?—May be considered as a drug.

What do you consider the exact meaning of the word drug—is it synonymous with medicine?—A substance that is used medicinally.

Does not drug rather mean an ingredient or substance which is used for mixing up in medicine?—That is one that is very often so used. It is used by itself, and it is used mixed with others.

Would not you call this medicine?—Well, no.

I do not know whether you are anything of an etymologist, but do not you consider the word "drug" as something cognate with the word "dry"?—I will not say that; preparations would then be all excluded under the Act.

Never mind that. Do not you think the word "drug" means something in the nature of a dry ingredient which is used in making up medicine?—No, I do not.

You do not think that?—No.

You think it means medicine generally?—Substances used medicinally.

A substance used medicinally is a medicine?—Yes.

Is carbonate of soda a drug?—In one aspect it is a drug.

Is it or is it not a drug in your opinion?—If used medicinally, decidedly.

Would you consider soda water a drug?—Well, what is called soda water is very rarely soda water.

But if soda water is merely aërated water without any soda in it, you would not consider that adulterated?—Simply speaking, yes I should.

Then adulteration may consist in the omission as well as in the putting in of things?—Well, of course I am not prepared to give a decided answer to that. That is a difficulty, no doubt.

Mr. Arnold: There has been no case as yet decided on this point, has there?

Mr. Rogers: Not that I am aware of. This is the first case in the Westminster district.

The Witness: Would you allow me to make one statement with regard to this drug? At the beginning of last year I was engaged for the medical department of the Privy Council in examining into the state of the retail drug trade in London, and I was given a list of a number of substances which included spirit of nitrous ether.

Mr. Arnold: I confess I thought the meaning of the word "drug" was an ingredient in a medicine.

Mr. Wontner: It is if you look in Johnson "ingredient used in physic." I was looking last night in several other dictionaries, which gave the same meaning.

The Witness: This, besides being an ingredient used in physic, may be used by itself.

Mr. Arnold: This is a physic, it is made up of different ingredients?—No, because the nitrous ether is the principal.

That is a compound?—Yes, that is a compound. Every substance is a compound, except it is an elementary substance.

Mr. Arnold: In one sense, every substance is a compound if it comes to that, but it is not an artificial compound. Every substance, I suppose, is a compound more or less, but not an artificial compound. Have you any legal comment to offer on that point?

Mr. Rogers: No, I have not.

Mr. Arnold: My strong impression is, that a drug merely means an ingredient from which, with other ingredients, medicine is made up.

The Witness: That is decidedly the case with spirit of nitrous ether.

Mr. Flux: You will find in the Apothecaries Act, 55 Geo. 3rd, c. 194, these words, "Dispensing and vending drugs, medicines, and medicinal compounds," thus by statute drawing a distinction.

Mr. Arnold: Making a distinction between a drug and a medicine. Would you consider that the spirit of nitrous ether is not a medicinal compound?—Certainly it is.

And a drug; you see the legislature has used three different words, a drug, a medicine, and a medicinal compound. Which of these three should you say spirit of nitrous ether is?—I should say it may be under two.

Mr. Arnold: I think not. I think the legislature uses three different expressions.—But the one, and the same substance may be included under two.

How?—Spirit of nitrous ether is used by itself, and then you may consider it as being a medicine, but when it is used to make up a medicine as an ingredient, then it becomes a drug.

Mr. Arnold: It is either a drug or it is not a drug. This is the Apothecaries Act, is it?

Mr. Flux: Yes, sir, and the language of the legislature appears to be consistent with that, in all the intermediate medical legislation.

Mr. Arnold: Another section talks about medicines, "wares, drugs, receipts, distilled water, chemical oils, syrups, conserves, lohochs"—what are those?

Mr. Flux: I believe those are forgotten, or nothing known of them.

Mr. Arnold: There is no evidence laid before me of any medical gentleman as to whether he considers spirit of nitrous ether to be a drug or a medicine.

Mr. Rogers: No, I have not any evidence of that character.

Mr. Arnold: You leave the case as it is?

Mr. Rogers: Yes.

Mr. Arnold: I think the case must go on, but I confess I have a very strong opinion at present upon that point.

Mr. Wontner: There is one question, if you please, upon another point. The learned magistrate has asked you the meaning of the word drug. I should like to ask, what you take to be the meaning of the word adulteration?—Adulteration is the addition of anything which is foreign to the substance, or lowers the quality of the substance.

But clearly an addition—something added?—Well, you cannot back from it; I think so.

Mr. Arnold: I think Mr. Dupré has already said he considered the omission of something might constitute an adulteration.

Mr. Wontner: He said so before, but now he has altered his opinion; it must be an addition, it is perfetly clear.—It is an existing difficulty, and a very important point, which is not so easily decided offhand, because there are many drugs sold where the important thing is left out, and it is a question whether that should be considered an adulteration or not. I believe under the Act it could not be so considered.

Mr. Wontner: You are not a lawyer, you say, neither a doctor nor a lawyer?—Oh, yes, I am a doctor.

A Ph.D., not a doctor of medicine?—That does not matter.

Would you take this to be a correct description of the word from Webster, "To make impure by an admixture of baser materials"?—No, I do not.

You do not think it is the proper description: It must be clearly an addition to an article, which lowers or debases its quality, such as adding sand to sugar.

Mr. Arnold: Or water to milk. If you put a quantity of cream to milk you would not call it adulterating, would you?—I do not know.

Mr. Wontner: What I want to get at really is, that to constitute adulteration there must be an addition, taking the meaning of the word in its ordinary sense, would not you say adulteration means to add something?—I think it does.

In fact the adulteration, if adulteration there were here, was the adulteration before it became this spirit of nitrous ether?—No, it may have been done after.

Would it be nitrous ether until it had gone through the still?—No.

Suppose we show by evidence how this was made, and that nothing has been added since, would you say there was adulteration then?—Yes, I should say so.

What! nothing added? You have told us there must be an addition, you know?—I should say there is something added; there is too much spirit of wine put into the still.

Mr. Arnold: I really cannot take this gentleman's opinion as to the meaning of the word adulteration; it is quite clear what that is. It clearly must mean the addition of some foreign substance.

The witness: But I contend that is an addition.

Mr. Wontner: It is not for you to contend. Technically on that point, I submit the case is bound to fail, and clearly also upon the point which your worship so readily saw, the case must fail also. In the first place it is perfectly clear that this is not a drug. In the second place, it is perfectly clear that the spirit of nitrous ether never had any existence until after the process of distillation had taken place, and the fact of not complying with the British Pharmacopœia by putting in copper and sulphuric acid to assist the action of distillation in more strongly bringing out the nitrous ether is not an adulteration, because the article had no existence until after the distillation was completed. If after distillation something had been done to it, according to the terms of the Act, which rendered it injurious to life or health, then, taking it to be a drug, it would be clearly an infringement of the Act of Parliament. But seeing that before it became spirit of nitrous ether it must go through a process of distillation, and the adulteration, if adulteration there be, would take place while the so-called drug was in the process of making, it is perfectly clear there could be no adulteration, as the summons charges, for selling as unadulterated a certain drug, which was adulterated by spirit of wine, because it did not become spirit of nitrous ether until after the process of distillation. Upon those two points it is perfectly clear that the case must fail.

Mr. Arnold: I have not yet got the amount of the spirit of wine that there is in this; only that it is considerably adulterated with spirit of wine.

Mr. Wontner: I will tell you, sir, directly; I will tell you the process.

Mr. Arnold: Mr. Dupré has not told us that.

Mr. Wontner: I put it to him, and he said he could not possibly tell, but that it was largely adulterated.

Mr. Arnold: Does the Pharmacopœia give the different quantities?

Mr. Wontner: I think it gives the amount of nitrous ether and the amount of spirit of wine. Sir, this case is one of very serious importance; there are several to follow it, and no doubt, if successful, as in the case of other branches of manufacture and trade which come within the Adulteration Act, it is no doubt intended to make a general crusade throughout the country, upon the foundation which a successful conduct of this case would give to the local authorities throughout the country. And when I point out that in the case of the manufacturing druggists who produced this article, it is made by that one firm alone to the extent of tons every year, you will at once see that the issue to be decided is a very large one. In point of fact, the issue is, whether the Board of Works is to be able to impose upon any manufacturer, or class of manufacturers, of either articles of food or articles of medicine any terms they like, and say: We insist on your manufacturing in a certain way, which we prescribe, and in no other way. They hold up to you a book published in 1867—the British Pharmacopœia; they say, we do not charge you with fraud; we do not charge you with selling a spurious article for the purpose of making additional profit; we do not charge you under the terms of the Act with fraudulently increasing the bulk of the article for the purpose of making additional profit, and so committing a robbery on the public. At the same time we cannot say with regard to this particular article whether that which you make or that which we prescribe in the British Pharmacopœia is the best; we cannot say which is the best, but we say as far as we can see that that which you make is not at all injurious to health; and as far as we can tell, it may be just as good a medicine as that which we prescribe. Therefore, looking at the question in its broad light, it must be perfectly clear to you that the Board of Works, and those under the Board of Works, are endeavouring to put an imposition on the general manufacturing public, to insist that they shall only make in accordance with the terms which they prescribe as an authority, namely, the British Pharmacopœia. If that

were the law, and if they could so impose, I am afraid that the growth of medical knowledge in the country would be extremely slow for the future; because if that be a correct view of the law, nothing but what is contained in the British Pharmacopœia could be manufactured at all. If, from superior and advanced knowledge, as time goes on, a better way of manufacturing than is shown by the British Pharmacopœia is discovered as to the manufacture of any article, according to their theory that better process of manufacture cannot be adopted, but they must adhere to the old rule as laid down by the British Pharmacopœia. If such were the law, it must be a most tyrannical one. But such is not the law, I am happy to say. It is perfectly certain, I take it, from what you have already said, that you agree with me in this matter, that such a law has no existence; and if it had it would be a law grossly in restraint of trade, and against the public benefit. Going back to the thirteenth century, pharmaceutical chemists are able to trace this very product which is here to-day condemned. I can take you back and give you the authorities from the time of Lully, in the thirteenth century, to Basil Valentine, the celebrated alchymist, in the fifteenth century. But, coming to more modern times, I can show you by standard works going back to 1746—Pharmacopœias then published—that this very product is recognised. In the way in which it was then made, it is now made, and I have no doubt will continue to be made. I can carry you on by those Pharmacopœias to 1864, when the British Medical Council first took upon themselves to publish a standard work for those who chose to follow it, and show you that after the Pharmacopœia was published in 1864, a fresh edition was published in 1867. In the first British Pharmacopœia in 1864 they published a formula different from that which afterwards came out; that is to say, differing from the old formula which Messrs. Herring make from. They found that that formula would never do; and, therefore, in the one of 1867, they completely altered their formula and adopted the present one. What was the result? The original sweet spirit of nitre, was used as a stimulant, and I suppose if the truth were told, when it is taken, it is rather more as a stimulant than as a medicine. It is a stimulant, pleasing to the palate, pleasing to the smell, and not distasteful to the eye. Its medicinal qualities, as we contend (and there is nothing to show that it is not so) are equally as great as those of the compound of the British Pharmacopœia of 1867. But those who had the editing of the British Pharmacopœia seemed to be of opinion that there should be more nitrous ether in the compound, and therefore, with the view of bringing out the nitrous ether more strongly, copper and sulphuric acid were added in the preparation to that which had been used from time immemorial, namely, nitric acid and spirit of wine. So that really the only difference between the two was that the one was particularly pleasing to the public, pleasant to the taste, pleasant to look at, and pleasant to the smell, whereas by the aid of the copper and sulphuric acid, the powerful smell of the nitrous ether was brought out, which rendered it unpleasant to the smell; the colour was rendered unpleasant by adding a very dark yellow tinge, and a strong bitter taste was imparted by the addition of copper; or, at any rate, by the stronger presence of the nitrous ether. When the Pharmacopœia was published, Messrs. Herring, and not only Messrs. Herring, but all the large manufacturing druggists endeavoured to fall in with views of the publishers of the Pharmacopœia. Accordingly, for the first year, they made large quantities of the new compound as propounded by the British Pharmacopœia. What was the result? The public liked the one, but they did not like the other, and the result was that nearly all they manufactured was returned to them and lay upon their hands. Naturally enough, finding that was so, and finding there was no law in the land to enforce the formula of the British Pharmacopœia upon them, they said it was their business to supply what was wanted. They said the public demanded the old article, and they should have it. Therefore they made not only the new article as propounded by the British Pharmacopœia, but also the old one, in such quantities as it was wanted; the result being that at the present time, for one ton of that which they sell made up according to the British Pharmacopœia, the public demand is for ten of the other. That does not apply only to Messrs. Herring, but to all the wholesale manufacturers. When we come to look at the merits of this case, it really becomes essential to see whether in a pecuniary point of view they are any gainers by this. The learned analyst says it is an adulteration, to put in spirit of wine. As a fact, the best spirit of wine, according to the proper degree of proof, is quite as expensive as spirit of nitrous ether. Therefore, there can be no possible gain to the producer, whereas by putting more ether he increases the specific gravity; he gets a greater weight; so that if he followed out the formula propounded by the British Pharmacopœia, in point of fact, in a pecuniary sense, he would be a gainer, because he would get a greater weight by that than he would by making the old compound, because the spirit of wine being lighter than the spirit of nitrous ether, of course in the proportion in which you add spirit of wine as compared with spirit of nitrous ether, the specific gravity of the compound becomes less, and therefore the manufacturer would have to make more of it in order to arrive at the same value. Really those are the facts of the case. The point lies in a nutshell. I really do not see what there is to be said about it. You hear from the analyst that it is very doubtful what the medicinal properties are. He does not tell you the old compound is not quite as effective as that compounded by the British Pharmacopœia, and there being no possible law to enforce on the trade the formula of the British Pharmacopœia, the case really seems to be at an end. If there were a law to say, you shall make up your medicines and your drugs in accordance with that publication, and they failed to do so, no doubt they would be liable to be summoned for an offence against that law. But to come here and ask you to say that this is an adulteration of a drug under the Adulteration of Food Act, an Act very properly passed for the suppression of fraud by means of the sale of spurious articles, which either are injurious to health, or which have been largely added to, and the bulk increased for the purpose of making a fraudulent profit; to come here and ask you to convict these gentlemen under an Act of that description, teeming with fraud from the very commencement to the end, from the preamble to the last section, is preposterous. The preamble states that the object was to prevent injury to health, and to come here and ask you to convict under that Act upon a summons of this description, when the principal witness himself said that no fraud has been committed, that there is no addition of bulk, but, on the contrary, what they call the adulteration makes the article lighter instead of heavier, and when in addition they admit that they cannot say that it is in any way injurious to health—to come here and ask you to convict under such circumstances, and so make a precedent for the rest of the magistrates in the country acting upon your opinion, is I think on the part of the authorities an unjust proceeding, and I am quite sure you will endorse that view by an adverse decision in this case.

[*Mr. Charles Umney sworn. Examined by Mr. Wontner.*]

Are you a pharmaceutical chemist by examination?—I am.

A Fellow of the Chemical Society and an Examiner of the Pharmaceutical Society of Great Britain?—Yes.

I believe for the last ten years you have been the director of Messrs. Herrings' laboratory, in Aldersgate Street?—I have.

I believe that is one of the largest firms of wholesale

manufacturing chemists and druggists of that description in the country?—It is.

I believe it has been established since 1808?—It has.

Since you have presided over their laboratory, have you been in the habit of selling two kinds of spirit of nitre?—We have.

For nearly ten years?—Yes.

Since the British Pharmacopœia was first published?—Yes.

Two. One of those made according to the formula in the book, and the other made according to the old formula which dates back for centuries?—It has been our custom so to do.

Which is in most request in the trade?—Spirit of nitre as known to the public for some centuries; it first appeared in the London Pharmacopœia in 1746.

Was that the description of spirit of nitre with which you supplied the defendant, Mr. Fenton, in this case?—It was.

Will you kindly describe the process of manufacturing that?—The process of manufacture which is carried on almost daily consists in putting into a still six gallons of spirit of wine, 56 degrees over proof, having a specific gravity of ·838, the strength prescribed by the British Pharmacopœia, and 4 lbs. of nitric acid, also of the strength prescribed by the British Pharmacopœia; then applying steam heat, and slowly distilling until 50 lbs. of distillate be obtained.

Mr. Arnold: The distillate, I suppose, is what is left?—The distillate is the liquid that passes over in the still; it comes over in the form of vapour, and is condensed by cold water in passing through a worm. This quantity of 50 lbs. is about half a pound less in weight (or one per cent. only) than the original spirit employed, when put into the still. We distil it until it is of the specific gravity of ·850. We find that the distillation of 50 lbs. will produce such a specific gravity, or thereabouts.

Mr. Wontner: Is that what, until the British Pharmacopœia appeared, was generally known as sweet spirit of nitre?—It is, and has been known as sweet spirit of nitre for some centuries.

When the British Pharmacopœia was published, did you proceed to manufacture according to the formula given there?—When the first British Pharmacopœia was published, we did so, but afterwards, with other manufacturers, we entirely abandoned the process. I am speaking of the 1864 Pharmacopœia.

What constituted the difference between the methods?—It was ordered to be made from nitrite of soda, a body which it was proved could not be made; therefore it was not likely the spirit of nitre could be made from it.

You first of all dropped the old system, and adopted that of the British Pharmacopœia; you found it was not successful, and reverted to the old one?—We adopted the process of the British Pharmacopœia, 1867, almost entirely, from its publication.

Did you find that the preparation took with the public?—It did not; it was returned in all directions.

Did you then proceed to make in accordance with the old plan?—Not entirely so; we have never abandoned the form of the British Pharmacopœia for those who will have it.

You did revert to the old plan for those who wanted it, selling that of the British Pharmacopœia to those who in their turn wanted it?—Quite so.

In about what proportion do you sell the one to the other?—I should say about nine of the old sweet spirit of nitre to one part of the spirit of nitrous ether of the British Pharmacopœia.

The difference, I believe, in the preparation of the two being the addition of copper and sulphuric acid in the new one, whereas by the old formula, you did not put those?—Quite so; copper and sulphuric acid are added in the retort to assist the formation of nitrous ether.

Mr. Arnold: The old formula omits those things?—Quite so.

Sulphuric acid and copper?—Yes.

That is the only difference?—That is the only difference, save probably in the relative proportions of spirit of wine and nitric acid that might be present.

Mr. Wontner: I take it it is a stimulant?—Undoubtedly.

And in the one way a stimulant pleasant to the taste and smell, and in the other way not so pleasant?—I believe the public so regard it.

Speaking as a pharmaceutical chemist can you tell us whether aldehyde, of which we have heard, is an ingredient in this?—I believe aldehyde is always present more or less in sweet spirit of nitre.

Is it a fact that medical men differ considerably as to what is the active ingredient in this?—I believe it is a very debatable point as to the compound upon which the medicinal properties of spirit of nitre depend—wholly, at any rate.

Whether the spirit of wine, or the nitrous ether, or the aldehyde?—Yes, or both, or all of them.

Mr. Arnold: Mr. Rogers, can you contend after this evidence that the only difference between the spirit of nitre which is manufactured by this gentleman and sold, it appears, by the defendant, consists in the omission of certain things, that that is an adulteration? Can you contend that as a point of law?

Mr. Rogers: No, I do not think I can.

Mr. Arnold: It is quite an end of the case.

Mr. Rogers: You see, sir, exactly the position the board are placed in with reference to this Adulteration of Food Act—we really scarcely know what we are to do.

Mr. Arnold: I should not advise you to attempt these rather expensive experiments.

Mr. Rogers: Certainly not, sir. But I would refer you again to the 6th section, by which, when the certificate is received, the inspector is obliged to lodge a complaint.

Mr. Arnold: It is not done by an individual person; it is the Board of Works, or some other authority, who are setting this on foot. You should exercise a little more caution before instituting proceedings of this kind. In the first place, I entertain, I must say, a very strong opinion upon the question whether this is a drug or not. My strong impression is, that it is not a drug in the proper sense of the word, in the sense in which it is used in the Act of Parliament. On that point, however, I should probably have taken a little time to consider; but I am quite clear on the evidence given by this witness, that the mere fact that certain ingredients are omitted from the compound in the making-up of the distillate cannot be called an adulteration. Do you ask for costs, Mr. Wontner?

Mr. Wontner: If you please.

Mr. Arnold: I think the defendant is entitled to costs.

Mr. Rogers then stated that after what had occurred he should of course withdraw the other summonses.

Mr. Arnold said that would be the best way, if the others turned on the same question. On the application of Mr. Draper he allowed the costs of the defendants in the other cases, except that of Mr. Saxby who was not in court when his name was called.

Mr. Braithwaite said he appeared for Mr. Saxby, and should have been in time, but for being detained by the train.

Mr. Arnold said he could not allow the costs in the case of a defendant who did not answer when called. In the other cases he should allow the costs, because persons had been brought there at great expense and inconvenience, and one summons would have been quite sufficient to try the question.

Notes and Queries.

[375.] COD LIVER OIL EMULSION.—"*Subscriber*" would be thankful for a recipe for making a cod liver oil emulsion that will not separate.

[*** The following formula for a "Cod Liver Oil Mixture," which is stated to have met with much favour in the United States, is quoted from the *Cincinnati Lancet* by the *Medical Record*:—

"Take four fresh eggs; lemon juice, a sufficiency. Place the eggs in a suitable vessel, and pour over them sufficient lemon-juice to cover them, and let the whole remain for twenty-four or forty-eight hours. Then pass the whole through a strainer, and add, with agitation, the following, and in the order given. To the lemon-juice and eggs add an equal volume of honey, cod-liver oil, and brandy or whisky. The whole forms a permanent emulsion, and will keep good during the summer months for a month, and longer in cooler weather. The taste of the oil can be completely covered by the addition of a few drops of oil of wintergreen or oil of bitter almonds. This mixture is pleasant to take, and a valuable therapeutic agent. Glycerine may be substituted for the honey."]

[369]. AQUARIUMS.—The best "grass" for the leech aquarium is the *Vallisneria spiralis*, one of the very few plants that will stand the *forcing* temperature of the shop. A very pretty moss, the *Fontinalis*, also grows well; but there are many pond and ditch plants, as the common Frogbite (*Hydrocharis Morsus Ranæ*), the ubiquitous Chokeweed (*Anacharis alsenastrum*), several of the *Potamogetons*, or even the Duckweed, that look very pretty, do well for a time, and can readily be renewed. Better, however, not start until the spring.—*A. P. B.*

[370.] HOMINY.—In reply to *J. T. H., E. E.* desires to say that "hominy" is maize, or Indian corn, coarsely powdered and boiled in milk for a considerable time over a slow fire, or allowed to macerate in an oven not too highly heated. It is common in Derbyshire—where, however, it is made from new wheat.

[371.] MORPHIA SOLUTION FOR HYPODERMIC INJECTION.—Mr. C. T. Vachell, writing to *Lancet*, recommends the following formula for the preparation of a solution of morphia for subcutaneous injection:—

Acetate of Morphia	1 drachm.
Distilled Water	12 drachms.
Acetic Acid	q. s.

One twelfth of a grain of acetate of morphia would be contained in each minim of the solution.

CASTOR OIL AND GLYCERINE.—A writer in the *Philadelphia Medical Times* states that if castor oil be mixed with an equal quantity of glycerine and one or two drops of oil cinnamon be added the taste of the castor oil is so covered that it can scarcely be recognized.

PRESENCE OF SUGAR AND TARTARIC ACID IN VINE LEAVES.—In a note presented to the French Academy in 1869, M. Petit stated that vine-leaves containted 20 to 30 grams per kilogram of glucose, and a quantity of acid varying from 13 to 16 grams. In further investigating the subject M. Petit has found (*Rép. de Pharmacie*, new series, i., 632) that about one-third of this acid is tartaric acid, which exists in the state of cream of tartar. He has also found that much sugar is present as cane sugar, and in taking special precautions to prevent the conversion of the cane sugar into glucose, he obtained from a kilogram of vine leaves—cane sugar, 15·80 grams; glucose, 17·49 grams. The leaves of the cherry and the peach also contain a mixture of cane sugar and glucose, and from a kilogram of peach leaves he obtained—cane sugar, 33 grams; glucose, 12 grams.

Correspondence.

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

Citrate of Magnesia.

Sir,—Naturally I have read with deep interest the flood of literature on the subject of the article which is, or of the articles which are, somewhat akin to my manufacture, called "Granular Effervescent Citrate of Magnesia," and I have so read with especial interest the letter of Mr. Sandford, and that also of H. C. W. upon one page of our last week's Journal.

I can unhesitatingly follow a suggestion of H. C. W., and say in regard to my manufacture that magnesia forms an essential part of the preparation, and is present in an important quantity. I, with others, consider that during effervescence it becomes a citrate, and I know of my own experience, and you will find the same recorded in the Pharmaceutical Journal, 1868-69, p. 194, that if neutral citrate of magnesia (from which it took its name) be used the preparation soon becomes deteriorated, losing its effervescence and colour.

Regarding Mr. Sandford's suggestions, to the purport that I have, from motives not commendable, launched a compound preparation under a false name, I would point to the necessity which existed for a name to that which was admittedly a new compound preparation, and to the experience of mankind regarding names. It next was necessary that the name of anything animate or inanimate should define the elements of its composition. All that is wanted in a name is that it should distinguish one thing from another. My belief was, and is, that the name adopted by me did distinguish the article from other compounds, and did not, in fact, mislead, and although I might have adopted another designation, and probably should have done so had I foreseen the *harsh* language recently used, I must respectfully disclaim having been actuated by any other than proper motives in my choice of a name.

As for the safety of gentlemen who may sell my article by its proper name, I may point to the opinion of the Attorney-General, Sir Henry James, M.P., and Mr. Poland, as conclusive.

Alfred Bishop.

Dec, 4th, 1873.

"What's in a Name?"—(Old England, 1573.) "£10 Penalty and Costs."—(Young England, 1873.)

Sir,—The explanation of the McDermott case in last week's Journal (p. 439) makes it still more serious. It now appears that this notorious penalty was inflicted upon the accused for misapprehending the meaning of an inexact expression written in a dead language. But did he misapprehend? This depends upon the intent of the writer, and he should have been made to state that upon oath, which, I think, would have been fatal to the prosecution.

If such questions as this come within the scope of the Adulteration Act, no one is safe.

It happened to me to-day in the ordinary course of business to receive a prescription on which was ordered 4oz. effervescing citrate magnesia, to be taken according to directions to be inscribed upon the bottle. Notwithstanding the notoriety of Mr. McDermott's conviction, the usual granular effervescent from Mr. Bishop's manufactory was supplied. What else could be done? Our usual printed label was attached in addition to the written directions as a special precaution consequent upon the publicity given to the late prosecution, but this does not affect the properties of the preparation *supplied as "Effervescing Citrate of Magnesia."*

I write therefore to support the appeal to the Council of the Pharmaceutical Society for intervention. It is intolerable that the whole trade should be subject to convictions under the Adulteration Act for discharging their duties intelligently, simply because a manufacturer has given an objectionable name to a popular article, which name has been adopted by the public and the medical profession, and only protested against by ourselves.

The conviction against Mr. McDermott was a gross miscarriage of justice which ought not to pass unchallenged;

leaving every member of the trade liable to similar annoyance at the instigation of anyone possessing the necessary qualification of unscrupulous malevolence.

RICHARD W. GILES.

Sir,—Mr. Bishop having acted on the President's persuasion, and procured for the Pharmaceutical Society the highest legal opinion as concerning *his own* article, let us hope to see the equivocating attempts to "ring the changes" on mag. cit. labels now give place to a broader view of the whole subject.

'Tis poor fencing to think only of guarding from the cut we've already received. Suppose the next should be on a new tack—*e.g.*, why not "Turkey" Rhubarb as well as "Wallsend" Coals? But I won't (like gentlemen at the Bloomsbury and Brighton Opening Meetings) suggest subjects to the analysts. "Sufficient unto the day," etc.

The guiding principle to be kept in mind seems to be not merely the old *caveat emptor*. The *vendor* must take care that the buyer is not deceived as to the nature or quality of the medicine or food purchased.

J. P. C.

W. B. R. writes to say in reference to the citrate of magnesia question, that he has been in the habit of using the following label, and that it seems to do very well:—"Granular Effervescent Saline, hitherto popularly called Citrate of Magnesia."

LOCAL SECRETARIES AND THEIR DUTIES.

Sir,—It affords me much gratification to have an opportunity, whilst endorsing Mr. Rimmington's expressions contained in the Journal of Nov. 22nd, of publishing my experience of local secretaryship, which certainly is an *honourable distinction!*

In the summer of 1870 it became my duty to report to the Council the fact of a person having, by illegal means, caused his name to appear on the register of chemists and druggists, and from that time till the following summer I was engaged in procuring evidence in support of my charge, and in defence of a writ of mandamus, filed by defendant in the Court of Queen's Bench, against the Council for having erased his name; in each case we (the Society) succeeded. It is needless to say how very delightful is the task of an "informer," raking up evidence against a neighbour—in a small town especially so. Well, after twelve months' trouble, the natural odium and loss of time, not one word of thanks did the Council think proper to accord me.

By this time you no doubt think, sir, "It's nice to be a local secretary;" it is so "honourable" and remunerative. I certainly second Mr. Rimmington's suggestion, "that they be elected for two years only, and not eligible for re-election;" we shall then see how the "new brooms" sweep our register of the incongruous matter contained therein at present.

CYMRU.

Sir,—That some change in the mode of appointing the local secretaries is not only desirable, but much needed, few pharmacists, I think, will question. The local secretary of the Pharmaceutical Society should be the centre of pharmaceutical life of the district in which he lives. This is not always the case; there are gentlemen who have held the appointment for a long series of years, and have done little more than collect the annual subscriptions, and perhaps occasionally answer a communication from the Secretary at Bloomsbury Square. It may be that the members themselves are at fault. The Secretary may have tried to bring them together on some occasion requiring unity of action in matters affecting the welfare of the trade, and after anticipating a full meeting, found that his remarks had to be addressed to a solitary individual and any number of empty benches. It is possible a change of officer might bring about better results the next time. I would go further than Mr. Rimmington in suggesting a change, and propose that every local secretary be instructed to call a meeting annually to elect his successor, and that the retiring secretary be ineligible for re-election. If the members were anxious to keep one in office who had served them well, they would take all the more interest in securing his appointment the next year. An objection to this plan would be that some gentleman would propose his friend to fill the office, and to oppose his election might be thought to display a hostile feeling towards him, and so the post would be filled alternately by two gentlemen. But this might be avoided if (as at present) the names of all the eligible members in the district were proposed for election, and the votes taken by ballot. Then, as figures are not so easily recognized as handwriting each name might be designated by a number and the number used on the voting paper instead of writing the name of the person in whose favour the vote was to be recorded.

R.

Nov. 26th, 1873.

EDINBURGH EXAMINATIONS.

Sir,—No one, through the medium of your columns, has attempted to solve Mr. Williams' problem as to how "the candidates in Edinburgh were much more successful than in London."

The London students had better take this rebuke to themselves, and apply themselves more thoroughly to their object.

The reasons for their repeated failures are very intelligible. Many go up from the provinces to the metropolis, and finding themselves for the first time in so great a city, fritter away their time, instead of using the few months in study, and when they do begin to study it is nothing more or less than "cram."

Now in Edinburgh and Glasgow there are classes in the evening, presided over by the University professors, which are always attended by the students at least two sessions before presenting themselves. And masters, with few exceptions, are too much interested in the welfare of their assistants not to give them every facility for studying, by granting time and giving a week or two's holiday to be spent at the Society's rooms, exclusively.

In Scotland we have no "expeditious and economic schools." All are *bonâ fide* students.

Lastly, Scotchmen, as a rule, are better educated than Englishmen. This is proverbial.

K.

Edinburgh, Nov. 22nd, 1873.

THE REMUNERATION OF ASSISTANTS.

Sir,—I have read with interest the letter of Mr. Haynes, in the PHARMACEUTICAL JOURNAL, and fully endorse all he has said relative to the great disadvantages of country students.

I am an assistant in a small country village, where I never have the opportunity of dispensing a physician's prescription, and where the chief trade consists of retailing commercial more than pharmaceutical articles.

As I am very anxious to pass the Minor (having had the good fortune to succeed in the Preliminary), and to set up in business for myself, I have every reason to be discouraged, inasmuch as I cannot afford either the time or the money to undergo a course of study in London, and there being no facilities here for attending lectures, seeing specimens, or engaging in experimental chemistry.

There are hundreds in a like situation, and I maintain that they have just cause to view their future in anything but *couleur de rose* light.

I know several young men who have forsaken the profession altogether, their circumstances not enabling them to prosecute their studies with any speedy chances of a successful termination, other trades holding out greater advantages in a pecuniary point of view.

CHEMICUS.

Sir,—In this week's Journal I see a letter headed "Chemists' Assistants' Association." But the writer of it very soon leaves his text, and launches out on another subject. Now, an association of that class is very much wanted in our midst, and I should be very glad if some gentleman of standing would take it under hand. I quite agree with "Minor Associate" when he says that plenty of young men would be found ready to enrol themselves as members of the association.

In every other walk in life we find the people banding together, and what is the result? Better remuneration for their labour. Not that I believe in strikes or anything of that kind, but I believe if such an association were convened, and then the case was properly represented by the heads of this association to employers, we should get wha

we want, viz., better remuneration and shorter hours. And when that happy day arrives, the Pharmaceutical Society may expect, and have a right to expect, those who present themselves to be better prepared for the ordeal of examination.

EUXESIS.

Osmeston, Nov. 22nd, 1873.

DRUGGISTS' CHARGES.

Sir,—The following advertisement is taken from the *Western Press* of Saturday, November 15th, 1873 :—

"Prescriptions faithfully and carefully dispensed, by duly qualified persons, with best drugs, at from 20 to 100 per cent. below the usual charges, at the Genuine Drug and Chemical Store, ————. ————, Proprietor."

Some of the younger members of our Society are so tender as to feel insulted by dispensing charges being cut down ; but uniformity of prices is impossible ; and whilst some chemists conceal their charges, others will advertise them. And, as regards the public, some will go to cheap shops, and others will avoid them ; so that chemists really need not be jealous of each other, and I am inclined to apply the same remark to co-operative stores.

I would strongly recommend the young chemist not to neglect his small retail customers who bring in ready money ; and, with respect to dispensing charges, if the young beginner charges *high* his customers will prefer the older establishments, and if he charges *low* they will doubt the quality of the medicines.

"Be thou as chaste as ice, as pure as snow, thou shalt not escape calumny."

JOSEPH LEAY.

Chilcompton, Bath, Nov. 24th, 1873.

The Report of the Special Committee respecting Examinations.—We are requested by Mr. Frazer to publish the following in reference to the amendment which he moved to the adoption of the above report (see p. 448) :—

"As it must appear very anomalous to your readers that I should have spoken to my amendment before Mr. Williams had spoken to the motion itself, I think a word of explanation is needed in vindication of my position :—Before the report was given in at all I had consulted Mr. Sandford as to the form in which I should word my amendment to the motion that I expected him to move. When Mr. Sandford, as I clearly understood, twice over, most distinctly said he "had no motion to propose"—that he had merely to give in the report of the Committee—when Mr. Sandford afterwards did this and had sat down, no one rising, and the Chairman, as it seemed to me, putting the report before the Council for its adoption, I saw no course open to me but to rise and propose the amendment. I need not say that I was in the hands of the Chairman and of Messrs. Williams and Sandford, and would at once have given way to them had they signified that such was their wish. As it is, the loss was all on my side—the gain on theirs. They replied to me instead of my replying to them, and they very properly took all the advantage that this position gave them."

"*A Molecule.*"—(1) The figures you refer to are in the first instance obtained by quantitative analysis. (2) In reply to this question we should recommend you not to attempt to commit the formulæ to memory, but rather to study the facts and principles upon which they are based. When these are understood your difficulties in respect to formulæ will have disappeared. As you seem to possess Attfield's 'Chemistry,' read carefully the chapter on the "General Principles of Chemical Philosophy."

W. Smith.—Probably your object would be best attained by redistillation of the spirit, either alone, or with a little carbonate of soda.

W. J. P.—The only trustworthy method for the detection of such an adulteration would be a microscopic examination by a person familiar with the appearance of this and other starches under the microscope.

W. F. C.—Our opinion upon this point has been already expressed in vol. ii., p. 540. To obtain an authoritative decision we should recommend you to apply to the Inland Revenue Commissioners at Somerset House.

J. Young.—The specific gravities corresponding with the several degrees of Baumé's hydrometer, as determined by different authorities, certainly exhibit discrepancies, slight indeed, but not very easy to account for. Thus the determinations made by Delezennes are all lower than those of Francœur, though the two were made at the same temperature, viz., 12·5° C., and Gilpin's numbers for 15° C. are intermediate between the two. Another set of numbers, for 55° F. = 12·8° C. is given by Graham in his 'Elements.' We do not know where he got them from. The numbers given in the article "Alcoholometry," in 'Watts' Dictionary,' vol. i., pp. 84-86, are Gilpin's ; those in the article "Hydrometer" (vol. iii., p. 210), written by Jevons, are Francœur's. We give a short table, giving the specific gravities, at intervals of 5° Baumé, according to the several authorities above quoted. The specific gravities, according to Delezennes and Francœur, for each degree Baumé, from 10° to 60°, are given in the article "Aräometer," in the 'Händworterbuch, 2te Auflage, ii., Band. Absh. 1, p. 180.

Degs. Baumé.	Specific Gravities, According to :			
	Gilpin.	Delezennes.	Francœur.	Graham's 'Chemistry,' 1st. ed., p.
	At 15⅝° C. = 60° F.	At 12·5° C. = 54·5° F.	At 12° C. = 54·5° F.	At 55° F.
10°	1·0000	1·0000	1·0000	1·000
15°	0·9666	0·9654	0·9669	0·963
20°	·9343	·9333	·9359	·928
25°	·9044	·9033	·9068	·897
30°	·8773	·8751	·8795	·867
35°	·8526	·8486	·8538	·842
40°	·8272	·8236	·8295	·817

A new determination of the values of Baumé degrees has lately been made, apparently with great care, by Berthelot, Coulier, and d'Almeida ; but the results are not yet published. A sketch of the method is given in the *Comptes Rendus*, for Nov. 3 (No. 18), p. 970.

"*Alpha.*"—What were formerly juleps in the Guy's Hospital Pharmacopœia are now called mixtures. The Julep. Amm. Sesquicarb. is now called "Mist. Ammoniæ. The formula is :—

Take of
- Carbonate of Ammonia . . . 40 gr.
- Treacle . . . . . 4 fluid-drachms.
- Compound Tincture of Lavard . 4 fluid-drachms.
- Peppermint Water . . . . . 11 fluid-ounces.

Julepum cinnamomi is not in the present edition ; it is probably an old form which has been expunged, and our correspondent may perhaps obtain it by writing to Mr. Stocker, the apothecary. The Pharmacopœia is printed by Ash and Flint, London Bridge, S.E.

E. E. will find that two formulæ for brilliantine are given in vol. i., p. 457.

T. Lunn.—There is a chapter on the examination of urine (illustrated by microscopical drawings) in Attfield's 'Chemistry' (Van Voorst), and another in Bowman's 'Medical Chemistry' (Churchill).

"*Syrupus.*"—(1) The new regulations for the Jacob Bell Memorial Scholarships are now in force, and will apply to the next award. (2) The amount of knowledge of elementary chemistry required would, we suppose, provided the candidate wished to carry off the Scholarship, be such as, *ceteris paribus*, would enable him to surpass the other competitors.

"*Patchouli.*"—Mr. Leonard M. Gill, the manager of *The Country*, a journal of rural pursuits, writes to inform us that the article on "Patchouli" in our issue of November 8 was copied from his paper, without acknowledgement, by the *Journal of Applied Science*, whence we took the article, and he requests us to give the credit of its first production to *The Country*.

☞ In consequence of the great length to which the reports of the Society's Transactions and of the Legal Proceedings extend,—necessitating eight extra pages,—the publication of several reports of provincial meetings at Edinburgh, Leeds, Liverpool, Dublin, etc., is unavoidable deferred.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Mee, Young, Armstrong, Illingworth, Clarke, Hayes, Berry, Mumbray, Safford, Tibbs, Harrison, Longley, C. B., "Heathen Chinee," "Inquirer," "Hater of Injustice," Sec. Midland Chemists Association.

AMMONIO-CITRATE OF IRON.

BY CHARLES UMNEY.

The variation in appearance of ammonio-citrate of iron, as met with in trade, must have been noticed by every observant pharmacist.

Since the time of its introduction into medicine by Beral, now about thirty years since, most manufacturers have adopted, notwithstanding the various officinal formulæ that have been published, one or other of the following methods for its production :—

(α) By dissolving metallic iron (nails) in a solution of citric acid by the aid of heat to the complete saturation of the acid.

(β) By adding hydrated ferric oxide to citric acid dissolved in about twice its weight of water, assisting its solution by the heat of a water-bath until the oxide is no longer dissolved, and is visibly in excess.

Solution of ammonia in both cases being added after filtration, to produce the double salt. By either method the result is very similar, the amount of anhydrous ferric oxide resulting from a calcination of the salt with free exposure to air from 30 to 31 per cent., and the appearance of the scaled product nearly or quite identical.

A review of the various formulæ that have been published in the London and British Pharmacopœias will serve not only to show the relative amounts of ferric oxide directed to be added to the citric acid, but also to indicate (when the examination of commercial specimens is brought forward) that obsolete processes are followed by manufacturers.

As this iron salt is almost universally used, it will be interesting at the same time, to note the formulæ of the French Codex and the United States' and German Pharmacopœias.

London Pharmacopœia, 1851. *(First officinal.)*

Sulphate of Iron	12 ozs. (Troy).
Carbonate of Soda	12½ ozs.
Citric Acid	6 ozs.
Solution Ammonia (·960)	9 fl. ozs.

British Pharmacopœia, 1864.

Solution of Persulphate of Iron (1·441)	8 fl. ozs.
Citric Acid	5 ozs. (Avoir.).
Sol. Ammonia (·960)	14 fl. ozs.

British Pharmacopœia, 1867.

Solution of Persulphate of Iron (1·441)	8 fl. ozs.
Citric Acid	4 ozs. (Avoir.).
Sol. Ammonia (·959)	19½ fl. ozs.

United States' Pharmacopœia, 1873.

Citric Acid	5 oz. 360 grains (Troy).
Sol. Persulphate of Iron (1·320)	16 fl. ozs.
Sol. Ammonia (·960)	20 fl. ozs.

French Codex, 1866.

Acid Citric	100 parts.
Hydrated Peroxide of Iron	q. s.
Sol. Ammonia	18 parts.

Add such a quantity of hydrated ferric oxide as will correspond to 53 parts of anhydrous oxide iron.

Pharmacopœa Germanica, 1872.

Citric Acid	2 parts.
Oxide of Iron	q. s.
Then add Citric Acid	1 part.
Sol. Ammon.	q. s. to saturation.

The following table, deduced from these formulæ, will show at a glance the relative amounts of anhydrous ferric oxide to the same amount of citric acid :—

	Citric Acid.	Ferric Oxide.	
Lond. Pharm., 1851	100 parts	57·3	Added as ferrous salt.
Brit. Pharm., 1864	,,	33·4	Added as ferric salt.
,, 1871	,,	41·8	,,
U.S. ,, 1873	,,	40·0	,,
French Codex	,,	53·0	,,
Pharm. Ger., 1872	,,	?	,,

The London and British Pharmacopœias describe the amount of ferric oxide resulting from incineration with free exposure to air, but the Codex and German and American Pharmacopœias do not state the amount of ferric oxide perfect specimens of their respective salts should contain.

Pharm. Lond.,	1851	34	per cent. Fe_2O_3
Brit. Pharm.,	1864	26·5	,,
,, ,,	1867	27·0	,,
U.S. ,,	1873	?	,,
French Codex		?	,,
Pharm. German.,	1872	?	,,

Most of the recent formulæ have one feature in common, viz., the complete saturation of the acid by the oxide of iron, but the quantities ordered by each work with this object in view are very disproportionate.

The British Pharmacopœia, 1867, says, "*dissolve the citric acid in eight ounces of distilled water, and having applied the heat of a water-bath, add the oxide of iron, and stir them together until the whole, or nearly the whole, of the oxide has dissolved.*"

It is presumed that complete saturation is intended by the expression "*until nearly the whole of the oxide has dissolved*," and that the amount of oxide produced by the precipitation of the persulphate of iron ordered is in slight excess of the quantity required for such saturation.

Be this as it may, upon referring to the Codex we find an amount of hydrated oxide ordered which shall be equal to 53 parts of anhydrous oxide, whereas the British Pharmacopœia, 1867, orders an equivalent of 42 parts only.

Practically I have found that the French Codex formula is much more like the basis of ammonio-citrate of iron of the best makers than is the British Pharm. formula, although fifty parts (half its weight) would more accurately represent the amount of ferric oxide (added as hydrated oxide) required to saturate 100 parts of citric acid than would *fifty-three* parts, as named by the Codex.

A comparison of the formulæ of the British Pharmacopœias of 1864 and 1867, as to the amount of ferric oxide added to the acid, and the amount stated to be left by calcination is most conflicting ; for instance, the 1864 Pharmacopœia shows that for 33·4 parts ferric oxide to 100 citric acid, as much as 26·5 per cent. is left upon calcination, whereas that of 1867 indicates that from 41·8 parts added to the same amount of citric acid, 27 per cent. is left by calcination.

The mean of three analyses of ammonio-citrate of iron (B.P. 1867) gave ferric oxide by calcination 27·4 per cent., proving the accuracy of the present officinal test and the fallacy of the 1864 Pharmacopœia.

Of course it may so happen that the British Pharmacopœia does not intend that the acid shall be saturated with oxide, and has merely framed its formula with other objects in view.

If it were so contemplated I think a great improvement in the formula would have been made if a salt had been recognized that would have scaled easily, and represented the best specimens as met with in trade.

An examination of the ammonio-citrate of the leading London manufacturers indicates that at the present time uniformity is the exception rather than the rule; that the British Pharmacopœia scales are not to be met with; that the preparation of the London Pharmacopœia, or a modification of it is still used; and that the *complete saturation* process is in some cases followed.

London Pharmacopœia, 1851 .	34·0	(determined).
British Pharmacopœia, 1867 . .	27·4	,,
Manufacturing Proccss (saturation)	30·7	,,
Trade Specimens . . . (1.)	26·0	
,, ... (2.)	24·1	
,, ... (3.)	30·1	
,, ... (4.)	30·0	
,, ... (5.)	33·4	
,, ... (6.)	33·3	
,, ... (7.)	29·4	

As uniformity in all substances used in medicine is of vital importance I would suggest that at the earliest convenient date the use of ferric oxide sufficient to the complete saturation of the acid by the aid of a water-bath heat be recognized, and that the formula of the British Pharmacopœia be amended by substituting *nine and a half fluid ounces* of the persulphate of iron solution for the present quantity of eight fluid ounces, or as much hydrated ferric oxide to one hundred parts of citric acid as shall be equivalent to fifty parts (49·6) of anhydrous ferric oxide.

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THE VERIFICATION OF BAUME'S AREOMETER.*

BY MM. BERTHELOT, COULIER, AND D'ALMEIDA.

The areometers of Baumé, as supplied by the manufacturers, being rarely accordant with each other, the authors were requested to draw up a report, indicating the proper methods for verifying these instruments. The following is an abstract from this memoir :—

§ I. *Definition given by Baumé of the fixed points of his Areometer.*—The following is the text taken from the last edition of Baume's '*Eléments de Pharmacie*' published during his lifetime (8th edit., vol. i., p. 341) :—"Take an ordinary glass hydrometer, and mark zero at the place where it ceases to sink below the surface of pure water; this will form the first term. For the second term prepare a saline solution by dissolving 15 pounds of very dry and very pure marine salt in 85 pounds of water; this will give 100 pounds of the solution. Plunge the instrument into this liquor, and when it ceases to sink mark the place on the tube as 15°, which will be the second term. Divide the interval between these two terms into equal portions, which will form degrees. The interval so graduated will serve as a standard for dividing in the same manner the lower part of the tube. All these operations ought to be conducted in a cellar, and it is necessary to leave the liquid sufficiently long to acquire the proper temperature, which is ten degrees (Réaumur) above freezing, or 12·5° C."

Such are the instructions of Baumé himself, and all instruments made in conformity with them will be in accordance with each other. The authors consider that the introduction of any change in these directions for the construction and verification of Baumé's areometer must be arbitrary.

§ II. *Density of the Standard Solution and Tables.*—The point of departure in all the operations for constructing or verifying Baumé's areometer is the preparation of the standard saline solution, and the determination of the weight of a litre of that solution. For the preparation of the saline solution the authors weighed fifteen parts of pure and carefully dried marine salt, and eighty-five parts of distilled water, and introduced them into a flask, when solution was effected with certain precautions. The determination of the weight of a litre was made by the flask method, and found to be 1110·57 grams. This number expresses the weight of a litre of salt and water at a temperature of 12·5° C., weighed in air with brass weights under a pressure of 760 millimetres, which conditions correspond with the definition and mode of operation adopted by Baumé. From this number, and that which represents the weight of a litre of water at the same temperature, the following table is calculated :—

*Table indicating the Relation of the Degrees of Baumé's Areometer with the Weight of a Litre of Liquid weighed in Air, under a Pressure of 760 Millimetres, and at the Temperature of 12·5° C.**

(The table can be used at 15° C., and all neighbouring temperatures.)

Degrees	Weight of Litre.	Degrees	Weight of Litre.	Degrees	Weight of Litre.
0	998·404	26	1210	51	1520·5
1	1005	27	1220	52	1536
2	1012	28	1230	53	1552·5
3	1019	29	1240·5	54	1569
4	1026	30	1251	55	1586
5	1033	31	1262	56	1603
6	1040	32	1272·5	57	1620
7	1047·5	33	1283	58	1638
8	1055	34	1295	59	1656·5
9	1063	35	1306	60	1675
10	1070·5	36	1318	61	1694
11	1078	37	1330	62	1714
12	1086	38	1342	63	1734
13	1094	39	1354	64	1754·5
14	1102	40	1366	65	1775
15	1110·57	41	1379	66	1797
16	1119	42	1392	67	1819
17	1127·5	43	1405	68	1841·5
18	1136	44	1418·5	69	1865
19	1145	45	1432·5	70	1889
20	1154	46	1446·5	71	1914
21	1163	47	1460·5	72	1938
22	1172	48	1475	73	1964
23	1181·5	49	1490	74	1990
24	1191	50	1505	75	2017
25	1200·5				

This table may be used not only for liquids at a temperature of 12·5° C., but also at temperatures up to 15° C., or a little higher, since up to that point the dilatation of the areometer may be neglected. It must be remembered however that when at a certain temperature—14° C. for example—the instrument sinks into the liquid to a fixed point, the table indicates the weight in air of a litre of this liquid, measured at the same temperature of 14° C.

§ III. *Verification of the Areometer.*—For this object two methods may be adopted, which are equally good.

(1) Commence by ascertaining that in distilled water, at + 12·5° C., the areometer marks zero. Then determine the weight in air of litres of liquids of different densities, such as more or less concentrated solutions of marine salt, sulphate of zinc, syrups, glycerine, sulphuric acid, etc. When the weight of a litre of one of these liquids has been taken, the vessel being filled at a given temperature, about 12·5° C., the areometer should be plunged into the liquid while at the same temperature.

* Abstracted from *Répertoire de Pharmacie*, vol. i., p. 621.

* This table does not agree with that given in the preliminary notices of the Codex of 1866. For instance, the Codex gives for 30° the density 1261, and the above table gives 1251. We think this later table will be preferred, because of the scrupulous care with which it has been drawn up.—*Ed. Rep. Pharm.*

The areometer ought then to indicate the degree corresponding with the previous table. The important point is that the temperature of the liquid when the litre is weighed should be exactly the same as when the areometer is placed in it.

When it is wished to verify the whole of the scale it is desirable to use such solutions as would represent the weights intermediary between 1000 and 2000 grams. But when the areometer is only required for one particular purpose, such as the testing of glycerines, it is only such weights as correspond with those of the glycerines met with in commerce that it is necessary to verify with care, and this may easily be done by means of the preceding table.

The second method of verification necessitates the employment of a good balance, which by means of a hook, string, and some small pulleys can be raised and lowered at will. Beneath one of the scales (A) is attached a very fine silken thread or hair about 12 or 15 centimetres long; at the lower end of this thread a small piece of soft wax, the size of a pin's head, is affixed, to which the areometer can be stuck. In the other scale (B) is placed a sufficient counterpoise to balance certain weights in (A), and to bring the needle of the balance to zero when the areometer is immersed as far as zero in water at 12·5° C. This counterpoise must be left in (B) during all the subsequent verifications. The areometer is then weighed in air, and its weight exactly noted. It is next placed in distilled water at 12·5° C., when it ought to indicate zero exactly. The vessel containing the water and the areometer is then placed under the pan (A) of the balance, and the thread is stuck to the stem of the areometer. Weights are removed successively from the pan (A) equal to the weight of the areometer multiplied by 0·03367, 0·06733, etc., as given in the following table, and when the needle of the balance is at zero, which is attained by raising the balance, the areometer should indicate the degrees which are placed opposite these numbers :—

Degrees indicated.	Numbers by which the weight of the areometer is to be multiplied.	Degrees indicated.	Number by which the weight of the areometer is to be multiplied.
5	0·03367	45	0·30300
10	0·06733	50	0·33666
15	0·10100	55	0·37033
20	0·13467	60	0·40400
25	0·16833	65	0·43766
30	0·20200	70	0·47133
35	0·23566	75	0·50500
40	0·26933		

If, for example, it were wished to verify the 25th degree of an areometer, of which the weight in air is 57·3 grams, this latter figure must be multiplied by 0·16832, and an equal weight to the product—9·645 grams—removed from the scale pan (A). Then, if the balance be raised until the indicator is at zero, the areometer should indicate 25 degrees, provided it be plunged into water at the temperature of 12·5° C.

The areometer should be well moistened several degrees above the level of immersion, and in reading this level a uniform method should be followed, which should be the same as that adopted in graduating the tube.

The remainder of the report is taken up with a description of the precautions taken by the authors to secure exactitude in their experiments.

SOLUBILITY OF ISINGLASS IN WATER.*

BY C. CARROLL MEYER.

The author took one hundred grains each of American ribbon, American sheet, Russian and Prussian (?) isinglass and treated them separately, first with f℥viii of water to soften them; then f℥viii more of water was added and boiled, until all soluble matter was extracted, then filtered, and the following table will show the solubility of the different kinds experimented with :—

Isinglass.	Quantity used.	Soluble.	Insoluble
American strip .	100 grs.	70 grs.	30 grs.
,, sheet	100 ,,	82 ,,	18 ,,
Russian . . .	100 ,,	88 ,,	12 ,,
Prussian . . .	100 ,,	80 ,,	20 ,,

From the foregoing experiments it will be seen that the Russian is the most soluble and the American strip the least soluble.

The bladder of a hake fish, weighing ℥xv, was washed with water to remove salt, and boiled with sufficient water until all soluble matter was obtained, then filtered, and found to contain ℥i of insoluble matter.

As aqueous solutions are prone to decompose, experiments were made to see if anything would arrest decomposition, and glycerine was found to answer very well in the proportion of one part glycerine to fifteen parts solution of isinglass. Solutions to which glycerine was added kept sweet and were quite palatable, while those to which no glycerine had been added soon decomposed, and became quite offensive to both taste and smell.

* From the *American Journal of Pharmacy*.

INDIAN HOSPITALS AND DISPENSARIES.

Bad water and bad drainage are in India the sources of pestilences which periodically carry off large numbers. Except in cholera years, fever claims more victims than all the other diseases and accidents put together. The number of deaths from fever alone in 1871 is computed at about one and a half million. Cholera has also been bad in some parts, but small pox has steadily declined since vaccination has been attended to. The passion for pilgrimages is another great source of mortality; hosts of pilgrims starting, but few returning. No less than 14,529 deaths from snake bites were reported in 1869; and Dr. Fayrer, who has made the subject his special study, estimates the annual mortality from snake bites to exceed 20,000. Deaths from wild beasts are very numerous. In the 'East India Progress and Condition Report' for 1871–72, from which these particulars are taken, a single tigress is spoken of as killing during three years no less than 108 persons. The Government offers rewards for their destruction, but without avail, partly owing to the natives looking on a "man-eating tiger" as an incarnate and spiteful deity which should not be interfered with, and partly from the wish of some to spare them as game.

The Government, however, is not inactive in these matters, and the sanitation of the towns receives careful attention. Sanitaria for the troops have been established in many places in the Hills. Quinine is looked upon as the only real remedy for fever; the people believe in it and are very anxious to obtain it, and the Government desires that the alkaloids shall be prepared at so low a rate as to be within the reach of all.

In all the large towns there are richly endowed and well regulated hospitals, partly supported by the Government and partly by private subscriptions. Numerous dispensaries also are established throughout the country on a "grant-in-aid" system, the town furnishing a building and guaranteeing a certain subscription, and the Government providing and paying for the necessary medical staff. In the North West Provinces there are 90 civil hospitals and 41 dispensaries. In Bengal there are 160 dispensaries, and certain medicines are distributed over the country and supplied to villages, so as to be sold at cost price. The medical students are first trained at

the dispensaries and then complete their course at the Agra College. At Bareli and Naini women are taught medicine and surgery, and some have already commenced practice. In the Panjab there are 110 hospitals and dispensaries, being in the proportion of 1 to every 160,000 inhabitants. The Mayo Hospital connected with the Lahor Medical School was opened in 1872, and has accommodation for 114 patients. In Oudh there are 26 Government dispensaries and 1 private one. In the Central Provinces there are 92 dispensaries, the Government furnishing the medical staff to 76 of them. In Bombay there are 121 dispensaries, 30 of which are attached to civil hospitals, 60 charitable, 1 self-supporting, and 30 wholly supported by Government. In some districts the *Hukims*, or native doctors, are made use of in epidemics after receiving elementary instruction, the Government paying them and supplying medicines. Many of the *Hukims* have sent their sons to medical schools for regular training.

SUNDERLAND CHEMISTS' ASSOCIATION.

ANNUAL DINNER.

The annual banquet of the Sunderland Chemists' Association was held on Wednesday evening, December 3, at the Palatine Hotel, and proved in every respect an enjoyable and successful one. Alderman Thompson, the president of the Society, occupied the chair. Mr. H. Thompson discharged the duties of vice-chairman. After the usual loyal and local toasts had been honoured—

Mr. Sharp, in proposing "The Medical Profession," said he was glad to see so many medical gentlemen present, and he hoped their intimacy would continue to increase. The professions of chemist and surgeon, as they were all aware, were most intimately connected, and no doubt each had done something to develop the other since the days when the physician prescribed toads, eels, serpents' tongues, and other abominable things. There was no doubt that medicine had advanced in proportion to the discoveries made in chemistry, and the time was coming when the people would act on the philosophy of "prevention is better than cure." As greater attention was paid to sanitary arrangements and the laws of health, the less would be required of doctor and drugs. In this conviction he might state that he was pleased they had got an efficient medical officer in Dr. Yeld, who would look well after the sanitary state of the town. Mr. Sharp next alluded to the question of medical men dispensing, and concluded by hoping that the time was not far off when the doctor would merely prescribe, and allow the chemists to have their legitimate work of dispensing.

Dr. Horan replied, and dwelt on the progress made in pharmacy, and, in alluding to the question of general practitioners dispensing, said they should, if possible, give it up. Nothing, he remarked, was more arduous, after a hard day's work, than for a medical man to have to prepare medicines, but when the members of the profession gave up this work, they would, of course, expect chemists to cease prescribing.

Dr. Yeld next proposed "The Sunderland Chemists' Association," coupled with the name of Mr. J. J. Nicholson, its secretary. He said that the subject of sanitary reform had been alluded to, and he might state that for many years past there had been a great many lives sacrificed entirely in consequence of inattention to sanitary arrangements. He believed that as they lessened the mortality of a town they at the same time diminished the burden on the rates. A great many cases had been brought before his notice which showed the necessity of taking energetic action in cases where the disease was of a contagious nature. He thought many of them had little idea of the miserable and wretched state which many poor people were in in that town. In the course of a few months he expected to be able to effect a considerable improvement in the sanitary state of the town. Dr. Yeld then referred to the subject of the toast, and said that although the chemists in the town were not numerically strong they were a thoroughly educated body of men, and he only wished they would devote a little more time to the scientific branch of their profession. The chemist could be of very great service he thought to medical men, for unless the general practitioner was well posted up in his chemistry, he was apt to prescribe drugs which were not compatible with each other, and would therefore counteract the effects of each other. He sincerely hoped the junior members would dive deeply into their science, and do all they could to advance it.

Mr. J. J. Nicholson briefly replied, and said the number present indicated that the profession of the chemist was advancing in this town. He hoped that the suggestions Dr. Yeld had made would be attended to, and that many of their members would take a deeper interest in their meetings and discussions. This was one of the great means by which they could not only advance their own interests, but the interest of the science which they all professed to love. There were many gentlemen who, when behind the counter, would say you ought to do so and so, but never came forward themselves. He hoped that the younger members of the profession at least would be inspired by what they had heard that night to renew their exertions in their studies.

Mr. Harrison Thompson, the vice-chairman, then proposed the health of the president, and said that Alderman Thompson was not only admired by his fellow-chemists, but by all who knew him, for his kind and benevolent disposition. He had been the very life of the Society, and had spared neither trouble nor expense in keeping it together. On all important occasions when their interests were at stake, he was first at the meeting and last to leave. They were deeply indebted to Alderman Thompson, and he hoped he might long be spared to preside over their meetings.

After returning thanks, the Chairman said he had only one object in view in relation to their Association, and that was to promote its success, and thereby improve the status of its members. Referring to his own career in the profession, he said he had attained his position through industry and perseverance, and he hoped he would not be the last chemist who would occupy the post of chief magistrate of the town. The young members of the profession had now a splendid chance to gain scientific knowledge in chemistry, and he hoped some enthusiasm had been that evening kindled in them, and they would go forward with the intention of mastering the science. In a short time he believed that the chemists would cease to deal in little things, and become solely compounders of medicine. After again thanking them for their kindness, he resumed his seat amid much applause.

Dr. Potts, who said he was the guest of Alderman Thompson, proposed "The Pharmaceutical Society," and pointed out that formerly the most dangerous drugs were compounded by men who had had no chemical education at all, but now—thanks to the Pharmaceutical Society—things are changed, and drugs were only dispensed by skilled men.

Mr. Sharp briefly replied, and then Mr. Turnbull proposed "The Visitors." Mr. Harkness, in responding, showed what chemistry had been able to do in the somewhat rough business of making steel and iron. By the aid of the scientific intellect, Bessemer steel was now made direct from pig iron, and through the aid of another chemist, Ratliff,—who was equal to Bessemer—malleable iron was now made direct from the raw material. These operations of course were not in their line, but if the young chemists connected with the Association had any love of their science, they would devote all their spare time to study and research.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 13, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE POSITION OF TRUSTEES UNDER THE PHARMACY ACT.

WHAT is the nature of the provision which a registered chemist and druggist can make for the carrying on of his business after his decease, without contravening the terms of the Pharmacy Act? This is a question that has frequently been asked with considerable anxiety by chemists and druggists, and frequently replied to. The additional elucidation of the problem, however, by the Solicitor of the Pharmaceutical Society, at the last meeting of the Council, and the points raised in the subsequent discussion, are of such importance that no apology is needed for recounting them here. The subject has been previously referred to in these columns more than once, and it is with satisfaction that we note that although it has now been discussed in greater detail, the opinion of the Solicitor is in strict accordance with that which we had ventured to express.

The subject naturally divides itself under three heads: (1.) Who can carry on the business of a deceased registered chemist and druggist? (2.) Under what conditions can such a business be carried on? (3.) How long can such a business be carried on? Taking the report of the discussion printed in last week's Journal for our basis, we shall endeavour to answer these queries succinctly in the order in which they are here set down.

(1.) *Who can carry on the business of a deceased chemist and druggist?* The Pharmacy Act is sufficiently explicit upon this point. It says (sec. 16), "Upon the decease of any pharmaceutical chemist, or chemist and druggist, actually in business at the time of his death, it shall be lawful for *any executor, administrator, or trustee* of the estate of such pharmaceutical chemist, or chemist and druggist, to continue such business." What constitutes a trust, and consequently a trustee, is a question for a lawyer and not for us to decide. It is evident, however, that this part of the section is very elastic, and although it would be a great misfortune if such trusts were very extensively created, their validity would be determined by rules of law of wider application than the Pharmacy Act. The case put by Mr. GREENISH probably illustrates the class of trusts which it would be sought most frequently to create. He asked, if a registered chemist and druggist left his business to his wife to be carried on for the support and education of his children, whether she, not being on the register, could carry it on. Mr. FLUX's reply to this question was explicitly affirmative, with this important proviso,—that there should be an active trust to that effect. He pointed out that by the law of the land these were duties which naturally devolved upon the parent, and that if a widow were left with a business not distinctly charged with the trust of maintaining her children, she was a beneficiary, and not a trustee. This answer will apply to a great number of cases which would only be variations of the foregoing one.

In the event of a registered chemist and druggist dying intestate, his widow, if he leave one and if she choose to act, or his next of kin, can take out letters of administration, and as administratrix may carry on the business. It is important to notice that here it is by virtue of being administratrix, and not through any relationship, that the power to carry on the business accrues, and that a widow, as a widow, stands on exactly the same footing as the children, sisters, mother, or any other relative, none of whom can acquire any right to carry on the business as legatees.

(2.) *Under what conditions can such a business be carried on?* The key to the answer to this question is to be found in the fact that the qualification to carry on the business of a chemist and druggist is now a personal one. Acquired personally by passing a certain examination, it cannot be transferred by its possessor to another person during life, neither can it be transmitted to his successor after death. In this it resembles that of other callings in which examination is the test of qualification, such as the clerical, legal, and medical professions, though for these latter obviously there could be no such provision even as is found in the Pharmacy Act. But on the death of a registered chemist and druggist his name is at once removed from the register, and no other is substituted for it; the question therefore naturally arises, what is the proper style for carrying on such a business? The answer given by the legal advisers of the Society is to the effect that, since the continuance of the business will not be in exercise of any personal qualification in the executors, administrators, or trustees, and will not confer upon them any degree of qualification to carry on business on their own account, or open any new business, the proper style for the conduct of such a business would be—

The { Executors, Administrators, or Trustees. } of A. B. { Pharmaceutical Chemist, or Chemist and Druggist. } deceased

Also, that as it is the intention of the Pharmacy Act that there shall be a personal responsibility to purchasers and the public for the fulfilment of the conditions imposed by clause 17, "the full names of the executors, administrators, or trustees, with the address at which the business is conducted," should, in every

sale of poison, be "placed on the label used for the poison—in addition to, and before the above-suggested style of business." Another condition imposed by the Pharmacy Act is, that the business shall be conducted by an assistant who is a pharmaceutical chemist, or a registered chemist and druggist.

The foregoing are conditions arising out of the Pharmacy Act itself, but of course, beyond these there is the usual responsibility of trustees in respect of debts, actions for damages arising from mistakes, etc., which probably would have a tendency to induce trustees to terminate their trusts as soon as practicable.

(3.) *How long can such a business be carried on?* The answer to this question is, So long as the trust exists and no longer. When the purposes for which the trust was created are accomplished the right to carry on the business by the trustees as representatives of the deceased immediately ceases. In the case of a person administering to an estate,—for instance, a widow,—so long as she carried on the business as an administratrix she would be protected by the Act of Parliament. A certain amount of time would be required to wind up the affairs of the estate, such as the collection and payment of debts, etc., and so long she would stand in the position of a trustee of the estate. But as soon as by force of her own act, or that of the next of kin, a settlement of the accounts takes place and the administration of the estate is terminated, the business would pass from her hands as trustee, and could no longer be legally carried on by herself or any other unregistered person. No person by virtue of having been appointed an administrator or executor could carry on a business for his or her personal benefit.

In thus laying before our readers what appear to be the principal provisions of the Pharmacy Act in relation to this important subject, we have avoided expressing any opinion as to their fairness or unfairness. We know that it has been asserted that the effect is sometimes very harsh, and is the result of an imperfect Act. Still we think it cannot be denied that the reading upon which the foregoing opinions are based, namely, that the qualification to carry on the business of a chemist and druggist is a personal one, which dies with the person acquiring it, is strictly in accordance with the whole spirit and tenor of the Pharmacy Act. We also think it evident that if exception were made in favour of any relative, it would be impossible to establish a limit that would not be harsh to those outside it, and the door would be at once opened to numberless evasions of the Act all over the country.

THE REGISTERS FOR 1874.

THE time has now arrived when, in compliance with the provisions of the Pharmacy Act, 1868, the Registrar has to prepare for publication the registers of Pharmaceutical Chemists and Chemists and Druggists for the year of 1874. We have frequently pointed out the importance to the Pharmaceutical body, collectively and individually, that the greatest possible correctness should be secured for every entry upon these Registers. On the one hand it is indispensable that the judicial authorities, who may be called upon to base their decisions upon the Registers, should find them trustworthy; on the other there is the fact, that absence of a person's name from the Register, is by itself evidence that it has no right to be there, and even an inaccuracy in the entry might involve the person referred to in considerable trouble to prove his claim. To assist in maintaining this desirable accuracy, the Registrar requests us to ask every member of the trade who may be aware of any rectifications in the Registers that have become necessary, in consequence of deaths, removals, or other causes, to send information respecting them *at once* to him at 17, Bloomsbury Square, London.

WE have much pleasure in announcing the safe arrival in India of MR. C. H. WOOD, F.C.S., who was recently appointed Quinologist of the Sikkim Cinchona plantations. MR. WOOD was known to most of our readers as a scientific chemist, and more recently as the able Editor of the 'Year Book of Pharmacy.' MR. WOOD sailed from Southampton on the 28th of August, and after a pleasant voyage arrived safely at Calcutta on the 8th of October, where he remained a guest of DR. HENDERSON, the Superintendent of the Botanic Gardens for about a week. The remaining part of his journey from Calcutta to Rungbee, near Darjeeling, where the plantations are situated, must have been very trying to one accustomed to English modes of conveyance, for owing to the extremely hilly nature of the country, and the badness of the vehicles, the rate of progress did not in some parts exceed a mile an hour. MR. WOOD has now been in his new home nearly two months, and he and his family are now enjoying excellent health. He describes the vegetation and general scenery as magnificent, and the climate all that could be desired. We are sure that all who knew MR. WOOD will unite with us in wishing him a continuance of good health, and success in his new undertaking.

Mr. C. R. MARKHAM, C.B., whose highly succesful labours in the introduction of the Chinchonæ into India are so well known, is about to bring out a memoir of the Lady ANA DE OSORIO, Countess of CHINCHON and Vice-Queen of PERU, A.D. 1629-39, the lady who first introduced the quinine barks into Europe. The book will be in small 4to, printed on laid paper and illustrated with coats of arms, maps, views of the castle and town of Chinchon, some in colours, and will contain a full history of the COUNTESS's family, and the story of her cure and of the introduction and distribution of the bark by her in Europe. The book will also contain a plea for the correct spelling of the genus, viz., *Chinchona*, instead of *Cinchona;* "cinchon" meaning a policeman's belt, and the alteration thus defeats LINNÆUS'S wish to honour the memory of the lady. The book will be published by Messrs. TRÜBNER and Co., and the price to subscribers will be one guinea.

Provincial Transactions.

PHARMACEUTICAL SOCIETY, EDINBURGH.

(North British Branch.)

The first meeting for Session 1873–74 was held in the Society's Rooms, St. Giles Street, on Thursday evening, November 27, at half-past eight. Mr. J. R. Young, President, in the chair. There was a full attendance.

The President gave the following introductory address :—

"When, a few days before the last election, it was intimated to me by Mr. Baildon that the Vice-President preferred in the meantime to retain his present position, and that the Council was desirous, if possible, that my friend and partner, Mr. Brown, should occupy the chair during this year, I promised to do everything in my power to aid in carrying out the proposal. Mr. Brown had been complaining for some time, had gone on a visit to the south of England, and accordingly I wrote him expressing the pleasure it would give us all if he would allow himself to be nominated. Mr. Brown promptly replied, thanking all for the kindly feeling evinced towards him, but regretting that the state of his health was such that he must at present decline. It was in these circumstances, and just on the eve of election, that I was requested to allow myself to be put in nomination. I was not dreaming in the least of such a proposal, having already occupied the chair on two previous occasions; and having no particular views to expound, or mission to accomplish, I felt disposed rather to linger on the memories of the past; but, from the want of sufficient firmness to say "no" decidedly, unlike some friends whom I could easily name, here you find me again for one year. And while I thank you all sincerely for the honour which has been done me, I do hope you will oblige me and gratify the Council by being present as often as possible at the meetings which may be held during the session, more especially at those when we are favoured with addresses from such friends as the Council may be able from time to time to secure. A very little reflection enabled me to perceive the difficulties connected with the position which I had thus somewhat hastily undertaken. I felt that I was succeeding one who from the institution of the Society had been one of its most valued members in this district; who was well versed in its history; who had been most serviceable in negotiating various matters of immense importance to this Branch; who was from experience very familiar with all the duties devolving on any one occupying the chair; who had the confidence of the Society in a very marked degree; and who had discharged the duties of its President during the meetings of the Pharmaceutical Conference in Edinburgh and at other seasons in such a way as to earn the gratitude and admiration of his constituents. Permit me just to say in passing how deeply we sympathize with Mr. Baildon and his family in their sore bereavement, and how earnestly we hope that the soothing influence of time may gradually enable them to recover from the sudden and severe shock which they have had to sustain. It was at a time when Mr. Baildon was President of this Branch of the Society that Professor Christison was kind enough to deliver an address at one of its scientific meetings. In that address the learned Professor sketched very graphically the contrast between this country and the continent in regard to the position which each occupied in the science of pharmacy as it presented itself to his mind during his period of study at Paris and at London; and alive to the steps which had been taken in connection with the formation of the Pharmaceutical Society, he looked forward with much hope to the younger pharmacists as being likely to raise the profession from that dead level to which in this country it had all but sunk. There were in the opinion of the Professor "three cardinal means always within reach" for the attainment of such an object, and these he comprehended in the brief advice, "extend, educate, and purify." Twenty years have nearly passed away since this laconic advice was given, and it may not be amiss now for a very few minutes to consider whether any or what progress has been made in any of these directions. Now I am sure that no one at all acquainted with the Pharmaceutical Society will venture to affirm that a great work has not been accomplished through its instrumentality. Its aim has been from the day of its institution to form into one solid phalanx the previously disunited units of the profession, to break down existing barriers through having friendly intercourse with one another, and by using all legitimate means for extending its influence, make it, what it really has become, one of the institutions of the country, recognized by the Government and the legislature, and every year its usefulness becoming more apparent to the general community. This state of things has arisen in great measure from the position which the Society has all along held in reference to the importance of education. So long as there was no compulsory examination, the Society did everything in its power to stimulate those connected with the profession to place themselves under its wing, and that they were not unsuccessful is proved by the many bright names which in various parts of the country now shine as stars in the pharmaceutical firmament, and which anyone interested in the science can readily point out. Now, however, none can enter its ranks without examination, and, so far as these have yet gone, I think on the whole the examinations are fair, but quite as stringent, as in the meantime they ought to be. Here, in Scotland, we have had, and are likely to have, even greater advantages than heretofore in the matter of education, but as many parents, more especially in our manufacturing towns, throw off their children as apprentices at or about the age of fourteen, it does not appear to me desirable that so long as we must draw our apprentices from that class, that the examination papers for the "Preliminary" should exceed the capacity of the average of boys of that age. It is certainly most desirable that the manner of conducting these Preliminary examinations should be beyond the taint of suspicion, and as rumours have been floating about of late that in consequence of it may be the want of suitable accommodation, or of proper surveillance, there have been occasional cases of supposed collusion amongst the candidates, I do think it is imperative on the part of the Society to use all the means in its power to prevent even the possibility of such an occurrence, and this, in my opinion, can only be done by having a sufficient number of local centres throughout the country, at which places rooms apart from places of business should for the time being be secured, and during the examination the local secretary of the district should attend, and be paid a proper fee for such attendance. I am well aware of the amount of work which our local secretaries have so long, so efficiently, and so ungrudgingly discharged, in the interests of the Society, but now that it has reached a point that its funds are sufficient, I think it is only an act of justice and fair commercial dealing that such an arrangement as has been indicated should be honestly carried out. I dislike the idea of handing over these examinations to other parties, and equally so that of confining them exclusively to London and Edinburgh, and very much for the reasons given in the very able letter of the late president, Mr. Haselden, which appeared in a recent number of the Journal. As regards the scientific examinations no great difficulty should be felt by our young men in mastering them, but it would tend very much to their convenience, and without lessening the value of the examination, if the system as at first introduced, or at any rate some modification of the present, was adopted by which, in the event of failure on a first attempt, the candidate should be told where he is deficient, and have credit given him for the subject or subjects in which he may have passed, thus giving him a measure of encouragement, and leaving him to concentrate his energies for a succeeding

examination on those subjects in which he is defective. It must always be borne in mind that the scientific acquirements of our young men are mostly attained during the period of their apprenticeship, when hard at work from morn till night, and that it is scarcely fair to place them on a level with the students of medicine, who for three or four years devote themselves exclusively to their studies. With all or many of these little matters still under consideration I think it will be admitted that, on the whole, we have made progress, and that the pharmacists of the present day are in advance of the past in so far as that there exists a very general feeling that everyone who now enters the business should be something more than a mere trader in the articles in which he deals; that he is now more fitted by his training to examine the goods received into stock; that he is interested in their history, qualities, and medical properties, and in many cases possessing the ability and having the inclination to make minute investigations regarding them. He is now much more alive to the responsibilities under which he labours: he watches with jealous care the manufactures of the various compounds in his laboratory: he becomes truly the handmaid of the medical attendant who, confiding in the purity of his preparations and the accuracy with which they are dispensed, engages in his arduous work with the conviction that in so far as the medicine prescribed can be effectual for the relief of his patient, every precaution has been taken, and his minutest instructions fully carried out. Unfortunately the purification specially recommended by Professor Christison is in many cases still wanting: the sale of quack medicines is rife as ever throughout the country, and so long as existing regulations continue regarding them it is not easy to see how any change can be effected. The most worthless nostrum, if sufficiently advertised, is sure to sell, and the day seems yet a long way off when the pharmaceutical chemist will be at liberty to take up such a position as will enable him to dispense altogether with their sale. Counter practice also prevails to a considerable extent in certain districts of the country; but for this the chemists are not wholly to blame. In some districts it would be impossible for a chemist to live did he not to some extent indulge in such a course, and in addition add to his stock many articles of a heterogeneous kind, the sale of which he would gladly, in other circumstances, avoid. Hucksters, it is true, are not now allowed to add to their stores paregoric, laudanum, and such like medicines, nor are they permitted to dispense prescriptions as in days gone by, but the evil is that, in most cases, the medical men in country towns dispense the prescriptions, and the huckster has very much the entire sale of castor oil, tincture of rhubarb, and medicines of a similar nature. I have no doubt that some remedy will ultimately be found for this state of things. Within my recollection an entire change has taken place in Edinburgh in regard to dispensing by medical men. I can remember when the leading medical men had well-appointed surgeries, each with a full staff of apprentices, for preparing their patients' medicines. Now, no such thing exists; even the youngest city practitioner shrinks from the idea of such a course, and as a consequence counter practice is discountenanced, and the result is pleasing and beneficial to all parties. You are all aware of the decision which was recently given under the Adulteration of Food Act, in reference to the sale of what has hitherto been called "effervescent citrate of magnesia," and of the excitement occasioned thereby throughout the trade. Such a decision points to a far higher condition of professional responsibility than we have yet dreamt of, and if such remains unchallenged and unaltered, will necessarily render it imperative on us all to examine very specially not only the quality, but also to weigh well the very name of every article admitted into our several places of business. Considerable discussion has taken place in reference to the course which should be adopted in dealing with this article in future. Mr. Bishop has taken high legal opinion, and announces his intention of retaining the name as it is, so far as his preparation is concerned, and as it does contain magnesia, the want of which in the article as supplied by Mr. McDermott led to the conviction, it seems to follow that all other manufacturers must in future introduce magnesia into their preparation. As the compound is not a citrate of magnesia a change of name, as suggested, would in my opinion have been the right course to adopt, but as Mr. Bishop's manufacture is well known to the public, is really an agreeable and refreshing beverage, and will continue to be advertised extensively, as heretofore, other manufacturers will be obliged to conform or leave Mr. Bishop to enjoy the full benefit of his invention. In connection with this it is well to observe that a meeting of chemists and druggists in London has been held under the auspices of the National Chamber of Trade, for the purpose of considering this very case, at which resolutions were moved and carried, that the judgment was contrary to equity, and that Parliament be petitioned to repeal that portion of the Act which relates to drugs and chemicals. This seems to me the right course to pursue, and I hope every encouragement will be given to the committee which was appointed to carry out the resolutions, so that it may proceed vigorously. During the recess the cabinet with specimens for the use of candidates for the scientific examinations has been carefully refitted. It contains specimens, and good ones too, of all the substances on which a candidate is examined, excepting the fresh botanical specimens. The cabinet will be open for inspection at such times as the Secretary will name hereafter. Ample provision has, as usual, been made for attendance on special terms by our young men at the classes of various lecturers on different branches of study, and in addition for the convenience of those who have not leisure during the day, Mr. Melville has opened classes in the evening for instruction in botany, materia medica, chemistry, and pharmacy; but of course it must depend on the number who join these latter, whether or not they will be continued. Many very interesting specimens have been added during the past year to the museum, and I have the pleasure to-night of presenting to the Society from my partner, Mr. Brown, a number of volumes which will tend very much to enhance the value of the library as one of reference. Mr. Brown was for a considerable period the convener of the library committee, and the members of that committee know well the zeal and enthusiasm with which he has all along advocated the importance of an extensive library. Many of us at times have thought his views a little Utopian, but he has proved by his valuable donation how sincerely he holds them, and how willing he is to help in having them carried out. From the experience acquired during the time we have occupied our present premises it is very evident that more efficient provision must be had before the full benefit we anticipated can be obtained; but from the interest taken in the welfare of the North British Branch by the parent society, and their determination to maintain it in a position commensurate with its connection, I have no doubt that everything will be arranged so as to secure the comfort and instruction of all who frequent the rooms."

At the close of the address Mr. John Mackay made a few remarks on some of the subjects alluded to by the President. He made special reference to the citrate of magnesia case, and to the movement in connection with it which had been taken in London at the recent meeting of the National Chamber of Trade, and thought chemists and druggists might fairly consider whether they should agitate for a repeal of that portion of the Act embodied in the Adulteration of Food Act which relates to interference with drugs and chemicals; stating that if some effort of this kind was not made, there was the prospect of constant annoyance in regard to many things in daily use in every pharmacy. He concluded by moving a vote of thanks to Mr. Young for his able and interesting address, which was carried by acclamation.

The Secretary then proceeded to draw the attention of the meeting to the handsome contribution of books by Mr. D. R. Brown (of Messrs. Macfarlan and Co.) to the library of the Branch of the Society in Edinburgh. The volumes numbered 209, and being on the table would speak for themselves. Not only were there several valuable scientific works of reference among them, but their good condition and the handsome binding of most of the volumes would commend them as being well suited to grace the shelves of the library. He proposed a very cordial vote of thanks to Mr. Brown for this present to the Society. This was unanimously and with acclamation carried.

The following is a list of the volumes presented to the library of the North British Branch of the Society in Edinburgh by Mr. D. R. Brown :—'Philosophical Transactions,' 18 vols.; 'Edinburgh Philosophical Journal,' 14 vols; 'Edinburgh New Philosophical Journal,' 50 vols.; 'Report of British Association,' 17 vols.; 'Cicero,' 10 vols.; 'Edinburgh New Philosophical Journal,' new series (1864), 19 vols.; 'Braithwaite's Retrospect of Medicine,' (1869), 59 vols.; 'Paris Universal Exhibition Catalogue, British Section,' 1 vol.; 'Scoresby's Magnetical Investigations,' 2 vols.; 'Metcalfe's Caloric,' 2 vols.; 'Catalogue of Library of R. C. P. and R. M. S.,' 1 vol.; 'German Pharmacopœa' (1872), 1 vol.; 'Lucretius, de Rerum Natura,' 3 vols.; 'Murray's Chemistry' (1806), 4 vols.; 'Duncan's Edinburgh Dispensatory' (1st Edition), 1 vol.; 'Duncan's Edinburgh Dispensatory (12th edition), 1 vol.; 'Lewis's Dispensatory (1781), 1 vol.; 'Complete English Dispensatory' (incomplete), 1 vol.; 'Berzelius, Treatise on Chemistry' (1839), 3 vols.; 'Haydn's Dictionary of Science,' 1 vol.—in all, 209 volumes.

In addition to Mr. Brown's presentation, the Secretary had further to announce the following donations to the library :—

From Messrs. Macfarlan and Co., North Bridge: 'Renodæus, Medicinal Dispensatory' (London, 1657); 'Pharmacopœia Medico-Chymica,' 1662; 'Dalei Pharmacologia' (London, 1737), 2 copies; 'Zwelferi Pharmacopœia,' 1672; 'Pharmacopœa Parisiensis' (Paris, 1738); 'Pharmacopée Universelle (Paris, 1738); 'Pharmaceutical Times,' vol i., 1847. From Messrs. Frazer and Green, 'Druggists' Price and Stock Book. The 'Pharmacist,' from the Chicago College of Pharmacy. Catalogue of Books in 17, Bloomsbury Square, belonging to the Society in London. 'Transactions' of the Chemical and Royal Societies in London for the current year, from Mr. John Mackay. For the Museum: Galls on English Oak, from Professor Maclagan; and a piece of Lignaloe (*Amyris Tecomaca*), Mexico, from Professor Archer of the Museum of Science and Art.

The Secretary then made the following announcement to the meeting.

The Secretary begged to draw special attention to the fact that the President of the Society in London, Mr. Hills, had in the most kind, generous, and liberal manner, given funded property, yielding £5 per annum, to the North British Branch, for the following purpose, viz., that of presenting books to the young man who stood highest in marks at each Minor examination in Edinburgh. It has therefore been arranged that as there are at present four examinations each year, £1 will be devoted at each meeting to be spent as indicated by the donor. If applications for examination become so numerous as to call the board together *five* times a year instead of *four*, then there will always be sufficient funds to continue the prizes. One word as to the application of the sum. It is Mr. Hills' expressed desire that the successful candidate be allowed to name the books he would like, but it must be distinctly understood that as the prize is to be given for the purpose of aiding the successful Minor to prepare for the Major examination, so the books named must be in connection with his forward studies, and therefore pertain to chemistry, botany, or pharmacy. No literary volumes will be allowed to be selected, as the main feature in the gift would be thus destroyed. The first application of the grant falls to be made at the January Examination, and the prize adjudged by the board of the examiners, when the numbers and marks of the candidates have been summed up and obtained. The Secretary then proposed that the meeting should award a very hearty vote of thanks to Mr. Hills for his liberal and handsome gift to the North British Branch of the Society; that the same be entered in the minutes, and conveyed in writing to Mr. Hills.

This proposal was met with acclamation, and the thanks of the North British Branch was cordially and unanimously passed to Mr. Hills.

Mr. Gilmour, Vice-President, then gave a very interesting lecture on the Polariscope, which he illustrated with the oxy-hydrogen light, numerous diagrams, and a great many very beautiful illustrations upon the screen. The crystallization of some of the substances was very interesting and striking, particularly that of santonin and tartaric acid. All the experiments were eminently successful, and at the close a hearty vote of thanks proposed by the Chairman was unanimously and enthusiastically carried.

The meeting then adjourned.

LEEDS CHEMISTS' ASSOCIATION.

The Annual Meeting of this Society was held on Wednesday evening, Nov. 12th, at the Trevelyan Hotel. Tea and coffee, with refreshments, were provided. About 120 persons sat down to an excellent repast; after which the business of the Society was proceeded with by the Hon. Secretary (Mr. J. W. Longley) reading the report and minutes of last meeting.

Mr. Freshfield Reynolds (the President) then delivered the following address :—

"I have to crave your kind indulgence, whilst in obedience to the time-honoured English custom of speech-making, I venture to address a few remarks to you this evening. But a few weeks ago it had never crossed my mind for an instant that I should be asked to become the President (for the ensuing year) of the Leeds Chemists' Association, under whose auspices we meet here to-night. I can honestly say that it is by no desire of my own that this position is not filled by some one of those older, abler, and better-known gentlemen who sit around me. I wish very much, both for your sakes and mine, that one of these had the opportunity of providing for you (now that we have taken thought for the wants of the body) an intellectual repast, fertile in imagination, and full of brilliant thoughts, such as the accomplished Mr. Schacht entertained the members of a similar association with, at Bristol only the other day. But, gentlemen, the banquet was for the sunny South this year; you must be content with only a few crumbs. The attitude which we, the chemists of Leeds, have assumed towards each other to-night, by meeting in this social manner, puts me in mind of a fact or two dwelt upon by Professor Williamson, in his recent inaugural address to the British Association, at Bradford. Speaking of the atomic theory, he reminded his audience that under favourable conditions, the molecules, or clusters of atoms of which matter is made up, are always acting and reacting upon their neighbours. If the adjacent molecules are of distinct natures (or, so to speak, of different nationalities), then a blending of races takes place, and new compounds are formed, having often distinctive characteristics and new powers. But if the molecules are all of one kind, then in the absence of alien or hostile ones, they proceed to act upon one another. One is tempted to pause and ask whether this law which works so silently in nature, is one and the same with that which actuates the untamed and savage tribes of American Indians, or of Central Africa? The former doubtless would rather scalp, and the latter rather devour, a white man or molecule, than one of his own kind; but failing a white man, I fear a friendly molecule would fare no better.

But is there not a wide difference between the all-wise law of the Creator as exhibited in the atomic process of nature, and that law (or rather absence of law) which rules the human passions of the savage? If we consider for a moment, we shall perceive that the design of the savage is solely *destructive;* whilst the design of nature is at once *destructive* and *constructive.* And may it not be that this very action which is constantly at work between neighbourly molecules, and which at first sight appears to be of a hostile character, is only part of a beautiful arrangement, by which stagnation or indolence of matter is prevented? But perhaps some of you will be saying, what on earth has this to do with our social meeting? Allow me to explain, gentlemen. We, the chemists of Leeds, are, if you please, molecules of the same genus. May I venture (for the sake of elaborating the idea) to assign the name of "Composing Atoms" to our associates present? Now, in a general way, we may regard the public as hostile molecules, upon whom, under our various *aliases* of Rhubarb, Aloes, Calomel, and Co., we are accustomed to act and react. But in the absence of these alien molecules let us act in a friendly spirit upon one another. I hope we shall all be refreshed by the process, and be the better friends when we part. Reverting again to Professor Williamson's address, it is cheering to find from so high an authority that, amidst the vast and rapid changes through which the science of chemistry has continued to pass of late years, there is at least one great discovery of a past generation which still, in his opinion, remains to be a truth. Let me tell you in his own words what he said about the great Dalton's "atomic theory." He says, speaking of a time when Dalton had ceased from his labours: 'The father of the atomic theory was no more; and the little infant had no chance of life, unless from its own sterling merits it were found useful in the work still going on. What, then, was the result? Did it perish, like an ephemeral creation of human fancy? Or did it survive and gain strength by the inquiries of those who questioned nature and knew how to read her answers? Although anticipating my answer to these questions, you will probably be surprised to hear the actual result which I have to record—a result so wonderful that the more I think of it the more I marvel at it.' Speaking of subsequent discoveries, he goes on to say:—'Not only did these various theories contain nothing at variance with the "atomic theory;" they were found to be natural and necessary developments of it, and to serve for its application to a variety of phenomena which were unknown to its founder.' The Professor also pointed out how the further development of this beautiful atomic theory has explained to us the mysteries of *Isomeric Compounds.* I well remember in my early apprentice days that an older fellow apprentice persisted in affirming that essence of lemon and turpentine were one and the same thing. Now, I think I did not doubt his word (for he whose gentle spirit has since been borne to a more peaceful world was incapable of telling a falsehood), but I am sure I did doubt whether the *ignorance* of the science of chemistry was not more wonderful than its *knowledge.* So much for the evidence of one's senses. But now the mystery of isomerics is explained, and bodies externally differing, but containing precisely the same number of molecules of the same families, are known only to differ by the manner in which those molecules are arranged. To a fuller understanding of this important fact, I believe we are indebted for many recently invented chemical bodies. It seems probable, also, that the artificial building up of substances like the vegetable alkaloids will be accomplished by the application of the knowledge of their exact composition, which this theory has furnished. This, you know, is a day when 'trades'-unions' flourish, and we are met here to-night somewhat in the character of a trades'-union. There is, however, one feature in which ours differs from most others, and which should commend it to the gratitude of a not over appreciative or generous public; thus, whilst colliery owners combine to keep the price of coal at what to many must be almost famine prices, in order that they may fill their pockets with a daily profit almost equal in amount to the average annual returns of a chemist and druggist's business; whilst butchers and farmers combine to place that ancient staff of an Englishman's life, roast beef, beyond the means of genteel poverty; whilst even the vendors of the sky-blue liquids hitherto known in our large towns by the generic term 'milk,' are forgetting their former petty jealousies and their little scandals, about Mrs. Cunning's stealthy visits to the cow with the iron tail, and Mr. Cheet-'em-well's belief that the daily consumption of even milk and water is unwholesome without the addition of say Cret. Ppt.,—I say even these much-abused members of society are uniting against their common enemy the "Adulteration Act," and they too demand a higher price for our children's staff of life,—and, lastly, whilst the main object of unions of every description of paid labour, down even to the agriculturist, is to enhance and force up the price of that labour; hitherto the aim of our Association has been to give the public better value for its money. For if we except this one annual social gathering, our chief energies are spent in endeavouring to give increased technical educational advantages to those who will make the future pharmacists of England. I venture to say that this being the principal object of our existence as an Association, we have a high and noble calling, however imperfectly and humbly it may have been followed hitherto. Some of us may feel that we are not able to do much by our own hands or heads to further the movement, but let us remember that our own noble town hall is built up of individual stones; the foliage but lately so beautiful in our matchless public park was made up of single leaves; and the very water composing its extensive lakes once existed as tiny dew or rain drops; so let us all make a fresh resolve that in the future our Association shall be a noble structure, because it shall be built up by, and composed of, the best efforts of every single member. In commending to you, gentlemen, who are our associates, the means of acquiring scientific information which are offered by Mr. Ward's chemistry classes, and Mr. Abbott's materia medica lectures, I believe it is not too much to say, that no provincial society enjoys the advantage of the educational services of abler or more conscientious teachers. The fees, moreover, for these courses are exceedingly small, and I hope that you will encourage those gentlemen by crowding their class rooms during the present session. The early closing movement has, I am glad to say, made considerable progress, even amongst the members of our trade, and I trust it is also very generally acknowledged by employers that they are bound not only in their own interest, but in absolute duty to their apprentices, to make way for them to avail themselves of such opportunities for technical instruction as I have referred to. And I maintain that, the examinations of the Pharmaceutical Society (at least so far as the Preliminary and Minor are concerned) being now made compulsory by Act of Parliament, no master can overlook his responsibility in this matter without doing a positive injustice to his pupils. Into the vexed question of educational centralization, or de-centralization, pharmaceutically considered, it is not my intention to enter; you are doubtless aware that a much abler brain than mine has already guided the pen on behalf of the interests of provincial chemists. I have the greatest sympathy with those to whom science is a hard mistress, and the pursuit of her mysterious depths no fondly wooed love; to whom, in fact, the systematic study of chemistry and botany is akin to constitutional Gregory's Mixture. I have a belief that the greatest difficulty these have to overcome is very much in the mastering of the first principles of science, the foundation upon which the superstructure is to be reared. There must of necessity be a good deal of drudgery in this where the bent of the mind does not lie in the direction required. My advice to all young men who feel this to b their case, is, to begin

their arduous work as early in life as possible ; by so doing they may perhaps soon overcome the dislike to uncongenial study, and having conquered the rudiments, find a real pleasure in the further pursuit of science. The recent sitting of the Pharmaceutical Conference at Bradford may possibly form the subject matter of one of our monthly meetings ; but there is just one question which occupied its attention, to which I will briefly call your notice. It is a question of considerable importance to the trade at large, namely, 'What is the duty of the dispenser when an unusual or excessive dose is prescribed?' The practical issue of the discussion was the adoption of a resolution to the following effect :—

> 'That this Conference having duly considered proposals for the use of special signs to mark unusual doses in prescriptions, and the great advantages to be derived from them, considers that the bracketed initial letters of the prescriber's signature, written immediately after the unusual dose, is the best method for the purpose. The Conference also urges upon medical men the importance of the prescriber's full name and address being written on all prescriptions to facilitate communication between the prescriber and dispenser. The Conference likewise considers it desirable for the dispenser to retain all prescriptions in which initialled unusual doses are presented.'

It was left with the officers to circulate the resolutions among the profession in the manner they thought most desirable. In the wisdom of this course I think you will all unite. Should the suggestion be adopted by the medical profession generally, dispensers will be relieved from much occasional perplexity. I need hardly point out the extreme undesirability of discussing, on a *quasi*-public occasion like the present, our personal experiences in relation to the clerical errors of prescribers. Of the smart controversy arising out of the well-known Ramsgate case, but little need be said, except that, had the precaution now proposed been in vogue, all the unseemly squabble might have been prevented. In dismissing the subject, I will venture to affirm that there never was a time when the medical profession, as a whole, was more cordially disposed towards pharmacists ; and the way for us to maintain this desirable state of things is, to act in all cases of difficulty or doubt (where immediate access to the prescriber is impossible) according to the dictates of experience and common sense. Turning to another subject of trade interest, I may remind you that the past few years have witnessed the rapid development of what is popularly termed the "co-operative," or "mutual supply" system, by means of which private families are enabled to obtain goods of almost every description at a small percentage above manufacturers' prices. I have some doubts whether the political economists who first advocated the establishment of this system ever intended it to apply to the general wants of society as a whole. At all events, I think it was originally designed to enable the then, perhaps, underpaid working classes to purchase the necessaries of life on equally advantageous terms with their wealthier neighbours, who were larger consumers than themselves. And so long as the plan is confined to such an object, it appears reasonable enough ; but when the principle is strained to admit of co-operative societies being formed amongst the rich and well-to-do classes, it becomes vicious in its character, and utterly inconsistent with true political and social economy. As Englishmen, we are justly proud of our past and present national prosperity, and of the general harmony and contentment which reign amongst us : is it boasting to say that this enviable condition of things is largely and principally due to the sterling character of England's trading citizens? Napoleon might call us a "nation of shopkeepers" in derision, but I say, gentlemen, he unconsciously pointed to a great truth, namely, that the energy, the shrewd common sense, the methodical habits, and the steady application of purpose acquired in the active business of the shop, has played no mean part in the chapter of England's success. What, then, is the bearing of all this? Carry out this new-fangled system to its logical conclusion, extend its ramifications throughout the kingdom, establish its stores in every town and village, and what then ? Why, simply the annihilation of the retail trader. The great industry of the middle classes is swept away, and we must all sink to the dull level of the artizan or labourer, or else swell the already over-crowded ranks of official or professional life. Our own trade is, by its very nature, somewhat sheltered from the worst attacks of this pernicious system. The question of 'personal confidence' enters so largely into the relations existing between pharmacists and the public that the co-operative store cannot easily undertake our functions and responsibilities. This argument, however, applies mainly to the dispensing of medicines. We are all aware that the majority of chemists depend more for their livelihood upon the miscellaneous wants of their customers than upon 'dispensing' *pur et simple*. Now it is quite evident that in the large branch of retail business embraced by the patent medicine catalogues, as well as in the domains of aërated waters, perfumery, and what are called 'druggists' sundries,' there is little to hinder the co-operative store from stepping in and robbing us of our legitimate trade. Can anything be done to prevent such a result from coming about ? Nothing can be done with 'the public' (because 'the public' is human nature in its least responsible aspect) unless you frighten it. Let a bishop be poisoned in a co-operative establishment, and then the favourable moment may have arrived. It appears, then, that we must endeavour to make it as difficult as possible for these societies to obtain our class of commodities at wholesale prices. This may be difficult, but something may be done if associations like our own, as well as individual members of the trade, would take the matter up, and, in a respectful but firm circular, address all wholesale houses, and also manufacturers, remonstrating against the practice of supplying societies which are ruining their best friends, namely, the retail traders. If, after this, any houses be found countenancing the practice, then the laws of self-preservation will naturally come into action, and retail traders must *combine*, and become their own 'wholesalers.' There is yet another, and even less agreeable phase of the subject, as illustrated by the defection of members of our own ranks. If a pharmacist so far abandons his *esprit de corps* as to sell himself and his pharmacy to the enemy, no words of mine, I am sure, can express the contempt with which you and I regard the traitor. I trust our Association is far too honourable to contain such an one. I now propose to draw your attention to a subject of great importance to all of us, namely, the bearing of the 'Adulteration of Food, Drink, and Drugs Act' upon the business of a chemist and druggist. Doubtless most of the gentlemen now present are aware that a London tradesman was fined £10, under the operation of the Act alluded to, for selling an article labelled 'Effervescing Citrate of Magnesia,' but which contained no magnesia at all. This is so far as I know the first prosecution for the adulteration of a drug, under the new Act ; and it not unnaturally makes one desirous of knowing how far we are amenable to it. I have very carefully gone through the whole legislation on the subject of adulteration, subsequent to, and including the Act of 1860. I will therefore in the first place endeavour to convey to you a clear idea of how the law stands, so far as it affects us. 'The Adulteration of Food and Drink Act' passed in 1860, was confined to the *sale* of adulterated articles 'in fraud of Her Majesty's subjects, and to the great hurt of their health,' etc. By a special clause in this Act, 'drugs and articles commonly used as medicines' were exempted from its operation. But I believe it has been generally overlooked that, by the xxiv. clause of the 'Pharmacy Act of 1868,' 'all articles taken or sold as medicines' are brought under the Adulteration Act of 1860. The clause runs thus :—'The provisions of the Act of the 23rd and 24th of Victoria, chapter 84, intituled "An Act for preventing the adulte-

ration of Articles of Food or Drink" shall extend to all articles usually taken or sold as medicines, and every adulteration of any such article shall be deemed an admixture injurious to health ; and any person registered under this Act who sells any such article adulterated shall, unless the contrary be proved, be deemed to have knowledge of such adulteration.' By this clause, be it observed, the Adulteration Act is made to apply *more stringently* to drugs than even to articles of food and drink. Firstly, because it *assumes* (unless proved to the contrary) the guilty knowledge on the part of the seller ; and secondly because *all* adulteration or admixture of drugs or medicines is to be considered injurious to health. The Act of 1860 proving very much a dead letter, another was passed in August, 1872, intituled 'An Act to amend the Law for the Prevention of Adulteration of Food and Drink, and of Drugs.' Now the 4th clause of the new Act says that, 'The Pharmacy Act, 1868, and the Adulteration Act of 1860 shall be deemed to be incorporated with this Act.' It is most important to observe, that, by the incorporation of the Pharmacy Act, 1868, we may be brought into grave difficulties under the 15th clause of the said Act. And I desire the more forcibly to draw attention to this because, in the printed copies of the Act which I have seen, the *marginal heading* or *summary* does not give one any idea of the true nature of the clause. The marginal note runs thus :— 'Protection of titles, and restrictions on sale of poisons ;' and yet, gentlemen, the most important part of the whole clause is contained in these words, 'or who shall *compound* any medicines of the British Pharmacopœia except according to the formularies of the said Pharmacopœia shall for every such offence be liable to pay a penalty of five pounds.' It may be this word *compounding* was only intended to apply to the dispensing of the prescriptions of qualified medical practitioners ; but I shall be able to show that it is by no means safe to rest satisfied with such an interpretation of the word ; indeed, I believe any chemist might be made to suffer a penalty, under the Adulteration Act, for selling to a retail customer an ounce of any compound, for which there is a formula in the British Pharmacopœia, which has not been prepared strictly according to that formula. Hence any pharmacist having his own private recipe for 'Spirit of Sal Volatile,' Quinine Wine, or, say Soap Liniment, is, literally speaking, prevented under a penalty of £5 from ever retailing the same. I think, however, there is a loop-hole out of this dilemma to be found in the 16th clause of the Pharmacy Act, 1868, which specially exempts 'the making or dealing in patent medicines' from its own operation. I think there is nothing to hinder a person putting up *any rubbish*, and labelling it 'Smith's Tincture of Rhubarb,' so long as it bears the 'respectable' Patent Medicine Stamp. But to return to the Adulteration Act of 1872— its first, second, and third clauses run thus :—

'1st. Every person who shall wilfully admix, and every person who shall order any other person or persons to admix, with any article of food and drink, any injurious or poisonous ingredient or material, to adulterate the same for sale ; and every person who shall wilfully admix, and every person who shall order any other person or persons to admix, any ingredient or material with any drug, to adulterate the same for sale, shall for the first offence forfeit and pay a penalty not exceeding £50, together with the cost attending such conviction ; and for the second offence shall be guilty of a misdemeanour, and be imprisoned for a period not exceeding six calendar months, with hard labour.

'2nd. Every person who shall sell any article of food or drink, with which, to the knowledge of such person any ingredient or material, injurious to the health of persons eating or drinking such article, has been mixed ; and every person who shall sell as *unadulterated* any article of food and drink or any drug which is adulterated, shall for every such offence forfeit and pay a penalty not exceeding £20,' etc., etc.

'3rd. Any person who shall sell any article of food or drink or any drug, *knowing* the same to have been mixed with any other substance, with intent fraudulently to increase its weight or bulk, and who shall not declare such admixture to any purchaser thereof before delivering the same, and no other, shall be deemed to have sold an adulterated article of food or drink, or drugs, as the case may be, under this Act.' Now, I would like to ask any common-sensed Englishman (not being a lawyer) if there is not running through all these clauses the clearest and most unmistakable evidence that the penalties of the Act were only intended to apply to wilful, known, or fraudulent adulteration ? But alas ! for plain English, when a lawyer is the interpreter ; for, Mr. Justice Blackburn (who has the reputation of being a sound one), in deciding a case sent for appeal to the Court of Queen's Bench, said, 'It is difficult to say what the 3rd section means, but I am clearly of opinion that it is not necessary to prove a guilty knowledge on the part of the seller' ! If this is not driving a coach and four through an Act of Parliament I don't know what is ! In the PHARMACEUTICAL JOURNAL of a recent date (November 8th) we have ample testimony from the lips of the President of the Pharmaceutical Society, Mr. Hills, of Mr. Sandford, and also of Mr. Haselden, that the qualifying words, knowingly, fraudulently, and wilfully, were introduced by the Marquis of Salisbury, with the concurrence of Lord Granville, at their special request, and with the express purpose of modifying, and of making more just the penal operation of the Act. One word more respecting the citrate of magnesia question, and I will leave the whole question in your hands. I am not sorry that it is now necessary for us to abandon an ill-chosen and misleading name for an elegant and popular preparation ; and that henceforth we may clear ourselves from the stigma of sailing under false colours and adopt a form of label which will at least be *honest*, if not scientifically accurate. We have not yet followed the example of some kindred associations in inviting ladies to attend our annual gatherings, and as they are absent this evening, perhaps we may the more freely speak of their possible future connection with the calling of pharmaceutical chemist or chemist and druggist. The question has more than once I think been debated in the Council of the Pharmaceutical Society, at present with a decision adverse to the ladies, as to whether they should be admitted to its examinations. I may here observe that I am by no means at present a convert to the 'women's rights' programme in its most pronounced form ; but we must pay some regard to the signs of the times, and be prepared for what is not unlikely to come about in the larger domain of national politics. It may be remembered as not without precedent, that what a government (with a large majority at its back) had refused to grant to a small section of its supporters, another government (with a very small majority) has been constrained to yield to its *opponents*. Such a thing *may* happen again. And in the event of the political franchise being granted to women, I anticipate that, in smaller matters, decisions favourable to their claims would speedily follow. Putting on one side, therefore, any question of good taste in the matter, and the desirability or otherwise of ladies having to attend to the miscellaneous wants (not always of a delicate character) of a chemist's customers, I warn you, gentlemen, who are students, that at no very distant date, you may have to compete for honours with the gentler, but by no means always mentally inferior sex. And now, in conclusion, I will venture to address a few more remarks especially to *you*. You are not ignorant of the increased and increasing competition in all branches of commerce ; thus the difficulty of making a living and of providing for the families which I hope some day you will be the happy possessors of is augmented. Then, this is not an age of 'physic.' Medical practice is more rational, if less favourable to the chemists' interest, than formerly ; prices which in most branches of industry are

steadily advancing, do not follow the same rule with us; and again it is possible the co-operative system may become a serious rival in the future. What then should you do? Quit the business, says some one! By all means if you like,—but will you find things much better elsewhere? Your truest course is to use all the facilities for obtaining scientific knowledge within your reach; store up in your minds all the information thus obtained; learn to apply it to the requirements of the age in which we live, and then you will have a stock-in-trade which no co-operative store can supply, and few competitors of any kind will be found to undersell you. The greatest king the world ever saw, when he was told to ask of the Great Head of the universe whatsoever he would, asked neither silver nor gold, neither great possessions nor great power, but he asked that which was of higher intrinsic value than these, and yet at the same time was the pass-key to them all,—He asked for 'Wisdom and Knowledge.'"

After a few remarks by Mr. W. Smeeton on the Adulteration Act, he said the system of co-operation, no doubt required well looking into before a decision was arrived at. He believed it first originated with some clerks at the General Post Office buying a chest of tea. One way he looked at co-operation was this:—Suppose there is a village of 1000 inhabitants, and there is one grocer to the whole number of inhabitants, and that he turned over say a £1000 a year, and when all expenses were paid he cleared £100. Well, so far, so good; but somebody said, "Let us club together and see if we cannot manage better than that." So they form a co-operative store, and the result is that the £100 has to be divided among the 999 members, which leaves them about 2*s.* per head, perhaps not so much, because there will be the extra expenses of a manager for the business, and the profits no doubt will not be so large, for, generally speaking, a man can manage his business better than a paid servant. Then, of course, we see the poor grocer ruined, who perhaps has a large family; and the only advantage that is derived by the inhabitants is that of being a shilling or so richer at the end of the year.

Mr. E. Brown fully endorsed the remarks of Mr. Smeeton respecting co-operation. One topic of the address just read he should like to say a word about, and that was the Preliminary examination. After a few words of good advice to those who were preparing for the examinations,

Mr. Abbott and Mr. E. Yewdall both spoke very warmly on the subject of adulteration, and urged the necessity of the trade binding themselves together, and getting better prices for the articles sold by them.

Mr. R. Reynolds said that as a public body they had a right to criticize the Act. The question of citrate of magnesia would no doubt require an alteration of labels; but it was to be hoped the injustice would be righted, and that that was an isolated case. In the country they had many advantages over co-operation which they had not in London, for there, there was no doubt, the various trades had suffered bitterly during the last few years, and the most cruel injury had been done them. Everything should be done that could be done to bring the influence of the Association to bear to protect themselves and try and avert the evil, or modify the degree to which the evil might extend.

Mr. Barclay (Messrs. Southall, Son, and Dymond) said it gave him great pleasure to meet the chemists of Leeds, and to propose the vote of thanks to Mr. Reynolds. He was also glad to see such a number of young men assembled together, and to hear from the report, that there was an increase in the number of associates. He should like to mention a word in reference to the co-operative stores. He did not think there was much to be feared on that ground. Liverpool had passed through the ordeal with fear and trembling, and the co-operative stores had come to an untimely end. He then briefly referred to the Adulteration Act, and advised the raising of prices, because there were greater expenses to bear, better education to provide, higher rents to pay, and larger wholesale prices to give. He had very great pleasure in proposing a vote of thanks to Mr. F. Reynolds for his able address.

Mr. Jefferson seconded the vote, after which Mr. F. Reynolds briefly returned thanks, and introduced Mr. Davis of Harrogate, who then read an abstract of a paper entitled:—

Monthly Analytical Examinations of the Harrogate Spas, 1872.

I have been requested by my friend, Mr. Reynolds, to occupy your attention on this occasion for a few minutes with an abstract of a paper by myself, recently published in the *Journal of the Chemical Society*, entitled "Monthly Analytical Examinations of the Harrogate Spas, 1872."

I feel somewhat diffident in bringing before you a matter which can hardly be classed as belonging to the domain of pharmacy. Nevertheless, I hope it may be of some little interest to you.

Anyone who has compared the tables of analyses of a mineral water, which has been submitted to repeated analytical investigation at considerable intervals, must have been struck with the discrepancies, and the conclusion usually arrived at is that the greater accuracy with which these examinations are now conducted detects constituents which analysts in former years with their imperfect methods have failed to find.

There is no doubt some degree of reason in this, but there are many remarkable discrepancies which do not admit of this ready explanation; the variations in many cases take place in the spring themselves. In the year 1872 I submitted to analysis, at monthly intervals, the water of two of the most important spas in Harrogate; the springs selected were the old sulphur well and the chloride of iron spa.

Quoting from my paper, "In making these analyses great care was taken to ensure accurate results; a sufficiency of the standard solutions was prepared in the first instance, and the same apparatus was used throughout. The determinations of the chlorine and the total residue obtained were calculated for the gallon from the specific gravities, and the temperatures were carefully noted, so that the results might furnish exact and trustworthy data with regard to these important springs."

First, as regards the old sulphur well:—

The temperature of the water in the well varied only six degrees throughout the year; from 46° in February and March to 52° in July, August, and September.

The following quantities are given for the gallon:—

The results in September furnished the largest proportion of hydrosulphide of sodium, viz., 17 grains; the smallest proportion observed was in March, viz., 15·13 grains; the quantities of chloride and total residue fluctuated, but not in corresponding proportion. The December analysis gave 625·52 grains of chlorine, while in May the amount was 603·91. The largest total residue was in November, viz., 1067·1 grains, while in June the quantity was 1028·43 grains.

In the early part of 1866, I had the honour of reading before you a paper giving the history of the chloride of iron spa, in which I had tabulated all the recorded analyses of the water of this remarkable spring. When first obtained, by boring in 1819, the water was free from ferrous chloride. Repeated analyses, extending over a period of thirty-five years, proved that it has been subject to considerable fluctuations in the amount of saline constituents. An analysis made by Dr. Hofmann in 1854 exhibits it as containing only 285 grains in the gallon; including ferrous carbonate, 4·6 grains.

From that date no analytical examination appears to have been made for eleven years, and, in the interval, this spa had almost fallen into disuse. In the spring of 1865 it was first discovered that some remarkable change had

taken place in the water, and an analysis subsequently made by Dr. Muspratt and Dr. W. Allen Miller in the same year first announced the presence of ferrous chloride in considerable quantity in this spa. At the present time not only is the quantity of ferrous chloride more than double, but the total solid constituents have considerably increased. In 1865 the water contained 14·49 grains of ferrous chloride in the gallon; the average of 1872 gives 30·57 grains. The solid constituents in 1865 were 465·47 grains in the gallon, while the average of 1872 was 540·97 grains.

The largest proportion of ferrous chloride was in January, namely, 34·5 grains; the smallest in April, 28·97 grains; of ferrous carbonate, 11·84 in January, while August exhibited 9·73. The largest quantity of chlorine was in June, viz., 346·69 grains; December gave the smallest, 329·53.

The total residue in April was 557·09 grains, while in February the proportion was 517·89.

Underlying these fluctuations, if I may so express it, other and more important changes in the course of years are gradually taking place. In 1854 Professor Hofmann analysed most of the Harrogate spas, and in all of them found sulphate of lime present in varying proportions.

In 1866 the waters, with one or two exceptions, were free from sulphate, while salts of barium and strontium had made their appearance. These changes, doubtless inherent to all mineral waters, are not at all surprising if we consider that one of those I am more particularly interested in, the old sulphur well, brings to the surface 17½ tons of saline constituents per annum. This must of necesssity exhaust the strata through which the water passes, however far and deep the ramifications of the spring may extend. The rainfall throughout the district will sensibly affect the yield. In addition, the geological changes which are slowly and imperceptibly taking place in the crust of the earth, producing upheavals and dislocations of strata will also have the effect of modifying the character of mineral waters.

After a cordial vote of thanks had been presented to Mr. Davis for his interesting paper, proposed by Mr. S. Taylor, seconded by Mr. T. B. Stead, the meeting terminated, a very agreeable evening having been passed.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fourth general meeting of this association was held at the Royal Institution, on Thursday, November 20th, Dr. Charles Symes, President, in the chair.

The attendance was again remarkably good, fully showing that the popularity of this association is on the increase. Messrs. Wm. Jones, John Brook, and Thomas H. Morris, were elected members, and Mr. John Griffiths an associate of this association. The following donations were announced:—*The Pharmaceutical Journal*, *The American Chemist*, *The New York Druggists' Circular*, and the 'Proceedings of the Liverpool Geological Society,' and addition of 'Lectures on Pharmacy,' by Barnard S. Procter, to the Library.

On behalf of Mr. Delf, who was unavoidably absent, Dr. Symes presented the association museum with a fine specimen of magnesite, from which large quantities of sulphate of magnesia are now produced. Formerly the carbonic acid for preparing bicarbonate of potash and soda was obtained almost entirely by decomposing carbonate of lime with sulphuric acid, a large amount of useless sulphate of lime resulting therefrom. Now in obtaining the carbonic acid from magnesite (which is composed chiefly of carbonate of magnesia, with some carbonate of lime), not only the dried product but the lye product also is available. If the crude article contains 50 per cent. carbonate of lime, it is then known as dolomite.

Mr. Alfred E. Tanner made some very interesting remarks on American drugs, explaining their properties and mode of preparation. He also exhibited a new American drug mill, which he thought very useful for many purposes, and advised the members who were chemists and druggists to give it a little of their attention.

Dr. Symes then said he thought good results would ensue if a proposition which the Hon. Sec. (Jas. T. Armstrong) had brought forward, were carried out, viz., that there should be an exhibition at every meeting of any new drug or preparation, or any new discovery, that had come before the members, and that he was glad so many things were that night upon the table. He felt quite sure that everyone would be benefited by the proposition, and he hoped that the members would bring forward many things of interest.

A lecture on Adulteration was announced to be delivered by Mr. Martin Murphy, F.C.S., but the Hon. Sec. read part of two letters he had received from that gentleman saying that he had been called to Birmingham on professional business, and therefore could not be present.

The President said he regretted the unavoidable absence of Mr. Murphy on the present occasion, and hoped to have his paper for another evening, He continued—the subject of that paper, "Adulteration," has become such an important one, that delay is dangerous; and without in any way anticipating Mr. Murphy's remarks, which would probably be of a more technical nature, it was very desirable that that association should at once consider the matter from a trade point of view, and if possible disarm the enemy. Whilst the Adulteration Act *appeared* as a measure intended to deal with fraud, men who conducted their business with integrity looked at it as something calculated to do good rather than otherwise, and did not fear any mischievous results to themselves from a thing so distant; but when it is found that its administration, or rather, he should say, its mal-administration, practised the very fraud it purported to suppress; when it is found that inspectors and analysts have so little legitimate work to do that they pounced on the innocent; when it is found that the justice which should be exercised in such cases is so grossly adulterated with injustice that there remains scarcely a trace of the genuine article in it; when we find this law to be but a whitened sepulchre, with something worse than rottenness within; then, gentlemen, it is surely time for the trade of this country to awake to its interests. We are told that the Act will work better by-and-bye, when our magistrates, etc., become educated to its actual requirements: let me ask how many victims are required to complete this education? That the unjust practices which the Act was ostensibly intended to suppress are actually and flagrantly perpetrated by its promoters, is evinced in the Government receiving duty on adulterated tea and afterwards prosecuting retailers of the same article. A case which comes more within our province, fully illustrating my second remark as to the prosecution of the innocent, is the recent one of Mr. McDermott, charged with selling an article known for some years as *citrate of magnesia*. You are all familiar with the facts of the case. Had a customer, or even the inspector, received a true citrate of magnesia, he would have refused the article; he got exactly what he wanted and what he paid for. As to the citrate containing *not a particle of magnesia*, I presume we cannot question the accuracy of Dr. Muter's analysis, as no other appears to have been made of the same sample. Still we have the errors in the tea cases as precedents for so doing were we so disposed. Dr. Muter tells us that his duties commence with receiving a sealed packet and end with handing in an analysis of its contents. This would imply that he exceeded his duty, as he is reported to have given evidence to the effect that it might have been prejudicial to health. And, finally, we have ignorance of facts put forth as a paltry excuse for the magistrate's decision. Is such an excuse for one moment tenable? I much regret that the usual lethargy which characterizes the operations of the Pharmaceutical Council was again displayed in this instance. It was not a question of the *man*, but the case—a case which affected the

direct interest of every one of their members, and the whole body of chemists and druggists of which it should be the representative. The cold, timorous manner in which the case was handled at the meeting, ended in something worse than abortive measures; for by proposing at this critical moment to alter the popular name of the article in question, they commenced undermining the ground on which we must take our stand and face the enemy.

Mr. Edward Davies then made some excellent remarks on the Act.

Mr. Shaw said, that he had not expected any discussion on the subject of adulteration on that evening, in consequence of the absence of Mr. Murphy, who was to have introduced the matter by reading a paper. He thought the Chairman had been unnecessarily severe in his observations on the conduct of the Council of the Pharmaceutical Society. He might state that the citrate of magnesia case had not been overlooked by the Council, but had been discussed. Speaking for himself personally, he considered it was much preferable that the working of the Adulteration Act should be discussed at the meetings of the various associations throughout the country, as was done at Bloomsbury Square at the evening meeting of the Society, so that when a definite expression of opinion had been obtained, the Council would then be better enabled to carry out the wishes of their constituents. He also observed, that in everything appertaining to the welfare of chemists and druggists, the Council took a warm interest, and he instanced the action taken in reference to the appointment of analysts under the Adulteration Act, when a definite opinion had been obtained, whereby competent chemists and druggists notwithstanding their possessing no *medical* qualification were quite eligible for appointment. However, he supposed that the Council in London, as well as the Council of the Liverpool Chemists' Association, might be considered fair game for an occasional shot. With respect to the Adulteration Act, he thought there was much need for amendment, or greater uniformity in its administration. And the mode of procedure of professional analysts was also open to improvement. In many cases, evidence of a most contradictory character had been given, which tended materially to destroy the value of analytical investigations. With respect to milk, he thought it very desirable that the *minimum* quantity of solids which genuine milk ought to contain should be authoritatively fixed. Dr. Anderson in a recent report stated, "that no fixed standard had been laid down up to which genuine milk must come, but he considered there ought at least to be 11½ per cent. of solid matter, and that he had analysed genuine milk containing as much as 17 per cent. of solids.

Mr. Sharp then spoke, chiefly with reference to the working of the Act.

Mr. Norman Tate, after a few remarks on the question, said, he was sorry the evening was so far advanced, and made a proposition to the effect that "the Council be requested to call another meeting on the subject, and that that one be considered adjourned," which was seconded by Dr. Cook, and carried. Arrangements were therefore been made that Mr. Martin Murphy, F.C.S., should deliver a lecture on "The Adulteration of Food, Drink, and Drugs considered in relation to legal repressive measures; its prevalence, and the means in operation for its detection."

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The third general meeting of the Association was held in Anderson's University, on Wednesday, 26th November, 1873, at 9 p.m., Mr. John Currie, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the Secretary read a note that he had received from the Secretary of the Andersonian Library, in which it was stated that the members of the Glasgow Chemists and Druggists' Association could have the use of the library only on the condition of their joining one of the lecture classes.

The Secretary also read a letter from Mr. McDonald, of the Glasgow Apothecaries' Company, in reference to the case of Mr. Freeland, chemist, Bathgate, asking if the Association would undertake the getting up of a subscription to assist in defraying the expenses connected with his law suit, and that he (Mr. McDonald) would start the subscription in the name of his firm.

It was finally agreed upon that it would not be advisable for the Association to have anything to do with the matter, but that it should just be left to individual members to subscribe if they felt so inclined and were called upon. At the same time, the Chairman thought that it would be a good thing if a defence or protection fund could be established for the benefit of chemists in the west of Scotland,

Dr. Nairn, Glasgow, then delivered an able and very interesting lecture on "The Brain and Nervous System," illustrated by anatomical specimens.

At the close, the lecturer was awarded a most hearty vote of thanks.

It was announced that at the next meeting of the "Assistants' Section" a paper would be read by Mr. John Foster on "Animal Substances used in Medicine."

The meeting then separated.

BIRMINGHAM AND MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

At a meeting of the Birmingham and Midland Counties Chemists' Association, held recently, a long discussion took place on the "citrate of magnesia" question.

A resolution proposed by Mr. Arblaster: "That the words 'citro-tartrate of soda, with magnesia and sugar, formerly known as "citrate of magnesia,"' be adopted for recommendation to the Council of the Pharmaceutical Society as the most suitable label" not finding a seconder was not put to the meeting.

It was then proposed by Mr. Homer: "That the words 'compound effervescing magnesia' be adopted"; this also found no seconder.

It was then proposed by Mr. Willcox and seconded by Mr. Crook: "That the words 'granular effervescing saline, formerly known as "citrate of magnesia,"' be recommended for adoption." This was carried.

It was then resolved that this resolution be forwarded for publication in the Pharmaceutical Journal.

HALIFAX CHEMISTS AND DRUGGISTS' ASSOCIATION.

A meeting of the above body, Mr. Jessop, President, in the chair, was held on Friday, Dec. 5, 1873, to consider the following resolution, viz. :—"That in case of any prosecution arising from the operation of the Adulteration Act with respect to the sale of drugs and chemicals to any of the members of the Halifax Chemists and Druggists' Association, this meeting is of opinion that it would be desirable for this association to support and assist such member by defraying in part or whole the expenses in connection with the defence before the Courts in this town, subject to the following conditions, viz. :—That a full and honest statement of the particulars of the case be laid before the committee, who shall then decide as to whether such case is deserving of the support of the association, and that their decision shall be final."

Mr. Brierley had great pleasure in moving the adoption of the proposal. That something of this kind was absolutely needed was shown by the recent attempt at conviction for the sale of spirits of nitre before the Westminster Police Court, which statement he read from the *Times* newspaper. No one now could feel absolutely safe from prosecution, and the idea was a good one to have an association to confer with and advise as to what course would

be best to adopt should any case arise calling for its support.

Mr. Robert Brook, honorary secretary, in seconding the motion, wished it to be clearly understood that while the Society should extend its support and sympathy to a member, it would not be responsible for the penalty if unfortunately a conviction should ensue. He thought also the action of the Society should be confined as closely as possible to drugs and chemicals. Much had been said about their being at the mercy of the wholesale trade to a large extent. In the 1849 edition of 'Mohr's and Redwood's Practical Pharmacy' the learned doctor had a chapter on drug grinding. He showed how powdered drugs are adulterated with sawdust, from the loss in moisture by drying being greater than the wholesale trade would allow. With the Adulteration Act hanging over their heads, if the system were still adopted, they certainly stood in slippery places.

Mr. Dyer, in supporting the resolution, thought the Society should not draw too sharp a line and confine its action to drugs only, as there were many other articles sold by the trade, such as mustard, pepper, etc., which should as a matter of course be included. The latter part of the resolution however left a wide margin for the committee to act upon and decide each case upon its own merits.

The President, in submitting the motion to the meeting for adoption, thought the Society was taking a wise step forward in bringing it before the notice of the trade. He had for some time thought it desirable that there should be a guarantee as to the purity of drugs given by the wholesale houses, and if the same system of per-centage in the drying and powdering of drugs was now in vogue as formerly it became more important than ever. He hoped the wholesale dealers would rise to the importance of the occasion. The resolution was carried unanimously.

ASSOCIATION OF CHEMISTS AND DRUGGISTS OF IRELAND.

A meeting of this Association was held at 44, Molesworth Street, Dublin, on Monday evening, the 1st inst.

The new Vice-President, Charles R. C. Tichborne, Ph.D., F.C.S., etc., was inducted into office by taking the chair on this occasion.

The first subject brought before the meeting was the report from the deputation of this Association which waited upon the Governor and Court of Directors of the Apothecaries' Hall, to confer with them as to what steps should be jointly taken to secure the new Pharmacy Bill (already drafted) being passed through Parliament during the coming session. One of the members reported the result of the interview to the following effect. He said that the deputation from the Society was received with much courtesy by the governor and court of the Apothecaries' Hall; the amendments suggested by the Society were discussed *seriatim*, some were agreed to, and others they thought it would not be advisable to adopt, but the Chemists and Druggists' Society had every reason to be satisfied with the result. It was also agreed that Dr. Leet (Secretary to the Apothecaries' Hall) should write to the Attorney-General, to know if he would receive a joint deputation from the Apothecaries' Hall and Chemists and Druggists' Society, to request his taking the conduct of the Pharmacy Bill through Parliament.

Messrs. Hodgson, Erson, Goodwin, and Hayes were then elected to join with an equal number from the Board of the Apothecaries' Hall to form this deputation.

The next matter brought under notice of the meeting indicates that since the chemists and druggists have determined that they will obtain a Pharmacy Bill for Ireland, they show an equal determination to prove themselves worthy of it, by insisting upon a high standard of education both for themselves, their assistants, and apprentices, and at once applying themselves to this important task.

It appears there has recently been formed, in connection with the Apothecaries' Hall, a course of practical instruction in chemistry, pharmacy and botany, chiefly, through the energy of Mr. Tichborne and his earnest desire for the instruction of young men in these important branches.

The Chemists and Druggists' Society deputed six of its members to attend these classes and report as to their suitability as an elementary educational course for its members. The reports being all of a favourable character it was unanimously agreed to adopt these classes. As a beginning eighteen names were given in to the Secretary of those present who wished to join the classes, and it is confidently expected that before many days there will be three times that number.

The Vice-President at the close of the meeting spoke at some length, giving much good and wholesome advice to the young men on the importance of at once applying themselves to study of a practical and useful nature, and strongly recommending perseverance in what might at first be only a drudgery, but would be much more useful to them in after life than studies of a more pleasing nature. He also recommended a short course of practical lectures from friends who take an interest in the Society, and intimated that he should not be backward in assisting in the filling up this part of the programme.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION.

At the second monthly meeting of the session, held at the rooms of the Association, 37, Blackfriars Street, on Friday evening, Dec. 5th, Mr. W. S. Brown, President, in the chair, a lecture on "Methods of detecting Hydrocyanic Acid and Cyanide of Potassium in poisoning cases" was given by Mr. Louis Siebold. There was a good attendance.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 4th Dec., 1873. Dr. Frankland, F.R.S., in the chair. When the minutes of the preceding meeting had been read and confirmed, and the nomination and election of Fellows had taken place, a paper entitled "Mineralogical Notices" by Professor Story-Maskelyne and Dr. W. Flight was read by the former, treating of the composition of caledonite and lanarkite. Mr. John Williams then exhibited some fine specimens of crystallized phosphorous acid and metallic phosphites and gave a short account of their reactions. After which, Professor Church made a communication to the Society on the composition of the mineral autunite. Professor Lawrence Smith of the United States, whilst describing a modifica- of the Bunsen gas burner employed by him for heating the crucible in determinations of the alkalies in silicious minerals, gave a short sketch of the process he had devised for that purpose. In the course of the evening, a gas burner by Mr. Fletcher of Warrington was also exhibited.

The meeting was finally adjourned until Thursday, 18th Dec., when the following papers will be read :—

1. "Researches on the Action of the Copper-Zinc Couple on Organic Bodies, No. IV., On Allyl Iodide," by Dr. J. H. Gladstone and Mr. A. Tribe.
2. "On a New Compound of Nickel and Phosphorus," by Dr. R. Schenck.
3. "On the Preparation of 'Standard Trial Plates,' to be used in verifying the Composition of the Coinage," by Mr. W. Chandler Roberts.

CALIFORNIA PHARMACEUTICAL SOCIETY.

The Annual Meeting of the California Pharmaceutical Society was held in San Francisco on Oct. 9th, 1873.

The following officers were elected :—President, John

Calvert ; First Vice, John Newman ; Second Vice, A. L. Lengfeld ; Secretary, J. W. Forbes ; Treasurer, W. J. Bryan ; Board of Directors, John Calvert, W. T. Wenzell, J. G. Steele, J. W. Forbes, H. B. Shaw.

Reports of retiring officers were accepted.

The Secretary of the Board of Pharmacy, Mr. J. G. Steele, presented a report. There have been registered as graduates, 20 ; licentiates, 25 ; practising pharmacists, 81 ; practising assistants, 102—total, 228. The actions which have been brought by the Board against those who failed to comply with the requirements of the Act have been successful in every instance. Mr. J. G. Steele, having resigned the position of secretary, Mr. J. W. Forbes has been elected to fill the vacancy. The affairs of the Society arc in a prospcrous condition, a larger balance remaining on hand than at any previous time.

Parliamentary and Law Proceedings.

The Alleged Adulteration of Tea in Birmingham

On Wednesday, November 26th, Mr. T. C. S. Kynnersley, the stipendiary magistrate at the Birmingham Borough Police Court, gave judgment in the cases of alleged adulteration of tea (see *ante*, p. 433). After noting the technical objections, he recapitulated the history of the cases, and the evidence that had been brought forward. The question whether the iron found in the tea was metallic iron or magnetic oxide he considered to be unimportant, unless its presence in the tea in such large quantities was accounted for. What business had it there at all ? One theory was that it was blown or washed on the plant, and stuck to the leaves, though thcy were as smooth and shining as those of a camellia ; another that it was the scale from the red-hot iron plates on which the tea is dried. Both theories appeared to him wholly insufficient to account for their presence, or for that of the sand. If the soil of China were so rich in iron as to throw up accidentally such an amount of metal it would be worth looking after for smelting purposes. The difference was so great in the quantity of iron and sand and lye tea found by Drs. Hill and Brown, and that found by Messrs. Scott, Bird and Murphy in the sample 52, that he could hardly conceive that their researches had been employed on the same samples of tea. While the experiments of Dr. Hill, and Dr. Brown, and Dr. Hassall were performed on the sample bought by Mr. Woolley's clerk, sealed up at the time, and handed from one to the other, those performed by the chemists called on the part of the defendants were on tea the identity of which with that produced on the part of the prosecution was so vague, that if the casc had been before a jury he doubted whether any judge would have admitted the evidence. Dr. Hassall, having heard the whole of the evidence on both sides, saw no reason to alter the opinion he had formed on the subject of the adulteration of the tea. But he added that since writing his statements he had made further experiments, and come to the conclusion that the iron detected in the tea was not really iron filings, but magnetic oxide and crushed ore. This, however, though it afforded a triumph to Mr. Bird, as to the nature of the substance, by no means altered the case as to the amount of adulteration. Whether it was crushed ore, or iron filings, or magnetic oxide was not of the slightest importance. In pure tea neither the one nor the other is ever found, and its presence cannot be accounted for by any theory of inevitable necessity or mere accident. Upon this evidence how could he hesitate as to the decision to which he must come ? All these substances—iron, sand, and lye tea—to say nothing of plumbago, Prussian blue, etc., were wholly unaccounted for. In one case there was no less than 23·8 per cent. of lye—the ash of the whole tea is 21·83 per cent. (being 15 pcr cent. above that of pure tea), and the ash of lye tea 56·34 per cent. If this were not adulteration what is ? If 5 or 10 or 15 per cent. of foreign substances were not enough to constitute adulteration where was the line to be drawn ? Would an additional 2 or 3, or 5 or 10 pcr cent. be sufficient ? Clearly it was impossiblc to refine to that extent. He had a plain question beforc him—adulterated or not ? and he could not hesitate to say that the whole of the teas, 45, 46, 47, 49, and 52, were adulterated. The next question was—If the tea was adulterated, did the defendants sell it as unadulterated ? Mr. Justice Blackburn says, "The simple fact of selling butter amounts to a representation that it is not adulterated, and the seller must take the trouble to examine his samples, and sce whether they contain lard or not." Mr. Justicc Quain says :—"I think that when a man sells butter across the counter to any one who asks for it, he means to represent that the article which he sells is butter, and not a compound of stearin and palmatin. I think, therefore, that there was a representation that the butter was unadulterated." In the same manner he (Mr. Kynnersley) was obliged to say that when *tea* was asked for, and an article sold, there was a representation that that article was tea, and not a compound of tea, and iron, and quartz, and silica, and plumbago, and Prussian blue, and turmeric. It had been contendcd that when the purchaser asked for tea he meant only the tea of commerce, and that anything which the Chinaman chose to send over as tea must be accepted as such ; which would really amount to this, that no tea could be considered adulterated so long as there was a particle of genuine tea present, unless it could be proved affirmatively that the addition of foreign substances took place in this country and not in China. Of course this would render the Act entirely nugatory as applied to tea. He was very glad to hear that it did not at all follow that because a tea was sold at a low price it was therefore adulterated. On the contrary, Dr. Brown had analysed a perfectly pure and genuine tea which was sold as low as fourteenpence a pound. It appeared that the price depended a great deal upon the season of the year at which the leaves are gathered, and the care bestowed on the drying. He had been told by a gentleman that he had bought in Russia what was called "caravan tea," made from the undeveloped buds at 25*s.* a pound. The leaves gathered in the autumn were said to be used in making the low-priced teas. As purc claret might be had at 12*s.* or 14*s.* a dozen as at 60*s.* or 70*s.*, and he was informed that cider varied in price from 3*d.* a gallon to 1*s.* 3*d.*, all equally pure. But what is the position of the retail dealer if this is *law* ? Simply this, that the effect of this clause of the Act of Parliament is to throw upon them the duty of ascertaining by competent analysis that every article of food which they sell is pure and unadulterated. If they neglect to do this they sell at their peril. The retail dealer had his remedy. He must have an understanding with the general merchant that no article should be considered accepted by him which does not stand the test of analysis, and that anything that proves to be adulterated shall be returned. With this, however, he (Mr. Kynnersley) had nothing to do. It was not his business to justify the law, but to administer it. He had found as a fact that the tea was adulterated, and the Court of Queen's Bench had decided that a person selling it without any qualification sold it as unadulterated. He had, therefore, no option but to declare that the defendant in each case had, by the act of selling, rendered himself liable to a penalty under the second section of the Act. He wished, however, publicly to declare that he had no reason whatever to suppose that in any case the seller was awarc of the existence of any adulteration, that none of the ingredients were injurious to health, and that he believed the addition of the foreign substances to have been made fraudulently by the Chinaman in the manufacture and preparation of the tea, and not in this country ; and therefore it was that he withheld the names of the defendants, and spoke of them only by their numbers. As regards the penalty, he was acting in accordancc with the opinion of other magistrates in thinking that if there was a conviction at all, the penalty should not be less than 20*s.*, and that was the penalty which hc inflicted in each case.

The defendants were ordered to pay the costs—not including, however, those of Dr. Hassall and Mr. Postgate. Upon these the magistrate made no order, thinking they might fairly be considered among the expenses of executing the Act, and be paid out of the Borough Rate.

Poisoning by Essential Oil of Almonds.

An inquest was held in Liverpool on Monday, Dec. 1, respecting the death of a child named Jane Orr, aged six years. It was stated that a man named Robert Williams had taken essential oil of almonds from a bottle standing on the mantelpiece, and which had been obtained for flavouring pastry, and administered some to the deceased and another child. Deceased became sick, and mustard was given to her as an emetic, but she died shortly afterwards.

Dr. D. D. Costine stated that he had made a *post-mortem* examination of the body of the deceased, and found a quantity of essential oil of almonds mixed with the food and mucus in the stomach. The smell of almonds was very strong, and permeated the intestines and liver. The brain was congested from convulsion consequent upon the poison. Death was the result of taking the oil of almonds.

Dr. Brown, borough analyst, said that on the 25th ult. he received a small phial from Dr. Costine, and also a jar containing a child's stomach. Both smelt strongly of oil of bitter almonds. He distilled from the fluid in the stomach oil of bitter almonds, from which he obtained prussic acid. The essence of almonds was improperly, and in his opinion dangerously, used as a flavouring in cookery. The oil was at all times very dangerous, as the strength of it was often very uncertain. The essential oil of almonds was not used as a drug.

When taken into custody Williams said he had given the children three drops in some water, and that he had often taken it himself. He added that he always believed it was essence of cinnamon.

The Coroner observed that the poison had been administered apparently without any motive, but if the jury thought that Williams had administered the poison against the child's wish, then the question arose whether he administered it so incautiously or recklessly as to be responsible in point of law for his actions.

The jury returned a verdict of manslaughter against Robert Williams.

Analysis of Bread.

On Tuesday evening, December 9th, a special meeting of the Shoreditch Vestry was held in the council chamber, Mr. Charles Stevens in the chair, to receive the report of a special committee appointed to investigate certain charges made by Mr. Butler, baker, Pitfield Street, Hoxton, against Dr. Stevenson, the analyst of the parish. Mr. Butler appeared before the Vestry some time ago, and stated that he sent, through a friend, a 2lb. loaf made of the finest flour to the inspector of the parish for analysis, and the certificate returned stated that the bread was not injurious to health, while a second 2lb. loaf in which there was a drachm of alum was certified by Dr. Stevenson as free from adulteration. The report stated that evidence had been given that alum was introduced into the second loaf. It had not been dissolved with water, but sprinkled in the dough, and then introduced into it in layers. A portion of the same loaf was submitted to Dr. Dupré, of the Westminster Hospital, and analyst for the parish of St. James's, Westminster, who reported that it had been adulterated with 0·507 of alum. Dr. Stevenson, in a long letter to the Vestry, said that Dr. Dupré's report confirmed the statement that alum was irregularly and imperfectly mixed in the bread. No chemist was at all times infallible in his operations, and he expressed the hope that the Vestry would not doubt his analytical skill in consequence of what had occurred. Mr. Stead moved that the report be received, and trusted that great caution would be exercised in future by their analyst. The report was at once adopted.—*Times.*

Reviews.

The Druggists' Stock and Price Book. Arranged by Frazer and Green, Pharmaceutical Chemists, Glasgow. London: J. and A. Churchill. 1873.

The Chemists and Druggists' Diary and Pharmaceutical Text-Book. 1874.

Now that the year is drawing to a close many tradesmen are doubtless looking forward with a certain amount of repugnance to the tedious process of stock-taking. We have, therefore, great pleasure in referring to the book recently issued by Messrs. Frazer and Green as one that is well calculated to relieve pharmaceutists from a great deal of the labour usually attending this operation, and to assist them in conducting it in so methodical a manner as to be really effective in securing the object in view. The compilers inform us that the volume was designed and prepared for the press without the remotest idea of publishing it, since it was intended for their own exclusive use, but that they complied with a suggestion made that its publication would be useful to the trade, and have accordingly issued it. We hope that their generosity will be repaid by an ample sale.

The book is divided into three parts, containing lists of the materia medica, furnishings and sundries, and proprietary articles in general use, respectively, and the pages are ruled in columns for stock-taking purposes and for recording the cost and retail price of every article kept in stock. There is also an explanatory note prefixed as to the way in which the book should be used.

The book is characterized by an admirable series of cross references of synonymous names to one heading—and last, though not least, it is clearly printed on good paper.

The nature of the second book on our list, 'The Chemists and Druggists' Diary for 1874,' has been too well foreshadowed by its predecessors to require more than passing mention. In fact, the publishers appear to have taken it for granted that its uses are so obvious and its birthplace so well known that a title-page could be dispensed with—at least there is none in the copy forwarded to us. The text this year consists of a considerable amount of information respecting impurities in drugs and how to detect them, the maximum doses of powerful drugs, abstracts of various Acts of Parliament, and other information specially interesting to chemists and druggists. The "diary," which is interleaved with blotting paper, is followed by a "revenue and expenses account," "quarterly statement," record of drugs purchased, and of pharmaceutical operations. Altogether, the book is one that is capable of being very serviceable to every chemist and druggist.

BOOKS RECEIVED.

Maud Vivian: a Drama; and Poems. By Walter Rew. London: E. Moxon, Son and Co. 1873. From the Author.

On Spectrum Analysis as Applied to Microscopical Observation. By W. T. Suffolk, F.R.M.S. London: J. Browning. 1873. From the Publisher.

The Chemists and Druggists' Diary and Pharmaceutical Text Book, 1874. From the Publishers.

Obituary.

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

On the 1st of December, Mr. Thomas Hadfield Gloyne Pharmaceutical Chemist, of Dewsbury, died suddenly from heart disease. The deceased gentleman, who was sixty-eight years of age, was dressing himself preparatory to going to his shop when he suddenly fell on the floor, and almost instantly expired. He was the son of a Wesleyan minister, and he had been in business as a chemist and druggist in Dewsbury forty-six years. Mr. Gloyne was one of the founders of the Pharmaceutical Society, and was also Local Secretary for Dewsbury.

On the 15th October, 1873, Mr. Andrew Wylie, Chemist and Druggist, of Stewarton, Ayrshire.

Correspondence.

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

Citrate of Magnesia.

Sir,—I heartily endorse the opinion expressed by Mr. R. W. Giles, in last week's Journal, that the decision in the "Citrate of Magnesia" case should not be allowed to harden into a precedent, but that every effort should be made to re-open the question whilst it is still fresh, and to have, if possible, a new trial, that the erroneous decision may be reversed.

It is all very well to discuss what better descriptive name should be given to a well-known and popular article, but the serious fact to be kept in view is this: that a severe fine has been inflicted for selling as "citrate of magnesia" the only article generally known by that name, and it matters little whether the sufferer was a registered chemist or not.

I maintain that no chemist would have been justified in sending out any other preparation than one similar to that supplied by Mr. McDermott, unless there had been on the prescription a special indication that some other preparation than that usually known as "Cit. Magnes. Eff." was intended. I frequently receive prescriptions for "Cit. Magnes," the Eff. being generally omitted, and I would no more consider myself justified in sending either the chalky tasting "potential" or "future perfect" citrate containing carbonate, or the neutral or acid citrate, than in giving the nauseous residual salts of the Seidlitz spring, were the prescription for "Pulv. Seidlitz."

The evidence given on the trial appears so extraordinary in the brief report that it is to be desired that opportunity may be given to the analyst on whose evidence the decision seems principally based, to clear himself of the suspicion of "suppressio veri," which may be only the result of the condensation of the report.

The analyst presides over an institution where students are rapidly instructed in subjects relating to pharmacy, including the preparations of the British Pharmacopœia, and it is scarcely conceivable that pupils can be permitted to pass over the sodæ citro-tartras effervescens without being told that this was introduced as the official representative of the effervescing citrate of magnesia of commerce.

There is no trace in the report of this all-important fact having been stated in court; indeed it is scarcely possible to reconcile the magistrate's decision with a knowledge of this. Was this explanation omitted, and if so, why?

The analyst is also represented as saying that the preparation in question "might be injurious if mixed in other medicines when citrate of magnesia was prescribed," but what does he mean by citrate of magnesia? Then as to the intention of the prescriber, it is curious to find that after a month's discussion we are still in the dark as to what was really meant.

Let us then by all means have the case re-opened, either by action taken by the Council of the Pharmaceutical Society, which would be the preferable course, or by a special committee of the trade.

If we do not get this question of names and things properly settled, we may find ourselves heavily mulcted, because our "cold cream" does not contain a particle of cream, and because analysts may be unable to discover the proportion of precious metal in golden ointment.

Alexander Kinninmont.

69, *S. Portland Street, Glasgow,*
Dec. 10, 1873.

Sir,—In reference to the letter of Mr. Bishop in your last number, I wish to point out that the statement that "magnesia forms an essential part of the preparation, and is present in an important quantity," does not strictly represent the fact, so far at least as regards the past. The amount of magnesia in this preparation has seldom exceeded 1 per cent., and that has been present in the state of sulphate. Neither the amount of the magnesia, nor the condition in which it exists, nor the chemical probabilities as to the effect produced during solution, justify the adoption of the name "citrate of magnesia" to distinguish the preparation referred to from others, for it fails to conform with the very sound principle enunciated by Mr. Bishop that "the name of anything animate or inanimate should define the elements of its composition."

If Mr. Bishop had acted on that wise principle in the outset there would have been no occasion for such harsh language as has recently been used to the prejudice of pharmaceutists. Mr. Bishop would not have had occasion to seek succour from legal subtleties, and individual chemists and druggists throughout the country would have been spared the anxiety attendant on the prospect of having to go to a police-court at the instance of meddlesome and officious analysts, to prove that in supplying their customers with the particular article they desired to have, although asked for under an erroneous name, they have not rendered themselves liable to a charge of having acted "in fraud of Her Majesty's subjects and to the great hurt of their health and danger to their lives."

X. Y. Z.

Sir,—Are not we making too much of a bugbear of this matter? Would not the course have been to have applied to a judge for a reversal of the sentence, or formed a deputation to Government for the same purpose? Properly explained, either must have seen the injustice of the case, and could not have refused the application, but the multitude of your correspondents seem to be racking their ingenuity for a new name, when, I think, the question might be finally settled, if dealt with boldly.

Frederick Tibbs.

Dec. 3, 1873.

Sir,—In reference to Mr. Payne's letter on p. 439, respecting the Act under which Mr. McDermott was convicted, in answer to an application to the Clerk at the Southwark Police Court I have been informed that the proceedings were taken under the Adulteration of Food Act 1872, and that no amendment was made in the summons.

I therefore understand the conviction to be for an offence against the Adulteration Act.

F. P.

3*rd December*, 1873.

Sir,—So many different names have been proposed and adopted that confusion and difficulty are sure to be experienced, especially by retailers and their customers. The name which I would suggest is "Citrated Magnesia," or "Granular Effervescing Citrated Magnesia." It is highly desirable that a common name be adopted, and it appears to me that the one I suggest would retain a resemblance to the old sufficient to prevent any serious doubt in the minds of purchasers, would for all business purposes sufficiently indicate the character of the article, while it would convey no idea of definite chemical composition, and would protect dealers from prosecution, always assuming that the article sold contained citric acid and magnesia, which the citrated magnesia I manufacture really does.

George Smith.

112, *Renfield Street, Glasgow, Dec.* 6*th*, 1873.

Who will be the Next Victim of an Experimental Prosecution?
Who Will Help Him?

Sir,—Most of your readers will, I think, feel that a great anxiety is added to the many they already have, in the possibility that any or every customer is on the look-out to entangle them in the meshes of a prosecution.

Amongst us there are some honest folk who are content that their daily lot shall be one of work and self-denial, if haply by these means and God's blessing they may in their old age be free from the necessity of appealing for help to the Committee of the Benevolent Fund, or, dying, leave their widow or orphans not utterly destitute. These, and many of our poorer brethren, may, as you say of the spirit of nitre prosecution, "congratulate themselves that the result of these prosecutions has turned out in the way it has," but "when they consider the perils with which even a sound defence is surrounded in a court of law, whenever the questions at issue are of a scientific nature," must feel a sinking at heart lest they should be the next victims selected for an "expensive experimental prosecution."

With your leave, therefore, I beg to offer the following suggestions for the formation of a fund, the first and

primary object of which shall be to provide legal assistance in all deserving cases.

1st. That any pharmaceutical chemist or chemist and druggist who shall be able to satisfy the trustees of the fund for the time being (or any person authorized by them) that the practice or sale for which he is subjected to prosecution is unobjectionable shall be supplied at the expense of the fund with every legal assistance necessary for the conduct of the defence.

2nd. That the fund shall be invested by the trustees in such manner as by them shall be deemed best, and that at the end of every year the interest for the past year, less expenses incurred as aforesaid, shall be handed to the Committee of the Benevolent Fund, to be by them applied in aid of annuities or grants.

3rd. That the trustees of this fund shall be the gentlemen who for the time being are the Committee of the Benevolent Fund.

It seems to me that an ill-conducted defence may lead to an honest deserving man being (so to speak) improperly convicted, and from that to loss of business, and to want.

From this possibility (an ill-conducted defence) it is not our large establishments or wealthy members that are likely to suffer; neither are they likely to apply to the trustees for assistance.

I take it, then, a fund of this kind would confer the following benefits:—

It would ensure an efficient defence in all deserving cases.

It would relieve us, as individuals, from all pecuniary anxiety, as long as we did what was honest in the sight of all men.

It would, by taking up the defence of a case, have no doubt a very considerable effect in favour of the defendant on the mind of the magistrate or judge before whom the prosecution was instituted.

Lastly, after relieving from the dread of loss or want, its yearly income would be spent in the alleviation of want.

If any of your readers are pleased to consider an object of this kind a worthy one, I shall be happy to add my mite to theirs, or, to say something more definite, if forty-nine others will join me in the like amount I will give a subscription of £10.

M. E. T.

The Adulteration Act.

Sir,—As the Adulteration Act is being carried out in such a peculiar manner, would it not be well to insert in the Journal a word of caution to those chemists who are vendors of the cheap aërated waters. In many cases the so-called soda and potash waters do not contain any alkali; the lemonade is acidulated with acid. sulph.; while the ginger-beer is a solution of tartrate of soda, flavoured with tinct. capsici.

In either case I presume the vendors render themselves liable under the Act, and should only sell the waters from those makers who will guarantee they are exactly as represented to the public.

R. Knowles.

Anerly Road, Anerly, S.E., Dec. 10, 1873.

What is Sweet Spirit of Nitre?

Sir,—In reference to the recent case of *so-called* adulteration of "spirit of nitrous ether," it seems to me, after reading your report, that one of the most important points was entirely passed over.

The inspector appears to have asked for "Spirit of Nitre" or "Sweet Nitre." I maintain that he *was* served with "Sweet Spirit of Nitre," the popular remedy of that name, made for upwards of two centuries in the same, or nearly the same manner. A formula for it was published in the London Pharmacopœias from the earliest until 1864, when the British Pharmacopœia, intended to unite those of London, Edinburgh, and Dublin, published a formula, and another new one in 1867 for a "Spirit of Nitrous Ether," to take the place of the old preparation. When the public ask for their favourite remedy they desire, expect, and should be served with Sp. Æther. Nitrici, P.L. I see no mention of "Spirit of Nitre" in the B.P., and while I do not think it right to give old names to new preparations, I consider it positively unjust and reprehensible to endcavour to palm off on the public a new and repulsive preparation by giving it the same name, and wishing to *force* it to be sold instead of an agreeable and highly popular domestic remedy.

In short, I maintain that "Spirit of Nitrous Ether" *is not* "Sweet Spirit of Nitre," and I should be glad to have some better opinion on the point.

C. W. A.

Dec. 9th, 1873.

[*** We think our correspondent is in the main correct, and if he will refer to the report of the case in our last number he will find that his view was substantially that adopted by Mr. Wontnor in his defence.—Ed. Pharm. Journ.]

The Library.

Sir,—No doubt the new regulation respecting the issue of books from the Library will be a great convenience to country members, but at the same time it may possibly prove inconvenient to those who use the Library for reference. Recently on two occasions I wished to consult such standard works as the 'Codex' and 'Redwood's Practical Pharmacy,' but was unable to obtain them. If such be the case now what will it be if the circulation of the books increases, as I hope it will, unless steps be taken to provide duplicate copies of all standard works for reference only?

Disappointed.

W. R. M.—We have received your letter offering to supply for a pecuniary consideration the formula asked for in our "Notes and Queries" column, but we must decline to make that department of the Journal a medium for sale and barter.

J. L. D.—Many extraneous substances are frequently introduced into the manufacture of vulcanized india rubber, but we cannot say whether a salt of lead is so used.

"*Chemicus.*"—(1) Yes, sulphocyanides. (2) We are not aware.

J. Young.—The proposed new test has not yet become law, but the former Act was continued for another year at the end of last session.

"*Student.*"—The best way to preserve the colours is to dry the plants as quickly as possible between bibulous paper, changing the sheets every four or six hours.

G. T.—Tinct. Rhei and Tinct. Rhei Co. might be considered synonymous terms, since the Tinct. Rhei, B. P., is a compound tincture; but Dec. Scoparii Co. could not be simple Dec. Scoparii, B. P.

W. B.—We agree with you that there seems to be little or no saffron present in the pills sent, but as your remedy should be with the maker we are unable to make further use of your communication.

J. S.—We believe that legally the arms of the Pharmaceutical Society can be used only by the Council in their corporate capacity.

A. P. B.—The moss sent is the *Fontinalis squarrosa.*

"*Litmus.*"—The cardamoms are added in the Extr. Coloc. Comp. at the end of the process in order that the essential oil, upon which their odour and medicinal properties depend, may not be destroyed by the continuance of heat necessary to bring the mass into the proper consistence for forming pills. Ext. Papaveris.—The spirit is added in order that the albuminous principle (the cause of ferment) may be precipitated and finally removed. Read Proctor's 'Practical Pharmacy,' and refer to the composition of the various drugs you have named as given in Pereira's 'Materia Medica' for information as to other queries.

"*Major Associate.*"—The colouring is probably due to slight oxidation, but we cannot state the precise reason why it occurs in some cases and not in others.

W. Tearle.—In spirit of nitrous ether the quantity of aldehyd bears some relation to the quantity of nitrous ether formed in the process by which the spirit has been prepared. Dr. Dupré stated that the spirit of nitre he examined contained only 0·36 per cent. of nitrous ether. There would not be much aldehyd in such a spirit, and no doubt much less than the spirit of nitrous ether of the B. P. would necessarily contain, although the latter would contain much less than spirit of nitre, P. L., of equal strength with that of the B. P. as regards the ether.

Communications, Letters, etc., have been received from Messrs. G. T. Smith, L. Lunn, G. L. Napier, Matthews (Brighton), F. H. Cumine, H. W. Jones, "Nota Bene," "Dipenser," "Pharm. Chemist by Examination," "Argentine," "Truth," C. W. A.

MR. SORBY ON THE COLOURING MATTERS OF LEAVES.*

BY HENRY POCKLINGTON.†

My last article on the "Microscope in Pharmacy" concluded with an intimation that I should immediately pass to the discussion of the colouring matters of leaves and bark of Eucalyptus, but on revising my notes I found that it would be advisable to defer their publication, until I had an opportunity of carefully working through Mr. Sorby's recent enlargement of our knowledge of the colouring matters of leaves, in order that, where possible, I might identify my colour elements with his, and attach his names to them. Having done this, I think it desirable to state the results of Mr. Sorby's latest researches, so far as they vary from his former conclusions, before proceeding with an account of my own work on Eucalyptus and the Cinchonas. To some extent, indeed, this is necessary, in order that certain technical names may be understood by those who have not access to Mr. Sorby's memoirs.

Mr. Sorby's present paper treats almosts solely of such colouring matters as are soluble in alcohol, bisulphide of carbon, ether, and the fixed oils. The large class soluble also in water, or selectively soluble in water, are little referred to.

The prominent feature of Mr. Sorby's paper is his enlargement of his previous classification of chlorophyll and chlorophyll compounds, of which I have already given an epitome,‡ and the recognition as definite of colour-elements previously only guessed at; and also the employment of photo-analysis in addition to the chemicals previously used. The more important colour-elements soluble otherwise than in water are now these, the actual number of colouring matters being probably many hundreds, or, including those soluble in water, possibly thousands. They are classified in the order of their optical character, commencing with those whose absorption extends nearest to the red.

The first group, as before, is the chlorophyll group, and comprises three entirely distinct substances, soluble in CS_2, but insoluble in water. The whole of these three have hitherto been treated as one substance, and were so charted in my previous paper, although doubts as to the elementary character of the substance were very present in my mind then and long before. They are all characterized by well-marked absorption bands in the red, differing so slightly in position, that a dense solution of the mixture shows only one broad band, and can only be obtained in an isolated form by skilful management, and then only in an approximately pure condition. The three chlorophylls are—blue chlorophyll, yellow chlorophyll, and chloro-fucine. The former, or blue chlorophyll, can best be obtained from olive algæ, and is peculiarly sensitive to the action of acids or alkalies. Its spectrum gives a band nearer the red end of the spectrum than the others, and the two other bands figured in No. 1 of the paper already referred to.§ Yellow chlorophyll has not yet been obtained in a pure state. Mr. Sorby states that the best method of procuring it is to boil *Ulva latissima* first in water and then in spirit. The dark-green solution in alcohol should be agitated with bisulphide of carbon and a few drops of water added, if requisite, to cause nearly all the green colouring matter to be carried down, and nearly all the xanthophyll to remain in solution. On removing this, and agitating the CS_2 with fresh alcohol (methylated of the usual strength) taking care to have a considerable excess of the CS_2 present, a large portion of the yellow chlorophyll and some of the blue are dissolved. Removing this solution to another tube,* adding a little water, and separating the diluted alcohol, the precipitated bisulphide should be evaporated to dryness at a gentle heat. On redissolving in benzole and examining the spectrum of a properly diluted solution, it will be seen, that, besides the bands characteristic of blue chlorophyll, it has a dark narrow band in the red (nearer the blue end than in the blue chlorophyll), and another much broader in the middle of the blue. This is the substance figured in fig 2, on page 61, already referred to. The substance examined and figured was, however, contaminated by an admixture of undecomposed blue chlorophyll, to which the band in the green was due. The band in the orange near D is, I think, due to an undiscovered or unisolated colour element. This yellow chlorophyll may be prepared in an approximately pure condition (contaminated with xanthophyll and chloro-fucine) from dried Eucalyptus leaves and there largely predominates over the blue. In the freshly gathered leaves the balance is rather the other way, but anything like an accurate quantitative analysis is as yet out of the question. Mr. Sorby prepares *Chloro-fucine* from the leaves of *Fucus* and other olive algæ as follows:—The fresh fronds should be crushed in a mortar and slightly dried, so that on adding ordinary spirit of wine too much water may not be present. On agitating with repeated quantities of CS_2 the whole of the blue chlorophyll may be removed, and the alcoholic solution then contains much fuco-xanthine and the chloro-fucine. On adding water and agitating with more bisulphide, both these substances are carried down; and on evaporating the mixed solution the chlorofucine is often partially lost by decomposition in some unknown way. To prepare it free from fuco-xanthine, the above-named alcoholic solution should be diluted with an equal bulk of water, a drop or two of ammonia added, and agitated over and over again with fresh bisulphide, until it subsides to the bottom nearly colourless. By thus adding ammonia the chloro-fucine is retained in the alcohol solution, which is then of a pale green colour, and contains chloro-fucine mixed with a yellow substance soluble in water. This yellow substance deserves prolonged investigation, and may be procured in an approximately pure condition from the young leaves of *Laurus Camphora;* its oxidation changes are of a highly interesting character, and there are many reasons for believing that the wonderful colour changes of the camphor tree leaves (ranging from delicate pink to deep claret red) are nearly entirely due to this nameless substance (as recently shown by me before the Leeds Naturalists' Society). On evaporating this mixture to small bulk at a gentle heat,

* 'Proc. Royal Soc.,' 146, xxi., 1873.

† This may be regarded as, in part, a continuation of my note on "M. Chautard's Classification of Chlorophyll Bands," PHARM. JOURN., 3rd series, vol. iv. p. 61, and as necessary to render my notes on the colouring matters of Eucalyptus and Cinchona understandable.

‡ PHARM. JOURN., 3rd series, vol. iv., p. 61.

§ Rapidly made alcoholic solutions of cinchona leaves contain this in a nearly pure condition.

* An india-rubber suction pipette, with glass tube, is the most convenient instrument for doing this. The bulbous expansion of the tube should be capacious, the tube fine.

loss of alcohol causes impure chloro-fucine to be deposited, and after transferring it to a narrow tube, allowing it to subside, and removing the aqueous solution, almost pure chloro-fucine can be dissolved out by absolute alcohol. Its spectrum gives two dark absorption bands, one between the red and the orange, and another between the orange and yellow. The whole of the green is transmitted, but the whole of the blue cut off, except in very dilute solution, when a broad and obscure band in the blue may be seen by excellent daylight. The xanthophyll group consists of a *series* of five substances, whose spectra differ only in the position of their absorption bands, which are all situate at the blue end of the spectrum. They are all soluble in CS_2, insoluble in water, and more or less selectively soluble in alcohol. They are: Phycoxanthine, with broad bands at 5—6½ of Sorby's scale; Peziza xanthine, 5½—7; orange xanthophyll, 6—7½; xanthophyll, 6½—8; yellow xanthophyll, 7—8½. Frequently several of these xanthophylls co-exist, giving more or less continuous absorption of the blue end of the spectrum, and then isolation is not a very easy matter. They are all more or less sensitive to the band-raising power of solvents, and to the action of light and acids.

Phycoxanthine, Mr. Sorby seems to think, is a derivative of orange xanthophyll, and may be prepared from *Peltigera canina* by a process which I have not space to describe. Peziza xanthine is similarly prepared from *P. aurantia* and some other fungi, and is not, so far as I know, found elsewhere. The three xanthophylls are found everywhere; they may be prepared separately from plants in which they severally exist, but cannot, I think, be separated from each other with any approximation to purity, where they co-exist in equal, or nearly equal proportions. Mr. Sorby gives wall-flowers and *Porphyra vulgaris* as the source of xanthophyll; yellow crysanthemums as the source of yellow xanthophyll, and the orange-coloured antherozoids of *Fucus serratus* as the source of orange xanthophyll. The xanthine and lichno-xanthine groups consist of colouring matters soluble in CS_2, but selectively soluble in alcohol and in methylated alcohol. They are to be prepared in a pure state only from those fungules or lichens in which they severally attain their greatest development, and can only be detected in the higher plants by carefully watching the action of light and reagents on the solution containing them, these solutions having been rendered as approximately pure as possible. The different members all give a more or less complete general absorption of the blue and green to the end of the spectrum, and are as follows:—Fuco-xanthine, the principal colouring matter of Fuci, and already referred to; orange lichno-xanthine, to be obtained from the lichen *Peltigera canina*, growing well exposed to the sun; lichno-xanthine from *Clavaria fusiformis;* and yellow lichno-xanthine, derivable from Parmelia (Physcia) *parietina*.

Two other groups are very briefly discussed. They are the Phycocyan, to which possibly the "yellow substance" of camphor leaves may be referable, and the Phyco-erythine. Both these groups are soluble in water, and are, I think, derivatives of either blue chlorophyll or yellow xanthophyll,* and pass probably into the members of the erythrophyll group. At least, my experiment on the deoxidation of the chlorophylloids and xanthophylloids of the leaves of *Cinchona succirubra* point in this direction, but considerable care must always be taken by those engaged in these researches to avoid errors introduced by what Mr. Sorby calls the band-raising power of solvents, even though these are in all other respects quite neutral and exert no chemical action on the colouring matters.

Mr. Sorby states that he has carefully determined the order in which various liquids thus raise bands and compared it with the order of their specific gravity, and of their dispersive and refractive power, but has hitherto failed to recognize any simple connection between what may be called the band-raising power and any other physical property.* This band-raising power is probably associated with some loading of the molecules of the colouring matter, or some new grouping of them, by the solvents, so that it is hardly accurate to speak of their exerting no chemical action upon them. It is of course no new thing for a substance in changing its state to vary its absorption bands. A well known instance in which this occurs is that of *didymium*, whose absorption bands are subject to numerous modifications, according to the physical state of the earth, whether combined or not; and the character of the light employed, whether common light or the ordinary or extra-ordinary ray of polarized light. (See Roscoe on Spectrum Analysis for a pretty full account of Bunsen's memoir on this subject.) Erbia agrees in part with didymium in these characteristics and they doubtless have a connecting link somewhere with the band-raising power we are considering.

* Probably the former.

THE PHYSIOLOGICAL AND THERAPEUTIC ACTION OF HYDROCHLORATE OF AMYLAMINE.†

BY M. DUJARDIN-BEAUMETZ.

During the author's physiological and therapeutic researches upon trimethylamine, he received a suggestion from M. Wurtz that amylamine would have a more energetic action, and that it was desirable to study its effect upon the system. A *résumé* of the results of the investigation has recently been presented to the French Academy.

The author used the hydrochlorate of amylamine ($C_5H_{14}NCl$), a perfectly definite substance, which crystallizes in colourless scales; the salt was prepared by M. Frederick Wurtz. When solution of hydrochlorate of amylamine was introduced under the skin, phenomena were observed varying according to the dose employed. For example, when a dose of 1 to 5 centigrams was administered to rabbits, there was a marked diminution of the pulse and of the temperature, the pulse in one hour falling from 204 pulsations to 156. The lowering of the temperature was less clear, amounting only to one or two degrees. When, with the same animal, the dose exceeded 5 centigrams, the depressive phenomena of the pulse and temperature gave place to eccentric and varying nervous symptoms, but characterized essentially by tonic and chlonic convulsions, and by staggering movements. These phenomena were much intensified

* He does not, however, seem to have made any comparisons between their thermal relations and this band-raising power, or to have made any attempts to trace a connection between it and their behaviour towards polarized light under the influence of an electric current.

† *Comptes Rendus*, vol. lxxvii., p. 1247.

by a dose of 20 centigrams, and with 30 centigrams became sufficiently severe to cause death. Upon a dog of medium size, the dose of 20 centigrams produced a notable depression of the pulse, which fell from 80 to 64 pulsations, but it was necessary to raise the dose to beyond a gram before the nervous disturbances before spoken of were observed. So that with the preceding animals hydrochlorate of amylamine produced first, in a feeble dose, lowering of the pulse and of the temperature, and in a higher dose convulsions, which promptly brought on death.

With man a dose of 50 centigrams to 1 gram was observed to cause also diminution of the pulse and temperature, amounting to from 10 to 20 pulsations per minute in the space of an hour. These depressive properties of hydrochlorate of amylamine upon the pulse and temperature have been applied in the treatment of fever, particularly of typhoid fever, and in ten cases where this medication was used a manifest lowering of the pulse and temperature was uniformly observed, and the result appeared to be advantageous,. In comparing the physiological action of hydrochlorate of trimethylamine with that of hydrochlorate of amylamine, it appears that the latter, if it does not possess the sedative and calming action upon the nervous system possessed by trimethylamine, at least exercises a much more marked action upon the pulse and temperature, and that its toxic action is much more considerable than that of hydrochlorate of trimethylamine, or that of hydrochlorate of ammonia.

The author proposes to continue his researches upon the compound ammonias, and investigate in the next place the physiological action of propylamine, and compare it with that of amylamine and trimethylamine.

PREPARATION OF CARBOLIZED RESIN CLOTH.*

BY EDWARD LUND, F.R.C.S.

The author having found some difficulty in preparing the antiseptic carbolic gauze recommended by Professor Lister (see PHARM. JOURN. [3] vol iii., p. 41) in the way indicated by him, has sought to modify the process by taking advantage of the property possessed by carbolic acid, and first pointed out by Professor Lister, that it can be combined with resin and resinous matters generally with great facility, and that when so combined nearly all its irritating acrid properties are neutralized, while the resulting compound retains the power of evolving an antiseptic vapour at the temperature of the body. It is well known that to touch the mucous membrane, or even the skin of the lips, with pure carbolic acid, occasions pain and excoriation, but the author found, in experimenting on a mixture of one part of carbolic acid and five parts of resin that all the acridity was destroyed, the acid being still present, but stored up and rendered harmless by the new combination. He, therefore, came to the conclusion that this property allowed of the easy preparation, without the aid of heat, of a valuable application for antiseptic purposes in surgery; all that would be required was the saturation of a very thin calico gauze with a mixture of resin and acid dissolved in methylated spirit, and drying it quickly after pressure had been applied to it. But the compound of resin and acid thus left on the threads of the calico after evaporation was found to be too brittle and adhesive for a wound covering, and therefore to impart flexibility castor oil was added, as being the only accesible fixed oil entirely soluble in spirits of wine. The author finds that some samples of castor oil, in consequence of adulteration, are not entirely soluble in alcohol, but he is content to use an oil that will unite with twice its bulk of rectified spirit. Mr. Lund thus describes the proportion of the ingredients and the preparation of the antiseptic cloth :—

"Carbolic Acid Crystals, melted . .	2 fluid ounces.
Castor Oil	2 ,,
Purified Resin, by weight	16 ounces.
Methylated Spirit	40 fluid ounces.

Mix.

"To dissolve these ingredients easily, we must add them together in a certain order. To the resin, liquefied by heat and removed from the fire, add one-third part of the spirit; when these are well mixed, put in another third of the spirit, in which the oil has been previously dissolved; and, lastly, the acid in the remaining portion of the spirit must be slowly added to complete the mixture. The whole must be agitated until all the constituents are thoroughly incorporated, and afterwards passed through a muslin filter to get rid of any extraneous matters. If this plan be not adopted, the resin will concrete into a mass at the bottom of the vessel, and it will be extremely difficult afterwards to get it perfectly mixed. When thus prepared, the solution is of a dark colour, clear and free from any deposit; and it can be kept unchanged, in a well-corked bottle, for a long time. It is, in fact, a kind of thick varnish. To make the resin cloth, as I term it, for the sake of distinguishing it from the cere-cloth dressing for wounds, which I described in a paper read at the Leeds meeting of the British Medical Association in 1869, it is needful to select a very thin, cheap, porous calico or calico-muslin, known in the trade as 'mulls,' which costs at wholesale price about four shillings per piece of twenty yards. This, divided into strips, each about nine inches wide and six yards long, is reduced to a convenient form for general use. The calico should be unbleached and free from stiffening, and each of the strips should be carefully folded up, so as just to lie flatly in the press, as I am about to explain.

"An ordinary square tincture press may be used to press the cloth, or such a press as is sold for copying letters, to which a tin box has been adapted, so that the plates of the press can work in it; and into this box the folded calico is placed, the solution being poured over each successive layer, so as to wet perfectly every part of it. There should be an aperture at the bottom of the box, with a tap by which the superfluous fluid can be removed, collected, and used a second time. The press being brought into action, the pile of calico should be squeezed as dry as possible, all the fluid drained off, the resin-cloth taken out, laid over a few lines of string in a warm room with a good ventilation; and in an hour or two, when all traces of smell of the methylated spirit have departed, the cloth may be rolled up and kept in tin cases ready for use.

"It is difficult for me to state the exact cost of resin-cloth made by this process, for I have not yet bought the materials for its preparation at such prices as could be had if it were to be manufactured in large quantities; but, allowing for some slight reduction, where six or eight twenty-yard pieces of calico are bought at a time, and the solution made by the gallon, I find it comes to a fraction less than threepence per yard of average width of 44 inches. In using it as a dressing for wounds, I deal with it precisely as I would do with Mr. Lister's antiseptic gauze, for which it must be taken as a cheap and ready substitute. I generally apply ten folds of it over the face of a wound, as in an amputation, and perhaps six folds higher up the limb for some distance, and I cover it with the macintosh hat-lining, so as to distribute the serous discharges through the breadth of the resin-cloth thus covered. I have never found it to irritate the skin in any degree beyond what the oiled silk (protective), liberally used, could control; except once, when, in the hurry of preparing the resin-cloth, I had neglected to dry it thoroughly, and it was applied, still moist with the methylated spirit, the naphtha in it seeming to be the chief cause of the skin irritation. But if this precaution be observed, I believe this resin-cloth will be found a very useful addendum to our means of treating wounds and abcesses on antiseptic principles."

* *British Medical Journal*, Dec. 6, p. 654.

A DISCOURSE ON MOLECULES.*

BY J. CLERK MAXWELL, M.A., F.R.S.,

Professor of Experimental Physics in the University of Cambridge.

(*Continued from page* 405.)

We find that now, as in the days of the earliest physical speculations, all physical researches appear to converge towards the same point, and every inquirer, as he looks forward into the dim region towards which the path of discovery is leading him, sees, each according to his sight, the vision of the same Quest.

One may see the atom as a material point, invested and surrounded by potential forces. Another sees no garment of force, but only the bare and utter hardness of mere impenetrability.

But though many a speculator, as he has seen the vision recede before him into the innermost sanctuary of the inconceivably little, has had to confess that the quest was not for him, and though philosophers in every age have been exhorting each other to direct their minds to some more useful and attainable aim, each generation, from the earliest dawn of science to the present time, has contributed a due proportion of its ablest intellects to the quest of the ultimate atom.

Our business this evening is to describe some researches in molecular science, and in particular to place before you any definite information which has been obtained respecting the molecules themselves. The old atomic theory, as described by Lucretius and revived in modern times, asserts that the molecules of all bodies are in motion, even when the body itself appears to be at rest. These motions of molecules are in the case of solid bodies confined within so narrow a range that even with our best microscopes we cannot detect that they alter their places at all. In liquids and gases, however, the molecules are not confined within any definite limits, but work their way through the whole mass, even when that mass is not disturbed by any visible motion.

This process of diffusion, as it is called, which goes on in gases and liquids and even in some solids, can be subjected to experiment, and forms one of the most convincing proofs of the motion of molecules.

Now the recent progress of molecular science began with the study of the mechanical effect of the impact of these moving molecules when they strike against any solid body. Of course these flying molecules must beat against whatever is placed among them, and the constant succession of these strokes is, according to our theory, the sole cause of what is called the pressure of air and other gases.

This appears to have been first suspected by Daniel Bernoulli, but he had not the means which we now have of verifying the theory. The same theory was afterwards brought forward independently by Lesage, of Geneva, who, however, devoted most of his labour to the explanation of gravitation by the impact of atoms. Then Herapath, in his "Mathematical Physics," published in 1847, made a much more extensive application of the theory to gases, and Dr. Joule, whose absence from our meeting we must all regret, calculated the actual velocity of the molecules of hydrogen.

The further development of the theory is generally supposed to have begun with a paper by Krönig, which does not, however, so far as I can see, contain any improvement on what had gone before. It seems, however, to have drawn the attention of Professor Clausius to the subject, and to him we owe a very large part of what has been since accomplished.

We all know that air or any other gas placed in a vessel presses against the sides of the vessel, and against the surface of any body placed within it. On the kinetic theory this pressure is entirely due to the molecules striking against these surfaces, and thereby communicating to them a series of impulses which follow each other in such rapid succession that they produce an effect which cannot be distinguished from that of a continuous pressure.

If the velocity of the molecules is given, and the number varied, then since each molecule, on an average, strikes the sides of the vessel the same number of times, and with an impulse of the same magnitude, each will contribute an equal share to the whole pressure. The pressure in a vessel of given size is therefore proportional to the number of molecules in it, that is, to the quantity of gas in it.

This is the complete dynamical explanation of the fact discovered by Robert Boyle, that the pressure of air is proportional to its density. It shows also that of different portions of gas forced into a vessel, each produces its own part of the pressure independently of the rest, and this whether these portions be of the same gas or not.

Let us next suppose that the velocity of the molecules is increased. Each molecule will now strike the sides of the vessel a greater number of times in a second, but, besides this, the impulse of each blow will be increased in the same proportion, so that the part of the pressure due to each molecule will vary as the *square* of the velocity. Now the increase of velocity corresponds, on our theory, to a rise of temperature, and in this way we can explain the effect of warming the gas, and also the law discovered by Charles that the proportional expansion of all gases between given temperatures is the same.

The dynamical theory also tells us what will happen if molecules of different masses are allowed to knock about together. The greater masses will go slower than the smaller ones, so that, on an average, every molecule, great or small, will have the same energy of motion.

The proof of this dynamical theorem, in which I claim the priority, has recently been greatly developed and improved by Dr. Ludwig Boltzmann. The most important consequence which flows from it is that a cubic centimetre of every gas at standard temperature and pressure contains the same number of molecules. This is the dynamical explanation of Gay Lussac's law of the equivalent volumes of gases. But we must now descend to particulars, and calculate the actual velocity of a molecule of hydrogen.

A cubic centimetre of hydrogen, at the temperature of melting ice, and at a pressure of one atmosphere, weighs 0·00008954 gramme. We have to find at what rate this small mass must move (whether altogether or in separate molecules makes no difference) so as to produce the observed pressure on the sides of the cubic centimetre. This is the calculation which was first made by Dr. Joule, and the result is 1,859 metres per second. This is what we are accustomed to call a great velocity. It is greater than any velocity obtained in artillery practice. The velocity of other gases is less, as you will see by the table, but in all cases it is very great as compared with that of bullets.

We have now to conceive the molecules of the air in this hall flying about in all directions, at a rate of about seventeen miles in a minute.

If all these molecules were flying in the same direction, they would constitute a wind blowing at the rate of seventeen miles a minute, and the only wind which approaches this velocity is that which proceeds from the mouth of a cannon. How, then, are you and I able to stand here? Only because the molecules happen to be flying in different directions, so that those which strike against our backs enable us to support the storm which is beating against our faces. Indeed, if this molecular bombardment were to cease, even for an instant, our veins would swell, our breath would leave us, and we should, literally, expire.

But it is not only against us or against the walls of the hall that the molecules are striking. Consider the immense number of them, and the fact that they are flying in every possible direction, and you will see that they cannot avoid striking each other. Every time that two molecules come into collision, the paths of both are changed, and they go off in new directions. Thus each molecule is continually getting its course altered, so that

* Lecture delivered before the British Association at Bradford, September 22, 1873.

in spite of its great velocity it may be a long time before it reaches any great distance from the point at which it set out.

I have here a bottle containing ammonia. Ammonia is a gas which you can recognize by its smell. Its molecules have a velocity of six hundred metres per second, so that if their course had not been interrupted by striking against the molecules of air in the hall, every one in the most distant gallery would have smelt ammonia before I was able to pronounce the name of the gas. But instead of this, each molecule of ammonia is so jostled about by the molecules of air, that it is sometimes going one way and sometimes another, and like a hare which is always doubling, though it goes a great pace, it makes very little progress. Nevertheless, the smell of ammonia is now beginning to be perceptible at some distance from the bottle. The gas does diffuse itself through the air, though the process is a slow one, and if we could close up every opening of this hall so as to make it air-tight, and leave everything to itself for some weeks, the ammonia would become uniformly mixed through every part of the air in the hall.

This property of gases, that they diffuse through each other, was first remarked by Priestley. Dalton showed that it takes place quite independently of any chemical action between the inter-diffusing gases. Graham, whose researches were especially directed towards those phenomena which seem to throw light on molecular motions, made a careful study of diffusion, and obtained the first results from which the rate of diffusion can be calculated.

Still more recently the rates of diffusion of gases into each other have been measured with great precision by Professor Loschmidt, of Vienna.

He placed the two gases in two similar vertical tubes, the lighter gas being placed above the heavier, so as to avoid the formation of currents. He then opened a sliding valve, so as to make the two tubes into one, and after leaving the gases to themselves for an hour or so, he shut the valve, and determined how much of each gas had diffused into the other.

As most gases are invisible, I shall exhibit gaseous diffusion to you by means of two gases, ammonia and hydrochloric acid, which, when they meet, form a solid product. The ammonia, being the lighter gas, is placed above the hydrochloric acid, with a stratum of air between, but you will soon see that the gases can diffuse through this stratum of air, and produce a cloud of white smoke when they meet. During the whole of this process no currents or any other visible motion can be detected. Every part of the vessel appears as calm as a jar of undisturbed air.

But, according to our theory, the same kind of motion is going on in calm air as in the inter-diffusing gases, the only difference being that we can trace the molecules from one place to another more easily when they are of a different nature from those through which they are diffusing.

If we wish to form a mental representation of what is going on among the molecules in calm air, we cannot do better than observe a swarm of bees, when every individual bee is flying furiously, first in one direction and then in another, while the swarm, as a whole, either remains at rest, or sails slowly through the air.

In certain seasons swarms of bees are apt to fly off to a great distance, and the owners, in order to identify their property when they find them on other people's ground, sometimes throw handfuls of flour at the swarm. Now let us suppose that the flour thrown at the flying swarm has whitened those bees only which happened to be in the lower half of the swarm, leaving those in the upper half free from flour. If the bees still go on flying hither and thither in an irregular manner, the floury bees will be found in continually increasing proportions in the upper part of the swarm, till they have become equally diffused through every part of it. But the reason of this diffusion is not because the bees were marked with flour, but because they are flying about. The only effect of the marking is to enable us to identify certain bees.

We have no means of marking a select number of molecules of air, so as to trace them after they have become diffused among others, but we may communicate to them some property by which we may obtain evidence of their diffusion.

For instance, if a horizontal stratum of air is moving horizontally, molecules diffusing out of this stratum into those above and below will carry their horizontal motion with them, and so tend to communicate motion to the neighbouring strata, while molecules diffusing out of the neighbouring strata into the moving one will tend to bring it to rest. The action between the strata is somewhat like that of two rough surfaces, one of which slides over the other, rubbing on it. Friction is the name given to this action between solid bodies; in the case of fluids it is called internal friction, or viscosity.

It is, in fact, only another kind of diffusion—a lateral diffusion of momentum, and its amount can be calculated from data derived from observations of the first kind of diffusion, that of matter. The comparative values of the viscosity of different gases were determined by Graham in his researches on the transpiration of gases through long narrow tubes, and their absolute values have been deduced from experiments on the oscillation of discs by Oscar Meyer and myself.

Another way of tracing the diffusion of molecules through calm air is to heat the upper stratum of the air in a vessel, and to observe the rate at which this heat is communicated to the lower strata. This, in fact, is a third kind of diffusion—that of energy, and the rate at which it must take place was calculated from data derived from experiments on viscosity before any direct experiments on the condition of heat had been made. Professor Stefan, of Vienna, has recently, by a very delicate method, succeeded in determining the conductivity of air, and he finds it, as he tells us, in striking agreement with the value predicted by the theory.

All these three kinds of diffusion—the diffusion of matter, of momentum, and of energy—are carried on by the motion of the molecules. The greater the velocity of the molecules and the further they travel before their paths are altered by collision with other molecules, the more rapid will be the diffusion. Now we know already the velocity of the molecules, and therefore, by experiments on diffusion, we can determine how far, on an average, a molecule travels without striking another. Professor Clausius, of Bonn, who first gave us precise ideas about the motion of agitation of molecules, calls this distance the mean path of a molecule. I have calculated, from Professor Loschmidt's diffusion experiments, the mean path of the molecules of four well-known gases. The average distance travelled by a molecule between one collision and another is given in the table. It is a very small distance, quite imperceptible to us even with our best microscopes. Roughly speaking, it is about the tenth part of the length of a wave of light, which you know is a very small quantity. Of course the time spent on so short a path by such swift molecules must be very small. I have calculated the number of collisions which each must undergo in a second. They are given in the table and are reckoned by thousands of millions. No wonder that the travelling power of the swiftest molecule is but small, when its course is completely changed thousands of millions of times in a second.

The three kinds of diffusion also take place in liquids, but the relation between the rates at which they take place is not so simple as in the case of gases. The dynamical theory of liquids is not so well understood as that of gases, but the principal difference between a gas and a liquid seems to be that in a gas each molecule spends the greater part of its time in describing its free path, and is for a very small portion of its time engaged in encounters with other molecules, whereas, in a liquid, the molecule has hardly any free path, and is always in a state of close encounter with other molecules.

Hence in a liquid the diffusion of motion from one

molecule to another takes place much more rapidly than the diffusion of the molecules themselves, for the same reason that it is more expeditious in a dense crowd to pass on a letter from hand to hand than to give it to a special messenger to work his way through the crowd. I have here a jar, the lower part of which contains a solution of copper sulphate, while the upper part contains pure water. It has been standing here since Friday, and you see how little progress the blue liquid has made in diffusing itself through the water above. The rate of diffusion of a solution of sugar has been carefully observed by Voit. Comparing his results with those of Loschmidt on gases, we find that about as much diffusion takes place in a second in gases as requires a day in liquids.

The rate of diffusion of momentum is also slower in liquids than in gases, but by no means in the same proportion. The same amount of motion takes about ten times as long to subside in water as in air, as you will see by what takes place when I stir these two jars, one containing water and the other air. There is still less difference between the rates at which a rise of temperature is propagated through a liquid and through a gas.

In solids the molecules are still in motion, but their motions are confined within very narrow limits. Hence the diffusion of matter does not take place in solid bodies, though that of motion and heat takes place very freely. Nevertheless, certain liquids can diffuse through colloid solids, such as jelly and gum, and hydrogen can make its way through iron and palladium.

We have no time to do more than mention that most wonderful molecular motion which is called electrolysis. Here is an electric current passing through acidulated water, and causing oxygen to appear at one electrode and hydrogen at the other. In the space between, the water is perfectly calm, and yet two opposite currents of oxygen and of hydrogen must be passing through it. The physical theory of this process has been studied by Clausius, who has given reasons for asserting that in ordinary water the molecules are not only moving, but every now and then striking each other with such violence that the oxygen and hydrogen of the molecules part company, and dance about through the crowd, seeking partners which have become dissociated in the same way. In ordinary water these exchanges produce, on the whole, no observable effect, but no sooner does the electromotive force begin to act than it exerts its guiding influence on the unattached molecules, and bends the course of each toward its proper electrode, till the moment when, meeting with an unappropriated molecule of the opposite kind, it enters again into a more or less permanent union with it till it is again dissociated by another shock. Electrolysis, therefore, is a kind of diffusion assisted by electromotive force.

(*To be continued.*)

THE EUCALYPTUS GLOBULUS AS A DISEASE DESTROYING TREE.

In the exhaustive report upon the culture, properties, and uses of the plants of the genus Eucalyptus, presented two years since by M. Wattel to the Paris Société d'Acclimation, a full abstract of which was printed in this Journal,* it was pointed out that one of the most valuable properties claimed for it was its antimiasmatic action when grown in marshy districts. Numerous experiments to test this point have been made in Algeria, and some of the results were recently brought before the French Academy by M. Gimbert.† Numerous cases are cited, amongst others that of a farm twenty miles from Algiers, formerly noted for its pestilential atmosphere. In the spring of 1867, 13,000 eucalyptus trees were planted on the farm, since which time not a single case of fever has occurred there, the immunity commencing the same year, whilst the trees were yet only two or three metres high. The *Gardeners' Chronicle* recalls the fact that a similar virtue has been attributed to the sunflower, and that the sanitary condition of the Washington (U.S.) Observatory, which was situated in a very unhealthy, marshy locality, where fever was rife at certain periods of the year, was much improved after the ground had been annually sown with sunflower. The *Gardeners' Chronicle* also recapitulates some interesting points in connection with this remarkable tree, as follows :—

"The numerous species of eucalyptus, known as gum-trees, iron-barks, or stringy-barks, are among the most characteristic features of Australian and Tasmanian vegetation. Many of them are extremely valuable as timber trees ; others yield a resinous juice, which, when hardened, possesses powerful astringent qualities ; and many are useful in various ways too numerous to mention. Among them all, however, there is none of more general utility or economic importance than *E. globulus*. Even from an ornamental point of view this tree is well worthy of cultivation. The trunk, of which the outer layers of bark detach themselves, as in the Oriental Plane, is smooth and ash-coloured ; the leaves are bluish green, or, when young, often glaucous-white, often from half-a-foot to a foot in length, and the flowers are large and axillary, growing close to the stem, either singly or in clusters of two or three. The tree sometimes attains the height of 200 feet, but often flowers when not above 10 feet high. It is a native of valleys and moist declivities of wooded mountains in various parts of Victoria, as well as of Tasmania. Besides its very great value as a timber tree, this species of eucalyptus, in common with many others, is of importance as a honey-producing tree. The flowers yield a large quantity of honey, and are greatly affected by bees ; at least, such is the case in Australia, where the honey-bee of Europe, introduced there, spread in a few years in a remarkable manner, and soon established itself in the forests, in which the eucalypti form nearly 99 per cent of the vegetation. The leaves, probably from their coriaceous and resinous nature, are singularly proof against the ravages of locusts. This was noticed by M. Ramel in 1865, in a part of Senegal where *E. globulus* had been introduced, when the leaves of all other trees were devoured by the locust, those of *E. globulus* resisted their attacks. It has been proposed to employ the leaves and other portions of the tree in medicine, but Mr. Broughton, the Government chemist of Ootacamund, does not find in either bark or leaves any traces of quinine, which was supposed to enter into their composition. He says :—'Much has lately appeared in the papers and quasi-scientific journals concerning the valuable qualities of the eucalyptus globulus as a febrifuge. In the *Lancet* for April 20, 1872, a notice is given of the uses of this tree medicinally, in which it is stated that all parts are most favourable as a febrifuge medicine, and also that the leaves, when smoked, are most efficacious in allaying pain, calming irritation, and procuring sleep. This article furthermore informs us that Professor Vauquelin obtained an alkaloid from the bark which crystallized like quinine as a sulphate, and which yielded the ordinary reaction of quinine with chlorine, water, and ammonia. I have examined the bark and leaves, and have the honour to state that neither quinine, quinidine, cinchonidine, nor cinchonine is contained in the plant in any proportion.' A French chemist, M. Cloez, has extracted from the leaves an essence analogous to camphor, to which he gives the name eucalyptol. This substance, which possesses the agreeable odour of the plant in the highest degree, seems to exercise upon the system an action similar to that of most other essential oils. Mixed with water, it yields a pleasant rather bitter camphor-like flavour. In Mauritius an infusion of the leaves was administered with some success in malarious fever, the leaves being sold for this purpose at 6*d.* per ounce. Cigars made from the leaves were exhibited in the Paris Exhibition of 1867, and recommended as being very efficient in promoting digestion ; and in the last International Exhibition were some

* PHARM JOURN. [3] vol. iii., p. 23, 43.
† *Comptes Rendus*, vol. lxxii. p. 764.

cigarettes made from the foliage, prepared by a chemist at Melbourne, who urges their employment in bronchial and asthmatic affections.

"In Germany, Italy, and France this plant is credited with the power of removing the sources of fever, and in addition to the case above mentioned we are told of a Dutch landed proprietor who planted some plots of sunflower upon the banks of the Scheldt, near his houses, and whose tenants enjoyed afterwards complete immunity from miasmatic fever, although that disease continues to be prevalent in the neighbourhood. In the swampy regions of the Punjab district the sunflower is grown in some places in large plantations with marked success, its influence tending to remove malaria, and thus benefiting the health of residents in those districts. The Agri-Horticultural Society of the Punjab has taken the matter up, and in a recent report advocates the extension of the cultivation of this plant."

In addition to the above it will be remembered that M. Rabuteau also has examined eucalyptus leaves with the view of ascertaining whether its alleged febrifuge powers are dependent upon the presence of an alkaloid ;* his conclusion, like that of Mr. Broughton, being that no such alkaloid exists in the leaves.

As this tree is now being so freely cultivated, the following information how to grow *Eucalyptus globulus* in England, communicated to the *Medical Times and Gazette* by Mr. V. F. Benett Stanford, of Pyt House, Tisbury, will be read with interest :—

"I have successfully reared from seed two dozen of these trees, and they are now growing well out of doors. I obtained the seed five years ago from South Australia, and forced it in a hot-house ; in one year it was four feet high, and now, in its fifth year, it is growing rapidly in a sheltered position in the park, having attained a height of thirty feet. The first three years the tree must be taken under cover every winter, and the fourth and fifth years should be protected for several feet up with wisps of hay or straw. When the trees are kept indoors in winter, it should be in an orangery or very high greenhouse, with plenty of light and little water."

RELATIONS OF PLANTS AND ANIMALS TO INORGANIC MATTER, AND ON THE INTERACTION OF THE VITAL AND PHYSICAL FORCES.†

BY J. BELL PETTIGREW, M.D., F.R.S., ETC.

In entering upon a great science like physiology it becomes us to take as wide a survey of its several dependencies as is consistent with the knowledge of the epoch in which we live. It has, therefore, appeared to me that it might not be inappropriate on the present occasion *to consider organic beings in relation to inorganic matter, and the forces and affinities which weld, as it were, the organic and inorganic together in living organisms.* This seems necessary in an introductory lecture like the present ; as it is of the utmost importance to familiarize ourselves at the outset not only with the matter from which, but the mode according to which, the several organisms and organs which it is the object of physiology to expound are formed.

The plant lives upon inorganic material, and the animal feeds on the plant or on some other animal nourished by the plant. Directly or indirectly, living organisms are linked to the globe they inhabit. It is impossible to speak of any one of the organic series as apart from the inorganic world, for the obvious reason that the same forces to a great extent enter into the composition of both. The grand scriptural dictum, "Dust thou art, and unto dust thou shalt return," is not more philosophical than it is physiological. It expresses in quaint but vigorous language those peculiar vital, physical, chemical, and other combinations and relations which bind living to dead matter. To trace those combinations and relations from their incipient beginnings in "*brut*," or inorganic matter, through the organic series, is the true province of physiology. In this wider and grander sense, physiology has to do with the universe and those beautiful physical laws which regulate the distribution and motion of matter. It has to do with embryology and the beginnings of life, whether by supposed spontaneous generation or from an accredited parent ; it has to do with anatomy and zoology, regional and histologic ; it has to do with chemistry and the myriad combinations and transformations incessantly going on between living and dead particles in vegetable and animal organisms ; it has to do with physics and mechanics, with mathematics, with electricity, magnetism, heat, light, and a great number of kindred subjects, many of which are still in their infancy.

The relation between the organic and inorganic kingdoms and between the vital, physical, and other forces is of the most intimate description ; and physiology, to be perfect as a science, must be all-embracing—*i.e.*, it must occupy itself not only with living and dead matter, but also with vital, physical, and other force. The ancients, with a boldness and grasp worthy of modern times, regarded physiology as synonymous with the science of nature. With the Grecks, who coined the word, physiology was the λογος, reason or philosophy of φυσις, nature ; that is to say, the generating and generated κοσμος, world or system of the universe. It was, in short, the science of universal nature. In modern times, and especially among the Germans, what was thus expressed by the ancients has come to be expressed by the exactly parallel terms, *natur philosophie*, and *naturwissenschaft* (our natural philosophy).

During the last century the term "physiology" was restricted in its meaning not merely to the science of life and organisation, but more especially to the life and organisation of man. It thus came strictly to denote an all important branch of medical science. During the present century it has been gradually widening its boundaries, and at the present day it holds out the prospect of an indefinable increase. There is now a physiology of man, a physiology of animals, and a physiology of plants. This increase has taken place contemporaneously with the enlargements in the fields of those sciences, such as botany, zoology, and human anatomy, which directly supply its subject matter ; and of those other sciences, such as chemistry, and all the kinetic branches of physics —*e. g.*, electricity, magnetism, heat, optics, etc.—which have become all important aids in the investigation of many of the hitherto altogether mysterious processes of life and organisation. Physiology is consequently emerging from the comparatively confined and isolated position it occupied during the eighteenth century, and entering into a most intimate relation not only with the whole range of the natural sciences, but also with the whole range of the physical sciences ; for with mechanical and dynamical laws, such as leverage and capillary action, it has as intimately to do as with the subtle physical powers of heat and magnetism. Physiology is thus plainly cosmic or universal in its relations and dependencies. From the tendency which the circle of the sciences has to widen, it is impossible to draw a sharp line of demarcation between them. Already the little circles which indicate collateral branches are indenting each other, and the time will assuredly come when all shall merge and blend to form one grand whole. Then, and then only, shall we realize the important fact that all science, like all truth, is one.

Such being the nature of our great subject, it cannot be inappropriate in an introductory lecture to direct your attention very briefly to the cosmic or universal relations and affinities of physiology.

In ancient Greece it was customary to regard all matter as consisting of four elements—viz., earth, air, fire, and water. The elements now, owing to the rapid advance of

* PHARM. JOURN. [3] vol. iii., p. 463.

† An Introductory Lecture to a Course of Physiology. Reprinted from the *Lancet*, Nov. 15.

chemistry and the judicious use of spectrum analysis in the hands of Bunsen and Kirchoff, amount to sixty-five.

Thales believed that the secret of life was to be found in the water; Anaximenes was of opinion it resided in the air; Pythagoras traced it to heat, and Xenophon to the earth. Hippocrates went further, and asserted that φυσις (Nature) presided over and controlled all the actions of the body. According to him, Nature assimilated what was good for the body and rejected what was bad. Plato, still more daring, attributed a soul to man, consisting of three parts—namely, the knowing or cognitive faculty, seated in the head; the passions, placed in the breast; and the appetites, confined to the belly. Aristotle entertained similar views. The soul, in Aristotle's opinion, was the vital energy or power which animated all organic bodies. Thus, with him, there was a vegetative soul for plants, a sentient soul for animals, and a rational soul for man.* Plato and Aristotle, with a weird wisdom, drew a broad line of demarcation between matter, life, and spirit. Democritus and Epicurus, who believed in none of these things, regarded the body as an accidental aggregation of stray particles, variously grouped, and consequently discharging dissimilar functions. In Democritus and Epicurus we behold the materialist of modern times; in Plato and Aristotle the immaterialist.

It is exceedingly interesting and, I will add, exceedingly instructive to trace those ancient doctrines rising gradually from matter to life, and from life to spirit or soul, but I will not tax your patience; suffice it to say, that the ground originally occupied by Plato and Aristotle on the one hand, and by Democritus and Epicurus on the other, is vigorously maintained by two rival schools of modern philosophers. Thus there are those who attribute everything that exists to a spiritual agency, or, what is the same thing, a divine power, while there are others who persistently maintain that the universe and all it contains is due to an accidental assemblage of parts mutually acting and reacting upon each other. Newton and Swedenborg, *e.g.*, support the former view, and Haeckel and Tyndall the latter. These four philosophers equally assume the existence of matter for their systems of the universe, but there is this fundamental difference between them: Newton and Swedenborg attribute the disposal, arrangement, and movements of matter directly to divine interposition and agency; whereas Haeckel and Tyndall refer everything to a power inhering in the matter itself. In other words, Newton and Swedenborg admit that matter, once created and placed in certain conditions, will obey certain laws; they, however, deny that matter can accomplish anything of itself, which is the position defended by Haeckel and Tyndall.

Newton's conception of the universe is very grand. He pictures a mighty chaos, matter without form in the illimitable void. He then represents it as assuming shape and falling into position by the force of gravitation and under divine guidance. The assuming of shape is the origin and order of movement. By motion thus produced the universe becomes gradually perfected; the relative size, distances, and movements of its several parts can be accurately ascertained.† Newton never loses sight of a first cause. Thus, speaking of the formation of the sun and fixed stars, he says: "I do not think (this) explicable by mere natural causes, but I am forced to ascribe it to the council and contrivance of a voluntary agent." Numerous other passages of a like tenor might be cited from this author.*

Swedenborg in like manner, when descanting of gravitation, attributes the disposal of matter to divine agency. He says that nothing can be truly known of the visible world without a knowledge of the invisible, for the visible world is a world only of effects, while the invisible, or spiritual, is a world of causes.†

Haeckel gives a very different and not over-cheering account of the Creation. It is too long to quote on the present occasion, but I may say briefly that he refers not only the origin of the primitive cell, but also that of the young earth, to condensation and rind-formation. He does not recognize a First Cause. He says: "The homogeneous, viscid, plasma substance, which singly and alone formed the bodies of the first organisms, and even at this day quite alone forms them in the case of the *moneres*, or simplest amœbic forms, is analagous to the tenacious and viscid planetary substance which contains the elements and substance of the young earth, as well as of the other glowing world bodies. . . . In both cases the form of the creation happened, not through the capricious interference of a personal Creator, but through the original power of matter fashioning itself. Attraction and repulsion, centripetal force and centrifugal force, condensation and rarefaction of the material particles, are the only creative powers, which at this point lay the foundations of the complicated structure of creation."‡ Thus speaks and writes Haeckel. His system is not more intelligible for having excluded the divine agency. It is principally remarkable for bringing us face to face with the hydra-headed, myriad-handed protoplasm, and with the primitive cell, regarding which we have heard so much in recent times. Haeckel, it will be observed, holds extreme evolutionist views. According to him, matter does everything of itself and for itself.

Tyndall is equally extravagant in his opinions. In the region beyond the microscope limit, he says, the poles of the atoms are arranged—that tendency is given to their powers; so that when the poles and powers have free action, and proper stimulus in a suitable environment, they determine first the germ and afterwards the complete organism.

From the foregoing it will be evident that philosophers are diametrically opposed to each other as to the constitution of the universe: one sect attributing everything to divine agency and to law and order impressed upon all matter, whether living or dead, from the first; the other believing that matter of itself can account for the universe and all it contains. Both sets of philosophers, however—and this is the point with which we as physiologists have to do,—equally believe in matter and force.

(*To be continued.*)

* Strictly speaking. Aristotle held that man, while possessing, in common with the brutes, a ψυχη, possessed also a πνευμα, or rational principle.

† "From the time when Newton discovered, by analysing the motions of the planets on mechanical principles, that every particle of ponderable matter in the universe attracts every other particle with a force varying inversely as the square of the distance, astronomers have been able, in virtue of that one law of gravitation, to calculate with the greatest accuracy the movements of the planets to the remotest part and the most distant future, given only the position, velocity, and mass of each body of our system at any one time."

* Newtoni Opera Omnia, p. 430. London, 1782.

† Life of Swedenborg, p. 17. New York, 1854.

‡ Haeckel: 'Natürliche schöpfungs Geschichte.' Berlin, 1868.

PALERMO MANNA.

The production and exportation of manna constitutes a very important item in the commerce of Sicily. Much valuable information on this subject was contained in Mr. Hanbury's paper, printed in the Journal (vol. iii., p. 421); but from a recent report on the commerce and navigation of Sicily we learn that during the three years ending in 1871, as many as 7,148 cwts. were exported, of an aggregate value of £45,720, made up as follows:—1869, 2546 cwts.; value, £15,972. 1870, 1564 cwts.; value, £10,220. 1871, 3,038 cwts.: value, £19,528.

Manna is produced chiefly in the Province of Palermo about Cefalù and Geraci, Cinisi, and Capaci. It is shipped principally to France and the northern ports of Italy, whence it is conveyed overland to the North of Europe. England consumes but a small quantity.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 20, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ.',*

TEA ADULTERATION.

OUR readers will doubtless be aware that one of the objections urged by the grocers against being subjected to the operation of the Adulteration Act in the case of sophisticated tea, has been the indiscriminate admission of all descriptions and qualities of tea by the Customs. A strenuous effort has been made by the grocery trade to strike at the root of adulteration of tea by means of government inspection. We think the action taken with this object will be of interest to our readers, as it may prove a possible means of paving the way for the adoption of the excellent suggestion made by Mr. UMNEY, at the late evening meeting, that drugs such as opium, scammony, etc., should be submitted to examination while in bond.

There would be little difficulty in proving that the Chinese, English merchants, and the British public have all assisted in bringing about the present state of things, with respect to the adulterated tea imported into this country. The Chinese have manipulated the lowest descriptions of tea so perfectly that it has become possible to palm on the British public tea of good appearance but low quality at comparatively a very high price, if the value is considered. The masses, always craving for something cheap, have patronized this imposture, and by buying these manipulated teas have encouraged the trade. With a reduction in the import duty to sixpence a pound, we have witnessed the importation of green tea loaded with sand and magnetic oxide of iron; "Maloo Mixture," which is nothing but exhausted and old leaves redried and mixed in the drying with offensive substances, which shall be nameless; putrid tea, and tea which has been damaged by sea water. As the duty now imposed bears a small proportion to the actual value of the tea, importers are willing to run the risk of importing teas of the lowest quality, well knowing that as the public taste just now runs in the direction of buying cheap and nasty things, these teas, however bad and unsound, can be sold at a fair profit, either alone or after being mixed with others of a better quality.

This trade had certainly become so gigantic that it was necessary somebody should take the matter in hand, and with great propriety and zeal the Sanitary Authorities of the City of London directed their attention to it. They met and consulted together, and after having discovered a shipment of tea "unfit for human food," they determined to make an example of the importers by taking legal proceedings for the condemnation of the tea. But unfortunately there was no law under which they could act as long as the tea remained in bond, and consequently they at once put themselves in communication with the Government. The Custom's Authorities, under their present laws, could not act in the matter, and we may say that up to last Saturday week the Government authorities took very little interest in the question so long as the duty was paid on the good and bad tea alike. On that day, however, Mr. Stansfeld seems to have become impressed with the arguments of the deputation which waited on him; and when it was proposed that a bill should be introduced into Parliament next session empowering local sanitary authorities connected with food adulteration to inspect the bonded tea warehouses, and place all spurious or adulterated tea under the regulations of the Adulteration of Food Act, he seemed to think that this should be a duty undertaken—if at all—by the Government. We think so too; for it seems to us a monstrous thing that, while tobacco containing the smallest admixture of saccharine or other foreign matter is pounced upon by the Customs and condemned, adulterated tea should be allowed to be imported and cleared for home consumption with impunity so long as the duty is paid.

It will be said that there is a great difference between tobacco and tea, because the great bulk of the former being imported in the unmanufactured state, it is necessary to provide that all which is imported shall be genuine, to enable the Inland Revenue Officers to guard against adulteration during the process of manufacture; whilst in the case of tea—a finished article ready for consumption when the duty is paid—if any of it is adulterated the adulterant is charged with the tea duty.

But we wish to show that as the government can frame laws for the protection of the tobacco revenue, and rigidly enforce them, they can, if so inclined, also frame similar laws for regulating the importation of tea. If we look into the Statute Book we find this was actually done when the tea duty was high, and at the present time it is a penal offence for persons in this country to manufacture certain leaves in imitation of tea. The British public have a right to demand that the duty of inspecting tea in bond shall devolve upon the Government. No local authority can have the facilities at its disposal that the Government officers have. At all the bonded warehouses the tea is always under revenue lock; the Government officers, in constant attendance, know where the tea comes from, the importer, and everything connected with the vessel bringing it. In addition to this, the officers at every port are under the same regulations and control, and, as a matter of course, have constant supervision from the central authorities.

If this proposed duty of inspecting bonded tea

warehouses were given over to the local authorities we are convinced they would be compelled to ask for assistance from the Customs to enable them to keep a watch on tea suspected of being adulterated, which might only be in the warehouse for transhipment; for we apprehend that, however stringent the law might be, it would only include in its provision tea imported for home consumption, and would not interfere with the carrying business of British shipowners. We may further state that the working of the Adulteration Act up to the present time has filled us with alarm. The readers of this Journal will have seen cases brought before the magistrates which ought never to have been taken into court, as well as chemical and microscopical evidence given by some of the analysts which was proved to be not well founded. At every port into which tea is imported we cannot expect to find an analyst who has had a life-long experience of adulterations of every kind, and to judge from some of the appointments lately made under the Adulteration Act, the public analyst may be a person who, with little experience in chemical and microscopical research, as applied to the adulteration of food and drink, would consequently not be competent to perform the duties connected with the inspection of tea in bond. There is another objection to the appointment of local sanitary authorities for this duty on account of the expenses connected with such inspection having to be borne by the borough or county rates, but chiefly by the former, and, consequently, the cost of the inspection would fall upon a small section only of the community. If the duty were undertaken by the Government the cost would be national, and all those paying taxes would then have to contribute. On the score, therefore, of justice, efficiency, and equity, this duty of tea inspection if done at all should be undertaken by the Government. It is evident from the numerous prosecutions of tea dealers in different parts of the country the matter cannot rest where it is. These traders may, in many instances, be regarded as innocent of any intentional fraud, and yet they are punished for selling an adulterated article on which the Government have been paid the duty as tea. Though we cannot adopt the opinion that they have no means of finding out whether the tea they vend contains exhausted leaves or is faced with Prussian blue or other pigments, and are more disposed to agree with Mr. KINNERSLEY* in thinking the effect of the Act is to throw upon retail dealers the duty of ascertaining by competent analysis that every article they sell is pure and unadulterated—still we can only regard that as an additional reason why the Government should perform its part in preventing the introduction of an adulterated article upon which duty is charged.

If the Government obtain powers to examine tea in bond, and condemn all found adulterated or unfit for human food, we are sure the Chinese will very speedily discontinue their present practice of sophisticating teas for the English market, and we shall, without doubt, soon have tea on our market, perhaps a little higher in price, but certainly much better in quality than that which is now sent into consumption. The evil has been of long duration, but stringent measures are only required to bring the tea trade once again into a healthy state.

* See PHARMACEUTICAL JOURNAL, p. 485.

OPIUM TRADE IN INDIA.

IN the 'East India and Progress and Condition Report' for 1871-72 some interesting notes are given on this subject.

The cultivation of opium in India is still increasing. At present there are 560,000 acres in Bengal and 608 in Bombay under cultivation, and Government has appointed an agent to watch the growth and to study blights or deteriorations in the plant, which requires high cultivation and careful manuring.

All the opium is bought up by Government which thus has the monopoly of sale. There are two opium agencies for this purpose, one at Patna, and another at Ghazipur, where the Government officers buy opium from the cultivators at a rate to meet the market. Malwa opium is grown within the territory of native states, and is there free of any duty. To guard against the advantage it would gain in the market when pitted against the highly taxed opium of the Government, it is only allowed to be exported from Bombay, and is there subjected to such a high duty as to make its price equal to the other.

The exports of opium during 1871-72 amounted to 93,364 chests, valued at £13,365,288; of this quantity Bengal contributed 49,455 chests, and Bombay 43,909 chests, and the net revenue to the Government amounted to £7,657,213. This large revenue was due to the high price, and to the small payments made to the cultivators owing to the shortness of the crops. The price per chest in Bengal was £139, leaving a net profit of £90, the price being £26 higher than the average of the preceding year. The short crop was owing to a peculiar blight in 1871, and dry winds in 1872.

ROYAL INSTITUTION ARRANGEMENTS FOR 1873-4.

WE have just received from the Secretary of the Royal Institution the programme for the coming session. It comprises the following probable arrangements for the Friday evening meetings before Easter:—

Jan. 16th. Professor Tyndall, D.C.L., LL.D., F.R.S.:—"The Acoustic Transparency and Opacity of the Atmosphere."

Jan. 23rd. Professor Sylvester, M.A., F.R.S.:—"Recent Discoveries in Mechanical Conversion of Motion."

Jan. 30th. Sir Julius Benedict :—"Weber and his Times."

Feb. 6th. Alfred H. Garrod, Esq. :—"The Heart and the Sphygmograph."

Feb. 13th. Dr. Doran, F.S.A. :—"The Opponents of Shakespeare."

Feb. 20th. Vernon Heath, Esq. :—"The Autotype and other Photographic Processes and Discoveries."

Feb. 27th. Francis Galton, Esq, F.R.S. :—"Men of Science, their Nature and Nurture."

March 6th. Sir Samuel W. Baker, M.A. :—"Suppression of the Slave Trade of the White Nile."

March 13th. Dr. C. R. A. Wright, F.C.S:—"The Chemical Changes accompanying the Smelting of Iron in Blast Furnaces."

March 20th. Dr. W. B. Carpenter, F.R.S.:—"The Temperature of the Atlantic."

March 27th. Professor A. C. Ramsay, LL.D., F.R.S.:—"The Physical History of the Rhine."

The following are the Lecture arrangements for 1873-74 :—

Professor Tyndall, D.C.L., LL.D , F.R.S.—Six Christmas lectures (adapted to a juvenile auditory), on the "Motion and Sensation of Sound," on Dec. 27th (Saturday), 30th, 1873 ; Jan. 1st, 3rd, 6th, 8th, 1874.

Professor Rutherford, M.D., F.R.S.E.—Five lectures on "Respiration." On Tuesdays, Jan 13th to Feb. 10th.

Professor Tyndall, D.C.L., LL.D., F.R.S.—Six lectures on "The Physical Properties of Gases and Liquids." On Tuesdays, Feb. 17th to March 24th.

Professor P. M. Duncan, F.R.S.—Six lectures on "Paleontology, with Reference to Extinct Animals and the Physical Geography of their Time." On Thursdays, Jan. 15th to Feb. 19th.

Professor W. C. Williamson, F.R.S.—Five lectures on "Cryptogamic Vegetation." On Thursdays, Feb. 26th to March 26th.

Professor G. Croom Robertson.—Four lectures on "Kant." On Saturdays, Jan. 17th, 24th, 31st, and Feb. 7th.

R. Bosworth Smith, Esq., M.A.—Four lectures on "Mohammed and Mohammedism." On Saturdays, Feb. 14th, 21st, 28th, and March 7th.

Charles Thomas Newton, Esq., M.A.—Three lectures on "Ephesus." On Saturdays, March 14th, 21st, and 28th.

Professor Rutherford will give six lectures on "The Nervous System" after Easter.

THE REPRINT OF THE PHARMACOPŒIA.

We are enabled to state that the reprint of the Pharmacopœia is being rapidly proceeded with, and that it, together with the Addendum, containing the requisite additions, may be expected to be published in a few weeks.

On Monday last a case of raw meat, preserved in Buenos Ayres in April last (as certified under consular seal) was publicly opened at the warehouse of Messrs. Culverwell, Brooks, and Cotton, Saint Mary Axe, City, in the presence of a large number of persons interested in the subject of meat preservation. Notwithstanding the time that had elapsed since its preservation, the meat appeared to be perfectly sweet and fresh.

According to consular returns, the total quantity of cinchona bark shipped from Saint Martha during the year 1872, amounted to 2,758,991 lbs., being a considerable decrease on that exported in the previous year, when it amounted to 3,415,149 lbs.

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

At a meeting of the Brighton Association of Pharmacy, at the room in North Street, Mr. W. D. Savage, President in the chair, Mr. W. H. Smith, of the Sussex County Hospital, in a short paper on "Opium and its Preparations," showed those present how Messrs. Deane and Brady had rendered the study of the microscopic characters of the opium alkaloids not only interesting, but very instructive and useful, to both the physician and the pharmacist. If a solution of opium like the tinct. opii of the B. P. was made with weak spirit, all the alkaloids would be dissolved, and such a solution would very well represent the medicinal properties of the drug from which it was produced. But all the alkaloids had not the same action when taken internally as medicines, and this fact had caused the invention of various solutions, from some of which certain alkaloids were excluded, while others consisted of solutions of only one or two alkaloids. A microscopic examination of such liquids would often exhibit their principal active ingredients. Mr. Smith had made a great number of slides of tincture of opium, but in every case he had only been able to recognize a very few of the crystals. He thought that the bases must be in combination with some acid, which was very easily separated, for he found that preparations which had been made by more elaborate processes gave much better crystals. He was unable to find any crystals in the tinct. opii which polarised so well as his specimens of narcotine, but he had observed that large crystals of narcotine did not give such strong colours as the small ones did. He was struck with the similar appearance presented by a slide of tinct. opii and a badly prepared slide of sulphate of morphine. Were the principal salts present in opium sulphates ? and would the lime present in common water separate the sulphuric acid from such combinations ? If so, he could easily understand why such preparations as liq. opii sed. yielded more definite crystals. One preparation (Jeremy's opiate) yielded only two kinds of well formed crystals, which he believed to be codeine and morphine.

The Chairman complimented Mr. Smith on his preparing a very excellent *résumé* of an important subject, and a vote of thanks having been heartily accorded, Mr. Smith exhibited a number of alkaloids and preparations, the President and Mr. Ettles kindly assisting with their microscopes, and towards the end of the meeting they exhibited various other objects of interest. The meeting concluded with a vote of thanks to the Chairman.

HULL CHEMISTS ASSOCIATION.

ANNUAL DINNER.

The members and friends of this Association celebrated their annual dinner on Tuesday evening, December 9th, at the Cross Keys Hotel, when about forty gentlemen assembled under the presidency of Mr. Anthony Smith. The vice-chairs were filled by Messrs. F. Earle and J. Beal. After the loyal toasts,

The President proposed the "Healths of the Mayor and Corporation of Hull," coupling with it the Mayor of Hull (Mr. Alderman Seaton), who was present.

The Mayor, after replying to the toast in his official capacity, alluded to the objects of the association whose anniversary they were met to celebrate. He had before him a report which accompanied the invitation to him to be present, and he was exceedingly pleased at the progress which the Association had made. He noted particularly the attention which had been given to the botanical class, and he only regretted that circumstances had prevented the prize which was given by the president being competed for. He could only say as the Mayor, and as an old chemist, that should there be no prize offered this year

for the botanical class, he should be happy to give one to the student the Association might recommend. Referring to an allusion in the report to the advisability of the earlier closing of their places of business, which, if carried out, would necessarily do away with Parliamentary interference, he said he thought the matter lay a great deal in their own hands. With mutual reciprocity and good feeling, added to a kind forbearance and forethought by the public generally, they would achieve their great object. He looked upon the continual interference by the Legislature in matters concerning business as a subject of extreme vexatiousness, and he could not help thinking, when reading the paragraph of that memorable Bath letter which Mr. Disraeli wrote when he spoke of "business harrass," that if there was one business harrassed more than another, it was really the business of a chemist and druggist. Only the other day an unfortunate chemist was fined for selling (what he had sold for years) citrate of magnesia, because of some informality in the designation, and because it did not contain magnesia. It had passed current amongst people under that name just as Schweppe's lemonade, or Day and Martin's blacking, though neither firm contained a Day, nor a Martin, nor a Schweppe. So there had been a tirade against sweet spirits of nitre, and he could not help thinking a poor druggist would be perplexed when a customer asked for drugs by the ordinary names of paregoric, Friar's balsam, or pilcocia, by which names people had been accustomed to ask for them from childhood. He might receive a visit from the inspector, who would at once institute an analysis to prove that the compound known as Friar's balsam was not the compound understood by the name of tincture of Benjamin of the present day. These things were so vexatious and harrassing that he hoped Government would see the necessity of leaving things of that kind alone. It was never intended that such microscopic matters should be gone into, when they could not be prejudicial to either life or health. As an old chemist, it gave him peculiar pleasure in being present as chief magistrate, and meeting many of his old friends holding together, with Mr. Anthony Smith as their president, and also to have the opportunity of congratulating them upon being presided over by so able a gentleman. He asked them to drink the "Health of their worthy President," and coupled with the toast "Success to the Hull Chemists' Association."

Mr. Anthony Smith said he little thought he should have been called upon by his fellow tradesmen to continue in office for another term. There was not the slightest doubt that the Adulteration Act would be a bone of contention, not only between the chemists, but every other class of trades, and the authorities who were appointed to look after them. It was unnecessary for him to say that in Hull there would be no violation of that Act; still he believed that at present it was working so badly that the big fish slipped through the net, while the little ones were caught. If Government would prosecute the manufacturer instead of the retail trader, the Act would work well. But they, as an Association, were bound to watch the working of this Act, and so to protect themselves. If they did so, no doubt they should find, to use a Hibernian metaphor, that the man who dared to tread on the registered palctot of the Chemists' Association would get a crack on the head with a shillalegh.

Mr. Bordass proposed the "Healths of the Vice-President, Secretary, Treasurer, and the Committee."

Mr. F. Earle, in responding as the Vice-President of the Association, thought they must all see the necessity of unity, and one means of effecting this was a more studious attention to the matters which their worthy Mayor had spoken about. The tendency of the present day was to put a considerable amount of oppression on the chemists, and he denounced the Adulteration Act as an insult to their intelligence and honesty. His feeling was that the measure referred to would have to be repealed; and if the Hull Chemists' Association would only move in the matter, and obtain the assistance of other kindred societies, they would succeed in getting it erased from the statute-book.

Mr. C. B. Bell replied as the Hon. Secretary and Treasurer of the Association. This was the sixth time he had had the honour of responding to that toast, and it was a great pleasure to him to think they had so often unanimously elected him to that honourable position. During the past year the Shop Hours' Regulation Bill had occupied the attention of the Committee, and the benefit of such associations as this, spread throughout the length and breadth of England, was shown by the fact that that obnoxious measure had been rejected. That bill would have affected very injuriously the retail trade of the chemists and druggists of the country, and it was with very great pleasure that they received the information that it had been withdrawn. During the next session in all probability petitions would be presented to Parliament in opposition to the Adulteration Act, and it would require the energy and watchfulness of every member of the trade to get the oppressive clauses of that bill expunged. He was glad to inform them that the balance-sheet this year was even more satisfactory than that of the preceding year, for after defraying all expenses there remained a balance in hand of £3 4*s.* 8½*d.* This must be gratifying to the members, as it was specially so to himself, considering that in the preceding year they had a deficit of £2.

Mr. Oldham, in responding for the Committee, said there were many things they ought to attend to, and if they only looked ahead and met more frequently it would be conducive of great benefit to themselves and likewise to all the members of the trade in this town, who did not meet with them as members of this Society. He thought they were hardly sufficiently alive to their own interests, their meetings were not always well attended, and their President and Secretary were not supported as they ought to be. He was glad to see so many members of the trade present, and only hoped that when they met at the next general meeting they would have an accesion to the number of their members.

Alderman Chapman next proposed the "Medical Profession."

Dr. J. H. Gibson observed that in replying to this toast at meetings of this Association he had, like Paganini, always to play upon one string, namely, the relationship between the chemists and the medical profession. He had told them previously how they could carry on those relationships amicably and harmoniously; and he was sure if they all put their shoulders to the wheel it could be done. He, like many of those present, was thoroughly tired of, and disgusted at, the idea of dispensing his own prescriptions; he had been annoyed and disgusted at it for many years; and he had even gone so far as to say that if a dozen others would join him he would not dispense any more medicine. This was done in Liverpool, Manchester, and by the Scotch in Edinburgh, and also in a great measure in Leeds, Bath, Bristol, and other places; and he did not see why it could not be done in Hull. He was sure it would relieve the medical men of a great amount of labour, and of some responsibility. He was very much pleased that this Association had for one of its objects a higher system of education. He believed the chemists had to undergo examinations in materia medica, in botany, and in chemistry. He did not care how strict these examinations were; the stricter the better, because the sooner would the medical profession have confidence in them, and give up that abominable mode of dispensing their own prescriptions. Chemistry was of essential assistance to the practice of medicine. He had only to call to their mind the invention of chloroform. A chemist, and not a medical man, invented it; and though Sir John Simpson led the way in utilizing it, yet the world would never cease to be indebted to the chemist who had given to them the greatest boon of the age (he excepted none) in medicine. So of another medicine —hydrate of chloral—with its wonderful hypnotic

power. They were also indebted to the chemists for the alkaloids. Therefore, he considered the more highly educated the chemist and druggist became, the more rapid would be the advances in chemistry—that was, in special chemistry as it bore upon the art and practice of medicine. He did not mean it as an insult when he said he looked upon them as stokers. The medical men were the engine-drivers, driving a mighty engine. As the practical engine-driver had nothing to do with the construction of his engine, so in the case with the art of medicine. The practitioner had to make use of it in the study of its anatomy, pathology, and physiology, and everything that related to it. They looked to the chemists for the fuel. Now, much had been said about the Adulteration Act, and he must say he was a little at variance with previous speakers on this point. He wished to touch upon it as delicately as possible, but he said it was sinful—outrageous—that medical men should be supplied with adulterated drugs. If they took the trouble to analyse they knew adulterations did exist, and he maintained it was the duty of the chemist to put himself in such a position that if the wholesale chemist or manufacturer placed in his hands an adulterated article he should be able to detect that adulteration. He sincerely sympathized with them in the course which this and other associations had taken. The prosecutors had gone to the wrong people; and not only so, they had not seized upon the proper objects of adulteration. Adulteration did exist; they all knew it did. He read in the *Lancet* the case of a man at Houndsditch who declared that such were the commercial prices of articles kept by the chemists and druggists that they could not afford not to adulterate them. If a man stood up in a vestry meeting and said such a thing as that, they were bound to believe there was something in it. It was a thing that ought to be detected, and, if it existed, ought to be put a stop to. Many drugs were capable of adulteration. For instance, the tinctures made according to the old Pharmacopœia; he thought they should be made according to the British Pharmacopœia. Then, again, East India rhubarb was often sold for Turkey rhubarb; cinchonine was mixed with quinine. Now the medical men wanted a good article. It was not much they prescribed, and they were willing to pay a good price. Therefore, he maintained the Adulteration Act was good in theory, and though it might want amendment it should not be expunged from our legislative enactments. Experience would show that it required revising, and perhaps re-modelling; but he believed if it were properly re-modelled and put in force it would be a great boon to the people of this country. Soon in that town they would have to appoint a public analyst, and he hoped there would be found some amongst that association who would feel themselves competent to take such a position.

Mr. A. Pickering proposed "The Pharmaceutical Society of Great Britain," in doing which he said he had called in question many of the proceedings in connection with that body, and he contended they had not done their duty in accordance with the charter granted them for the extension of pharmaceutical education. The first clause of that charter stated that the Society was incorporated for the express purpose of promoting pharmacy and chemistry, in especial relation to the trade in which they were engaged. But when he found that they possessed an income exceeding £10,000 a year, and that during the past year they had, in the fulness of their hearts, only granted the sum of £10 for the advancement of provincial pharmaceutical education, he must say he could not accord to them any great amount of anxiety to promote the welfare of the pharmaceutical chemists of the country. He did not begrudge a farthing that had been spent for the extension of the School of Pharmacy in Bloomsbury Square; but he did think that, whilst investing in the three per cent. consols two or three thousands a year, and granting only £10 for the spread of pharmaceutical education in the provinces, they had failed in their duty. At the same time he was not prepared to say they had done nothing to advance the interest of pharmacy and chemistry. He believed they had been, and would continue to be, a power for good; but it was within their power to be instrumental in doing more good than they had done hitherto. He referred to the case tried only a few days ago at Westminster, in which the magistrate and lawyers were totally devoid of scientific education, and it was only when Mr. Umney, the manager of Messrs. Herring and Co's laboratory in Aldersgate Street, as well as one of the examiners of the Pharmaceutical Society, was called in, that they could arrive at any solution of the difficulty. Dr. Dupré, the analyst of the Westminster Board, wrote on a piece of paper "4 oz. *spiritus ætheris nitrosi*," and gave it to a policeman, who took it to a medical man keeping an open shop, and asked for 4 oz. of sweet nitre, as the old people were in the habit of calling it. Dr. Dupré's assistant analysed it, and pronounced it deficient in nitrous ether; and on information being furnished to the Board, summonses were issued not only against this unfortunate medical man, but also against several chemists in London. What was the result? The Court got into a glorious muddle, and it was only when Mr. Umney was called in, and explained the difference between the spirit of nitrous ether of the British Pharmacopœia and the sweet spirit of nitre of the London Pharmacopœia, that the judge was able to understand the question brought before him. Had the British Pharmacopœia of 1864 been prepared by practical men, they never would have been so foolish as to stake their reputation by giving a formula for the preparation of spirit of nitrous ether from nitrite of soda, when they knew such a thing could not exist. He would say that the spirit of nitric ether of the London Pharmacopœia was a preparation which had given satisfaction to the public and the profession, whereas the spirit of nitrous ether of the British Pharmacopœia of 1867 was an unchemical preparation, that it would not keep, that it was liable to decompose in a very short time, that it was unsatisfactory in its character and effects. It was unsatisfactory for the chemist as well as for the medical man. He maintained that the committee which the College of Physicians employed in preparing their Pharmacopœia should comprise practical pharmacists as well as scientific chemists. He was not surprised that judges gave such extraordinary verdicts as that returned in McDermott's case, who was fined £10 for selling an article known by the public as citrate of magnesia. Had the judge in that case possessed chemical knowledge, or had the assistance of a man like Mr. Umney to explain its composition, he never would have given so unjust a decision. A great deal of unjust and untruthful clamour had been raised in the country by the prosecutions undertaken under the Adulterations of Food and Drugs Act, and by the untruthful articles which had appeared in some of the medical journals. As a member of the trade for forty years, he solemnly pledged his honour, and staked his reputation there, and denied that there was an organized system of adulteration in the country. A pharmaceutical chemist would scorn to send to a patient any drug that was not strictly and faithfully in accordance with a prescription.

Mr. C. B. Bell regretted the absence of Mr. James Baynes, who, had he been present, would, as a member of the Council of the Pharmaceutical Society, have been enabled to reply to the remarks of the last speaker. He agreed that the funds of that Society had not been invested to the best advantage. With regard to education, the Council of the Society had a difficult and laborious task, and if this were remembered, they would not be so free to stigmatise them as they frequently did. Certain members of the Council had reflected on the conduct of the local secretaries as being lax. With regard to Hull, he might say that during the eighteen months he had held that position—and he was sure he could speak for Mr. Earle, who had preceded him—he had discharged the duties to the best of his ability, and he believed to the satisfaction of the Pharmaceutical Society. He com-

plained of the tardiness of the Society in forwarding the printed instructions connected with the examinations, and contended there was not the slightest ground for imputation against Hull.

The chairman proposed the "Healths of the Lecturers," alluding to the great assistance rendered by Mr. Niven in the botanical class, and by Mr. Parson in materia medica.

Mr. Niven and Mr. Parson acknowledged the compliment, and after a few other toasts the company separated.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

On the Energies of the Imponderables, with especial reference to the Measurement and Utilization of them.*

BY THE REV. ARTHUR RIGG, M.A.

Lecture VI.

The Energy of Light, especially with reference to the Measurement and Utilization of it.

The energy of light is all-pervading. Wherever life is there this energy is. Darkness, or absence of light, is another name for death. That our knowledge of the mode in which this energy acts is "cabined, cribbed, confined," there can be no doubt. It has however, an extended influence; indeed, there is reason to infer that it has an actual active kinetic power which may be described as enormous, even when separated from its usual allies, heat and actinism. The very small area of explored light-land only serves to assure us by its embarrassment of rich energies that in respect to light there are not only as great, but even greater developments to be made, than have yet taken place in any of the "imponderables."

The animal, vegetable, and mineral kingdoms; solid, liquid, and gaseous matter, each, in some form or other, admits of the energetic action of what passes under the general name of light. Such universal consent to the power of light, which recent science-investigations seem now, for the first time in the history of the human race, to be making known, is rendering a spontaneous but somewhat unconscious and undesigned testimony to the truths of Scripture. In the first chapter of the book of Genesis, and at the third verse, we read that the very first act of creation is light—"Let there be light." It must be admitted as singular, very singular indeed, that that old book—the Bible—about which some men cavil, should have had written in it of events occuring, say, 6,000 years ago (six million years ago, if you please), that which science-investigation of the last 50 or 100 years has only made clear to all who read. Strange that this, "offspring of Heaven first born," without which no life can even now be sustained in healthy vigour, should have been formed in the fullness of energy before revelation asserts that life was. The strangeness ceases when the religious faith in inspiration enters.

Before this lecture is closed the conclusions and illustrations, if successful, will prove that, whilst this energy is less comprehended, and, if possible, more perplexingly mysterious than even the energy of affinity, it is nevertheless one whose presence is for vigorous action. Even the conducting power of bodies for electricity have within the last few months been shown to be so connected as to be influenced by light.

It is not in my power to produce the experiment, but it may be stated that if a small bar of selenium—say two inches long, and one eighth of an inch diameter—have its ends electrically connected with a galvanometer, then the speck moves as light shines upon or is excluded from the bar.

The sources of this energy are the sun, the stars, and meteors, which in some way unknown to us, setting aside the theory of luminous heat consequent upon atmospheric friction, are self-luminous.

There is no similar self-luminosity on earth. If it be wished to obtain light from other and accessible sources it is done by extraneous agencies. Heat caused either by affinity, electricity, or mechanical means, or by a concentration of the energies of some self-luminous source, is the way by which we usually produce light.

This process of production by concentration from self-luminous sources, although generally adopted, is very unpromising as a means for ascertaining the energies of such source-produced light. For this reason—as the light passes through or is reflected from the bodies employed in the concentrating operation, the extent or degree in which this energy may have been expended in chemical or physical work within or upon the concentrating body cannot be ascertained. Hence the remaining work—be it represented chemically or mechanically—is all that is left for investigation. It represents but the balance of the account. Now as a coin so small as one shilling may represent the balance of two accounts, neither of which reaches one pound, so the same coin may represent a balance of accounts reaching many thousand pounds. Clearly, then, from this remaining work no inference can be drawn respecting the total of the energies involved in the production of such a balance.

The energy of light varies with the source from which it originates. In some respects, viz., as regards heat and light, properly so called, the energetic elements in what we call the electric light are more similar to those in the sun than any from other lights within our means of artificial production; in another respect, viz., chemism, or actinism, the energy of that from the combustion of magnesium is nearer to solar light than is the electric.

There are two lights which seem to have in themselves no traces of an energy producing effects on any of our appliances. They are the result of some unknown and as yet unappreciated energy. These are lights due to phosphorescence and fluorescence.

The decay of what was once possessed of the energy of vitality is a condition manifesting phosphorescence, a state in which light is without much (if any) heat. Whether the light on being given out is the result of some new operation of what was once called the vital principle, or whether it is a consequence of some elements of affinity approximating in character to those we call combustion, is an unsolved problem. Friction and the passage from a formless state to the state of crystal frequently cause a phosphorescent light to be emitted.

Phosphorescence is a name also given to a mode of obtaining light which seems to depend upon the property that certain bodies possess of rapidly concentrating within themselves the light they may receive from being exposed in the neighbourhood of a luminous body, and then emitting this absorbed light gradually. Probably the light stored up in a few seconds is not emitted in less than minutes.

Diamonds and other substances shine in the dark for a short time, after exposure to intense light. This shining of certain crystals, in the absence of light, probably led to the opinion that such crystals were living beings, petrified by light in the hands of men. Certain flowers, especially those with bright *yellow* petals, sometimes emit a sudden flashing light a little after sunset; also, some plants growing in mines emit light from their whole surface. Certain preparations continue to emit this light so intensely and continuously as to be used as night lights—not for illuminating rooms, but for such purposes as reading the hands of a watch.

There are in this box a series of tubes which, doubtless, appear to all of you, at the present time, perfectly white. If, however, we allow an intense light to shine upon them they are seen to possess a phosphorescence that will last for some time—from ten minutes to half-an-hour, as the case may be. This magnesium lamp shall be lighted, and

* Cantor Lecture, delivered March 10, 1873; reprinted from the *Journal of the Society of Arts*.

the tubes exposed to its rays for a short time, and you will see, not only the simple phosphorescence, but different colours which the contents of each tube assume.

Fluorescence is a peculiar appearance consequent upon placing some substances in certain positions with respect to light. This may be illustrated by the action of light upon sulphate of quinine. In this bottle is what appears as pure colourless water; it is a very weak solution of sulphate of quinine. If looked at in the presence of light rich in actinic rays, a change in the appearance is observed. A piece of magnesium ribbon is now lighted. In certain angular positions a beautiful azure blue may be noticed; this blue is a consequence of those phenomena called fluorescent. These, phosphorescence and fluorescence, are two characteristics of the energy of light, of which all we know is that we can render no account of the causes of them, unless the theoretical explanation be accepted that the two may be classed as one—by regarding them as consequences of an alteration in certain wave lengths in portions of the entire beam of light. From the previous statements it may be inferred that the measurements of the energies of light are not yet accomplished; also, that two lights, which to the eyes do not differ much in intensity, or in what some might call power, yet may show very different energies. It must be borne in mind that here, as in electricity, intensity is not energy; there may be great intensity and little energy.

The great source of light is the sun, and whatever may be the speculations of science, either as to the cause of that light, or as to the mode in which it is propagated from the sun and received at the earth, they do not concern us at present. What we are concerned with is, how are the energies of the light thus received, and of such artificial lights as are utilized, to be measured?

A reference to the diagram of the spectrum may explain what is manifested by an analysis of solar light. Observe, there is shown in this spectrum heat, light, and actinism, or chemism, as it is sometimes called. The spectrum visible to us is the part thereon coloured, containing the usual prismatic colours: red, orange, yellow, green, blue, indigo, and violet; therefore, the light, properly so called, and which is utilized by human eyes for vision, extends from the letter A to the letter H and no further, and any energy consequent upon the state which occurs before the letter A, and any energy consequent upon the state beyond the letter H, is not the energy of light properly so called. Now, to the left of the letter A, extending over a space which bears a proportion to light, about half as long again as light, is a space containing the energy due to heat. To our right, beyond the letter H, extending to a distance longer than that of light, we have a space in which photographers and chemists delight. Chemists can get nothing out of this dark end to our left, except heat, and chemists and photographers get nothing out of that dark end to our right except chemical action. The intensity of heat lies here, just before we reach light at all; and the intensity of chemical action lies there, just after we get beyond the light. No scientific investigation has yet detached the energy of light and its intensity from these two energies with which it is associated. At this line, marked D on the diagram, it will be noticed that those curves, indicating heat and actinism, die out. The one seems to be passing into the other. At D is what mathematicians might name a "cusp"—a zero on the scale similar to that zero in the arithmetical tables which may be said to mark the turn between counting by integers to the left, and by decimals to the right. At D is this dead blank for heat and actinism, and yet it is there the energy of light really lies. Before the end of the lecture something more should be said about the energy of light at this particular point. Amongst these three constituents of a solar beam—heat, light, and actinism—there are several marked and extraordinary differences, yet we call them all "light." For instance, heat causes bodies to expand, but heat fails to make an impression upon the retina. Professor Tyndall, some years ago, put his eye into the focus of a heat beam where platinum was melted, and it produced no impression upon the eye. In his account of the experiment he says he did it, but he does not advise anybody else to do it—a piece of advice likely to be more generally accepted than advice usually is. This shows that heat fails to make an impression upon the retina. Heat also fails to produce any photographic result; heat can be conducted along metals, and heat can cause organic and inorganic bodies to expand.

Light, properly so called, possesses these qualities. It makes an impression upon the retina, it effects changes in organic bodies, and probably (in some way mysterious to us) in inorganic bodies also. Light does not possess these qualities—it cannot be conducted by metals, it cannot cause bodies to expand. Now, as to actinism or chemism, it possesses these qualities—it produces photographic results and chemical changes in organic as well as in inorganic bodies. It does not possess these qualities—it fails in making an impression on the retina, it cannot be conducted by metals, and it cannot cause bodies to expand. Hence there seem to be properties in each portion of the spectrum which do not exist in the other; therefore in the comprehensive term—light—there are three distinct elements, and it is really an error to write them under the one name light. Great would be the social misunderstandings if, because wheat, barley, and oats, are all called corn, or grasses, these general terms were as constantly applied to them as the term light is to phenomena with which it is associated, but not connected.

There is also another form in which the energy of light is presented, *i.e.*, in its penetrative power.

For lamps and lighthouses this penetrative power is all important. Certain substances in combustion are possessed of this power in a much higher degree than other substances. It is not, however, only in the material burnt, but further in the mode of burning, that this penetrative power is manifested. The same substances under different conditions manifest very different energies in the emission of light to a distance.

Even the ordinary paraffin lamps—how very inferior in illuminating power some are to others. The utilization of the energy in the one and only way in which it can be utilized without waste is well illustrated in the various constructions for the burning of different hydrocarbons, to which time forbids further reference. Many present are aware of the different schemes now before the public for obtaining both light and heat from the combustion of the hydrocarbons.

But it is not in liquids only that this difference exists. Even the same quantities of gas—*i.e.*, of a suitable gas—one containing such an element as carbon under different circumstances, yield lights of marvellously different penetrative power.

(To be continued.)

Parliamentary and Law Proceedings.

Prosecution Under the Adulteration Act. Alleged Adulteration of Meal.

At the Greenock Police Court, on Dec. 13, a grocer was charged under the Adulteration Act with selling oatmeal adulterated with barley meal. The case was adjourned for a week, to give the defendant an opportunity of having a portion of the sample analysed by another analyst.

The Masters and Servants Act.

At the Guildhall Police Court, on Wednesday, Dec. 17, Mr. Holmes Keall, a chemist and druggist of Maida-vale, was summoned by Mr. James Crisp, of No. 4, Cheapside, chemist and druggist, his former employer, for breach of contract under the Masters and Servants Act.

Mr. Poland appeared for the complainant, and Mr. H. N. Christmas for the defendant.

Mr. Keall had been an assistant to Mr. Crisp for about

two years on the usual terms of a month's notice, his salary being £60 per annum with board and lodging. On the 9th September the defendant asked leave to go out for a short time, and received permission from Mr. Crisp to do so. It appeared that his object in going out was to purchase a business at Maida-vale, which he succeeded in doing. When he returned, he told Mr. Crisp what he had done, and asked to be allowed to leave forthwith. Mr. Crisp refused to allow him to do so, but said he would let him go as soon as he could get another assistant in his place. The defendant told him that he could not stay, as he had to take possession of the business the next night; but he offered to give up one month's salary to terminate the engagement, in lieu of one month's notice. Mr. Crisp declined that offer, and threatened proceedings against him if he left without the month's notice. He did eave without that notice, and twice afterwards applied for the salary due to him from the 30th of June to the 9th of September, less £5, for one month's notice. The money was not paid, and on the 29th November Mr. Keall took out a summons in the County Court against Mr. Crisp for the amount, and on the 10th of December Mr. Crisp obtained this summons against the defendant. The County Court summons would not be heard until the 22nd instant. Mr. Crisp deposed that the custom was a month's notice on either side, unless mutually arranged to waive all such rights; and Mr. Keall stated that either party could terminate the engagement at a moment's notice on giving the other side a month's wages.

Mr. Christmas took a legal objection to the summons under the third section of the Act, which said, "Nothing in this Act shall apply to any contract of service other than a contract within the meaning of the enactments described in the first schedule to this Act;" and there was nothing in that schedule which mentioned chemists' assistants. They did not come under the head of artificer or labourer, but were in the position of clerks, to whom this Act did not apply.

Mr. Poland contended that although a skilled man, in the shop he was only an ordinary shopman, and as such he contended that the Act did apply to him under the head "servant," although that term did not apply to domestic servants and clerks.

Sir Thomas White said he had given the greatest consideration to the case in consequence of its importance, and he had come to the conclusion that there was no doubt the defendant did not come within the Masters and Servants Act, and he must therefore dismiss the summons; at the same time he had no doubt that the defendant had acted very improperly to his master.

Mr. Poland said he would ask that the judgment of the court might be respited for a week to give him time to consult his client as to whether he would ask for a case for the superior court, so as to obtain a definition as to who really was a servant under the Masters and Servants Act.

Sir Thomas White said it was a most important question, and he would give every facility for taking the opinion of a superior court. He would therefore adjourn the case for a week, when if the plaintiff decided not to have a case stated the summons would be dismissed.—*Daily News.*

Reviews.

MILK ANALYSIS; a Practical Treatise on Milk and its derivatives, Cream, Butter, and Cheese: by ALFRED WANKLYN, M.R.C.S.

An excellent little treatise as welcome to the chemical public as was the 'Water Analysis,' published by the same author (jointly with the late Mr. Chapman) some years ago; equally clear and straightforward in its statements, and also, like that treatise, everywhere bearing the marks of extensive experience in the subject on hand, but, at the same time, equally dogmatic and dictatorial. In the book before us, in fact, the author simply "lays down the law," without looking to the right hand or to the left. But, after all, perhaps we ought not to find fault with him for that: the author's colleagues will look in the book for nothing but *Mr. Wanklyn's* methods and *his* way of interpreting results, while the general Demos of "chemists" are all the better to have it simply told them what they have to do. Now let us pass to reviewing.

What we inhabitants of large cities buy and drink as "milk"—as everybody knows—is, in general, not what it pretends to be, but consists largely of water, mixed with more or less of what would be real cows' milk, if it had not been previously skimmed. Other adulterations, as our author states as the result of his extensive experience, scarcely ever occur. They would either not pay or be too easily detected. Thus all that the milk analyst, as a rule, has to do is to find out the relative quantity of cream taken away and the amount of water added by the salesman when he mixed the article. But here we at once meet with a difficulty: what *is* the composition of "*normal*" milk? The author's answer is: Cows' milk is a mixture of—we all know what—constituents, the relative proportions of which vary only within very narrow limits. "The milk of an animal has probably very much the same constancy of composition as the blood of the animal." Now that is putting it rather strongly, and, even if considerably toned down, would be contrary to what other authorities give as *their* experience. But be it as it may, the only correct way of interpreting the results of a milk analysis is first of all to ascertain the average composition of true cows' milk of the respective district, then to take such average milk as one's standard, and, for the "milk" under examination, to ascertain the weight of fat that would have to be added to, and the weight of water that would have to be eliminated from it, in order to bring it up to the ideal standard.

To determine these quantities we must evidently ascertain the relative quantities of at least two of the constituents, say of fat and sugar, or fat and casein, or fat and "solids not fat." Supposing, for a moment, the solid constituent of milk (*i.e.* the sum total of what is not water) was a complex of constant composition, and the practice of "skimming" did not prevail, then the amount of water added might, perhaps, be ascertained, with a sufficient degree of accuracy, by means of a good hydrometer. But, unfortunately, skimming *is* practised along with watering, so that, in commercial milk at any rate, the ratio of fat to "solids not fat" is eminently variable, and of these two constituents the first diminishes while the second increases the density. Hence the "lactometer," although it is extensively used, is a treacherous instrument, says our author, and we think he is right. Regarding another instrument, which pretends to determine the percentage of fat in a milk from its relative opacity, the author says he has no experience. We happen to be in a position to supply some information on this point. According to our experience, which is founded upon a series of comparative determinations of fat in different milks, by means of the instrument in question on the one hand, and exact chemical means on the other, the apparatus is absolutely useless. The "*cremometer*" (a graduated cylinder in which the milk is allowed to stand until the cream has gone up, the volume of which is then read off) would *prima facie* appear to be of some value, but according to Mr. Wanklyn is, like the "lactometer," at best, a "treacherous guide."*

In short: A reliable analysis of milk can be effected only by *chemical* methods. A full analysis, however, is not necessary; it suffices to determine the fat and total

* Possibly the indications of the cremometer might be rendered more constant by saturating the milk with sulphate of soda before setting it aside; at any rate, the cream would then separate out more completely.

solids, or at most these and the milk-sugar, casein, and salts.

For all these determinations the author gives short, elegant, and easy methods, which, according to his experience, lead to exact or at any rate constant results; and he describes these methods with such admirable clearness, that any person who has the slightest experience in quantitative work should be able to execute them.

For the determination of the total solids, the author simply evaporates 5 c.c. of the milk to apparent dryness in a platinum dish over a water-bath, exposes the residue to the heat of the bath for a definite number of hours (found by experience to suffice for the complete expulsion of the water) and weighs the residue. The customary addition of sand or plaster of paris, according to Mr. Wanklyn's experience, is a needless complication of the process. To determine the fat, the solids from a somewhat larger known volume of the milk are treated with ether; the ether is expelled by evaporation, and the remaining fat dried and weighed. From what the ether left, alcohol extracts the sugar, leaving the "casein" (*i.e.*, the sum total of nitrogeneous constituents) and the salts, which are first weighed jointly, whereupon the salts are obtained for themselves by incineration and weighed. The well-known titrimetric method of determining sugar by ascertaining the quantity of cupric oxide which it is capable of reducing to cuprous oxide, finds no favour with our author. We venture to think that if he would only take the trouble of making himself familiar with this method he would be sure to adopt it. For the determination of the "casein" Mr. Wanklyn has quite a peculiar process, which, if we understand him rightly, he considers quite as good as the direct gravimetric method:—He distils the milk with *largely diluted* permanganate and alkali, determines in the distillate the ammonia formed, colorimetrically, by means of Nessler's reagent, and from the results—and by means of constants empirically determined by him—calculates the quantity sought.

The fat and "solids not fat," according to the author, are the safest elements for the calculation of the fat skimmed off (as cream), and water added, to what served to make 100 c.c. of the "milk analysed," supposing the maker to have started with "standard milk." To make things easy the author gives the necessary formulæ, and explains them so clearly that even a person who has no knowledge of algebra is able to see through and work them. Speaking of these formulæ, we will direct the attention of the author to the fact that his way of grouping together the several terms of an arithmetical expression—though quite correct—is contrary to usage, and apt to lead to mis-reading. Thus, for instance, the formula at the head of the last column in the table on page 42 would be improved by transforming it from

$$100 - \frac{100}{9{\cdot}3}\,a + \frac{3{\cdot}2}{9{\cdot}3}\,a - b \text{ into}$$

$$100 - b - \frac{a}{9{\cdot}3}\,(100 - 3{\cdot}2).$$

This formula, by the way, is mis-printed on page 40.

After the division on milk there follow shorter chapters on cream, butter, and cheese. Regarding these we should like to say a few words, but prefer here to close, the more willingly as, no doubt, all those of our readers who take an interest in the subject will possess themselves of a book which at present is, and for some time will be, *the* book on the branch of applied analysis it treats of.

Waste Products and Undeveloped Substances: A Synopsis of Progress made in their Economic Utilization during the last Quarter of a Century at Home and Abroad. By P. L. Simmonds. London: R. Hardwicke. 1873.

The aphorism of Lord Palmerston, that dirt is but matter in a wrong place will well bear extension, so as to include "waste," and no small portion of recent chemical investigation has been devoted to the task of putting such errant matter into a right place. Probably in no other twenty-five years of the world's history has so much of this kind of work been accomplished as during the last quarter of a century, and in no country more than in Great Britain. The subject is one to which the author is known to have paid considerable attention, he having read two or three papers before the Society of Arts, and published a former volume on Waste. When, therefore, it was decided by the authorities of the Vienna International Exhibition to set apart a special section where each exhibiting country might show what advancement it had made in this direction since the year 1851, it was only natural that the British Commission should invite Mr. Simmonds to form a representative collection for this country, and it is just as natural—according to modern custom—that a book should be the outcome of his work.

But we heartily wish the book had been a better one. Even the author's modest estimate of himself—surely too modest if it be true that hints and suggestions formerly thrown out by him "have led to the establishment of many great and profitable industries"—as but a "gatherer and disposer of other men's goods," which he endeavours to "classify and arrange systematically," is one that would hardly find a basis in the present work. Wealth of material is certainly present, but arrangement and critical supervision, in our opinion, are not. Some facts are stated, and restated more than once, yet not with the effect of impressing them upon the reader's mind, but rather of bewildering him; for they are so surrounded with a sea of verbiage, that

"Apparent rari nantes in gurgite vasto."

"Prevention is better than cure"; and the economy of unsoiled paper is surely as much a duty as the utilization of that which has been stained by printer's ink.

To illustrate our meaning, we may remark that at the commencement of the volume appears what the Archduke Regnier had to say upon the general subject of waste, followed by extracts from Lyon Playfair, the *Commercial Bulletin*, the *Times*, the *Telegraph*, the *Saturday Review*, etc., each quotation made with a special object, doubtless, but not being confined to the illustration of that particular point they involve frequent repetition. As to the arrangement, the division "Animal Wastes," commences with offal, including bones; passes to the economic uses of dead animals, horse-flesh as food, etc.; next to waste in the silk manufacture; waste hair; and then comes back to the utilization of blood, bladders, guts, etc. (surely offal); next to leather clippings, and then to bones again, past woollen rags, to silk waste again.

Much of this results from the freedom with which the author appropriates "other men's goods;" collation and condensation of these extracts would have multiplied their value. But when the author speaks for himself he occasionally makes astonishing statements. "So long as bones are a substitute for lime in agriculture, and it is cheaper to dissolve or grind them than to quarry limestone, crush it, and carry it to the land, so long only will they be thus used" (p. 11), and "Cod-liver oil and chloral hydrate are on the wane" (p. 74) are statements that have surprised us; whilst "tartaric acid of potash," "saponification with sulphuric acid," "sulphate," and "bisulphate of carbon," and "a most beautiful white carbonate of potash of great strength" are terms that one does not meet very often.

But, though quarrelling with the style, we do not despise the matter of the book, nor would we wish to mislead the reader as to its value. It contains an immense variety of information upon various products, sometimes outside even the wide range of the title; information, too, that is not to be met with in many places. It would be useless to give one division preference over the others, but that which relates to waste products of the fisheries is very suggestive. The following extract gives an account of a new source of lamp-black of which few probably of our readers have heard:—

"A few years ago a party of gentlemen started what they intended to be an oil-well, near Cumberland, Maryland. They soon, however, were disappointed in their expectation, for instead of striking oil, they came upon a gas-chamber. A short time afterwards the emitting gas was accidentally set on fire, and continued to burn for a period of two years. About a year ago Mr. Haworth, a gentleman from Boston, having heard of the burning well, went to Cumberland, tested the quality of the gas, and was satisfied that he could put into operation a scheme or plan of his own for the manufacture of carbon (lamp-black) from the gas. Accordingly, the well was leased or purchased, and a patent obtained for the manufacture, according to the plan of Mr. Haworth. A building was constructed and the manufacture commenced. There are now in operation six hundred and sixty burners, each burner consuming eight cubic feet per hour. The gas is allowed to burn against soapstone plates, on which the carbon is deposited in the form of soot. By a very neat mechanical arrangement, the soot is scraped off and deposited in large tin boxes about three feet long, a foot and a half wide, and a foot and a half deep; scrapers are passed along the soapstone plates every twenty minutes, and the boxes are filled on their fourth passage. A large building is now in course of construction, twice the size of the present one, which will have in use thirteen hundred and twenty eight-feet gas-burners. The present consumption of gas amounts to about one-twelfth of the whole quantity escaping from the well. When the new building is completed, and the burners put in operation, the total consumption of gas, by the burners of both buildings, will be one-fourth of the whole. The carbon is used for the manufacture of ink."

Obituary.

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

On the 8th December, 1873, from disease of the heart, Mr. W. Christopher, Pharmaceutical Chemist, of Crickhowell, Brecknockshire, aged 56 years. Mr. Christopher was one of the Founders of the Pharmaceutical Society, and formerly acted as its Local Secretary.

On the 11th December, 1873, Mr. James Atkinson, Chemist and Druggist, of Norton, near Malton, Yorkshire.

On the 13th December, 1873, at Canterbury, Mr. John Thomas Linford, aged 82 years. Mr. Linford was in business in Canterbury from 1819 to 1842, and afterwards in London, with his son, from 1859 to 1864.

Notes and Queries.

[376.] PILL COATINGS.—Can any reader kindly favour me with the best mode of varnishing pills, and also of preparing the opaque white coating so much in use now.—NOTA BENE.

[**** See some remarks upon this subject which occur in a paper by Mr. Haselden, PHARM. JOURN. (3), vol. ii., p. 467.—ED. PH. J.]

[377.] OBSCURE FORMULÆ.—Can any correspondent inform me where I shall find the formulæ of any of the following:—"*Tinct. Testæ*," "*Pil. Aloes Glacial*," "*Gutt. Buchu*," "*Pil. Philippi*." They have come under my notice within a few weeks' time in a chemist's establishment in London. I cannot find them in any Pharmacopœia, and therefore can only conclude that they are written by some of the noted London quacks. They have, however, fallen into the hands of very respectable people, and I am anxious to know where to find the formulæ of them, and other such preparations, if they are published anywhere, or if known generally to London chemists.—AN M. P. S. FROM THE COUNTRY.

[**** If these formulæ be all not of the "Philippic" order, perhaps some of our readers may be able to give the information asked for.—ED. PH. J.]

QUININE PILL MASS.—M. Berquier of Provins publishes (*Répertoire de Pharmacie*, N.S., i. 630) the following formula for a quinine pill mass:—

Sulphate of Quinine	30 grams.
Pulverized Gum	5 „
Pure Glycerine	10 „

Suspend the gum in the glycerine, then incorporate the sulphate of quinine, rubbing the ingredients well together in a mortar. A white mass of good pilular consistence is thus produced, which may be divided and rolled as wanted. The mass should weigh exactly 45 grams, or one-and-a-half times the weight of the sulphate of quinine employed, so that it is easy to calculate any desired quantity. Thebaic extract, or any other substance, may be readily introduced. Pills prepared thus are small, and do not harden so as to become more or less insoluble in the stomach. The mass may be kept indefinitely, and if at length it should lose a little of its malleability, a few strokes of the pestle will soften it without any addition.

ADULTERATION OF LYCOPODIUM.—M. Paul Cazeneuve states (*Répertoire de Pharmacie*, N.S., i. 630) that he has been supplied with a quantity of pine pollen in the place of lycopodium. Having had his suspicions aroused by the yellower colour, and smaller degree of mobility and fineness, he examined it under the microscope, and recognized in it the characters given as those of pollen of conifers, and especially of pine pollen, this latter being always constituted by two lateral cells near to a central cell, which is ruptured by the pollenic contents for fecundation. How this pollen is collected is matter for conjecture, but it may be obtained at a lower price than lycopodium, and M. Cazeneuve thinks it to be a substance worthy of further investigation. He has found that in the rolling of pills and plasters and the healing of chaps, etc., it presents the same advantages as lycopodium. It is nearly neutral; the tegumentary membrane has the cellulose nature of other pollens; it contains a little resinous matter, and the pine odour is faintly perceptible in a large quantity. The proportion of mineral matter is very small. One gram of pollen, dried in a water-bath gave, when incinerated, 45 milligrams of white ash, composed of phosphates of potash and lime, and traces of sulphates and chlorides.

LIQUEFACTION OF GASES BY MEANS OF CHARCOAL.—M. Melsens describes (*Comptes Rendus*, lxxvii. 781) a method by which gases may be readily liquefied for the illustration of lectures. Charcoal placed in the longer branch of a tube bent like a siphon is saturated with dry chlorine; the charcoal will thus absorb about its own weight of chlorine. The longer branch, containing the charcoal, is to be heated in a water-bath, at 100° C.; if the shorter branch be then plunged into a freezing mixture, a considerable quantity of chlorine leaves the charcoal and reassumes the gaseous state, but under the influence of the pressure which is developed is liquefied in the short cool branch of the tube. When the tube is removed from the water-bath the liquid chlorine enters spontaneously into ebullition, and is again condensed by the charcoal, while the shorter branch is covered with a kind of rime. A repetition of these phenomena may be caused indefinitely. The author has in this manner obtained several cubic centimetres of pure liquid chlorine, and he has also succeeded in liquefying, with a temperature not exceeding 100° C., ammonia, sulphurous acid, sulphydric acid, hydrobromic acid, chloride of ethyl, and cyanogen.

Correspondence.

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

The Position of a Widow under the Pharmacy Act.

Sir,—The present discussion on the above subject is not only an interesting, but a highly important one. There is a matter which illustrates the absurdity of the present law and which I greatly wonder has not been alluded to.

I understand Mr. Flux's exposition of the law to be this. If I leave my business to my widow for her support and sole benefit she would not be allowed to continue it as my widow, even with the aid of a duly qualified assistant. And yet, during my lifetime, the law will allow me to open a hundred shops anywhere, in a hundred different towns if I choose, and carry them all on with the aid of *non-qualified men*. Residing in Manchester, the law will allow me to open a branch establishment in Birmingham, and place it under the superintendence of a raw apprentice, who may dispense and sell poisons to any extent without let or hindrance, if only the business is my own *bonâ fide* property, and the apprentice my own *bonâ fide* servant. I am not sure that I should be compelled even to put my own name over the door.

I submit that, in view of these facts, the case of the widow is hard in the extreme, and the law absurd in the extreme.

J. T. Slugg.

Manchester, Dec. 13th, 1873.

"Pharmaceutical Chemist by Examination."

Sir,—Will you permit me a word of comment on that portion of Messrs. Flux's letter, published in the Journal for Dec. 6, which relates to the use of the title "Pharmaceutical Chemist (by examination)."

Why should this distinction, corresponding, as it does, to a real and actual difference, be branded as a misdescription?

If it be permitted to an M.D. (Lond.) so to distinguish himself from the graduate, in the same degree, of some less eminent seat of learning, why should it be forbidden to draw the line between those pharmaceutical chemists who have, and those who have not, passed the ordeal of examination.

Amongst the motives which impel a man to present himself for the Major Examination, one of the most reasonable and natural is, that by passing it he may establish a surer claim to the confidence of his customers; but if no means exist for readily acquainting them of the fact, this aim is totally defeated.

Some more compendious expression may, I admit, be substituted, with advantage, for the present clumsy expedient; but while the need for maintaining a high standard of pharmaceutical knowledge is so strong and so widely felt, it must be unwise to weaken, in the least degree, the incentives to its attainment.

A Pharmaceutical Chemist (by examination).

Local Secretaries and Preliminary Examination.

Sir,—The question of Local Secretaries generally or individually, whether they perform their duties conscientiously and well, is a matter apparently resting with themselves; but, in my opinion, they do not all carry out the strict letter of the law—indeed, it would be a wonderful brotherhood if such were the case. The Preliminary Examination seems to be a source for continual correspondence and fraternal commiseration. That there are so many failures in the Minor Examination every month, I am led to believe is due to a great extent to the Preliminary being passed, or got through, through incoherent supervision, or "cram," I truly hope those local secretaries who have done their duty to the Society and candidates will not feel my remarks as touching them; but still, I know there are stray sheep here and there who require shepherding up, and whose consciences want pricking occasionally. There are many of our local secretaries who have sons, one of which, at any rate, we hope to see join the pharmaceutical profession, also a friend or customer may have a son anxious to join our ranks, I think, with all due deference to most of our worthy local secretaries' strict sense of duty, their paternal, or amicable feeling may in these cases sometimes overcome duty.

These are merely objections which could be raised to one party being left alone to watch the interests of the Pharmaceutical Society, and to do the candidate justice. It may be out of place for me to propose anything, but still, I am entitled to an opinion, and I most decidedly think that the following, put in the form of a proposition, would remedy the present unsatisfactory manner of conducting the Preliminary Examination in the Provinces:—

1st. That a special secretary be appointed for each county, and that secretary to reside in the central or chief town in such county, and that he be called the county secretary.

2nd. That any Pharmaceutical Chemist or Member of the Society residing in such town shall be eligible to be elected such county secretary, and that he shall be voted for by the local secretaries.

3rd. That all candidates for the Preliminary Examination shall attend such town at such an hour as the Board of Examiners shall think fit, for the purpose of answering such questions as are put before them, in writing, etc.

4th. That the Examination shall be under the supervision of the county secretary and three or more of the local secretaries, who shall be summoned to attend by the Board of Examiners, and that their (the local secretaries') expenses shall be paid by the Society.

This would, I think, facilitate a fair and impartial return from the country, which is impossible under the present circumstances. It would prevent the unseating of local secretaries, they would have further honour in being called upon to vote for a county secretary, and by occasionally meeting a few brothers at the examinations; it would also prevent the candidates being at the expense of attending 17, Bloomsbury Square, which has, I believe, been proposed.

I ask again, the forgiveness of those who may feel my remarks as irreverent, which is far from my intention.

Relwof.

Lincolnshire, Dec. 15th, 1873.

"Citrate of Magnesia."

Sir,—I have read with interest the voluminous correspondence which has appeared in the Journal regarding the proposed re-baptism of the so-called citrate of magnesia. It is certainly highly desirable that some suitable name should be speedily and uniformly adopted. The name Effervescing Powder, suggested by you in a leader on the subject, is to my mind the simplest and most practical that has yet been offered. It is sufficiently descriptive, and answers every purpose. I would, however, restrict the term to the present official preparation, the so-called citro-tartrate of soda, and apply the name Effervescent Powder with Magnesia, to Bishop's preparation, and the preparations of other makers which contain magnesia. Or, if the different manufacturers would in future prepare it with a certain percentage, say 5 or 10, of the true citrate, it could then be honestly and correctly termed, Effervescent Powder with Citrate of Magnesia; or, perhaps, better, Effervescent Powder of Citrate of Magnesia; for would it not then be closely analogous to some other preparations in the Pharmacopœia? Syrupus Ferri Phosphatis, for example. For Effervescent Powder would bear the same relation to Effervescent Powder of Citrate of Magnesia, as Syrupus does to Syrupus Ferri Phosphatis, and other syrups. But bringing it into close relationship with the present official preparation, would necessitate its introduction into the Pharmacopœia; the proposed appendix no doubt could afford it the necessary space. The advantage attaching to the above titles would be that we could also include the entire host of satellites that revolve around "Magnesiæ Cit."

We should then have a list something like the following:—

Pulvis Effervescens.
Pulvis Effervescens cum Magnesiæ Citrate
vel
Pulvis Effervescens Magnesiæ Citratis.
Pulvis Effervescens Ferri et Quiniæ Citratis.
Pulvis Effervescens Ferri Carbonatis, etc., etc.

These could be rendered definite in strength by making them official, in each case a certain percentage of the name.

giving ingredient being added to the ingredients of Pulvis Effervescens. The labels for the public use might be Effervescent Powder of Citrate of Magnesia (formerly known as Citrate of Magnesia.) This preparation contains ... p.c. of the true Citrate of Magnesia.

THOMAS GREEN.

7 & 9, *Corn Market, Belfast,*
Dec. 15th, 1873.

THE ADULTERATION MUDDLE.

Sir,—The lamentable want of discretion displayed by the officials entrusted with the working of the Adulteration Act in the selection of cases for prosecution has hitherto greatly impeded its intended operations. Why should persons totally ignorant of trade and its customs be appointed detectors of adulterations?

Mr. Owen Williams, the Inspector of the Board of Trade, may be an excellent detective officer, and Dr. August Dupré, the Analyst of the Westminster Board of Works, a very skilled manipulator, but if either of these well-intentioned zealots had been a pharmaceutical chemist, such a mare's nest as the nitrous ether prosecutions would not have been taken into court.

Let a properly qualified man, of course not actually engaged in business, such as a pharmaceutical chemist or a chemist and druggist who has himself managed or superintended a well conducted business for a number of years, be appointed to inspect the members of his own profession. A grocer might in the same way be appointed to inspect grocers, and so on. Then we might hope to see real delinquents called out and ticketed, instead of respectable tradesmen being harrassed in a manner never intended by the legislature.

FREDERICK PARSONS.

Leicester, Dec. 16th, 1873.

DRUG AND CHEMICAL TESTING.

Sir,—You call attention in an editorial article of Nov. 28th, to the importance of pharmaceutists testing the drugs and chemicals they use. That drugs and chemicals should be tested is highly important, not only to insure the public from fraud, but also for the safety of the pharmaceutist, who is liable to be prosecuted for selling impure drugs, even though they be adulterated previous to his purchase of them and without his knowledge. How this testing is to be done each pharmaceutist must decide for himself. One man may find time to test his chemicals and drugs—another may not.

The British Pharmacopœia gives characters and tests for nearly all the articles contained in it, but in more than one instance these do not afford conclusive proof of the genuineness of an article. Take, for example, gum scammony: according to the British Pharmacopœia it should yield from 80 to 90 per cent. of resin soluble in ether. Suppose a sample should be examined and found to yield 80 per cent. of resin, does it follow that this soluble resin consists entirely of scammony resin? Certainly not. I have only just examined a sample of scammony which is largely adulterated with guaiacum. I am aware of the fact that guaiacum resin is not relatively so soluble as scammony resin, and that a sample very largely adulterated would in all probability yield less than 80 per cent. to ether, but this does not alter the case, or show that scammony need not be tested further than the Pharmacopœia instructs. If a chemist were summoned for selling scammony adulterated with guaiacum, it would not, I think, acquit him of the offence to plead that the sample answered the B.P. tests, and yielded 80 per cent. to ether. As such a sample might exist, it behoves every chemist to see that his scammony is not adulterated even in a slight degree with guaiacum. Again, yellow cinchona bark may be tested according to the instructions given in the Pharmacopœia, and a residue obtained which weighs more than two grains, and the bark considered to be of good quality, at the same time such a bark, such a residue, containing *not a trace of quinine*, the pharmaceutist being misled in this case by the positive statement made in the Pharmacopœia that the residue obtained by the ether process "consists of nearly pure quinia."

These illustrations serve to show the importance of all available knowledge being brought to bear on the subject of drug and chemical testing, and that the Pharmacopœia be not taken as an exclusive guide. It may be said, in defence of the Pharmacopœia, that it is not intended to be, among other things, a manual of technical analysis. Perhaps not, but if it gives tests at all, then such tests should be conclusive ones.

An "appendix" is mooted to the British Pharmacopœia; and may not further and more conclusive tests appropriately find a place there?

H. WILLIAMS JONES.

17, *Bull Street, Birmingham.*

REMUNERATION OF ASSISTANTS.

Sir,—Under the heading of "Remuneration of Assistants" appears a letter from "Chemicus," who was evidently in a hypochondriacal condition when he penned his communication, as it is full of despair; no ray of hope cheers him in his somewhat exceptional position.

All I know of him is, he occupies a situation as "an assistant in a small country village," and has more to do with commercial than pharmaceutical transactions; consequently a physician's prescription is seldom, or, as he says, never seen.

From his statements he is master of the Preliminary, and is anxious to pass the Minor, but he is discouraged because he cannot afford either time or money to prosecute his studies in London; there is no association existing near him; specimens he has not; nor opportunities to pursue chemical research. And he winds up with almost the determination to allow the thin barrier of the Minor to debar him from entering in business for himself, which is his ambition.

Such is his case; and what a deplorable, yet by no means an exceptional one! His impression as regards the Minor is, that it is necessary to undergo a course of lectures and study in London prior to presenting himself to the examiners; which is a great delusion, as anyone with application can do better in the country, having no enticing allurements. His lack of specimens must surely be through his not applying to the wholesale drug-houses; and, by making an effort, there is no reason why he should not conduct the necessary experiments in chemistry.

Instead of meditating upon his situation, let him shake off his despondency and work for the object he has in view with earnestness and zeal, coupled with a resolute determination, which will culminate in victory; at the same time dispense with "anxiety," as he will satisfy the examiners much better without its presence.

A. J. R.

Swansea, Dec. 10th, 1873.

D. J.—(1) *Œnanthe fistulosa.* (2) *Obeonia portulacoides.* (3) *Spiræa salicifolia.* Nos. 2 and 3 are probably escapes from cultivation.

J. E. Saunders.—In consequence of the contraction which takes place, although 60 volumes of water are added to 100 of spirit, the product will only measure 156 volumes.

W. W.—You will find an answer to your question in any work on chemistry.

P. H. M.—A table showing the composition of various so-called "fruit essences" will be found in the PHARM. JOURN., 2nd. ser., vol. viii., p. 467.

Edinburgh Examinations.—We have received a letter from "*Honour Bright,*" disputing the correctness of an explanation recently given (*ante* p. 467) of the reason why students do not pass their examinations in London as well as in Edinburgh. He says "no university professor presides over any class in the evening that would be of any avail to us," and considers the statement that masters in Edinburgh, with few exceptions, allow their assistants a week or two's holiday to spend in the Society's rooms exclusively, to be grossly misleading. The explanation suggested by "*Honour Bright*" is, that "Scotchmen are not so sure as Englishmen and read more," and, therefore, are better prepared and pass.

Erratum.—A. P. B.—The moss sent was *Fontinalis squamosa*, not *squarrosa*, as printed last week.

G. and T.—We are not acquainted with Dr. Dusart's formula, but formulæ for Syr. Calcis Lacto-Phosphatis have been given in the PHARMACEUTICAL JOURNAL, and the 'Year Book of Pharmacy.'

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Bell, Prof. Axel Key (Stockholm), Mr. Barnby, Mr. Guest, Mr. Saunders, Dr. Symes, Mr. Wilson, Mr. Pitman, Mr. Kinninmont, R. D. M., "Civilian," "Apis."

AN EXAMINATION OF SOME SAMPLES OF HYDROCYANIC ACID.*

BY A. TOWERZEY.

Some little time since, at the suggestion of Mr. Schacht, I submitted to a careful examination the hydrocyanic acid we were then using in his dispensary. As we half suspected, it proved to be distinctly below the standard strength.

The necessity of being very accurate, compelled me to make repeated experiments; and anxious for a variety of samples I applied to several chemists in the neighbourhood, who very kindly acceded to my requests, and gave me the opportunity of more extended experience.

The results I am thus able to show will perhaps be interesting to the association, although I am well aware that this subject has frequently been treated by more competent observers. I may especially call to your recollection a communication by Dr. Tilden, published in the PHARMACEUTICAL JOURNAL of July 29th, 1871; also a paper read by Mr. Abraham before the Liverpool Chemists' Association on the 8th of May, 1873; and likewise Mr. Siebold's report on the "Purity of Commercial Specimens of Officinal Acids," which will be found amongst the transactions of the last meeting of the Pharmaceutical Conference; and I trust these gentlemen will forgive my saying that my results tend to corroborate theirs.

It is not necessary to say one word here concerning the preparation of hydrocyanic acid; indeed, the exact process does not seem to be of much importance, provided the solution contains 2 per cent. of real acid.

The Pharmacopœia gives two tests for estimating its strength. The cyanogen may either be precipitated and weighed as dry cyanide of silver or tested volumetrically with a standard solution of nitrate of silver. This latter was the method we preferred to adopt, and, in practice, found it convenient to employ a nitrate of silver solution of such strength that 40 c.c. would show 1 per cent. in 4 grammes of sample. (I say *we*, because throughout these experiments I was kindly assisted by Mr. Schacht.)

Briefly then, we dissolved 3·15 grammes of dried nitrate of silver in one litre of distilled water; 4 grammes of each sample were carefully weighed in a balance capable of turning to one-tenth of a milligramme, with all the expedition possible (a most important matter), and mixed with rather more than sufficient solution of caustic potash to convert all the HCN into KCN; our silver solution, contained in a burette, was then run in until the last drop produced a permanent faint opalescence in the liquid after stirring. The number of c.c. of silver solution required to produce this effect divided by 40 gave at once the percentage.

Our experiments, conducted I may say, with every precaution to avoid error, and repeated more than once, indeed, several times in every case, upon twelve samples of hydrocyanic acid, gave the following average results:—

So-called B.P. Acid.

No. 1	1·92.
„ 2	1·52.
„ 3	1·36.
„ 4	1·32.
„ 5	1·262.
No. 6	1·22.
„ 7	1·165.
„ 8	1·16.
„ 9	0·26.

Acid of "Scheele's" strength.

„ 10	3·62.
„ 11	4·02.
„ 12	1·3.

The history, as far as we know, of these samples will serve to show how unfortunately unstable is this important remedy, and to indicate the necessity for special care in its management.

No. 1 was obtained from a wholesale house of deservedly good reputation, and examined *directly it arrived*.

Nos. 4 and 6 were samples of the same acid examined in the one case when the bottle was first opened, and in the other when the contents had suffered from the frequent removal of the stopper incidental to the dispensary.

Nos. 3 and 5 were kindly sent me by a friend, who appended the following remarks:—No. 3 "from a 40 oz. bottle, from which over 35 ozs. have been from time to time removed." No. 5. "First removal from a 40 oz. bottle, which has been in stock several months, during which time, however, the stopper had not been withdrawn." "Both samples have been carefully preserved in bottles encased in blue paper, and kept in a cupboard in a cool underground cellar."

Nos. 2, 7, 8, and 9 were portions of the contents of dispensing bottles kindly given me by friends who share with us the desire for a more perfect preparation.

Of the three samples of "Scheele's acid,"

No. 10 had been in stock for several months, during which time the stopper had been frequently removed.

No. 11 was a fresh sample, obtained expressly for examination, and

No. 12 was an acid of unknown birth. Its owner regarded it as a curiosity, and, like most curiosities, it is only fit to be kept on a shelf.

Here, then, gentlemen, are nine samples of hydrocyanic acid, B.P., taken from various sources, and representing very fairly, I should say, the condition in which this medicine is generally met with.

It will be seen at a glance that no two samples are alike, and all, with one exception, considerably below the standard. That such should be the case must be regarded as a matter of grave importance: and the question so frequently asked before I ask once again—Can this variation in so important a remedy be obviated? There is no doubt it arises chiefly from the extreme volatility of the substance itself. This was brought home to us most convincingly during the conduct of our experiments. HCy is much more volatile than water, hence the slightest exposure does something to weaken the sample. I feel bound therefore to answer that I fear nothing can entirely prevent this unfortunate variation in commercial hydrocyanic acid. But I think at the same time that more may be done than is always done to limit this variation and I hazard the opinion that a difference so great as that here shown ought not to exist in any neighbourhood.

In the management of this chemical it is of the utmost importance that every chemist should test for himself the strength of his solution; without so doing he can know absolutely nothing of the real strength of the article sent him. But starting with

* Read at a meeting of the Bristol Pharmaceutical Association, December 12, 1873.

an acid of full strength and keeping it under the most favourable circumstances, he may then have fair reason to expect success in his endeavours to render this powerful agent something like a reliable remedy in the hands of the medical man.

The method we have recently adopted is to purchase acid of Scheele's strength and reduce it to 2 per cent. Mixing some ten or twelve ounces at a time we keep this quantity in well-fitting stopped bottles (1 oz. capacity) protected from the light and in a cool place. One ounce only is brought into the dispensary at a time, and *is renewed every fortnight* provided it lasts so long. This insures a frequent supply of fresh stock. Whether this plan will answer all our expectations I am not yet able to say; still, after all, this is but an endeavour to make the best of a bad job. The object to be sought for is, I venture to think, some other cyanide that may be proved to be equal to the cyanide of hydrogen in medicinal value and superior to it in chemical constancy. The most promising substance we have yet examined is the double cyanide of zinc and potassium. It is a perfectly definite crystalline body, having the composition, $K_2Zn''Cy_4$. The crystals contain no water, and are so stable that they may be even fused without change. In its solution, moreover, the cyanogen appears to be very securely fixed as the following experiment may serve to show. A sample containing (by calculation) 2 per cent. of cyanogen, was tested and found to yield exactly 2 per cent. A pint of air was then driven through the solution in small bubbles, and being again tested, it was found to be of precisely the same strength. A sample of B.P. acid was then treated, with this result—that whereas in the first case it was shown to be of exactly 2 per cent., after the transmission of the pint of air its percentage was reduced to 1·7. But although the cyanogen in this double cyanide is non-volatile, and to that extent more constant than in hydrocyanic acid, yet it is easily evolved by even the weakest acids, such, for instance, as may be presumed to exist in the stomach. In point of fact, hydrocyanic acid itself would be produced directly the remedy was swallowed. The crystals are prepared very easily by dissolving cyanide of zinc in aqueous solution of cyanide of potassium, in the proportion of one equivalent of the former to two of the latter; upon evaporation this yields beautiful octahedral crystals.

A solution corresponding with the strength of the B. P. acid is made with 2 grammes of the salt, and 42·82 grammes of water.

As to the medicinal value of this solution, I am, of course, not able to speak, but I scarcely think it could in any great degree differ from that of hydrocyanic acid.

OBSERVATIONS ON THE ACTION AND USES OF CROTON-CHLORAL HYDRATE.*

BY OSCAR LIEBREICH, M.D.

Professor of Materia Medica in the University of Berlin.

I have the honour of directing attention to a new remedy, which serves to corroborate the theory I have propounded with respect to the action of hydrate of chloral.

When chlorine gas acts on aldehyde, croton-chloral is formed, as has been demonstrated by Dr. Krämer and Dr. Tinner. In order to avoid a mistake which is apt to be caused by the name, I must here remark that this body possesses no relation whatever to croton oil, although its chemical constitution proves it to be the chlorated aldehyde of crotonic acid. Croton-chloral differs in its outward appearance from hydrate of chloral by its being dissolved with difficulty in water, and by its crystallizing in small glittering tablets. Its action, though similar to that of hydrate of chloral, differs widely from the latter with regard to its physiological effects. Four grams, or a drachm, of this substance, dissolved in water, and introduced into the stomach, produce in the course of from fifteen to twenty minutes a deep sleep, accompanied by anæsthesis of the head. Whilst the eyeball has lost its irritability, and the nervus trigeminus shows no reaction whatever on being irritated, the tone of the muscles remains unaltered.

I have experimented with this remedy on maniacs during an attack of mania. They remained quietly sitting on their chairs in a deep sleep, their pulse and respiration being unchanged for two whole hours together. If anæsthesis had reached so high a degree in consequence of the application of hydrate of chloral, the patients would have dropped from their chairs, and both their pulse and respiration would have been considerably retarded. I have seen croton-chloral acting in the same way on healthy individuals. In some cases of tic douloureux, the remarkable phenomenon is exhibited that pain ceases before sleep sets in. I am sorry to say, however, that this remedy acts only as a palliative in this dreadful disease. I nevertheless prefer its action to that of morphia, because it has effects as good as the latter remedy, without being so detrimental to the constitution in general. I have never observed any unfavourable effects of croton-chloral on the stomach or any other organ, although I have made frequent experiments with it.

The indications for the use of this remedy are to be found—1. In cases where hydrate of chloral is inapplicable on account of heart disease; 2. In cases of neuralgia in the district of the nervus trigeminus; 3. In cases where very large doses of chloral are necessary to produce sleep. I there recommend the addition of croton-chloral to hydrate of chloral.

Whilst examining the difference between the action of hydrate of chloral and that of croton-chloral, I have discovered the remarkable fact that it is not the first, but the second product of decomposition of the latter substance which is brought into action, on account of the first being too rapidly destroyed. Croton-chloral, when subjected to the influence of an alkali, first forms allyl-chloroform, a trichlorated body, which is rapidly decomposed into a bichlorated substance called bichlor-allylene. Now, both chloroform and trichlorated substances act, as I have shown, in their first stage upon the brain, in the second on the spinal cord, and in the third on the heart. The retardation of respiration is to be explained by the agency of these substances on the last-mentioned organ. Bichlorated substances act differently, as is proved by bichloride of ethylene. Even if the circulation of the blood in an animal have been stopped by this latter agent for one minute, life may be restored by artificial respiration, which is impossible whenever trichlorated substances have produced this effect, in which case the muscles of the heart remain paralysed. Well, in animals poisoned by croton-chloral to such a degree that both circulation and respiration are stopped entirely artificial respiration is able to restore the action of the heart immediately, and the life of the animal may thus be saved. Bichlor-allylene, inhaled by the lungs, produces the same effect on animals as croton-chloral. We thus see these bichlorated substances acting on the brain, spinal cord, and medulla oblongata, but not on the heart, which explains the fact that both respiration and circulation remain unaltered in man by a medicinal dose. It is a highly interesting fact, however, that under favourable conditions, we still are able to produce in animals the effects of the first product of decomposition of croton-chloral—*i.e.*, of the trichlorated sub-

* From the *British Medical Journal*, Dec. 20.

stance, or of allyl-chloroform. In order to observe these effects it is necessary to introduce immense doses of croton-chloral into the body, when paralysis of the heart actually does ensue.

A DISCOURSE ON MOLECULES.*

BY J. CLERK MAXWELL, M.A., F.R.S.

Professor of Experimental Physics in the University of Cambridge.

(*Concluded from page* 494.)

Another branch of molecular science is that which relates to the exchange of molecules between a liquid and a gas. It includes the theory of evaporation and condensation, in which the gas in question is the vapour of the liquid, and also the theory of the absorption of a gas by a liquid of a different substance. The researches of Dr. Andrews on the relations between the liquid and the gaseous state have shown us that, though the statements in our elementary text-books may be so neatly expressed as to appear almost self-evident, their true interpretation may involve some principle so profound that, till the right man has laid hold of it, no one ever suspects that anything is left to be discovered.

These, then, are some of the fields from which the data of molecular science are gathered. We may divide the ultimate results into three ranks, according to the completeness of our knowledge of them. To the first rank belong the relative masses of the molecules of different gases, and their velocities in metres per second. These data are obtained from experiments on the pressure and density of gases, and are known to a high degree of precision.

In the second rank we must place the relative size of the molecules of different gases, the length of their mean paths, and the number of collisions in a second. These quantities are deduced from experiments on the three kinds of diffusion. Their received values must be regarded as rough approximations till the methods of experimenting are greatly improved.

There is another set of quantities which we must place in the third rank, because our knowledge of them is neither precise, as in the first rank, nor approximate, as in the second, but is only as yet of the nature of a probable conjecture. These are :—The absolute mass of a molecule, its absolute diameter, and the number of molecules in a cubic centimetre. We know the relative masses of different molecules with great accuracy, and we know their relative diameters approximately. From these we can deduce the relative densities of the molecules themselves. So far we are on firm ground.

The great resistance of liquids to compression makes it probable that their molecules must be at about the same distance from each other as that at which two molecules of the same substance in the gaseous form act on each other during an encounter. This conjecture has been put to the test by Lorenz Meyer, who has compared the densities of different liquids with the calculated relative densities of the molecules of their vapours, and has found a remarkable correspondence between them.

Now Loschmidt had deduced from the dynamical theory the following remarkable proportion :—As the volume of a gas is to the combined volume of all the molecules contained in it, so is the mean path of a molecule to one-eighth of the diameter of a molecule.

Assuming that the volume of the substance, when reduced to the liquid form, is not much greater than the combined volume of the molecules, we obtain from this proportion the diameter of a molecule. In this way Loschmidt, in 1865, made the first estimate of the diameter of a molecule. Independently of him and of each other, Mr. Stoney in 1868, and Sir W. Thomson in 1870, published results of a similar kind, those of Thomson being deduced not only in this way, but from considerations derived from the thickness of soap bubbles, and from the electric properties of metals.

According to the table, which I have calculated from Loschmidt's data, the size of the molecules of hydrogen is such that about two millions of them in a row would occupy a millimetre, and a million million million millions of them would weigh between four and five grammes.

In a cubic centimetre of any gas at standard pressure and temperature there are about nineteen million million million molecules. All these numbers of the third rank are, I need not tell you, to be regarded as at present conjectural. In order to warrant us in putting any confidence in numbers obtained in this way, we should have to compare together a greater number of independent data than we have as yet obtained, and to show that they lead to consistent results.

Thus far we have been considering molecular science as an inquiry into natural phenomena. But though the professed aim of all scientific work is to unravel the secrets of nature, it has another effect not less valuable on the mind of the worker. It leaves him in possession of methods which nothing but scientific work could have led him to invent, and it places him in a position from which many regions of nature, besides that which he has been studying, appear under a new aspect.

The study of molecules has developed a method of its own, and it has also opened up new views of nature.

When Lucretius wishes us to form a mental representation of the motion of atoms, he tells us to look at a sunbeam shining through a darkened room (the same instrument of research by which Dr. Tyndall makes visible to us the dust we breathe), and to observe the motes which chase each other in all directions through it. This motion of the visible motes, he tells us, is but a result of the far more complicated motion of the invisible atoms which knock the motes about. In his dream of nature, as Tennyson tells us, he

> "Saw the flaring atom-streams
> And torrents of her myriad universe,
> Ruining along the illimitable inane,
> Fly on to clash together again, and make
> Another and another frame of things
> For ever."

And it is no wonder that he should have attempted to burst the bonds of fate by making his atoms deviate from their courses at quite uncertain times and places, thus attributing to them a kind of irrational free will, which on his materialistic theory is the only explanation of that power of voluntary action of which we ourselves are conscious.

As long as we have to deal with only two molecules, and have all the data given us, we can calculate the result of their encounter, but when we have to deal with millions of molecules, each of which has millions of encounters in a second, the complexity of the problem seems to shut out all hope of a legitimate solution.

The modern atomists have therefore adopted a method which is, I believe, new in the department of mathematical physics, though it has long been in use in the section of statistics. When the working members of section F get hold of a report of the census or any other document containing the numerical data of economic and social science, they begin by distributing the whole population into groups, according to age, income-tax, education, religious belief, or criminal convictions. The number of individuals is far too great to allow of their tracing the history of each separately, so that in order to reduce their labour within human limits they concentrate their attention on a small number of artificial groups. The varying number of individuals in each group, and not the varying state of each individual, is the primary datum from which they work.

This, of course, is not the only method of studying human nature. We may observe the conduct of individual men and compare it with that conduct which their

* Lecture delivered before the British Association at Bradford, September 22, 1873.

previous character and their present circumstances, according to the best existing theory, would lead us to expect. Those who practise this method endeavour to improve their knowledge of the elements of human nature in much the same way as an astronomer corrects the elements of a planet by comparing its actual position with that deduced from the received elements. The study of human nature by parents and schoolmasters, by historians and statesmen, is therefore to be distinguished from that carried on by registrars and tabulators, and by those statesmen who put their faith in figures. The one may be called the historical and the other the statistical method.

The equations of dynamics completely express the law of the historical method as applied to matter, but the application of these equations implies a perfect knowledge of all the data. But the smallest portion of matter which we can subject to experiment consists of millions of molecules, not one of which ever becomes individually sensible to us. We cannot, therefore, ascertain the actual motion of any one of these molecules, so that we are obliged to abandon the strict historical method, and to adopt the statistical method of dealing with large groups of molecules.

The data of the statistical method as applied to molecular science are the sums of large numbers of molecular quantities. In studying the relations between quantities of this kind, we meet with a new kind of regularity, the regularity of averages, which we can depend upon quite sufficiently for all practical purposes, but which can make no claim to that character of absolute precision which belongs to the laws of abstract dynamics.

Thus molecular science teaches us that our experiments can never give us anything more than statistical information, and that no law deduced from them can pretend to absolute precision. But when we pass from the contemplation of our experiments to that of the molecules themselves, we leave the world of chance and change, and enter a region where everything is certain and immutable.

The molecules are conformed to a constant type with a precision which is not to be found in the sensible properties of the bodies which they constitute. In the first place, the mass of each individual molecule, and all its other properties, are absolutely unalterable. In the second place, the properties of all molecules of the same kind are absolutely identical.

Let us consider the properties of two kinds of molecules, those of oxygen and those of hydrogen.

We can procure specimens of oxygen from very different sources—from the air, from water, from rocks of every geological epoch. The history of these specimens has been very different, and if, during thousands of years, difference of circumstances could produce difference of properties, these specimens of oxygen would show it.

In like manner, we may procure hydrogen from water, from coal, or, as Graham did, from meteoric iron. Take two litres of any specimen of hydrogen, it will combine with exactly one litre of any specimen of oxygen, and will form exactly two litres of the vapour of water.

Now if, during the whole previous history of either specimen, whether imprisoned in the rocks, flowing in the sea, or careering through unknown regions with the meteorites, any modification of the molecules had taken place, these relations would no longer be preserved.

But we have another and an entirely different method of comparing the properties of molecules. The molecule, though indestructible, is not a hard rigid body, but is capable of internal movements, and when these are excited it emits rays, the wave-length of which is a measure of the time of vibration of the molecule.

By means of the spectroscope the wave lengths of different kinds of light may be compared to within one ten-thousandth part. In this way it has been ascertained, not only that molecules taken from every specimen of hydrogen in our laboratories have the same set of periods of vibration, but that light, having the same set of periods of vibration, is emitted from the sun and from the fixed stars.

We are thus assured that molecules of the same nature as those of our hydrogen exist in those distant regions, or at least did exist when the light by which we see them was emitted.

From a comparison of the dimensions of the buildings of the Egyptians with those of the Greeks, it appears that they have a common measure. Hence, even if no ancient author had recorded the fact that the two nations employed the same cubit as a standard of length, we might prove it from the buildings themselves. We should also be justified in asserting that at some time or other a material standard of length must have been carried from one country to the other, or that both countries had obtained their standards from a common source.

But in the heavens we discover by their light, and by their light alone, stars so distant from each other that no material thing can ever have passed from one to another, and yet this light, which is to us the sole evidence of the existence of these distant worlds, tells us also that each of them is built up of molecules of the same kinds as those which we find on earth. A molecule of hydrogen, for example, whether in Sirius or in Arcturus, executes its vibrations in precisely the same time.

Each molecule, therefore, throughout the universe, bears impressed on it the stamp of a metric system as distinctly as does the metre of the Archives at Paris, or the double royal cubit of the Temple of Karnac.

No theory of evolution can be formed to account for the similarity of molecules, for evolution necessarily implies continuous change, and the molecule is incapable of growth or decay, of generation or destruction.

None of the processes of Nature, since the time when Nature began, have produced the slightest difference in the properties of any molecule. We are therefore unable to ascribe either the existence of the molecules or the identity of their properties to the operation of any of the causes which we call natural.

On the other hand, the exact equality of each molecule to all others of the same kind gives it, as Sir John Herschel has well said, the essential character of a manufactured article, and precludes the idea of its being eternal and self existent.

Thus we have been led, along a strictly scientific path, very near to the point at which Science must stop. Not that Science is debarred from studying the internal mechanism of a molecule which she cannot take to pieces, any more than from investigating an organism which she cannot put together. But in tracing back the history of matter Science is arrested when she assures herself, on the one hand, that the molecule has been made, and on the other, that it has not been made by any of the processes we call natural.

Science is incompetent to reason upon the creation of matter itself out of nothing. We have reached the utmost limit of our thinking faculties when we have admitted that because matter cannot be eternal and self-existent it must have been created.

It is only when we contemplate, not matter in itself, but the form in which it actually exists, that our mind finds something on which it can lay hold.

That matter, as such, should have certain fundamental properties—that it should exist in space and be capable of motion, that its motion should be persistent, and so on, are truths which may, for anything we know, be of the kind which metaphysicians call necessary. We may use our knowledge of such truths for purposes of deduction, but we have no data for speculating as to their origin.

But that there should be exactly so much matter and no more in every molecule of hydrogen is a fact of a very different order. We have here a particular distribution of matter—a *collocation*—to use the expression of Dr. Chalmers, of things which we have no difficulty in imagining to have been arranged otherwise.

The form and dimensions of the orbits of the planets,

for instance, are not determined by any law of nature, but depend upon a particular collocation of matter. The same is the case with respect to the size of the earth, from which the standard of what is called the metrical system has been derived. But these astronomical and terrestrial magnitudes are far inferior in scientific importance to that most fundamental of all standards which forms the base of the molecular system. Natural causes, as we know, are at work, which tend to modify, if they do not at length destroy, all the arrangements and dimensions of the earth and the whole solar system. But though in the course of ages catastrophes have occurred and may yet occur in the heavens, though ancient systems may be dissolved and new systems evolved out of their ruins, the molecules out of which these systems are built—the foundation stones of the material universe—remain unbroken and unworn. They continue this day as they were created—perfect in number and measure and weight, and from the ineffaceable characters impressed on them we may learn that those aspirations after accuracy in measurement, truth in statement, and justice in action, which we reckon among our noblest attributes as men, are ours because they are essential constituents of the image of Him who in the beginning created, not only the heaven and the earth, but the materials of which heaven and earth consist.

Table of Molecular Data.

		Hydrogen.	Oxygen	Carbonic oxide.	Carbonic acid.
	Mass of molecule (hydrogen = 1)	1	16	14	22
Rank I.	Velocity (of mean square) metres per second at 0° C.	1859	465	497	396
	Mean path, tenth-metres	965	560	482	379
Rank II.	Collisions in a second (millions)	17750	7646	9489	9720
	Diameter, tenth-metres	5·8	7·6	8·3	9·3
Rank III.	Mass, twenty-fifth-grammes	46	736	644	1012

Table of Diffusion. $\frac{(\text{Centimetre})^2}{\text{Second}}$ measure.

	Calculated.	Observed.	
H and O	0·7086	0·7214	Diffusion of matter observed by Loschmidt.
H and CO	0 6519	0·6422	
H and CO_2	0·5575	0·5558	
O and CO	0·1807	0·1802	
O and CO_2	0·1427	0·1409	
CO and CO_2	0·1386	0·1406	
H	1·2990	1·49	Diffusion of momentum (Graham and Meyer).
O	0·1884	0·213	
CO	0 1748	0·212	
CO_2	0·1087	0·117	
Air		0·256	Diffusion of temperature observed by Stefan.
Copper		1·077	
Iron		0·183	
Cane Sugar in water		0·00000365	Voit.
(Or in a day		0·3144)	
Salt in water		0·00000116	Fick.

VOLUMETRIC ESTIMATION OF BISMUTH.*

BY MM. BUISSON AND FERRAY.

The method of volumetric estimation of bismuth proposed by the authors is based upon its complete precipitation by iodic acid from an acetic solution. The iodate of bismuth is a white anhydrous powder, corresponding with the formula Bi_2O_3, $3IO_5$, insoluble in water and in acids. Not a trace of it is dissolved by free acetic acid. This method is applicable to the estimation of all the compounds into which bismuth enters, but the authors employ it principally in the estimation of the bismuth contained in the subnitrate, which compound they have found to be adulterated on a large scale.

Commercial subnitrate of bismuth being frequently mixed with the oxychloride, it is important to be able to estimate separately the quantity of subnitrate contained in the salt. This is accomplished by treating with acetic acid, which does not dissolve the oxychloride, and besides allows of the dilution of the liquid without fear of partial precipitation of the bismuth by the water.

The examination of subnitrate of bismuth is effected by dissolving 50 centigrams of the salt in a few drops of nitric acid, and diluting slightly with water; the solution is then saturated with bicarbonate of soda until the appearance of a slight permanent precipitate; the precipitate is re-dissolved by excess of acetic acid, so as to prevent the partial precipitation of the bismuth by the water. The solution is then heated to ebullition and filtered to separate iron and oxychloride of bismuth that may be present. To the filtered liquor 25 cubic centimetres of iodic acid are added, and water to make up 250 cubic centimetres. It is then well shaken and after standing a few minutes it is poured upon a dry filter. To 100 cubic centimetres of the clear liquor are added dilute sulphuric acid and iodide of potassium, in order to decompose the unemployed iodic acid and to re-dissolve the iodine set free, which point is readily observed when grey pellicles of iodine no longer float on the surface. The reaction is represented by the following equation:—

$$IO_5 + 5KI + 5SO_3 = 5SO_3KO + 6I.$$

Into the liquor containing the iodine is poured, by means of a burette, graduated to tenths of a cubic centimetre, solution of hyposulphite of soda until the yellow tint of the iodine has disappeared. The difference between the titration when operating upon iodic acid alone and upon iodic acid from which a known weight of pure bismuth has been precipitated allows of a calculation of the amount of bismuth contained in the compound examined. In testing the subnitrate the authors find it preferable to express the result as metallic bismuth rather than as subnitrate, in consequence of the true composition of that body being yet unknown. According to their experiments they believe it to contain 0·6894 of bismuth.

Lead or baryta present in the compound under analysis should be eliminated as sulphate; tin and antimony as stannic and antimonic acids by previous treatment with nitric acid.

The re-agents employed should be free from chlorides, as the oxychloride of bismuth which would be formed in contact with water is insoluble in acetic acid, and would cause a loss. The iodide of potassium should be free from iodate and the solution used should be a saturated one. The titrated solution of iodic acid is prepared by dissolving 30 grams of crystallized iodic acid in one litre of distilled water, and titrating the solution with pure bismuth. The solution of hyposulphite of soda is of suitable concentration when it is necessary to employ 30 or 40 cubic centimetres to oxidize the iodine set free by 10 cubic centimetres of iodic acid.

* *Moniteur Scientifique*, vol. iii., p. 900.

THE FLUID EXTRACT OF IPECACUANHA OF THE UNITED STATES' PHARMACOPŒIA.*

BY RICHARD V. MATTISON.

Some dissatisfaction having been experienced with the above officinal fluid extract in consequence of its thick and inelegant appearance, the author instituted a series of experiments in accordance with suggestions of Professor Maisch, which resulted in the selection of the following formula:—

Take eighty troy-ounces of carefully selected ipecac root, grind to appropriate powder, and, after moistening thoroughly, pack firmly in a cylindrical glass percolator, allow to stand four days as directed, then using the officinal menstruum, allow percolation to proceed slowly until the root is exhausted. To the percolate add ten fluid-ounces of glycerin, and evaporate at a temperature not exceeding 140° Fahr. (if the temperature is allowed to rise higher a gelatinous mass will result) until reduced to the measure of fifty-five fluid ounces. Transfer this to a moistened filter and allow to drain. To the soft mass

* *American Journal of Pharmacy*, vol. xlv., p. 481.

remaining upon the filter, consisting of the peculiar substance usually called resin (though not so, properly speaking) water is added by means of a spritz, and the whole thoroughly washed until the filtrate measures sixty fluid-ounces. This causes a reprecipitation of the resinous substance which necessitates the refiltration of the filtrate. To this second filtrate twenty fluid-ounces of glycerin is added, and the whole well mixed.

This furnishes an extract containing in each pint two fluid-ounces less of glycerin than the officinal preparation, limpid, perfectly transparent, and one that can be mixed with syrup without turbidity, and in this respect will, Mr. Mattison thinks, meet the approval of all lovers of elegant pharmacy.

RELATIONS OF PLANTS AND ANIMALS TO INORGANIC MATTER, AND ON THE INTERACTION OF THE VITAL AND PHYSICAL FORCES.*

(*Continued from p.* 496).

BY J. BELL PETTIGREW, M.D., F.R.S., ETC.

At the very threshold of physiology we have to do with the so-called proximate principles of the body—*i.e.*, the substances which enter into its composition. We have also to do with the vital, chemical, and physical forces which aggregate and work up the proximate principles into a consistent living whole.

The proximate principles have been divided into the *inorganic*, comprising such substances as water, chloride of sodium, chloride of potassium, carbonate of potassa, phosphate and carbonate of lime, etc.; and the *organic*, under which may be enumerated starch, sugar, fats, fibrin, albumen, casein, pepsine, etc. The inorganic substances are found both within and without the body; the organic substances being confined to it.

The organic substances are, so to speak, manufactured from the inorganic by plants and animals. A plant to live must be supplied with soil, with water, and air. The soil contains saline matters, to which are generally added decomposing substances, which furnish carbonic acid and ammonia. The water furnishes oxygen and hydrogen in chemical combination; and the air oxygen and nitrogen, and small but important quantities of carbonic acid and ammonia. The plant is thus supplied with water, salts, carbonic acid, and ammonia. But the plant can disintegrate the carbonic acid and appropriate its carbon, which it can subsequently build up with oxygen and hydrogen into sugar, oil, and starch; or it can combine carbon, hydrogen, oxygen, and nitrogen to form those peculiar nitrogenous substances recently known as protoplasm. The sun lends its aid to the plant in these transformations; in fact, the heat of the sun enables the plant to separate the oxygen from the carbon and the nitrogen from the hydrogen in the formation of sugar, oil, and starch. The heat of the sun is, marvellous to relate, not lost in the process. It is stored up in the newly-formed sugar, oil, and starch; and may be reconverted into heat either by burning in the animal body or in an open fire. The heat thus obtained can, when collected, be made to perform a definite amount of mechanical work. The physical and vital forces are correlated and interact.† Sugar, oil, and starch are manufactured by a vital chemistry, and, when once produced, are appropriated, with other substances, as food by the herbivora, and subsequently by the carnivora and omnivora. By vital, chemical, physical, and other forces, the inorganic material of the outer world is incorporated in the organic or inner world of the individual.

The animal, built up, as it were, indirectly from the inorganic and directly from the organic kingdoms by means of the plant, reverses the operations of the latter. It returns to the inorganic world the substances abstracted from it by the plant. Thus the animal takes the complex bodies produced by the plant and oxidizes or burns them. It restores the carbon of these bodies to the atmosphere chiefly in the form of carbonic acid, the hydrogen as water, and the nitrogen with the remainder of the carbon as urea, to the soil.

While these transformations are going on in the animal body the tissues are being built up and conserved, secretions formed, and work done. This work may be either mechanical or mental, or both. The animate and inanimate kingdoms plainly interact. The plant lays the inorganic world under contribution, and the animal lays the vegetable world under contribution; but the animal in due time restores to the inorganic or mineral kingdom, in undiminished quantity, the substances abstracted from it by the plant. In like manner the energy displayed by the animal is to be regarded as the sum of the potential energy stored up in chemical compounds; and this, in turn, is restored to the outer world as heat, which, like the matter, is undiminished in quantity. There is therefore a cycle of force and a cycle of matter in living beings. "Animals, like machines, can only move and accomplish work by being continuously supplied with fuel (that is to say, food) and air containing oxygen; both give off, again, this material in a burnt state, and at the same time produce heat and work. All investigation, thus far, respecting the amount of heat which an animal produces when at rest is in no way at variance with the assumption that this heat exactly corresponds to the equivalent, expressed as work, of the forces of chemical affinity then in action. As regards the work done by plants, a source of power in every way sufficient exists in the solar rays which they require for the increase of the organic matter of their structures."*

It would be quite out of place to refer to the great physical law of the conservation of energy on the present occasion were it not for the fact that the law applies also to physiology. This law resolves itself into three parts—viz., the conservation of energy, the transformation of energy, and the dissipation of energy. We have examples of the conservation of energy in physiology wherever we have mechanical or physical adaptations† which produce a maximum of work with a minimum of power. We have examples of the transformation of energy in the muscles moving the bones, or the heart the blood; and we have examples of the dissipation of energy in the friction accompanying the movements of both bones and blood. In all the vital, physical, and chemical actions and reactions the law plays a prominent part. To take an example: A skilful blacksmith can hammer a piece of cold iron until it becomes red-hot, and the iron so heated can be employed in raising steam and driving a steam engine; but the muscles of the smith's arm are fed by animal matter, that again by vegetable matter, and lastly this by inorganic matter.‡ Similar results might be obtained direct from the inorganic world without the intervention of the smith's arm. Thus the heat in the universe causes water to evaporate, water evaporating is

* An Introductory Lecture to a Course of Physiology. Reprinted from the *Lancet*, Nov. 15.

† "The life of men, animals, and plants could not continue if the sun had lost its high temperature, and with it its light."

* 'Popular Scientific Lectures,' by Helmholtz (1873), pp. 383, 384,

† "There is hardly a natural process to be found which is not accompanied by mechanical actions, or from which mechanical work may not be derived—heat, electricity, magnetism, light, chemical forces, all stand in manifold relation to mechanical processes. . . . While the steam-engine develops for us mechanical work out of heat, we can conversely generate heat by mechanical forces."

‡ "A certain portion of force disappears from the sunlight, while combustible substances are generated and accumulated in plants, and we can assume it as very probable that the former is the cause of the latter. . . . . The immense wealth of ever-changing, meteorological, climatic, geological, and organic processes of our earth are almost wholly preserved in action by the light and heat-giving rays of the sun. . . . In the series of natural processes there is no circuit to be found by which mechanical force can be gained without a corresponding consumption."

steam, but steam collected and confined propels the steam-engine.

The interaction of the physical, chemical, and vital forces is thus expressed by Helmholtz: "If a certain quantity of mechanical work is lost, there is obtained an equivalent quantity of heat, or, instead of this, of chemical force; and, conversely, when heat is lost, we gain an equivalent quantity of chemical or mechanical force; and, again, when chemical force disappears, an equivalent of heat or work: so that in all these interchanges between various inorganic natural forces working force may indeed disappear in one form, but then it reappears in exactly equivalent quantity in some other form. . . . . The universe possesses, once for all, a store of force which is not altered by any change of phenomena, can neither be increased nor diminished, and which maintains any change which takes place on it. . . . The force of falling water can only flow down from the hills when rain and snow bring it to them. To furnish these we must have aqueous vapour in the atmosphere, which can only be effected by the aid of heat, and this heat comes from the sun. The steam-engine needs the fuel which the vegetable life yields, whether it be the still life of the surrounding vegetation or the extinct life which has produced the immense coal deposits in the depths of the earth. The forces of man and animals must be restored by nourishment; all nourishment comes ultimately from the vegetable kingdom, and leads us back to the same source. . . . We are thrown back upon the meteorological processes in the earth's atmosphere, on the life of plants in general, and on the sun."* It would appear from this that living force can generate the same amount of work as that expended in its production.

From what has been stated, it will be evident that physiology is veering more and more round to chemistry and physics, and particularly the latter. The physiologist has at present to deal with the distribution of matter and force, not only in the individual, but also in the universe. It no longer suffices to say the muscles move the bones. The explanation now required is, What substances constitute and what forces actuate the sarcous elements?—for these we know move the muscles. In like manner we are not satisfied with the statement that a certain animal lives: the rising generation asks, Does the animal live by direct descent from a parent, or is it descended from a long line of ancestors dating back to the primeval mud of Haeckel? In other words, is each animal distinct and perfect from the first, or is each animal up to man himself an evolution from lower to higher forms, each improving upon its predecessor? These questions are difficult of solution, difficult even of comprehension, but they confront the physiologist of modern times. Herbert Spencer, one of the most advanced thinkers of the present day, avers "that the chasm between the inorganic and organic is being filled up, and that organisms are *highly differentiated portions* of the matter forming the earth's crust and its gaseous envelope." In like manner, Huxley, also in the vanguard of science, states that "protoplasm can originate only in that into which it dies—the elements—the carbon, hydrogen, oxygen, and nitrogen—of which it is found to consist. Hydrogen with oxygen forms water; carbon with oxygen, carbonic acid; and hydrogen with nitrogen, ammonia. Similarly, water, carbonic acid, and ammonia form, in union, protoplasm. . . . Protoplasm, then, is but an aggregate of physical materials, exhibiting in combination—only as was to be expected—new properties. . . . . All vital action whatever, intellectual included, is but the result of the molecular forces of the protoplasm which displays it."† Protoplasm, according to Huxley, is the formal basis of life. It is the clay of the potter, which, bake and paint it as he will, remains clay, separated by artifice, and not by nature, from the commonest brick or sun-dried clod. Thus it becomes clear that all living powers are cognate, and that all living forms are fundamentally of one character. Huxley regards protoplasm as identical in composition and uniformly diffused in plants and animals—*i.e.*, not contained in cells. In this he differs from the German histologists, who still regard the cell as the precursor and parent of protoplasm. With them, "there is as yet no matter of life; there are still cells of life." Huxley claims for protoplasm a threefold unity—a unity of faculty, a unity of form, and a unity of substance. Each of these positions has been disputed, and properly; for how, say Huxley's opponents, can there be unity of substance if the elements carbon, oxygen, hydrogen, and nitrogen, which constitute the protoplasm, are combined in varying quantity in different kinds of protoplasm? If there is not unity of substance there cannot be unity of form, and if there is neither unity of substance nor of form there cannot possibly be unity of function. The unity of substance of protoplasm depends for its proof mainly upon ultimate organic analysis. Ultimate organic analysis, however, teaches next to nothing in such cases. "Ozone is not antozone, nor is oxygen either, though in chemical constitution all are alike." Further, some protoplasm, in addition to carbon, oxygen, hydrogen, and nitrogen, contains a certain proportion of sulphur; and the Germans have shown that the cells which produce protoplasm contain in some cases glycogen, in others cholesterine, in others protagon, and in others myosin.*

Analogous in many respects to the protoplasm of Huxley is the bioplasm of Beale. This, as its name implies, is also an elementary life stuff. It is undifferentiated, and in this respect is identical with protoplasm. Beale and Huxley differ as to the mode of production of their elementary life stuffs. Beale affirms that they are the product of the *vital* forces, *per se*;† Huxley of the

* Helmholtz, op. cit.

† Huxley as epitomized by J. Hutchison Stirling, LL.D., to whose able critique on "Protoplasm" the reader is referred.

* According to Stricker, protoplasm varies almost infinitely in consistence, in shape, in structure, and in function. In some cases it is fluid, in others semifluid, in others firm and resisting. Occasionally it is club-shaped, bottle-shaped, spindle-shaped, branched, prismatic, polyhedral, etc. One kind produces fat, another pepsine, another pigment. There is a protoplasm for each of the tissues—nerve, bone, brain, muscle, etc. There is, further, a protoplasm for the several kinds of plants and animals, each producing its own kind.

† His words are: "Force (*i.e.*, physical force) is actually opposed to construction, and before anything is built up the tendencies of force must be overcome by *formative agency* or power. . . . The *vital power* transcends altogether physical forces; for it controls, guides, directs, arranges; while the latter *are controlled, are guided, are directed*, etc." ('Life Theories and Religious Thought,' 1871, pp. 40 and 42.) In proof of the foregoing, Beale states that a tree grows against gravitation. This is quite true; but it is equally true that in such cases the physical forces of capillarity, osmosis, chemical affinity, etc., as I endeavoured to show in my 'Lectures on the Circulation,' are largely employed. The vital forces may override or bridle certain physical forces while they act in conjunction with others. In like manner nature may override or bridle one or more of the physical forces by employing stronger physical ones; but the physical forces subdued, or inoperative for the time being, are not on this account destroyed. They are ready for use when the proper time arrives. Capillarity and osmosis (purely physical forces) in certain cases overcome gravitation equally with the vital forces; but it does not follow from this that gravitation as a power is extinguished. When gravitation (and this remark applies to all the physical forces) is useful in building up the organism, it is employed by nature in conjunction with the vital forces; and when capillarity, osmosis, etc., are more convenient, they are preferred. The vital and physical forces must be regarded in their totality, nor must the object in view be lost sight of. Natural laws and forces (vital, chemical, and physical) act and react upon each other; and though at

physical ones. Beale attributes all organization to life, as apart from the chemical, physical, and other forces. According to him the bioplasm or germinal matter is the same always and everywhere, and consists of small masses of a structureless, colourless, and transparent viscid substance. Beale claims for his bioplasm or life matter similar properties to that claimed by Huxley for his protoplasm. To both the same objections apply. Beale grounds the homogeneity and identity of his bioplasm on microscopical research, and Huxley, as explained, upon ultimate chemical analysis. Neither, however, is trustworthy. Experience teaches us that the microscope is limited in its powers, and that chemical analysis, instead of simply disintegrating and breaking up a body into its ultimate elements, not unfrequently produces new combinations, and consequently new substances.

The grand fact remains that the germs and seeds of plants and the eggs of animals, apparently homogeneous and identical, invariably produce not only their own kind, but, during the process of evolution, substances which are altogether dissimilar. Even man himself, with his wealth of imagination and thought, is the product of an egg, which to the eye of the microscopist and chemist is, as to its several parts, homogeneous and identical. Yet this egg, with its several portions placed in exactly the same conditions, produces the tender pulp of the brain, the flaccid muscles, the tough tendons, the elastic cartilages, the hard bones, the still harder teeth ; the enamel, a substance nearly as brittle as glass, and, in due time, the several secretions, the major portion of which is composed of water. To these are to be added the external skin, with its hair, nails, etc. ; the internal skin, or mucous membrane, with its numerous glands ; the secreting and excreting organs ; the nerves ; the lymphatics ; and the bloodvessels, with their contained blood, so rich, so complex, so marvellous in composition. These various products, so diverse in form, composition, and function, are, we know, the product of an egg. Shall we be told, or, if told, shall we believe, that this egg is homogeneous and identical in all its parts and particles? Identical these parts may be to the eye of sense, but to the eye of reason they are not so. Matter similarly constituted, similarly disposed, and similarly conditioned—*i.e.*, placed under precisely similar circumstances—behaves in precisely the same manner ; in other words, all the parts are influenced alike. If life had to operate on absolutely identical matter, the living mass would be simply homogeneous—*i.e.*, undifferentiated, and if undifferentiated, it would have no power either to build up a plant or an animal. It is impossible to produce muscle, bone, brain, etc., from matter identical in ultimate composition. In the germ, the seed, the egg, even from the first, there is differentiation. The first embryonic changes are the result of this differentiation. It is this which enables the different parts of the embryo to attract and assimilate different substances and to build up different textures. One embryonic change involves another, and gradually the individual is evolved, each according to its kind. The weaver may not produce a web dissimilar in texture and pattern in the absence of dissimilar elements. He must be supplied with the warp, the woof, and the varied pigment. A queen bee may be formed from an ordinary grub by changing the quantity and quality of its food, but no amount of change in diet can produce from the same grub a dragon-fly or a locust.

(*To be continued.*)

times some are inoperative, they are not annihilated, neither are they opposed when the final effect to be produced is taken into account. Organized structures are built up in accordance with natural laws. Thus their parts and particles consist of substances which naturally have a chemical affinity for each other ; those substances absorb and respire—*i.e.*, take in and give off fluids ; they exhibit for the most part capillary spaces and interspaces in their interior ; they have weight, porosity, elasticity, and various other purely physical properties. In this way, chemical affinity, osmosis, capillarity, gravitation, etc., have free play, and each in turn assists not only in forming and maintaining the body, but also in disintegrating it. The vital forces, if I may be allowed the expression, use and abuse the physical ones. They do not—they cannot—annihilate them. As well may we say the vital forces annihilate matter."

THE PURIFICATION OF CHLOROPHYLL.*

BY F. A. HARSTEN.

Chlorophyll forms with metalic oxides compounds which allow of the isolation of the fatty matters that accompany it. The author has experimented upon the chlorophyll of the ivy (*Hedera Helix*) which, besides being obtainable at all seasons of the year, offers great resistance to the action of light and chemical agents. The leaves are reduced into a pulp with 55° alcohol, and after twelve hours this pulp is expressed and the residue washed with strong alcohol to remove water together with a bitter substance, hederine, and a principle analogous to saponin. The dried mass is then treated with benzine, and, after twenty-four hours, expressed ; the benzine upon being distilled, leaves a brown residue, with a fatty appearance. Three kilograms of leaves yield about 80 grams of this residue. This is boiled for ten minutes with double its weight of water, and one-eighth its weight of soda. The alkaline liquor is allowed to cool and then filtered, when it is of a dark green colour. The addition of chloride or nitrate of sodium to this solution precipitates the fat soap together with the chlorophyll soap. These soaps are washed with a very concentrated solution of the same salt, then dissolved in water, and sulphate of copper added. A powder is thus obtained of a beautiful colour containing a copper soap and chlorophyllate of copper. After washing and drying, this powder is boiled with alcohol, then washed with ether and benzine, which dissolves the copper soap. Finally, the chlorophyllate of copper remaining is suspended in alcohol, and decomposed by sulphuretted hydrogen.

The chlorophyll thus obtained consists of brittle grains of a nearly black green colour. It is insoluble in water, soluble in alcohol and in hydrochloric acid, with a beautiful green colour different from the colour of the leaves, the latter being modified by yellow. This chlorophyll may be considered free from fatty matters, for it is dry and brittle, and when heated it does not give of acrolein.

Chlorophyll also forms combinations with the oxides of silver and lead, but these do not lend themselves readily to its purification.

INFLUENCE OF THE SEASONS UPON THE PRINCIPLES CONTAINED IN PLANTS.†

BY F. A. HARSTEN.

The author illustrates the fact that the extraction of certain principles from plants is influenced by the seasons. Thus in the autumn he failed to obtain chrysophyll from the elm or the *Mercurialis perennis*, both of which yielded it easily in the spring time. Chlorophyll was affected in a similar manner in the autumn, and that before the colour of the leaves was sensibly modified.

The author states that at the time of flowering he has extracted from the *Isopyrum malictroides* two alkaloids, the one amorphous and the other crystallizable. In the autumn the former was found in the root in greater abundance, whilst the latter had completely disappeared. The author presumes that the crystallizable alkaloid is first formed in the plant, and that it is gradually transformed into the amorphous alkaloid. He considers it probable that this remark would apply in other cases ; for instance, that opium required for the extraction of morphine should be collected at a different period to that required for the extraction of narceine or codeine.

* *Répertoire de Pharmacie*, vol. i., p. 614, from the *Bull. Soc. Chim.*

† *Bulletin de la Société Chimique*, vol. xviii., p. 410.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 27, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

WHAT IS A "PATENT MEDICINE?"

OUR ingenuity and patience have often been sorely taxed upon the receipt of a label carefully framed to go as closely as possible to the meshes of the Medicine Stamp and Licence Acts without becoming entangled therein, accompanied by a question as to whether it would be liable to stamp duty or not. Obviously, it is not within our province to decide such doubtful points, and we have been compelled sometimes to recommend that the problem should be forwarded for solution to the Excise authorities. It would appear that similar experiments have been tried in the United States, but with a result that was probably neither expected nor desired, and with a development of the tax-gathering faculty which Englishmen fondly imagined was a peculiarity of the late CHANCELLOR OF THE EXCHEQUER. The following are the principal points in a controversy that has for the past two or three months roused the indignation of our American *confrères*.

A perplexed supervisor, feeling incompetent to the disentanglement of certain logical knots tied for him by wicked and mischievous hands, passed his troubles on to his chief, Mr. Commissioner DOUGLASS, who quickly undid them by the Gordian method. "It is an opinion very generally entertained," said that gentleman in so many words, "that only such medicinal preparations as are patent and proprietary, or are made or prepared by some private formula, or occult or secret art, are liable to stamp tax, and many revenue officers have too generally acquiesced in the same opinion." He then went on to state that any medicinal article, "whether simple, or compounded by any rule, authority, or formula, published or unpublished," which is put up in style or manner similar to that of patent or proprietary medicines, was liable to stamp tax, and that there need be only a similarity in style, a likeness in the general points.

Such an elastic phrase as "similarity of style" was sufficient to rouse the angry susceptibilities of even the long-suffering race of pharmacists. Colleges met and passed resolutions; deputations visited Washington and interviewed the Commissioner: but to little purpose. That functionary took his stand upon the newly-discovered reading of the Act of Congress, and, staunch in the performance of his duty, was deaf to all such pleas as "interference with trade," "hardship to poor purchasers," etc., but so far showed himself conciliatory as to state his views on the question in a letter which, as it would occupy several columns, with little probable benefit, we may refrain from quoting.

At first it was intended to test the correctness of the Commissioner's ruling by an appeal to the law courts, but it was found that a decision could not be obtained for two or three months, and it has therefore been resolved to appeal to Congress to modify or repeal the obnoxious clause. Since under the new ruling such labels as "Epsom Salts—one dose," "Castor Oil—one dose," on packages previously made up, were, when submitted, said to "both require stamps," we heartily wish our American brethren success in their effort.

THE RELATION BETWEEN ATOMIC WEIGHT AND PHYSIOLOGICAL ACTION.

THE theory put forth some time since by M. RABUTEAU, and endorsed by Dr. FRASER, in his lectures delivered before the Edinburgh College of Physicians,* that the metals are more active physiologically according as their atomic weights are more elevated, has recently been questioned by Dr. JOHN CURNOW, in his Introductory Address delivered before the Medical Society of King's College.† M. RABUTEAU illustrated the assumed law by the examples of sodium, potassium, and thallium, and magnesium, zinc and cadmium. Thus, sodium with an atomic weight of 23 is inert; potassium, 39, is active in moderate doses; while thallium, 204, is a dangerous poison. But Dr. CURNOW points out that lithium—a more manifest member of the alkali group than thallium—is remarkable alike for its activity and its low combining number (7). Again, he compares copper (63·5) with lead (207), mercury (200) with bismuth (207), and arsenic (75) with antimony (122). Dr. CURNOW also disputes the value of the conclusions adopted by Dr. FRASER in the same lectures, that salts of the same base have analogous actions (compare the carbonate of ammonium with the chloride, or the sulphate of sodium with the chloride), and that isomorphous substances produce similar effects (compare the fluoride, bromide, and iodide of potassium; the sulphates of zinc, iron, and magnesia; and the phosphate and arseniate of soda).

CULTIVATION OF VANILLA IN THE ISLAND OF REUNION.

THE cultivation of the vanilla plant has recently become in high favour in the island of Reunion in consequence of the enormous increase in its value, which is stated to have quintupled during the last eighteen months, and to be still increasing. Last year's crop, however, fell short of that of 1871-72, by something like 2000 kilos, while in Mexico, the great rival of Reunion in vanilla, the decline was still greater.

The value of the vanilla exported from Reunion last year, was upwards of £50,000. It is said by the people of Reunion, that the Germans contracted a taste for vanilla in confectionery during their stay in

* PHARM. JOURN. [3], vol. iii., p. 385.
† *Med. Times* and *Gazette*, Nov. 22, p. 599.

France during the late war, and that owing to the great increase in their wealth by the payment of the French indemnity, they are now able to indulge that taste. At any rate, a large portion of the vanilla now grown in this island is exported to Germany, to supply a demand that has sprung up since that time. Unfortunately, the island is devastated by periodical cyclones, which make it very difficult to cultivate successfully a plant like the vanilla, notwithstanding the support and shelter afforded by the trees, or espaliers, on which it is trained. It suffered immensely in the cyclone of 1872, and one that has recently passed over the island has probable seriously compromised this year's crop.

A POISONOUS COMPOSITE PLANT.

Though some of the members of the Composite order are well-known for their acrid properties, few, if any, have hitherto been known of an actually poisonous nature. A case, however, is reported from America of the poisoning of some hogs from eating the leaves of *Rudbeckia laciniata*. The genus is a well-known North American one, consisting of herbaceous plants nearly allied to *Helianthus* or the sun-flowers; the receptacle, however, is cone-shaped, not flat as in the sun-flower. Several species are known in cultivation. *R. laciniata* is not uncommon in herbaceous borders. It is a smooth, branching plant, growing to a height of from six to eight feet, the lower leaves are pinnate, and the upper three or five parted. The ray florets are vertical, in a single series, yellow, and the disc florets are tubular, of a greenish-yellow colour. The plant is common in some parts of Canada and the States. The effect upon hogs after eating the leaves of this plant is said to be a kind of delirium, succeeded in a few hours by death. A correspondent, writing from Oregon to the Department of Agriculture at Washington, says:—"The hog invariably seeks water, and if he reaches it remains in it until he dies. Vomiting and purging often occur, and are considered favourable symptoms. The discharges are green. Milk and lard are the most effective remedies, and always give relief when the animal is discovered in time. A number of cases were named to me where the hogs had passed into an extreme state of delirium, but were relieved in a few hours by pouring a pint of milk and lard mixed down the throat, and restored to complete health without any other treatment. This plant is very plentiful along the creeks in this county, and is among the earliest in the spring to send forth its leaves, which are eagerly eaten by hogs when turned out. It is also the latest green thing that grows in the fall of the year, and is then eaten by hogs. During the summer months they do not eat it, probably for two reasons—the plants are then tall, and not so tender, and there are many other things for them to eat. The plant is used by some people very early in the spring for 'greens,' but all seem careful to avoid using it except when very tender, as it seems to be the general belief that it is poisonous; indeed, cases have been cited wherein the same results followed the use of it by persons as has been observed in the hog, except that none have been fatal."

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

December 17th, 18th, 19th, and 22nd, 1873.

Present (17th and 19th)—Messrs. Allchin, Barnes, Carteighe, Corder, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Southall, and Umney.

(18th)—Messrs. Allchin, Barnes, Carteighe, Corder, Cracknell, Davenport, Gale, Hills, Martindale, Schweitzer, Southall, and Umney.

(22nd)—Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, and Umney.

Dr. Greenhow was present on the 18th, on behalf of the Privy Council.

MAJOR EXAMINATION.

Four candidates were examined, and declared qualified to be registered as Pharmaceutical Chemists:—

	Walton, Major Foulds	Sowerby Bridge.
Equal.	Senior, William Furber	Doncaster.
Equal.	Wenham, George Daniel	King's Lynn.
	Normand, Claude	Hammersmith.

MINOR EXAMINATION.

Ninety-six candidates were examined. *Forty-two* failed. The following *fifty-four* passed, and were declared qualified to be registered as Chemists and Druggists:—

	*Howell, Evan John	Sloane Street, S.W.
	*Luff, Arthur Pearson	Old Brompton.
	*Dutchman, Walter	London.
	*Gilkes, Frederick George	Banbury.
	*Walker, William	Settle.
	Edmondson, William	Morecambe.
	Morton, Henry	London.
	Atkinson, John George	Horncastle.
	Davies, Samuel	Swansea.
	Wilks, Maurice	Leeds.
	Campbell, Henry	Hammersmith.
	Kemble, James	St. Austell.
	Thomson, Robert	Stirling.
	Broomfield, Robert William	Harrogate.
Equal.	Clayton, Charles	Lincoln.
Equal.	Owles, Charles Edward	Bungay.
	Goodacre, John William	Coventry.
	Harris, William	Llandilo.
	Gordelier, William Gibbs	Sittingbourne.
Equal.	Bladon, William George	Cheltenham.
Equal.	Taylor, George	Kendal.
Equal.	Williams, William	Aberffraw.
	Dunnill, George Henry	Sheffield.
Equal.	Clarke, Thomas Edward	Shrewsbury.
Equal.	Umpleby, Samuel Sayer	Harrogate.
	Kiddle, Richard Neller	Lambeth.
	Lloyd, Frederic Wm. Wellington	Rhyl.
	Evans, Thomas Mould	Derby.
Equal.	Hamond, Joseph	Peterborough.
Equal.	Pearson, Charles Frederick	Liverpool.
	Bridges, Ashley Colston	Cleobury Mortimer.
Equal.	Bumpstead, Robert George	Colchester.
Equal.	Davies, Frank Henry	Portsmouth.
	Flint, Charles Bruce	Glasgow.
	Haysworth, William Stone	Preston.
	Case, Perkins William	Trowbridge.
	Limon, Henry James	Burgh-le-marsh.
	Willson, Alfred	Landport.
	Hookes, Robert Thomas	St. Asaph.
	Shaw, Stephen	London.
Equal.	Dobson, George	Egremont.
Equal.	Elkington, Walter T. Woolldridge	Leicester.
Equal.	Hobbs, Thomas Henry Hurle	Wells.
Equal.	Maude, William Robert	York.
	Wakefield, John	Teddington.
	Forth, William Pilcher	Ashford.

* Passed with Honours.

Equal. { Blacklock, John .....Swinton, near Manchester.
Tharle, Charles Albert.....Ventnor.
Thomas, Thomas Francis.....London.

Equal { Capes, John Henry Cooper.....York.
Evans, David.....London.

Whewell, Herbert.....Birmingham.
Barlow, Joseph Alexander .....Rochdale.
Thomas, Frank.....Boston.

The above names are arranged in order of merit.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The third general meeting of the present session was held at the Bristol Museum and Library, on Friday, Dec. 12th. The President, Mr. G. F. Schacht, in introducing the business of the evening, namely, the "Reading and Discussion of Papers," congratulated the Association on the fact of so many really important communications being forthcoming for the occasion. With such a programme as had been announced, there was little fear that their time would be otherwise than fully and profitably occupied. Without further preface, he would call upon Mr. Giles, whose name was first on the list, for the paper he had kindly promised.

The Official, Commercial, and Authentic Sources of Pareira Brava.

BY R. W. GILES.

Mr. Giles said the object of his paper would be limited to such an illustration of Mr. Daniel Hanbury's recent communication to the Pharmaceutical Journal on the subject of Pareira Brava as would serve to explain the interest which attached to the specimens on the table which he desired to present to the Association as a contribution to its contemplated museum. Mr. Hanbury's paper was extremely valuable and practical. All his researches were thorough, but inevitably they had not always the advantage of possessing so much trade interest as this last. In it he showed conclusively that pharmacists had been the victims of official delusion as to the source of Pareira Brava, since the period when the Pharmacopœia undertook to enlighten them in 1836, and, what was worse, that they had been the victims of commercial miscarriage—whether wilful, negligent, or excusable, he could not say—which had resulted in supplying them, and through them our customers, with an inert production, instead of a drug of old-established, and, he believed, deserved reputation. This was obviously a matter of real and serious importance, and one against which it was exceedingly difficult for a pharmaceutist of ordinary quality to guard. The possibility of such substitutions as had occurred in respect of Pareira Brava, showed the advantage of a good museum of authentic specimens, with their known substitutes; such a museum as they were proud of possessing in Bloomsbury Square, such a one as he hoped might be formed in Bristol. It also taught them to appreciate the value of the investigations which were pursued with so much zeal by pharmacologists like Mr. Hanbury. He was sure that most of them had remarked the suspicious variations of character in the Pareira Brava which they had obtained from time to time in the ordinary course of trade. It had never seemed to be twice alike. He had noticed these differences with great mistrust, and had not known how to help himself. Mr. Hanbury had explored these occult phenomena, and had not only distinguished between the various *soi-disant* Pareira Bravas, which they might perhaps have done for themselves, but had patiently mined amongst the MS. records of past generations, and had distinguished and brought to light the identity of the original Pareira Brava, which was brought to the knowledge of European medicine in the 17th century, and had held its place with more or less favour to the present day. These investigations assured them that the suspected samples of recent years had in fact been spurious, and the preparations made from them with much pains entirely worthless; but it was satisfactory to know that the drug now in the market was genuine, although it certainly was *not* the product of *Cissampelos Pareira* which the Pharmacopœia required pharmacists to use. Thus it followed that they were liable to penalties under the Adulteration Act for every prescription dispensed intelligently, and guilty of an offence against the public health if they adhered to the official directions, being one of many instances in which they were charged with the obligations of a profession while subject to the annoyances of a trade. They were worried with the trades and harassed with the professions. He would now present to their notice the specimens to which the foregoing remarks referred, viz.:—

1st. *Cissampelos Pareira.*—Given by all the Pharmacopœias from 1836 as the source of officinal Pareira Brava. This specimen was some of the drug referred to by Mr. Hanbury as coming from Jamaica; it was also found in Brazil and elsewhere. They had probably never seen any commercial samples of Pareira Brava bearing any resemblance to this.

2nd. *Chondodendron tomentosum* (Brazil).—Real Pareira Brava, identical with the drug introduced into Europe about the year 1688. (An enlarged section of the stem of *Chondodendron* was represented on a diagram.) Of this root Mr. Hanbury writes: "I strongly advocate returning to the use of *Chondodendron*, which is the drug on which the reputation of Pareira Brava was originally founded." Speaking also of spurious pareira which had occupied the market in past years, but was neither derived from *Chondodendron* or *Cissampelos*, he says: "It should be rigidly excluded from pharmaceutical use." Before, however, gentlemen went home and committed their stock of spurious pareira to the flames, as they would of course do, he had to ask the favour that they would kindly reserve some good typical specimens to add to their museum series of "false pareira." He had, unfortunately, not been able to secure any for that evening's meeting. In concluding that slight, but he hoped not altogether unintersting communication, he could not refrain from expressing disapproval of the laxity which had perpetuated in four Pharmacopœias, from 1836 to 1867, an official error apparently so easy of correction as the ascription of Pareira Brava to the *Cissampelos Pareira*, to which it bears not the least resemblance. It would be better to give no "*unde derivata*" at all, than one which was calculated to increase confusion and to sanction mistakes; and it was painful to think that some youth of ingenuous countenance, who, with becoming diffidence had confessed his ignorance of the origin of Pareira Brava, may have been ruthlessly plucked by his examiners for not repeating the fallacious fiction that it was derived from *Cissampelos Pareira!* (He dedicated that observation with much respect to all whom it might concern.) Let us hope, now that Pharmacy was fairly established in the joint compilation of its own text-book, that those errors might be weeded out. With Dr. Redwood to advise as to the processes, they had every reason to feel confidence that they would be kept up to the advancing course of pharmacy. Could we see the animal and vegetable materia medica placed under the direction of Mr. Hanbury, we might feel equally satisfied as to their thorough revision.

The President expressed the obligations of the Association to Mr. Giles for the interesting paper he had just read to them, and for the excellent specimens which he had kindly promised to contribute to their local museum. He had frequently heard disappointment expressed by medical men with the action of the Pareira Brava preparations, attributable, no doubt, to the worthless substitutes that had been shown to have been in use. Great credit was due to Mr. Daniel Hanbury for his painstaking in-

vestigation of this subject, from which they might reasonably expect the most satisfactory results. And they would agree with him that Mr. Giles was entitled also to their best thanks, for having brought the matter directly under their notice in so complete and instructive a manner.

Mr. Stoddart had also noticed the marked variation in the Pareira Brava preparations sent out by different wholesale houses, and had experienced considerable perplexity on that account. He knew of an instance in which a London firm who had supplied a preparation made from the true variety, had had it returned as unsatisfactory. Referring to the specimens shown by Mr. Giles, he took occasion to draw the attention of the students present to a simple but most reliable method of distinguishing between roots and stems—sometimes not an easy thing to do. With the aid of an ordinary lens, lichen might almost invariably be detected on stems which grew above ground, whereas these were never found upon underground roots. If they would bear this fact in mind, they would find it greatly assist them in the event of their being examined upon the point.

Mr. Boucher (Ferris and Co.) asked Mr. Giles if he had determined the relative proportions of extractive matter in the root and the stem.

Mr. Giles said he had not, but the stem was undoubtedly rich in extractive matter. Mr. Hanbury was of opinion that there was no medicinal superiority in the roots over the stems. It would be noticed that the decoction of the *Cissampelos Pareira* on the table, had a pronounced bitter taste, but was wanting in that sweetness resembling the flavour of liquorice, which was present in *Chondodendron*, and had been remarked by Geoffroy in 1741 as characteristic of the Pareira Brava then known.

The President said he had listened to the discussion with very great pleasure. He was glad to know that the *Chondodendron* of Brazil was easily procurable in the market at the present time. He had scarcely ventured to hope that a supply would be so soon forthcoming. He would now call upon Mr. Stoddart, who had kindly undertaken to discourse to them upon adulterated drugs.

Mr. Stoddart said that before proceeding to that subject he would show them a couple of specimens which he intended for the projected materia medica museum. The first was a fine specimen of Cryolite from West Greenland, a nearly pure sample of the double fluoride of sodium and aluminium. The second consisted of some perfectly formed prismatic crystals of Thenardite, or anhydrous sulphate of sodium, collected on the mountains near Tarapaca, in Peru. The latter were most interesting because they illustrated the fact that in that part of the world there is no rainfall.

Note on some Samples of Adulterated Drugs.

Mr. Stoddart then alluded to the unfortunate and unwise prosecutions that had taken place under the Adulteration Act in the matter of citrate of magnesia and sweet spirit of nitre. He said that unfortunately there was no occasion for choosing such doubtful cases. To prove this assertion he placed on the table samples that had been brought before his notice. Among others were opium, largely adulterated with gum senegal; jalap, with linseed meal; cream of tartar, with alum; white precipitate, with gypsum; citric acid, with tartaric acid; and iodide of potassium containing 10 per cent. of iodate. Mr. Stoddart then reverting to the subject of spirit. æther. nit., said he had examined his own stock and also that of some of his neighbours. He found that none of the P.L. preparations showed the slightest sign of an excess of nitrous ether. The specimen prepared according to the process of the British Pharmacopœia showed an excess of ether from 1 to 1½ per cent. This he thought was very fair. The calcium test is a very unreliable one, from two causes; one from variation in the solution of chloride of calcium itself, and the other from the escape of some of the nitrous ether, which, without great care, it is impossible to prevent. If the solution and the P.L. sp. æth. nit. be shaken together in a graduated glass tube, little action is seen. If, however, the B.P. sp. æth. nit. be used, considerable effervescence takes place, with some amount of pressure upon the thumb or stopper, as the case may be. He thought that to affirm sp. æther. nit. P.B. was not sweet nitre was in reality a kind of quibble. Doubtless the old process for making sweet nitre was by the distillation of nitric acid and spirit of wine, produeing a solution of nitrous ether; but when a proposed better process was used for the production of the same spirituous mixture, he did not think it was untrue to say it was also sweet nitre. The remarks made by many that they could not sell the B.P. article surprised him. Ever since the appearance of the 1867 Pharmacopœia he had sold the sp. æth. nit. of that edition, and in no instance had ever heard of any eomplaint, not even when a teetotaller drank it as a harmless (?) stimulant, instead of the P.L. compound to which he had previously been accustomed. He was rather surprised at Mr. Umney's evidence in favour of the defendant when he said, *he used the process of the London Pharmacopœia, and distilled over nearly the whole of the spirit, according to the directions of the* 1746 *edition*, and ignored all succeeding ones which ordered a less amount of distillate, and which was the article generally understood when any one ordered sweet spirit of nitre without meaning the B.P. article. In his opinion it was rather rash to say that such a preparation was equally worthless with a very much stronger solution of nitrous ether. He could not quite endorse the opinion that sp. vini. rect., containing 10 per eent. of nitrous ether in solution, had no different effect from simple spirit. Medical men no doubt found it so when their prescriptions were made up from the antique formula of 1746.

The President thanked Mr. Stoddart, on behalf of the society, for the valuable mineralogical specimens. They undoubtedly were of more than ordinary interest, and would be an important acquisition to the museum collection which they hoped soon to possess.

Mr. Giles, alluding to the presence of iodate in the sample of iodide of potassium shown by Mr. Stoddart, said that it could not be considered a fraudulent adulteration, but it was evidence of reprehensible neglect in the process of manufacture. Iodate of potash is formed conjointly with the iodide, but it should have been subsequently reduced by ignition, as directed in the Pharmacopœia.

Mr. Charles Townsend (Ferris and Co.) said that some time since they had offered to them, at eight shillings per pound, at a time when opium was quoted at twenty-one shillings, an article to all appearance—internally as well as externally—of remarkably good quality, but which, on examination, was found to contain less than 3 per cent. of morphia. He believed it was commercially known by the name of "pudding." It was adulterated with some gum, and presented a much better appearance than the sample shown by Mr. Stoddart. No doubt a market had been found for it, but he need not say that his firm had not yielded to the tempting inducement.

Mr. Boucher (Ferris and Co.) said that he had found it to contain even less than 2 per cent. of morphia. Tragacanth was the gum with which it was adulterated, and so perfect was the intermixture that no suspicion would be aroused by its appearance, but immediately any attempt at manipulation was made, the fraud was discernible, for it was found impossible to deal with the substance in the ordinary way.

Dr. Tilden—who was cordially applauded on rising—said that he should consider the presence of 10 per cent. of iodate in iodide of potassium a most serious matter, likely indeed to produce poisonous effects, inasmuch as iodine would be liberated on the mixture of iodate and iodide coming into contact with the acids supposed to exist in the stomach. Alluding to the sp. æther nit. controversy, he said that previous to the publication of the

1864 Pharmacopœia, Professor Redwood, himself, and others, had made a number of experiments in connection with sweet spirit of nitre. He considered that the Pharmacopœia test was a most unsatisfactory one, and he believed that for practical purposes the best way would be to treat with a standardized weak solution of caustic potash, and observe the amount neutralized. This method was found to answer very well for estimating the amount of compound ethers in wines, etc. Probably the best of all methods would be to heat with liquid ammonia, and measure the nitrogen gas evolved; but in practice he was afraid this would be found too complicated and troublesome, and, therefore, not likely to be generally employed.

Percolation.

BY R. W. GILES.

Mr. Giles proposed a modification of the usual process of percolation, which he found more convenient and equally efficient. The plan recommended was to moisten the powdered ingredients with, say, half their weight of the spirituous menstruum, so as to allow of their swelling before packing in the percolator—then pack them very tightly, and follow with remaining spirit and displace with water. He found this process more expeditious and more easily conducted than any other, especially with reference to the facility with which the spirituous solvent could be displaced by water without mixing. The apparatus used was simply an inverted wide-mouthed bottle without a bottom, the mouth being covered on the inside by a perforated strainer.

Mr. Towerzey wished to know if Mr. Giles had found it necessary to use any sand.

Mr. Giles: Neither sand nor anything else.

The President remarked that one advantage of Mr. Giles' method was the remarkable simplicity of the apparatus employed.

Mr. Towerzey then read a paper on

"Results of an Examination of some Samples of Hydrocyanic Acid."

[This paper will be found *in extenso* at p. 509.]

The President observed that he felt he must say but little as to the merits of the paper they had just heard, as to some extent he was answerable for the conclusion arrived at. He might, however, be permitted to say that it had given him great pleasure to assist Mr. Towerzey. He had found him throughout moved by the best possible spirit of fair inquiry, always scrupulously careful in performing his experiments, and perfectly content with his results. That hydrocyanic acid was an extremely volatile substance, and on that account absolutely certain of variation in strength, had been abundantly shown in the course of their investigations; for, despite the use of every possible precaution, they had, in successive testings of the same sample, found a gradual diminution in the quantity of acid indicated.

Mr. Boucher said that they were much indebted to Mr. Towerzey for the facts which he had brought before them. It would be a great boon to pharmacists, as well as to prescribers and their patients, if some more stable preparation could be devised; for besides the tendency to lose its HCN on the slightest exposure to air, as shown by Mr. Towerzey, its liability to decomposition on being kept, when perfectly pure and without the addition of other acid, was equally annoying. He had found in his experience that if the percentage of acid was large, rapid diminution of strength took place, and on the other hand a weak solution seemed to undergo decomposition more readily.

Dr. Tilden said he had listened with great pleasure to Mr. Towerzey's observations. Possibly the double cyanide of zinc and potassium would form a good substitute for the fickle acid now used. The crystals exhibited were certainly of beautiful structure, well formed, and apparently stable; but he doubted if the medical profession would be easily induced to prescribe a new preparation, the present one having been for so long a period universally employed. With regard to the remarks of the last speaker, he could not corroborate from his own experience the statement he had made as to the decomposition of a weak acid when pure. This decomposition might be explained, perhaps, by the well-known fact that water was capable of dissolving out a sufficient quantity of the alkali present in glass to acquire a distinctly alkaline reaction, and he believed the alkaline cyanides to be extremely unstable in solution. To obviate this tendency manufacturers were in the habit of adding a small quantity of some mineral acid; he believed sulphuric acid was chiefly used for the purpose as it did not clash with the Pharmacopœial tests. Believing that the changes of strength observed were, however, attributable to volatilization rather than to decomposition of the hydrocyanic acid, his suggestion was that experiments should be made with a much weaker acid—one, say, of ·2 per cent.—equivalent to one-tenth of the present strength, with the addition of the requisite quantity of hydrochloric acid.

Mr. Boucher observed that it had been shown by recent observation that hydrocyanic acid in a state of purity would decompose when kept for a short time in bottles of any description.

Mr. Giles thought that hydrocyanic acid must be accepted as presenting certain difficulties which it was their business to reduce to a minimum by appropriate precautions. If the necessity for these precautions was kept in mind, he thought the difficulties were not such as would cause serious embarassment to themselves or disappointment to the medical profession. Similar difficulties met them in other articles, for example, in stale stock generally, and in infusions and decoctions particularly, and perhaps it was well that they should have their attention directed to these considerations, where it might be that they were most vulnerable, for there were possibly those who would keep a drug until it became bad, who would not willingly buy a bad drug. In looking at the diagram before them they had to remember that it was not simply a case of *not falling below 2 per cent., for it was even worse to be above it*; and in a volatile preparation like hydrocyanic acid, it was inevitable that stock in use should be constantly somewhat below the official standard; for if up to it to-day it would be short of it to-morrow. They were not told expressly whose were those local samples numbered on the diagram respectively Nos. 2, 3, etc., and they would each naturally believe that No. 2 was their own. He should certainly assume it to be *his*, and would proceed to tell them by what arrangements he was enabled to maintain such a creditable specimen. He did not adhere to the high moral and religious formulary of purchasing two strengths of hydrocyanic acid, in order that they might keep each other in countenance, while they lost strength. He thought the best plan was to keep stock of one strength only, and to convert this into the lower official strength from day to day, as required for actual service. By this means it was quite possible to maintain a sufficiently close approximation to the standard for practical ends, and he recommended this method because he did not think there was much prospect of so popular a remedy as the liquid acid being soon supplanted by a more permanent cyanogen compound.

Mr. Stoddart alluded to the old-fashioned practice of sending out hydrocyanic acid in blue glass bottles, which was, he said, about the worst colour that possibly could be chosen, inasmuch as it most readily admitted the chemical rays of light, and so induced the very results it was intended to obviate.

The President having congratulated Mr. Towerzey upon the animated discussion his paper had excited, the proceedings terminated.

GLASGOW CHEMISTS' ASSOCIATION.

(Assistants' Section.)

The Third General Meeting of Assistants' Section of Chemists' Association was held in Anderson's University, on Wednesday, 10th December, 1873, at 9 p.m. Mr. John Hunter, President, in the chair.

The meeting being constituted, the minutes of last meeting were read and approved of.

Mr. John Foster then read a paper on "Animal Substances, as used in Medicine and the Arts." In it he described the origin, history, and uses of the various substances, and touched more especially on the several adulterations to which they were liable, and the best methods of detecting them. At the close, Mr. Foster was awarded a hearty vote of thanks for his able and instructive paper. At the previous meeting Mr. John Hunter gave a paper on "Modern Relations of Organic and Inorganic Chemistry," the object of which was to show that, as researches deepened, many substances for which we had now to rely on uncertain natural sources would be supplied from our chemical works.

These papers were two of a series written for prizes, which, by the generosity of a Glasgow chemist, the Association has been able to offer.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Thursday evening, Dec. 11th, a lecture was delivered before the members of the above Association, at their Rooms, Halford Street, by F. T. Mott, Esq., F.G.S. Mr. T. H. Lloyd took the chair, and there was a large attendance, many of the members having brought friends with them.

The Chairman having briefly introduced the lecturer, Mr. Mott delivered a most exhaustive and lucid address on "The Natural Orders of Plants," confining himself, after a few preliminary remarks, to the description of the principal characteristics of thirteen natural orders most commonly met with in this country. Among these were the natural orders Ranunculaceæ, Rosaceæ, Caryophyllaceæ, Umbelliferæ, Compositæ, Cruciferæ, Leguminosæ, Rubiaceæ, Campanulaceæ, and Scrophulariaceæ.

The difficulties attending the classification of plants owing to the singular relationships and similarities which plants of different natural orders sometimes bear to one another were then referred to, and the members were strongly advised to follow out the directions given in some standard work by careful practical study.

A large amount of interesting information was condensed into a lecture of an hour and a quarter, and the audience thoroughly testified to their interest in it by the great attention which was paid throughout and by the intelligent questions which were put to the lecturer at the conclusion.

Mr. Mott indeed thoroughly popularized a subject which is eminently distasteful to many minds, and exhibited the science of botany not as a dry collection of facts and names, but in the aspect of an instructive and delightful study.

A very hearty vote of thanks was accorded to the lecturer for the enjoyable evening he had afforded, and for the interest which he took in the welfare of the Association, and Mr. Mott, in replying, promised at some future time to repeat his kind services.

A vote of thanks to the Chairman closed the proceedings.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 18th December, 1873. Dr. Odling, F.R.S., President, in the chair. The customary business of the Society having been completed, a paper "On the Preparation of Standard Trial-Plates, to be used in Verifying the Composition of the Coinage." was read by the author, Mr. W. C. Roberts, Chemist of the Royal Mint. After giving a sketch of the variation in composition of the English gold and silver coins from the earliest times, he noticed the various trial plates which had been prepared since 1660, showing that they sometimes varied considerably from the standard of 916·66 parts in 1000 for the gold, and 925·0 for the silver. He then proceeded to describe the process employed and the difficulties to be overcome in the preparation of the new standard trial-plates. These were exhibited at the meeting, and also a magnificent specimen of pure crystallized gold.

The other papers read were "Researches on the Action of the Copper-zinc Couple on Organic Bodies, Part IV.: On Iodide of Allyl," by Dr. J. H. Gladstone, and Mr. A. Tribe, being a continuation of their investigations on this subject. "On Tetranickelous Phosphide," by Dr. R. Schenck. "On Ferrous Anhydrosulphate," by Mr. T. Bolas. The compound, which is crystalline, is precipitated on mixing an aqueous solution of green vitriol with about nine times its volume of concentrated sulphuric acid. The last paper was "On the Hydrochloride of Narceine," by Dr. C. R. A. Wright, after which the meeting was adjourned until Thursday, 15th Jan., 1874, when the following papers will be read :—

"On the Action of Tricloracetyl Chloride on Amines, I. Action on Aniline," by Dr. Tommasi and Mr. R. Meldola.

"Researches on the Action of the Copper-Zinc Couple on Organic Bodies, Part V.: On Ethyl Bromide," by Dr. J. H. Gladstone, and Mr. A. Tribe.

SOCIETY OF ARTS.

On the Energies of the Imponderables, with especial reference to the Measurement and Utilization of them.*

by the rev. arthur rigg, m.a.

Lecture VI.

The Energy of Light, especially with reference to the Measurement and Utilization of it.

(*Continued from page* 503.)

Take a common gas burner; if a short tube having a few holes at the bottom be placed over it and the gas lighted at the top of the tube you have a light which has a certain non-penetrating power. It cannot penetrate far; it has a pale blue lambent flame. Now if the tube be taken off, and the gas lighted at the burner, you have the same quantity of material burning, but with a very different penetrating power. In this case it is evident that the penetrating power depends entirely on the mode in which the apparatus is arranged for combustion of the gas.

From the remarks made it may be inferred that science is yet incompetent to pronounce decidedly, 1st, what or which element or elements in the solar beam, constitute light properly so called; 2nd, even if this be determined positively, yet science is still undecided by what rule, or weight, or measure, the energy of light is to be gauged.

Indeed, this remark may not be an exaggeration—in all probability no two persons see the same degree of light. It may be surmised that no two persons see any portion of the spectrum of the same colour, and, further, it is highly probable that there is no such thing as colour in nature at all. It is likely that colour is a pure impression produced upon the retina of each person's eye by the vibrations of the medium which strike upon it. Hence what we call red, orange, yellow, green, blue, indigo, and violet do not exist actually in the spectrum, but in the eye of the observer, and probably one person will see the red beginning here, and extending thus far, whilst others will see it beginning a little more to the left, and ending a little more to the right, or *vice versa*. Upon that point there is nothing really settled.

* Cantor Lecture, delivered March 10, 1873; reprinted from the *Journal of the Society of Arts*.

As to the first of the foregoing inferences the energy of light is said to be concentrated in the yellow portion of the visible spectrum. If the views of those whose pursuits are photographic are to be received, the perplexities of science are increased. The very name of their art—photography—indicates the writing of or by light alone.

The fact is that photography is not a process dependent upon light as light, but upon that portion of light which is possessed of certain peculiar, and hitherto unexplainable, influences of a chemical character. Photographic chemistry is as yet very partially understood. Were it not that those who think they understand it might be offended, the truth would not be outraged, by saying, that photographic chemistry is not at all understood. And yet no process for estimating the energy of light, as light, has been suggested more hopeful for success than that dependent upon chemical changes ; but these are not those chemical ones to which the photographer appeals. The fact is, that those changes appreciated by the photographer can be produced in inorganic compounds ; what they are can be partially noted, they can be recorded, and that in terms which are but relative (not absolute), and which chemistry alone can measure. The day may not be distant when the energy of light, as light, will be duly and absolutely measured.

Judging from its place in the order of creation, previously named—judging from its influence over the whole world of animal and vegetable existences—judging from such facts as that when light is absent all animal and vegetable life lapses into a species of torpor, or sleep, and on the return of light nature awakes, and resumes its activity and strength, the conclusion is a very legitimate one, that in light—as light—there is great energy. Light opens the eyes, not of animals only, but even of flowers ; hence one of our little English flowers is called "The day's eye." Those who can sleep through noise, and even through heat, are not insensible to the energy of even artificial sources of light, playing, however gently, upon the closed eyelid. Medical men and nurses are well aware how essential light is for the regaining of health and strength by the sick or the infirm. Egypt and Madeira, as sanitaria or convalescent homes for our ailing brothers and sisters, may owe more of their influence to qualities or energies of light, very different from those the photographer esteems, than are usually allotted to them. And it may be permitted to add, that marvellous testimony to some unknown element (be it figurative or be it real) which, whilst pervading all Scripture from Genesis to Revelation, assumes a most marked peculiarity in that expression of St. Paul (Eph. v. 14), "Awake thou that sleepest, and arise from the dead, and Christ shall give thee [marvellous gift] light"—not life, observe, but "light."

Sir H. Davy, in an article on the causes of the colours of organic beings, written about 1790, when Davy was only nineteen years of age, writes—"Nature has catenated together organic beings, and made them mutually dependent on each other for their existence, and all dependent on light. A privation of light would be immediately destructive to organic existence ; vegetation would cease ; the supply of oxygen gas would be immediately cut off from the animals ; the lower strata of the atmosphere would become composed of carbonic acid ; and perception and volition would exist no longer."* Although these views were expressed more than 80 years ago, very little progress has been made in the direction they indicate.

Such considerations as these suggest that he who would truly ascertain and measure the energy of light—that energy upon which all terrestrial life depends—must look to do so in its influence on organized beings ; he must either separate the allied influences, or he must so separately estimate that he can apply his estimate, correcting a general result by a process of common occurrence—viz., the eliminating of all foreign or allied energies, and thus give to science the true energy of true light. He who, with knowledge and patient skill, enters upon this hitherto almost unexplored and yet noble field of investigation and research, will give to the age in which he lives, and transmit to future generations, that which will indeed be a boon to all. Pending the coming of that time when some science investigator, possessed of sufficient knowledge, humility, originality, and skill, shall do for light what Newton, Attwood, and Kater have done for the measuring of the energy of gravity—what Mayer, Joule, and Thompson have done for that of heat—what Haughton has done for that of vitality, and what Siemens, Matthieson, Jenkins, and others have done for electricity—what Davy, Dalton, and others have very partially done for that of affinity, and what Bunsen and Roscoe have done for the chemical energy of light—but what no one has yet done for that of light—properly and exclusively so-called—we must content ourselves with such modes of estimating this energy as are at present known and available.

This energy is supposed to be manifested in the promotion and facilitating of chemical affinities. These affinities (as doubtless some present remember) vary in their character as one or more of the "imponderables" are combined in their promotion. So much is this the case that chemical notation now adds, in reference to certain indicated changes, the words, by heat or electricity, as the case may be. There are, however, certain affinities called forth under the influences of light, which do not show themselves under any other conditions. As, for example, certain of the salts of silver (such as silver combined with chlorine, iodine, or bromine) change their colour and their character, the silver being set free from its combination as a black powder. There is also that power, which plants in the presence of sunlight possess, of changing the carbonic acid gas, which, if allowed to accumulate in the atmosphere, would soon render it unfit to be breathed, into its constituent elements, the plant retaining the carbon and ejecting the oxygen. Priestley, in 1790, that is, at the period when Davy wrote the article from which an extract has been read, a period when, for a short time, men's minds were being directed to this department of scientific research, was the first to show that plants kept the atmosphere pure and healthy, but he could not calculate. His was rather a qualitative and not a quantitative result.

Changes in the colour of salts of silver, through some energy of light, have been observed since the middle of the 16th century. In 1777, Scheele suggested some explanations which, although very imperfect, are as yet the only recognized ones. In the early part of the present century experiments of a similar kind were made at the Royal Institution by Wedgwood and Davy.* The absence of any mode of fixing the impression caused the results to be very evanescent, but the localizing of this peculiar property of light is clearly announced in these words :—"Red rays, or the common sunbeam, passed through red glass, have very little action ; yellow and green are more efficacious, but blue and violet light produce the most decided effect."

The rapid development of the art of photography during the past twenty or thirty years has led enthusiasts in this branch to overlook the purely chemical character of their art, and to attribute the changes with which they deal to a manifestation of the energy of light. Hence scales have been devised which may enable photographers to adopt some kind of a standard. They are not, however, worthy of the name of scales of energy, as they depend upon the power of the eye to appreciate very slight differences in shade. A scale or measure, to be of general use, should be of such a character that a person in one part of the world writing to one in another might refer to some common standard.

* Davy's Works, vol. ii., p. 106.

* *Journal of the Royal Institution* for 1802, p. 170.

There is, however, a process for obtaining a measurement of one element in the energy of light capable of greater accuracy of observation than the photographic one. This also is chemical.

In the lecture on the energy of affinity a brief time was devoted to the peculiar manifestation of affinities under the conditions of the nascent state.

It is apparently a deviation from this form of energy when the two well-known gases, chlorine and hydrogen, are produced and intimately mixed, either in their nascent state or afterwards, in the dark or in the presence of that portion of the solar beam we call red. Under these conditions no rapid union of the gases takes place. Permit the evolution or the mixing of the two gases to be in ordinary light, properly so-called, and an intimate union, or rather an actual chemical combination is a consequence.

If these gases be separately produced and collected in a glass vessel in equal parts, the union and formation of a new chemical compound in this glass vessel follows from exposure to light. If the light, or rather that particular portion of the solar beam to which chemical action is generally attributed, be permitted to act upon the two mixed gases, then the union takes place at a rate determined by the energy of some one or more of these constituent elements of light on which the combination depends. Where in the solar beam these constituents are is a question easily solved.

Every ray, or every portion of a beam of light, is capable of producing union between hydrogen and chlorine; but the combination takes place at very different rates, according to the portion of the beam which acts upon the united gases. The actinic portion will act seven hundred times as rapidly as the heat portion. That is to say, a certain combination will take place under the influence of this portion in one minute, which it will take more than eleven hours to accomplish under the influence of the heat portion. Therefore, by separating the ray of light, we can graduate the rate at which the combination occurs. Here are some glass bulbs, containing chlorine and hydrogen which have never yet been exposed to the light. If one of these be placed under this globe of red glass then the light that passes through it will be the portion of light corresponding to the heat end of the spectrum, and it will take hours to accomplish the perfect union of these two gases. If, however, one be placed under a globe of a blue colour, the light falling upon it will represent that belonging to the actinic portion of the spectrum, and the gases will unite (if the experiment be successful), and explode in about ten seconds.

Whilst recognizing this test and measuring gauge of the chemical brightness of certain lights, it must be borne in mind that it is chemical action and not the energy of light, properly so-called, that is measured. For instance, when the brightness of the sun's disc, as a case of light-brightness, is 520 times that of magnesium wire, the chemical brightness has been found to be not forty times as great.

Here are diagrams of two spectra, one of which is obtained from flint-glass. Now, flint-glass produces an effect which is considered to be due more to the physical property of density than to the elements of which it is chemically formed. Assume this diagram to be a faithful reproduction of the spectrum from flint glass. Now, however similar another glass may be in appearance, yet if it differ in density and constituent elements the distances between certain lines in the spectrum may in some portions be the same, but in others they will differ. If, therefore, light be estimated from the spectral appearance of it after it has passed through any substance, it is clearly subject to the influence of that substance. Again, on another diagram is a series of colours produced by a process called diffraction. This is the apparatus, and this is the mode of producing those colours. At the object-glass end of the telescope there are a number of very fine lines drawn, and if the telescope be directed to a very intense speck of light, such as the reflected sun from a small silvered globe or the bulb of a thermometer, coloured bands are seen, containing the same colours that the flint-glass spectrum shows. But the colours seen under this diffraction arrangement are very different in quantity to those seen under any other arrangement. A diffraction experiment is easily made by each for himself. From that hook a bright reflecting silvered glass globe is suspended, and two or three smaller ones of the same kind. If any one is tired of listening, and feels disposed to go to sleep, they can perform this experiment very easily. Just close your eyes and allow the eyelash to interfere with that speck of light reflected from the globe, and you will probably see colours radiating on both sides. Those are colours due to diffraction, and there are modes by which they can be made to appear much wider apart than by the one now described. Taking the diffraction spectrum, we find that these distances, from D to E, say of the yellow portion of the spectrum, are not of the same length as the corresponding portion in the flint-glass spectrum, and the same with the other portions, so that the proportions are quite altered. This is called the "irrationality" of the spectrum. Line D there becomes the middle of the spectrum instead of being, as it is here, very near to one end. The consequence is, when we talk of there being no heat in this portion of the spectrum, we have really and truly distributed the heat which ought to be condensed in F, G, over that large space, and therefore it shows on a fixed area much less heat than it would do not so distributed. If, now, these apparently unequal halves of the spectrum be examined for heat, it will be found that collecting them into two separate foci, the heat in the one focus is equal to that in the other. Clearly, had these portions been examined over equal areas the heats would not have been equal. Therefore the notion generally entertained of heat being confined solely to one end of the spectrum is not strictly true. That diffraction spectrum explains it, and there are other matters bearing upon it which, if time permit, shall be referred to presently.

(To be continued.)

Reviews.

QUANTITATIVE CHEMICAL ANALYSIS. By T. E. THORPE, Ph.D., F.R.S.E. Professor of Chemistry, Andersonian Institution, Glasgow. Longmans, Green, and Co. 1873.

The 'Text Books of Science' published by Messrs. Longmans and Co., of which series this work is one, are intended to meet the requirements of artizans and students in public schools. But since it is acknowledged that the study of quantitative analysis presupposes sound knowledge, both of theoretical chemistry and of qualitative analysis, there is a great future before us, we think, ere there will be any successful teaching of this branch of chemical science in our public schools; the most to be expected, then, at present in practical chemistry, is the attempt to give instruction in elementary chemical manipulation, and in the outlines of qualitative analysis.

"The aim of this work," in the author's words, "is to teach the principles of quantitative chemical analysis by the aid of examples chosen, partly on account of their practical utility, and partly as affording illustration of the more important quantitative separations." The subjects are arranged under the following heads: (1) The Principles of Quantitative Analysis; (2) Simple Gravimetric Analysis; (3) Volumetric Analysis, solids and liquids; (4) General Analysis; (5) Organic Analysis. The chapters on the principles of analysis and the theory and practice of the balance, are well worth the careful attention of students. Indeed, we do not remember to have seen the article on the balance equalled in a work of this kind. Preliminary details usually given in similar treatises are not wanting, nor, it is to be noted, does the author hesitate to introduce new plans which he considers

to be improvements on the old systems; hence there are many contrivances, mechanical and otherwise, that chemists are continually devising, and which help to perfect the chemistry of analysis. Without further introduction, after the detailed analysis of common salt and cupric sulphate, pearl ash is given for the estimation of potassium and moisture, the student being told to estimate as carbonate the K found from K_2PtCl_6, though, we notice, he is informed that pearl ash contains in addition alkaline sulphates, chlorides, etc. Then follow, Rochelle salt for K and Na; dolomite, for its complete analysis; the indirect estimation of Ba and Ca; glass alloys, etc., finishing the second section. Dr. Thorpe has here introduced the method of CO_2 estimation by absorption in lieu of the one by expulsion and calculating from the loss; also his own methods for nitric acid, lately read before the Chemical Society, based on the re-action ensuing between nitrates and the "Couple" of Dr. Gladstone and Mr. Tribe. The part dealing with volumetric analysis contains but little new, excepting novelties in the graduation of pipettes, and in an ingenious appliance for the estimation of CO_2 in artificially aërated waters. Under the head of general analysis are included schemes for the analysis of refined lead, Fahl ores, wolfram, iron slags, iron for its impurities, phosphates, superphosphates, and the valuation of coal for the manufacture of illuminating gas. For iron ores the excellent acetate of ammonium method is the one described: but sulphur is recommended to be estimated in the acid solution and not by fusion of the ore: and the P_2O_5 is to be determined with ammonic molybdate. Few chemists, however, have as yet been able satisfactorily to work the molybdate method for phosphoric acid. Also many methods are given for estimation of carbon in steels, *e.g.*, Wöhler's, where the metal is directed to be burnt in a stream of oxygen; Weyl's, which consists in dissolving the iron in HCl with the aid of a single element of a Bunsen's battery, no ferric chloride being formed, then, burning the carbon in oxygen as usual in a combustion; also the method of Ullgren, who directs the carbon undissolved by cupric sulphate to be oxidized with CrO_3, and the CO_2 produced to be absorbed in soda-pumice tubes; finally Eggertz's colour test, where the standard is recommended to be made by digesting roasted coffee in dilute spirit. Much space is given to Dr. Frankland's method of water analysis, but with this we are already familiar, from Mr. W. Thorpe's article in Sutton. In the concluding section of organic analysis, it is to be regretted, we think, that only the combustion with oxygen or air is described.

For the most part the methods given are those recognized by the majority of chemists; others there are that require the test of experience, while again some are more select methods of analysis. Dr. Thorpe, we fear, has written beyond the range of those for whom the 'Text Books of Science" are intended, but the work is worthy to be commended to the advanced student in the special science institutions. For the sake of beginners, we should have preferred to have seen in a work bearing this title many more illustrations and explanations, like those given in the analyses of common salt and cupric sulphate, which, while of paramount interest to the young student, would have made the work valuable as a text-book.

PRACTICAL EXAMPLES IN QUANTITATIVE ANALYSIS, forming a Concise Guide to the Analysis of Water, etc. By ERNEST FRANCIS, F.C.S., Demonstrator of Practical Chemistry, Charing Cross Hospital.

Unless for reasons more valid than the contents here warrant, there is but little gain to the student by an increase in the number of works on quantitative analysis. In about sixty pages the author has endeavoured to satisfy the want of the medical student by selecting such "typical examples" as may prove most useful to him. We fail to see that there is any need to recapitulate Wanklyn's method of water analysis, because the recent Sanitary Acts have thrown upon the medical profession the responsibility of examining waters chemically, with a view of ascertaining their potability and freedom from various organic impurities. It is difficult to reconcile the prefatory statement of Mr. Francis that "other examples are given, which the author hopes will furnish such general instructions as will enable the student with a little variation, to apply the examples here given to other cases, which, though differing in detail, are the same in principle," with the fact that amongst the fifteen examples given, exclusive of water analysis, there are three in which we see very little difference, either in detail or in principle, namely, the estimation of solids in water, solids in milk, and solids in urine. The other so-called typical examples include separation of organic from inorganic substances by ignition, casein in milk, uric acid, albumen, and urea in urine, and the estimation of cream, sugar, etc.

Obituary.

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

On the 17th December, 1873, Mr. Maxwell Low, Chemist and Druggist, of Dumfries, N.B.

Notes and Queries.

[378.] CLEANING OF SILVER LACE.—Will any reader tell me the best mode of cleaning silver lace? I am aware that cyanide of potassium will clean the gold, but it will not touch the silver.—ARGENTUM.

[379.] DEVONSHIRE OILS.—*R. D. M.* asks for a recipe for "Devonshire Oils."

[380.] DATE'S OINTMENT.—"*A Correspondent*" wishes to be supplied with a formula for "Date's Ointment," a preparation for which "Ceratum Calaminæ" is frequently substituted.

[381.] MEDECIN DU ROI.—Do you happen to know the composition of "Médecin du Roi," a popular medicine in Belgium?—W. ENGLAND.

[*** We know of no medicine bearing exactly the above name, but there is a purgative preparation sometimes called "Médecin de Leroy," which is probably the one meant, for which Dorvault gives the following formula:—

	1st Strength.	2nd Strength.	3rd Strength.	4th Strength.
Scammony. . .	48	64	95	125.
Vegetable Turbith	24	32	48	64.
Jalap	190	250	375	500.
Eau-de-Vie (20°)	6000	6000	6000	6000.

Infuse for 12 hours at 50° C., filter and add syrup prepared as follows:—

Senna (Alexandria)	190	250	375	500.
Water	750	1000	1500	1500.

Infuse, filter, and press, then add:—

Brown Sugar . .	1000	1250	1500	1750.

Make a syrup. The second strength is that most commonly used. Dose 1 to 4 spoonfuls daily.

Dorvault adds: "Chacun connait ce rémède, de réputation."—ED. PH. J.]

[382.] DISPENSING.—"*Dispenser*" wishes to know the best method of preparing pills according to the following prescription:—

℞	Zinci Valer.	gr. vii.
	Phosphori Pur. . . .	gr. ½.
	Quiniæ Disulph. . . .	℈ss.
	Codeiæ	gr. iv.

Ft. mass. et divid. in pil. xv.

[*** 12½ grs. phosphoretted resin (see *ante*, p. 441) = half a grain of phosphorus, with the addition of a few drops of tincture of tolu, will make the above into a suitable plastic mass for forming pills, which will not be inconveniently large.—ED. PH. J.]

Correspondence.

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

"Voluntary Assessment."—Benevolent Fund.

Sir,—As this is the season of the year when charitable projects have more consideration than at other times, I wish to make a proposal which I trust will be favourably received, and, if acted upon, be the means of relieving many cases of real distress and suffering. Our business is one which requires a considerable amount of personal attention and many years' application, as a rule, before anything like a competency can be obtained; and, unfortunately in many cases, after several years of toil and close attention, the pharmaceutist has not been able to provide anything against accident, illness, or for his family in case of death. This is the time for the application of the Benevolent Fund, but the amount at disposal *is far too small* for the object, and I think that it may readily be increased, and in such a way as will commend itself to the members of the Society generally. It is simply to make a *voluntary* assessment, and to make the subscription for membership 25*s.* per annum for members, and 12*s.* 6*d.* for associates; it being always understood that 4*s.* in the first case, and 2*s.* in the latter, is a voluntary payment to the Benevolent Fund, and that any who object may pay their guinea and half-guinea respectively, as before. Practically, I think this will yield something like £500 a year in addition to the amount now subscribed, for in making this calculation I have first deducted from the number of members and associates connected with the Society those who already subscribe; these would continue to pay their annual subscriptions. Then I have allowed a discount of 25 per cent. for those who would object to increase their subscription. This would be quite enough, I think, for the assessment would not press on anyone, and the poorer members would be more likely to pay it than others, for they are most interested in the matter naturally. And I would suggest that this amount, notwithstanding the objections raised in the Council against using current income, be annually disbursed amongst the needy applicants. I would have faith enough to elect annuitants for the amount received in response to the first yearly assessments, for I believe we should have an increase of members through the usefulness of the fund, and we may also take it that as the examinations proceed we shall have a constant addition of members and associates, so that the fund through the voluntary assessment would continually be enlarged. I hope this suggestion and appeal will bear good fruit.

Thomas Barclay.

17, *Bull Street, Birmingham.*

Citrate of Magnesia.

Sir,—In common, I suppose, with many other chemists, I have received a printed circular in which Dr. Stevenson Macadam certifies that Bishop's citrate of magnesia contains 1·31 per cent. of magnesia, and that Messrs. Sang and Barker's citrate contains 1·52 per cent of magnesia, and that therefore he (Dr. S. Macadam) is "of opinion that these samples are of excellent quality and are entitled to be regarded as granular effervescent citrate of magnesia."

I should like to ask Dr. Macadam whether Edinburgh chemists as a rule consider that the less a compound contains of the ingredients it is named after the better it is, and how much smaller quantity of magnesia he would consider the citrate should contain to arrive at the climax of perfection?

Self-interest might perhaps be pleaded as an excuse for Mr. Bishop's statement that his compound contained an important quantity of magnesia, but what shall we say to Dr. Stevenson Macadam for having favoured us with such an opinion founded on these percentages.

Perhaps he would oblige the pharmaceutical world with a chemical justification of the well-known proverb "the greater the truth the greater the libel," which may be parodied by "the less citrate of magnesia the more it should be called so." I think Edinburgh and Speck's Fields may now shake hands. *Arcades ambo!*

H. C. W.

Dec. 19, 1873.

The Adulteration of Food and Drugs Act.

Sir,—While the recent convictions under the above Act are fresh in our minds I have taken the liberty of making some suggestions on the subject, hoping that they may lead to combined action, with the help and under the guidance of the Council of the Pharmaceutical Society, to get matters upon a better footing as regards prosecutions under this Act.

Some things I desire to call attention to affect retailers generally; others affect more especially chemists keeping open shop. I will take generalities first. The mode in which the articles to be analysed reach the analyst appears open to objection—viz., a stranger may walk into a shop, ask for an article, get it, pay for it, and then simply say—"I have bought this to have it analysed." Away he goes, and the next heard of the affair is that the unfortunate salesman is summoned to appear before the magistrate if the article he has sold be found impure. Here is one thing calling for amendment; when the article bought is stated to be for examination, the seller should be allowed then and there to put *his* seal upon the package, he should be allowed to be present when the package is opened by the analyst, and also be allowed to see the article he has sold analysed if he choose to do so, otherwise what guarantee has he that the article he has sold is not tampered with after it leaves him? I do not think there should be a separate analyst for each town or district, for I should certainly doubt the capabilities of many local analysts who will be appointed, and I think that a local man might be open to local influences; I do not say it would be so, but it might.

I would suggest a central analytical laboratory, with a proper staff of analytical chemists and other officers necessary to the working of the same; it would be far more satisfactory. These men would be beyond the suspicion of partiality and local influence, and if this laboratory were established in London, the chances of incorrect analyses and one-sided certificates would be reduced to a minimum. Again, the local analyst would not have the practice the men employed at a central laboratory would have, and any person who knows anything of the matter knows quite well how necessary is constant practice to enable a man to analyse correctly.

Now as to the manner in which the Act may operate against the interest of the retail chemist especially. It is perfectly right to fine the man who sells sugar and sand, or tea with just a suspicion of chopped birch brooms, or the publican who puts coculus indicus into his porter, and so on, *ad infinitum;*—it is equally right that the chemist who sells cayenne pepper adulterated with red lead, or spirits of nitre with a good dash of "*aqua pumpum,*" (and many other things that could be mentioned) should not be allowed to go unpunished; but I maintain it is most unfair to prosecute a man and to brand him as a fraudulent adulterator because he is found to sell spirits of nitre which is not of the sp. gr. 0·845 (B. P.), or carbonate of soda which will not come up to the B. P. test. This may be an extreme case, not bearing any parallel to the cases in which conviction has been obtained, but the principle is the same, and any one may be prosecuted and punished to-morrow for selling such things as I have mentioned. In the citrate of magnesia case, if I remember rightly, the gentleman who suffered endeavoured to throw the blame upon the wholesale house of whom he purchased, and I think with a great deal of justice; but you, Sir, differed with that view, and held that a chemist should test for himself the quality of the articles supplied to him. I certainly say that every chemist should have sufficient knowledge of analysis to be able to test an article, even if he be unable to make a complete quantitative analysis, and ignorance should be no excuse for selling adulterated drugs; but if a chemist were to test every article that came upon his premises his whole time would be occupied in so doing, and I ask any brother druggist—could he afford to do this or to employ some one to do it for him? Unfortunately the poor retail chemist has to employ his time very differently than in this scientific manner to make both ends meet, and often is not able to keep the wolf from the door. If a chemist is to employ his time in testing drugs and chemicals he must necessarily neglect his retail business, and I fancy the public would not be satisfied if, missing the proprietor of a shop from his accustomed place behind the counter, it were told on inquiry, "that Mr. So-and-so was busily engaged examining his drugs for fear of the consequences of the Adulteration Act."

I think the wholesale dealer should share the responsibility with the retailer. How can the honest grocer afford

to have his cayenne pepper tested each time it comes to him? This is only a solitary article; for you must remember, to be really safe, that every article received by the retailer from the wholesale house should be tested before it is sold to the public. This becomes a really very serious affair, and one, I think, demanding immediate and careful attention, combined with energetic action, for a remedy.

If the act was worked to the fullest extent I think the majority of chemists would stand a very poor chance of being able to continue their business. Take an example—"spot" a man for prosecution; first of all test his sp. æth. nit., not finding it of proper sp. gr. (B.P., this appears the standard)—fine him; then try his sp. am. co., if it does not come up to the B.P. test—fine him; next try his glycerine, find the sp. gr. not 1·25, slightly acid, not quite free from smell, and so on—fine him again. In what estimation do you suppose the public would hold this man if he continued carrying on his business after these repeated attacks? This sort of thing may be done strictly within the letter of the Act, although the unfortunate retailer thus punished may have bought from a good wholesale house, and would utterly scorn the idea of buying adulterated goods or of adulterating them himself.

I know something of the time and attention it requires to test, only in a rough way, and without hesitation I say no man in business (if he has any) can possibly devote the time necessary to test every article he receives from the wholesale houses with whom he deals, and this is the only safe way if the retailer is to be the sole delinquent. Perhaps it may be suggested that the retailer should proceed against the wholesale man who supplied the adulterated articles for the selling of which he (the retailer) was punished. But it is generally admitted how extremely unpleasant a thing it is to be involved in a law suit; particularly so when the chances of obtaining a verdict in one's favour are slightly remote.

However, in conclusion, I would most earnestly appeal to the Council of the Pharmaceutical Society, to all chemists and druggists, and to others having interest in the matter, to set to work at once, and with all the vigour they are capable of exercising, to remedy this most unpleasant, and, perhaps, to many unprofitable, state of things. Do not let the matter drop, hoping the Act will not be pushed to its utmost limits, or that presently it will not be worked so actively as it appears to be just now. Let us combine to bring about an alteration in this obnoxious Act, not the least alteration being in some way to make the wholesale dealers partly responsible. We are quite enough hampered by legislation already without having more burdens to bear.

I think the poor chemist will very soon illustrate the old story of the Frenchman's horse, who, when he was brought to such a state of economical perfection as to live upon a straw a day—died. So with the chemist. When he has been educated, legislated for, examined, fined, and what not—in fact, taught to live upon the "straws" of the trade—he will be found to have died out, his place occupied by a man of another class, more ornamental, but, perhaps, not so useful.

Unfortunately all legislation has been against us. We have had the Pharmacy Act, compelling us to be examined; the Sale of Poisons' Act, to make us register poisons, and to refrain, in some measure, from selling them; and now the Adulteration Act—all very good in their way. Have we had one thing to counterbalance these? No. We are still liable (pharmaceutical chemists excepted) to serve on juries; surgeons are still allowed to dispense their own medicines. The chemist is the poor trader still, with responsibilities as great as a medical man, without his advantages. It is useless to talk of raising the status of the chemist without giving him some advantage.

J.

Homœopathy and the 'British Medical Journal.'

Sir,—Believing you to be "A Lover of Fair Play," I ask space, in the name of truth and justice, for a few remarks on the article headed, "A Dying Faith," reprinted from the *British Medical Journal*, at p. 425 of the Pharmaceutical Journal.

Having looked into homœopathy for some time past with considerable care, and practically tested it in my family for twelve years with the happiest results (several times in critical cases, both as regards myself and others) I am fully able to affirm, without the slightest hesitation or fear of contradiction, that the above-named article, and also that referred to as previously appearing in the same journal, (and which I read when it appeared,) give an entirely distorted and unfair view of the present aspects and past history of homœopathy. The picture there drawn is—I do not say an intentional, but a complete misrepresentation of the facts of the case. In opposition to the Editor of the *British Medical Journal*, I affirm, and am prepared to substantiate the statement by facts and reasoning, that homœopathy never was a "delusion," and is not a "fraud."

The use which the *British Medical Journal* and Dr. G. Johnson make of the so-called cases of "Poisoning by Homœopathic Camphor," clearly reveals the party spirit which has dictated these articles. These cases are apparently quoted as reflecting discredit on homœopathy. They do nothing of the kind. Not one of the persons "poisoned" took the camphor according to the printed directions. These directions are: "Five drops on sugar every 5, 10, or 15 minutes, according to the severity of the symptoms." In another case, "Two or three drops on sugar every 15 minutes; less frequently when relieved." But "Miss T.," instead of taking *five* drops, took *twenty-five*, and in the third case a teaspoonful (!) was positively taken. Suppose a person took a teaspoonful of laudanum instead of 20 drops, then we should have "Allopathic Poisoning by Tincture of Opium," and it would be quite as fair to regard the unpleasant symptoms resulting as reflecting on allopathy, as to regard those arising from this abuse of camphor as reflecting on homœopathy. Just as reasonable in both cases, and quite unreasonable in either. If persons cannot read directions, and follow them, the blame is theirs, not any fault of the system they adopt.

The inferences drawn—or rather the conclusions jumped at by Dr. G. Johnson and the Editor of the *British Medical Journal* in connection with these cases of "poisoning" are as amusing as they are false. We are informed of something called "pseudo-homœopathy." "long known to practitioners in London." Then we are told that "homœopathists have passed from the irrational and ludicrous extreme of infinitesimal dilutions to the dangerous extreme of the greatest possible concentration of active and poisonous drugs." This will, I apprehend, be news to homœopaths. During the twelve years in which I have tested homœopathy, I have come into contact with some half-dozen homœopathic practitioners, and watched their practice, as well as the progress of the system, with the greatest care, but never until I read this article did I hear of "pseudo-homœpathy," or of any such change in practice as Dr. Johnson mentions.* The use of low or high dilutions, etc., is regulated now as always by the nature of the disease, age, and physique of the patient, as any text-book on homœopathy will explain. Some medical men prefer stronger potencies than others, just as some allopaths give larger doses than others. but there is no "recourse," as Dr. Stewart says, "to concentrated tinctures, in order to produce an appreciable effect by very minute doses," since "infinitesimal doses" are absurd. The dose is always "infinitesimal," however concentrated the remedy—that is, it is less than sufficient to produce chemical or physiological action. There is no absurdity however—begging Dr. Stewart's pardon—in infinitesimal doses. They produce plenty of "appreciable" though no *sensible* effects. Has miasmata no power? Dr. Kopp (who was converted to homœopathy unwillingly as the result of his experiments) says his conscience obliges him to acknowledge that "decillionth parts exhibit definite curative power." Cure depends in homœopathy primarily on the law of similars (the only *law* of cure which in my opinion exists, but which the *British Medical Journal* carefully ignores). A bucketful of the wrong medicine will do no good; a drop of the right will relieve at once.

I dare not encroach on your space by referring to the

* There has been no "return in secret to the ancient paths of medicine." This allegation of copying from others, and using more potent remedies than formerly, might be preferred against allopaths with some truth, but not against homœopaths. I have seen a prescription in which tincture of aconite was ordered *alone* in fever by an allopath, evidently a leaf out of homœopathy. Who ever thought of using aconite in fevers until homœopaths recommended it? So of many other medicines I could name. But allopaths freely use the facts and principles of homœopathy, and then abuse the system they get them from. All that the Editor says about the harmful effects of strychnia tincture, etc., reflects no more discredit on homœopathy (if true?) than the camphor cases.

other points to which the article in question alludes, but I may just add that the negative results of analysis, of which the Editor makes a good deal, are satisfactorily disposed of by Mr. Ross in a letter which appeared in a late number of the *Monthly Homœopathic Review*, in reply to the analysis of globules which was copied from the *Practitioner* in a recent number of the PHARMACEUTICAL JOURNAL. The letter was, of course, refused admittance by the *Practitioner*.

As a matter of fact, many homœopathic dilutions *do* give *positive* results when chemically tested, as may be seen in Dr. Granier's 'Conferences on Homœopathy'; but whether they do so or not is no argument against their therapeutic power. The only real test is their efficacy in combating disease, and this is being proved every day and hour.

These attacks on homœopathy are evidently designed to prejudice medical men against the system. I know one allopath who is as disgusted with them as any homœopath could be, and who is giving up the *British Medical Journal* and dissolving his connection with the Association. He is sincerely trying homœopathy, and, I believe with the best results. I am sure no practitioner can honestly test the system without becoming a convert, and that no one could write as the Editor of the *British Medical Journal* does who had really investigated it. There is not a single dispassionate argument throughout either of these articles, which consist of nothing but distorted facts and clap-trap appeals of the most transparent kind. The Editor resorts to the last refuge of the defeated antagonist—a poor trick after all—to slander that which he cannot disprove.

I am no blind partisan either of allopathy or homœopathy. I believe both systems have their value, but that in homœopathy only have we a definite law of cure. All I ask in this, as in everything, is fair and searching inquiry, and gentlemanly treatment of opponents. This, I contend, the Editor of the *British Medical Journal* has not accorded. He has libelled homœopathy as a system, and thereby inculpated the whole body of homœopathists. He is bound either to establish his position, by disproving the homœopathic law of similars, or to retract it, and apologize for having so grossly maligned a truth.

A HATER OF INJUSTICE.

Sir,—The exposure of inconsistency or dishonesty is promotive of good. Homœopathists are human and may deserve to be charged with both; but conscientious men having any claim to be considered either scientific or rational, will be careful not to make these charges without sufficient and satisfactory evidence.

Nothing would be easier than to concoct evidence of the kind produced by the members of the London Clinical Society, to prove that the practitioners of "*rational*" medicine are equally criminal with the homœopathists.

My advice to those gentlemen is, "do not play with edged tools;" and to your readers I would say, "Prove all things and hold fast that which is good."

JOHN P. BERRY, M.R.C.V.S.,
"Registered Chemist."

Northampton, Dec. 3rd, 1873.

HOMŒOPATHS V. HOMŒOPATHY.

Sir,—Originally one of the principal advantages set forth by the advocates of Hahnemann was the immunity to be enjoyed by patients from dangerous overdoses of powerful remedies.

Enthusiastic believers were to be cured by infinitesimal quantities of drugs, hitherto considered of feeble power.

Faith in globules has, however, gradually declined; these apologies for medicine have ceased to perform almost miraculous cures, and are replaced by pilules possessing sensible qualities of dose and flavour, while tinctures of unusual potency supplement their effect. If the old homœopathist strained at a gnat the modern disciple swallows the camel without much effort. I was brought to this conclusion the other day by the following laconic prescription:—

Pot. Brom.	℥ j.
Inf. Gent. C.	ad ℥ vj.

℥ ss. b. d. s.

Had this formula proceeded from an allopathic practitioner of the heroic school it might not have excited remark, but the prescription was accompanied by a bottle bearing the label of a well known homœopathic chemist.

"*A tablespoonful to be taken twice a day.*"

I dispensed the medicine and afterwards heard that it had proved of much benefit in a case of neuralgia, but whether the effect ought to be ascribed to the magic spell of the old dogma "similia similibus" or to a known specific action of the salt must remain an open question.

R. GOODWIN MUMBRAY.

HOMŒOPATHIC (?) PREPARATIONS.

Sir.—Apropos to the article in the Journal, headed "Poisoning by Homœopathic Tincture of Camphor," could you not draw the attention of the public to the unsafe preparations now sold by the homœopathic chemist (?) as tinctures, improperly so called,—they being untinctured by any colouring matter, and so much the more dangerous,—which, if they possess medicinal virtue at all, are necessarily solutions of the alkaloids, as atropia in the tinct. bellad., strychnia in the tinct. nux vom., aconitine, etc., such as it is illegal for any but registered chemists to deal in, and dangerous for any but a medical man to prescribe.

There seems now to be but little difference between the remedies used by the two Schools of Medicine, but there is a vast difference in dispensing for the two; in that the homœopath adds plentifully of that profitable chemical H_2O, whereas the tendency of the regular practitioner is to leave that out altogether, so that the chemist may get as little profit as possible.

E. J. P.

SPONTANEOUS CRACKING OF GLASS VESSELS.

Sir,—There was a discussion some time since in the *Times* on the well-known but singular liability of barometer tubes to crack if they have only been touched on the inside with metal wire.

Last week I stirred a thick watery liquid in a 20oz. measure, which had long been in constant use, with a silver spoon. No liquid differing from the atmospheric temperature had been in the measure for weeks. An hour or so after the measure had been touched by the silver, while standing on a wooden counter with about eight ounces of liquid in it, the bottom of the measure cracked with a considerable noise.

Have any of your readers met with a similar fracture? I have before been surprised to find bottles, pipettes, etc., unaccountably cracked, perhaps from a similar cause. The above measure must have been at least seven years old.

W. SYMONS.

Barnstaple, 24th Nov., 1873.

DRUGGISTS' CHARGES.

Sir,—I think Mr. Leay has nothing to fear from the advertisement he speaks of; for if these "duly qualified" persons really do dispense, etc., at 100 per cent. below the usual charges they must soon "go to the dogs," but if they do not mean what they say, educated business people will think that they are *not* "qualified," and may poison them not meaning it either.

I think they do not know what they are talking about.

T. H. CUMINE.

King's Lynn, Dec. 9th, 1873.

"*Apis.*"—(1) The leaves of the plant mentioned have reticulated venation, which may be seen upon holding one between the eye and a strong light. (2) The table you refer to includes Mg, which is thrown out of solution by the phosphate of ammonia. (3) No; 5·41.

W. England.—(1) The great mullein, according to Thornton's 'Herbal,' is used for colds and diarrhœa. A decoction is made by boiling 2 oz. of the leaves in a quart of water, for 20 minutes. Dose, 6 oz. every three hours. In Dr. Jeannel's 'Formulaire,' there is the following recipe for an infusion—"Mullein, 10 grammes; boiling water, 1 litre. The infusion should be strained, to separate the hairs of the stamen. *Emollient inutile inusité.*" Bentley says it is demulcent and slightly narcotic, and the seeds are used to poison fish. (2) See p. 525.

COMMUNICATIONS, LETTERS, etc., have been received from Symes Armstrong, Pocklington, Gardiner, W. Macnaught, "Enitar," Excelsior, A. A. A.

PHARMACEUTICAL STUDY.*

BY CHARLES SYMES, PH.D.

We are now about to consider briefly the subject of pharmaceutical study; let us do so as fellow students. For I must confess that when looking around on the vast fields of knowledge open before us; when I contemplate what has been done and what remains to be done; when I narrow my view and behold the operations of the sciences forming an essential part or closely allied to pharmacy, and lastly, when I look into what has been accomplished by myself in a life of thirty-three years, I am impressed with the great necessity of plying my every energy, and of becoming a student in earnest.

Some students are necessarily younger in the field than others, and it is to these I would address myself in particular, and offer a few words of advice and encouragement. We always work better and more to a purpose when we have some object in view. It might be well, then, first to consider what is our *object* in study.

Taking the youth just entered on his apprenticeship, he congratulates himself on having done with school and books, and votes study a bore; soon, however, if he has not passed his Preliminary examination (which, by the way, he ought to have done) this stares him in the face as a stubborn reality, but one which should cost him very little effort to pass. After this comes the Minor and Major; again he finds himself amongst text-books, and probably connected with a school, but of a more technical character than the one he has left. It is evident, then, that one object of study is to gain the necessary knowledge for passing the pharmaceutical examinations now incumbent on all. But if this is made the only one, the acquirements will most certainly be superficial. It might be very proper to keep the examination in view whilst you prosecute your studies, and very creditable to pass in honours, but what would you say of a microscope that would show test objects only? There must be a desire to possess knowledge for its own sake, for the pleasure it affords, for the power it gives, for its usefulness in the investigation of intricate subjects beyond the comprehension of the ignorant. Were it not for the pressing necessities of existence, surely such objects were worthy the devotion of half a life-time to study.

Then, most of us have faith in business prosperity; it does not always follow that a man who has passed examinations is necessarily a good business man, or that a man who has not done so is otherwise. Indeed, in times past it has often been the reverse; the ignorant populace have often given the preference to a man of little knowledge and much assurance. But we must bear in mind that the public are becoming better educated, and that elementary chemistry is being taught in most schools; in fact, we often find the youth of fourteen years or the mechanic taxing our abilities to explain their chemical and technical difficulties, and to whom but to the pharmacist have such to go for their solution? It is not necessary that we should invade the territory of the purely scientific chemist; but that a man who undertakes the conduct of a pharmacy should be able to perform minor analyses for medical men and others, and that he should be able to render an intelligent reasoning or explanation in any scientific proposition bearing more or less on his calling, will, I think, be admitted by all. Wherever we find such knowledge, combined with a moderate amount of business tact, there we are sure to find a fair amount of prosperity; there we find pharmacy really elevated, there we find it assuming a professional character, and to such alone can we look as its true representatives.

There are five principal methods or heads under which knowledge is acquired, viz., *Observation*, *Reading*, *Instruction by Lecture*, *Conversation*, and *Meditation*. In its narrowest sense the term study is applied only to the latter of these, but in its broader application it embraces the whole. Let us consider them separately.

Observation is an important part of a pharmacist's education. Shall I say the most important? Yes, for all practical purposes it is so. We occasionally find in our journals letters from dissatisfied apprentices, complaining that they have to dust bottles, etc. For my own part I must say that the short time spent each day in dusting bottles during my apprenticeship was time well spent; in the performance of this duty, which some consider so *infra dig.*, I learned the distinctive characters of the contents of each bottle; the properties which gave an individuality to each; the effects of light on vegetable substances and their preparations; also on some products of the mineral kingdom. I found the pulv. sennæ became bleached, pulv. rhei darkened, and argenti nitras blackened. Then the imperfect stoppering often allowed the effects of atmospheric influence to become apparent; whilst the sodæ sulphas effloresced the potassæ acetas deliquesced, and ferri sulphas lost its grassy green, and became the brown persulphate. Another active agent, time, has many a lesson in store for an observer, and I found the sacred precincts of the pharmacy far from proof against its all pervading influence. Tinctures of cinnamon and kino solidified; liq. antim. tart. became a mass of fungoid growth, and decoct. aloes lost its bitterness.

Doubtless cause and effect were often misplaced, but it was study nevertheless, and grave philosophers have often committed such errors.

Reading.—By this means we become acquainted with the thoughts of others, the accumulated wisdom of ages. It is well that observation and reading should go hand in hand, for by familiarizing ourselves with the thoughts and methods of observation adopted by others we learn to observe more correctly ourselves.

Reading enables us to acquire knowledge which we could not otherwise do; the experimental labour of years is often condensed in a few pages which the student might master in an hour. It is available where but short periods can be devoted to study. One or two facts thoroughly impressed on the mind are worth chapters carelessly read, and it is a fact that those who have but little time at their disposal often render that little more valuable than much possessed by others.

As to the books which should be read by the pharmaceutical student, much depends on the amount of time he can give to study. Make it your law, as steadfast as that of the Medes and Persians, to acquire as *much* knowledge as possible; never ask yourselves *how little* will pass you through your examinations. There are many excellent text books now published which but a few years since had no existence. Fownes' Manual was the student's book on chemistry now superseded by Attfield. Botany was gained in

* Short address delivered at Liverpool Chemists' Association to Students, Dec., 1873.

a somewhat fragmentary manner from Lindley, Balfour, etc.; now Bentley supplies all that can be desired. Pereira and Royle were the books on Materia Medica; the former too voluminous, the latter a most excellent work and one which to my mind leaves nothing to be desired even in the present day. A useful work has been published under this head by Professors Redwood and Bentley. Its arrangement is good, but I am not sufficiently familiar with it to offer an opinion on its merits. In turning over its pages a few days since I observed some statements with regard to doses which scarcely accord with my experience. Chloral hydrate is stated to be given in doses of from 30 grains, whereas from 20 to 25 are more frequently prescribed. On the other hand the dose of bromide of potassium is given as 4 to 10 grains, whereas the average dose is from 20 to 30; sometimes 60 grains are given. But I am digressing. 'Redwood's Pharmacy' is getting out of date, but contains much matter worth perusal: we find it now replaced to some extent by Proctor. I would say then that of the various works at the disposal of the pharmaceutical student, Royle, Attfield, and Bentley stand pre-eminent.

The method I would recommend is—in the first instance read one subject at a time, carefully making notes as you proceed; at the end of your subject study your notes. Then read your various subjects together, *i.e.*, on alternate days; again make notes; each day before prosecuting your study, read over the notes previously made; this you will find a great aid to memory.

From *lectures* and experimental demonstration we acquire knowledge in a pleasant and permanent manner; here the eye lends its aid in imprinting on the memory that which would otherwise be readily erased. I cannot speak too highly of the excellent courses of lectures delivered at Bloomsbury Square. Those who have listened to them will bear me out in their praise. But all cannot go to Bloomsbury Square to study, hence we have provincial Schools of Pharmacy established; we have one in connection with this Association, which, if it in the past has not been so successful as it might have been, we can still hope has a bright future before it. We cannot secure Professors Redwood, Bentley, and Attfield to direct it, but we can offer you lectures by gentlemen thoroughly competent for the proper discharge of the duties they undertake. At present the Chemical Class is but small, yet it is doubly as large as on former occasions; let us hope it will be considerably increased next session. I am sure the students find in Mr. Davies an efficient and painstaking instructor.

In March next we hope to have a course of lectures on botany commenced by a gentleman whose ability none will doubt; and next winter, in addition to these, lectures on pharmacy and materia medica; but you must bear in mind, without a good number of students there can be no success, and it rests mainly with yourselves whether, in a few years, there is established here a School of Pharmacy second to none in the provinces, or whether the effort is given up as useless. This is a serious responsibility—one in which every student in Liverpool participates even though he refuses to acknowledge it. Let us each faithfully discharge our duty and show that we are in earnest in this laudable undertaking.

Conversation.—Under this head comes mutual improvement, and is it too much to hope that the rising generation of pharmacists in Liverpool will yet establish a class amongst themselves on this basis? Aided by a spirit of emulation, this form of study prompts the student to exercise the best of his ability in gaining all the good he can from the sources we have been considering. For my own part I consider the time I spend in converse with professional brethren amongst the most pleasant and profitable hours of my life.

Finally we come to *meditation*, in which we bring together all we have culled from other sources, compare and draw inferences. In meditation we learn to *apply* all the knowledge we possess; by meditation we recall much that would otherwise be forgotten, and originate new thoughts; by thus bringing together the integral parts of what we know we can look at it as a whole and bring the entire power of our minds to bear on any particular subject.

The question of *time* for study is rather a vexed one with you; indeed it is with us all. There is much cause for complaint. The evil originates with and might be terminated by ourselves. Time rolls on and adds years to us. Would that it added wisdom with equal rapidity, enabling us to see that our service should be measured not by its length but by its usefulness.

Such time as you have at your disposal, lose none of it. If your business duties encroach on your evenings you have the mornings at your disposal. I believe in morning study; the mind is fresh from repose and readily impressed; the power of comprehension is clearer and progress is more rapid. If after this before going up for your ordeal you feel it necessary to do a little cramming (and who does not?) take your own notes and from them make an epitome, which do not write on your finger-nails or on the palms of your hands, but deeply imprint on your brain. Throw off timidity and success is yours.

ON THE ADMINISTRATION OF CASTOR OIL.*

BY E. GREGORY.

Castor oil is indisputably nauseous and unpleasant to take, so much so that some patients cannot be induced to swallow it, by any device or on any consideration. At the same time, its qualities are such that in some disturbed states of the system, no other purgative can be substituted with safety. On this account a great deal of ingenuity has been exercised in endeavouring to devise means by which the dose may be swallowed without tasting it. So far as I know, success in this attempt has been only partial, and I fear the difficulties in the way are too great to be entirely overcome. Efforts seem to have been made in three directions; first, to enclose the oil in a tasteless envelope, such as the hard and soft castor oil capsules. To these there seem to be two objections. One, from the number of capsules necessary to be taken for a purgative dose; the other from the fact that most of the makers, in their efforts to reduce the size of the dose, have been tempted to add a foreign ingredient, such as podophyllin, or croton oil, both of which are of so drastic a nature as to make it unwise to give them to a delicate patient. The second class of efforts have been made principally by medical men and nurses, and have consisted in floating the oil on some vehicle, such as tea, coffee, punch, wine, beer, etc., etc. The result is that the patient, in spite of the most careful management, finds some of the oil sticking to his mouth, and sinks back in the bed with the conviction impressed on his mind that oil is abominable stuff. The most successful vehicle of

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* *Canadian Pharmaceutical Journal*, vol. iii., p. 39.

this kind that has come under my observation is flax-seed tea, well sweetened and flavoured with any agreeable aromatic. If the oil be floated on this, and before the dose is taken the lungs be thoroughly exhausted, so that the whole can be drunk with a deep inspiration, the taste is very little noticed. The third direction in which inventors have exercised their ingenuity in endeavouring to cover up and disguise the unwelcome flavour is by adding various ingredients to the oil, and by making it into an emulsion.

Mr. Herbert G. Rogerson* has given a formula adapted to emulsify most oils and balsams. It certainly makes a very nice looking preparation, having a white pearly lustre, and with the taste and smell of the active ingredients very well disguised. But it is too thick and must be gulped down.

For some twelve or fourteen years past I have used the following formula for a castor oil draught, which has proved very acceptable to adults who could not get down the pure oil. For children it does not answer so well, the dose of necessity being double that of the oil :—

℞

Ol. Ricini, ℥ j.
Mucil. Acaciæ, ℥ ij.
Shake well together, then add
Syr. Simp., ℥ ij.

Shake again, then flavour with spts. menthæ pip., or according to taste, and make up two ounces with water. This mixture can scarcely be called an emulsion, but it mixes well on vigorous shaking. The taste is well disguised; it is thin enough to be easily taken from a wine-glass, and it leaves no oil sticking round the mouth. I have lately obtained still better results from the following formula :—

℞

Ol. Ricini, ℥ j.
,, Anisi, gtt x.
Chloroform, gtt x.
Shake well together, then add
Mucil. Acaciæ, ℥ ss.

Shake well, and make up to two ounces with water. I know not whether this may be considered an infringement on Mr. Copland's patent, but it is a very nice looking and palatable preparation, and does not separate so speedily as the last.

THE PALM OIL TRADE IN OLD CALABAR.

Mr. Consul Livingstone, reporting on the Trade and Commerce of Old Calabar for the year 1872, says, that in all the rivers our agents trade only with the tribes that own the river mouth, and are not oil producers, but merely oil brokers or middlemen. Gladly would the nearest oil producers come and trade direct with the whites, to the advantage of both, and most willingly would some white and many black traders go up to the markets of the oil producers, but the black brokers are strict protectionists, and allow no trade with white or black, except what passes through their own hands, at their own price; and each tribe on river or coast does the same with its next inland neighbour. All are protectionists and have ever been.

Barter is the only medium of trade between white agents and black brokers; but black brokers and oil producers have risen above this rather primitive stage of civilization. The brokers rarely offer trade goods to the producers in exchange for oil. They take the goods to one of the great country fairs and there sell them for native money, and with this money purchase the oil from the producers.

In 1866 sixteen British firms traded in these rivers, and one Dutch. This year, 1872, the number of Liverpool, Bristol, and Glasgow houses is twenty-four, and there are two foreign (Dutch and German). These 26 palm-oil traders have 55 trading establishments in seven rivers, and employ 207 white agents, clerks, mates, etc., 419 black coopers, carpenters, cooks, and stewards from our settlements at Accra, Cape Coast Castle, and Sierra Leone, and 2000 Kroomen from Cape Palmas and other parts of the Kroo coast. Most of the above live in large airy hulks, moored near their cask houses on the beach; a few have houses on shore. For many years the carrying trade was done by sailing ships, and as they remained in the sickly rivers for months, numbers of their men died of fever; but since the two lines of steamships began in 1869, with reduced rates, and five steamers a month, they have secured nearly the whole of the carrying trade, and sailing ships and seamen's deaths have almost disappeared from the principal rivers.

In the days of sailing ships a few wealthy firms had a sort of monopoly of the oil trade, and made large profits; but steam has brought new firms and a keen competition. It has also developed a goodly number of black traders possessed of some education, little capital, and minds satisfied with small profits and quick returns. The price received for oil in England has fallen of late years, while the price paid for it in the rivers has risen to twice and even thrice its former figure.

Many agents are of opinion that the annual oil product of the rivers does not increase; and that while natives take life as easily as they do, and receive such high prices for the oil, the exports are not likely to be much augmented. A large amount of oil is now exported from the west coast direct to foreign countries; and the total exports from the whole coast are undoubtedly increasing to a considerable extent.

The Fernando Po oil crop never exceeds—seldom equals—400 tons a-year. A trustworthy observer who trades in various parts of that island states that, from the number of oil palms he has seen, at least 4000 tons might easily be obtained. But the 25,000 aborigines, or Bubés, do not choose to work beyond 400 tons. Their wants are few—a cheap musket, a little powder and shot, pipes, tobacco, and rum are nearly all. If traders could create new wants, trade might increase; but where is the genius who can create a new want for a Bubé?

On the mainland the oil producers have many more wants, and therefore work harder, *i.e.*, the women and children do; for the men think they have done enough when they climb the palm trees and bring down the masses of palm nuts.

Probably not many of the palm nuts of the countries drained by the oil rivers remain ungathered near the native villages. More oil palms might be planted; there is abundance of room for them in the oil district, though but a mere fringe of the African continent. But natives never plant oil palms, though they plant the palm which produces the best palm wine.

After separating the palm oil from the fibres round the nut, the oil producers used to throw away the nuts, though it was known that the kernels contained a valuable oil. Black brokers would not carry nuts in their canoes for the price received; and agents felt that it would hardly pay to send nuts unbroken to England. Machines for breaking nuts were invented at home, but failed, owing, perhaps, to the different shapes and sizes of the nuts. At length native women and children undertook the business of nut-cracking, and a thriving kernel trade sprang up forthwith. This kernel trade sprang up in Old Calabar early in 1869, and a little sooner in some of the other rivers. A trader, accompanied by a misssionary, visited several oil-producing villages, and urged the people to begin nut-cracking. 1000 tons of kernels were bought that year at 2*s.* a bushel, and in 1871 upwards of 2000 tons at 8*s.* a bushel. But this year—1872—black protection interfered and stopped this new and flourishing native industry. The rapid development of the kernel trade, with the large oil trade, and its pernicious "trust system,'

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* Pharm. Journ, [3], vol. iii., p. 701.

produced a glut of English goods in the great country fairs, and consequently a heavy fall in prices. When the principal oil brokers went to the country markets and found, to their no small disgust, that, owing to the depreciation of their goods, they had to pay for oil in the markets nearly as much as they received for it in the hulks, they felt that something must be done in order to shut trade goods out of the markets until prices should rise. Now, as the kernel trade was entirely in the hands of poor people, who had neither capital nor credit to become oil brokers, the rich brokers determined to stop the kernel trade. But, having some regard for public opinion, these black protectionists never once hinted that this rapidly growing native industry, so valued by the poor, was crushed for the benefit of the few capitalists. A plausible story was started that the kernel trade was ruining the oil trade—the staple trade of the country—inasmuch as nut-cracking was usurping the place of oil-making. "Do you wish to buy oil *or* kernels?" asked the wily King of the agents; and oil being the response, he announced that the kernel trade was now strictly prohibited.

The statement that the kernel trade injured the oil trade by lessening its amount was evolved from the internal consciousness of the rich brokers. Among the producers the men had still to climb the palm trees, and the women to do nearly all the oil-making work before getting the nuts ready to crack. No African woman in her senses would, after working hard for it, throw away oil worth twice as much as kernels in order to get kernels only, when she could have both oil and kernels.

Many believe that the kernel trade has hurt the oil trade, because they have purchased less oil since the kernel trade began; but this can readily be accounted for by the fact that there are now twenty-six firms in the oil rivers, instead of sixteen, and no increase in the yield of oil. A similar impression was produced in Lagos, and from the same cause, viz., an addition to the number of merchants; but the accurate statistics of that flourishing colony show a steady increase of oil, as well as kernel exports.

CONTAMINATION OF BICHLORIDE OF MERCURY.*

BY M. BULTOT.

Some bichloride of mercury received by the author from a chemical manufacturer was found to be pulverulent and soluble in distilled water in the usual proportions; but in the colourless solution were observed some small yellow insoluble particles. Tested with ether there was a slight rose colouration, and the yellow particles still remained insoluble. Alcohol dissolved the salt with a red colour, which soon became very intense, but the deposit of insoluble matter still remained apparently the same. Chloroform was without action upon it, but the red colour appeared directly alcohol was added. The suspected sublimate was also coloured upon the addition of nitric or hydrochloric acid.

Suspecting the presence of an aniline derivative, M. Bultot added to the red alcoholic solution ammonia, which decolourized it instantaneously, giving at the same time a precipitate of amidochloride of mercury. The filtered colourless liquor again became red upon the addition of hydrochloric acid, yielding a fine crystallization of sal ammoniac. These reactions are easily explained by the fact that the aniline reds are coloured salts of a colourless base rosaniline, and it was this impure base that had caused the alteration in the sublimate. Rosaniline is but slightly soluble in water, insoluble in pure ether, and soluble in alcohol, which it colours red. Acids colour it a crimson red, forming monacid salts, which are decomposed and decolourized by ammonia.

M. Bultot considers the foreign matter causing the contamination was rather the residue of a manufacture than a commercial substance mixed by inadvertence, and that it is probable that the high price of mercury has brought into the market mercurial preparations that have been previously used in the manufacture of aniline colours.

* *Journ. de Pharm. et de Chimie*, vol. xviii., 414.

THE DOSES OF THE PHARMACOPŒIA.*

We are enabled to give in another column a short foretaste of what may be expected from the forthcoming addendum of the British Pharmacopœia, which will probably be read with interest, since the Pharmacopœia is the every-day working tool of the medical practitioner. All good workmen are careful as to the quality and form of their tools, although it is said that they are not the best who are the most prone to fall out with them. In an angry little article lately published, Dr. Anstie scolds the Pharmacopœia Committee very violently for presumed shortcomings in the matter of doses. Dr. Anstie has his own ideas of what the posological table of a pharmacopœia ought to be, and he can hardly find language strong enough to express his anger and contempt for those who differ from him. They have been guilty of an "unpardonable blunder," of "extraordinary ignorance or negligence," of "lamentable timidity," of "unaccountable rashness"; they must have been "entirely unfamiliar" with the practical use of drugs; they are "extravagantly wrong"; and their "mischievously misleading" errors have this "unfortunate significance," that they "indicate an ignorance and a carelessness which are very wide-spread in the profession." These are rather strong expressions even from the mouth of this commonly rather impetuous writer; they are especially so if we remember that these ignorant, misleading, and practically uninformed posologists include men bearing the names of Christison, Apjohn, Aquilla Smith, and Quain. If, however, we look to the little fire whence all this smoke proceeds, we see that the particular wrong alleged is, that the Pharmacopœia gives only what may be considered as safe average doses, representing the mean of ordinary practice, without going to either extreme. The compilers of the Pharmacopœia, in departing from the earlier precedent of the London Pharmacopœia, and giving posological indications, met the known and expressed wishes of the profession; but they might easily have incurred very serious risks, and really misled numbers of people, if they had gone to any extreme. The range of doses in the Pharmacopœia does not bind any one; it only affords a certain datum—an indication for the neophyte. More refined or more adventurous therapeutists may give half-ounce doses of tincture of digitalis, or *ounce* doses of succus conii, as Dr. Anstie suggests; but it must remain very doubtful how far such doses can be generally counselled even in extreme cases; and it is far more reasonable, not to say more modest, to assume that, when the compilers of the Pharmacopœia declined to stamp officially with assent doses which might under ordinary circumstances be considered extreme and dangerous, they did so out of the fulness of their knowledge, than that they did so in the vacancy of their ignorance. If they had defined the extreme doses, or had given the whole possible range of administration of every drug, they must have also indicated the special circumstances which justify, or which have been thought to justify, these doses; and, further, they must have proposed safeguards. This would have converted the Pharmacopœia into a treatise on therapeutics. It might almost be advisable, therefore, for this excellent and able critic to reconsider and take back some of his big words. Meantime, as it has been thought advisable to continue to give posological indications in the forthcoming Addendum, we are not sorry to know that the old rule of giving an indication of average doses only, continues to be the guiding principle of pharmacopœial posology.

* From the *British Medical Journal*.

The Pharmaceutical Journal.

SATURDAY, JANUARY 3, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ.'*

1873.

THE greetings of the New Year remind us that the time has arrived for taking a retrospect at another twelve months. The history of the past year has been eventful to pharmacists of the present day in many respects, and it will have an important influence upon those of the future ; since, whether for good or evil,—the former we hope and believe,—the Pharmaceutical Society has resolved upon extensive changes with respect to education and examination.

Probably the most important action of the Society during the year has been in reference to education. The alteration in the arrangements of the School was but the realization of a change that had long been contemplated ; but the establishment of the new system is too recent to admit of any inference being yet drawn from its working. The amended regulations as to the examinations, which were finally adopted by the Society at the last anniversary and have subsequently been approved by the Privy Council, do not come into operation until the end of the year now commencing ; but, if we may judge from the large increase in the number of candidates for the qualifying examinations, they appear to have already exercised some influence. Last year the number of candidates for the compulsory qualifying examinations was 656, while this year as many as 913 candidates have presented themselves. It would seem, also, that the somewhat increased stringency which the examinations will have, under the new regulations, has induced some candidates to come up prematurely, for we find that the number of failures was very much larger than in the previous year.

In the Minor examination there have been 820 candidates examined, 776 in London, with 44 per cent. rejected, 44 in Edinburgh, with 43 per cent. rejected. There have been only 93 candidates for the Modified examination, as against 149 in the previous year ; 78 in London and 15 in Edinburgh, with about 26 per cent. rejected at both places. In the Preliminary examination there have been 1291 candidates examined in England, with 48 per cent. rejected, and in Scotland 162, with 41 per cent. rejected.

We think the trade at large may be congratulated upon the sifting of wheat from chaff which the foregoing data indicate as having been the result of the labours of the Board of Examiners, who have thereby earned the gratitude of the whole body. At the same time, the very large proportion of rejected candidates justifies our urging upon masters the importance of fulfilling their obligations towards apprentices by allowing them time for serious methodical study, either during business hours or by closing earlier in the evening, and more especially by instructing them practically in the scientific aspects of the usual routine work of the shop. Those who could and would conscientiously do this might well require from their apprentices an extra year's service with real advantage to both, or they might be recompensed for extra trouble by an equivalent increase in the apprenticeship premium.

Taking the standards to come into force in October next as a basis, it cannot be questioned that any ordinary youth who has passed the Preliminary before being articled, ought at the expiration of his apprenticeship to be able to pass the Minor easily, if he and his employer have done their *duty*. To this end we would urge proprietors of good businesses, and many others well qualified to teach, who now decline the office, to accept the new state of things loyally and take their share in improving the character of our technical education. If from considerations of self-interest those who are competent for this work leave the less qualified to monopolize apprentices, it will be their own class that will suffer *most* in the next generation from the want of competent assistants.

The failures in the examinations may be regarded as due partly to pure ignorance and partly to cram. The latter acts mischievously, inasmuch as country youths are encouraged by the crammers to attempt to gain knowledge which ought to have been acquired during apprenticeship in a few weeks.

Compared with last year, the statistics of the Major examination are rather favourable. In 1872, out of 89 candidates 52, or 58·4 per cent. passed. In 1873 of 83 candidates 54, or 65 per cent., were successful.

Of the total number (1267) who have passed the various examinations 341 have joined the Pharmaceutical Society, either as Members, Associates, or Apprentices. Probably this proportion is much the same as that of former years ; but whether it be an increasing or decreasing ratio it is still painfully small, and demonstrates want of feeling and *élan*, both on the part of the candidates and those who trained them. It is very desirable that the members of the Pharmaceutical Society who are not officers should strive to be as active as the present and past councillors, examiners, and local secretaries have been, and that, in the spirit of the founders, they should work *through* their sons, apprentices, and assistants for the common good. Once obtain an educated united body and it may defy co-operative stores, as well as outcries against dispensing charges, and Adulteration or other Acts will have no terrors for it.

The question of Local Secretaries, their position and duties, is one that has attracted considerable at-

tention, but as the subject is still under discussion we confine ourselves to saying that, since it is very desirable, in the interest of the Society and of the trade generally, that there should be—in every town if possible—throughout the country men ready to represent the Society and capable of carrying out such business as may arise, often at a considerable expenditure of time and labour, it seems only reasonable that some plan should be adopted by which such services might be remunerated.

While preparing the 'Calendar of the Pharmaceutical Society' for 1873, it was discovered that the title of "Major Associate," which for some years had been held by a number of gentlemen who had passed the Major examination, had no legal foundation, and that, by the terms of the Bye-Laws, Associates upon passing that examination had to be removed from the Register of Associates and became eligible as Members. The REGISTRAR had no choice, but was compelled to omit the entire list, containing 149 names, from the Calendar. Some little irritation followed, but it is satisfactory to know that 103 out of the 149 gentlemen have since been elected Members.

A subject which has frequently been mooted in these columns—the manner in which the Funds of the Pharmaceutical Society are invested—was formally brought under review early in the year. At the January meeting of the Council, Mr. URWICK moved that £10,000 of the Society's funds should be invested in freehold land and freehold ground rents. The proposition was seconded by Mr. BAYNES, but after a prolonged discussion, it appeared to be generally felt that no sufficient reason had been given for altering the plan hitherto adopted, and the motion was rejected by a considerable majority.

A little later, when the time arrived for the preparation of the annual Balance-sheet, the Finance Committee expressed a wish to have professional assistance, as the work had become one of considerable responsibility. This was granted, and led to the preparation of a balance-sheet in which the new course was taken of charging each department with its portion of the general expenses, so that an idea might be obtained of the cost of each to the Society. But it would appear that the auditors declined to sign a statement of accounts containing estimated amounts, and it was therefore found necessary to revert to the former system. A proposition by Mr. URWICK, seconded by Mr. BETTY, to publish, in addition, the detailed accounts and estimates that had been prepared was decided upon adversely by the Council as unnecessary, Mr. HASELDEN as PRESIDENT giving the casting vote.

Although the subscriptions to the Benevolent Fund showed for a larger sum in the balance-sheet this year than last, it appeared at first that the Society would have to depart from its custom for several years past by electing only one annuitant instead of two; it was found possible, however, at the last moment to elect two, but this was in consequence of the death of one of the annuitants, not of any sudden and liberal influx to the funds. During the year a legacy of £25 from the late Mr. GEORGE WAUGH was generously increased to £100 by his widow. Still it is felt that this Fund is not so widely supported as it should be. Opinions have been freely expressed that a point has been reached at which the Council may cease to invest any more subscriptions, depending upon the current year's income for the payment of any liabilities that may be incurred for annuities, and that if this were done many who now stand aloof, preferring to distribute their own money in the relief of present necessities, would be induced to contribute to the fund. Acting upon this view Mr. ROBBINS brought the subject before the Council, and a committee was appointed to consider what steps should be taken to increase the amount of subscriptions, as well as the usefulness of the fund. Only at the last meeting of the Council Mr. BROWN expressed his opinion that the time had come when annuities might be granted out of annual income in some way.

There is much reason for congratulation in the fact that, as compared with the numbers engaged in the drug trade throughout the kingdom, there are still so few applicants for relief from the Benevolent Fund. This would seem to show that though we hear frequent complaints of the business being a poor one, it does not, even in its present state, more than any other occupation entail the prospect of having to seek the aid of charitable organizations. Yet it is distressing to find the resources of the fund inadequate to satisfy the actual calls upon it, and that three out of five admittedly deserving applications must be left without the assistance required. We trust that this state of matters will now be remedied, and that by the adoption of some plan to meet the objections to the course hitherto followed in administering the fund, there may no longer be any need to point to the striking disparity between the total number of subscribers and the number of chemists and druggists upon the register.

Early in last year a correspondent, writing from Reading, expressed his surprise that so few subscribed to the Benevolent Fund, and suggested, as Mr. SCHOLEFIELD had previously done, that in future all donations and subscriptions should be expended in granting relief. He considered that by this means many additional subscribers would be obtained, and the same view was taken by Mr. CLARK of Leicester, and others. In regard to this suggestion, it was pointed out by Mr. SANDFORD that according to the existing bye-laws donations to the fund must be invested, and that the granting of annuities must be regulated by the amount of invested capital.

But though grants made on the basis of annual subscriptions can only be contingent, and therefore of less value to the recipient than those secured by the invested capital of the fund, there seems to be a widespread feeling that the action of the fund may be so far extended that there may not in future be any

occasion to reject three out of five candidates, and, to use the words of a correspondent, a "conviction that the fund can and may be made sufficiently strong to meet all legitimate demands."

The effort made to provide a fund for the support and education of the children of JOHN CARGILL BROUGH, late editor of the *Chemist and Druggist*, has been carried to a successful issue, and a sum of nearly £2,000 has been vested in trustees for that purpose.

One question, which at the commencement of the year was certainly a vexed one, appears now to be set at rest, namely, the position to be taken by the Pharmaceutical Society in respect to the admission of women pharmacists. Much misrepresentation, based upon ignorance of the points at issue, has occurred in the public press respecting this matter, and even during the last few weeks the President of an important provincial association evidently laboured under the impression that the Society had refused to admit women to the pharmaceutical examinations, the fact being that there are at present on the register three by virtue of having passed the examinations, and several in the right acquired by being in business before August 1, 1868. What has really been discussed is this:—Shall women be allowed to join the Pharmaceutical Society as Apprentices, Associates, or Members? At the commencement of the session in October, 1872, the Council resolved to rescind a resolution prohibiting the attendance of female students at the professors' lectures in the School of Pharmacy. Shortly afterwards the question naturally arose—were they to be allowed to compete for the sessional prizes in connection with those lectures? In December, and again in January, motions were brought forward in Council by Mr. HAMPSON that ladies should be eligible to compete for the prizes and certificates given at the end of each session. This was met by the objection that only "Registered Apprentices and Students of the Society" were eligible for these honours. When called upon to answer an application from three ladies for election as "Apprentices," in order that they might come within the pale, the Council transferred the responsibility of the decision to the Annual Meeting, which by a considerable majority negatived the proposition. There had been much lively discussion in these columns and some talk of an application to the Court of Queen's Bench for a *mandamus*, but fortunately the decision has produced as little hurt as it would probably have done if given the other way. Still it cannot be too plainly understood that there is nothing to prevent a woman who is qualified from passing the qualifying examinations, and thus acquiring the right to carry on the business of a chemist and druggist.

The Evening Meetings of the Pharmaceutical Society cannot, on the whole, be considered satisfactory. For, although they have not wanted in interest, yet there has been a great dearth of original communications of such value as should be forthcoming at such representative gatherings. Only six evenings in each year are set apart for these meetings, and one of these is always taken up by the Inaugural Address and Distribution of Sessional Prizes; hence it might have been thought that in so wide a field as that covered by the materia medica and chemical and pharmaceutical preparations there would have been sufficient research to require a committee of selection to deal with the superabundant records of results offered for acceptance. Unfortunately, this has not been the case, and the faith shown in the certainty that "something would turn up" could not have been exceeded, even by Mr. MICAWBER. With few exceptions, the time at these meetings has been chiefly occupied with discussion arising upon articles exhibited, or some subject brought forward without previous announcement. Amongst these exceptions, however, were a paper on "Morocco Drugs," contributed in February by Dr. LEARED; one on "A New Basis for Suppositories and Pessaries," by Mr. W. MARTINDALE, and one on "The Mustard of the Pharmacopœia," by Mr. T. GREENISH, contributed in April; some "Pharmaceutical Notes," by Mr. J. B. BARNES, in November; the paper on a "New Solvent of Phosphorus," by Mr. A. W. GERRARD, and a "Note on Glycerine of Gallic Acid," by Mr. S. GALE, read at the last meeting. On two occasions the subject of the Proposed Appendix to the Pharmacopœia was discussed at the suggestion of Professor REDWOOD, and on two other occasions the Adulteration Act was discussed in reference to its relations to pharmaceutists.

During the year the Committee to whose care it is entrusted have spared no expense or pains upon the Library. A considerable alteration and improvement has been effected in the reading-room itself and every suitable book has been placed on the shelves as soon after publication as possible. A very useful and clearly arranged catalogue of the books has been prepared by the LIBRARIAN and printed, copies of which may be had by members upon application. The practice of opening the reading-room from eight until ten on two evenings in each week has been continued, and it is appreciated by some students; but we do not think that the number availing themselves of the privilege is nearly so large as might have been expected in a place like London.

A few months since it was stated in these columns that it was intended to form, in connection with the Museum of the Pharmaceutical Society, a medical herbarium, in which specimens of plants known to be used in popular or scientific medicine, and also of plants that are sometimes substituted for them, should find a place. A request was made that medical gentlemen and pharmacists residing in various parts of the world would assist in making this herbarium as complete as possible. Some assistance has already been promised, and doubtless as the project becomes better known other helpers will come forward. The herbarium now contains between

300 and 400 specimens. During the year, a catalogue of the whole of the specimens in the Museum has been prepared by the CURATOR, which we hope will be printed, and thus rendered more widely available. Separate well-preserved specimens of all the more important indigenous medicinal plants have also been mounted, and are now in daily use by the students.

The meetings of pharmacists, which may now be looked upon as annual, have this year all been interesting and successful. The business of the Annual Meeting of the Pharmaceutical Society, referring principally to the admission of women to membership, and that of the Special General Meeting, referring to the new bye-laws, are spoken of elsewhere. The Dinner at the Crystal Palace and the Conversazione at the South Kensington Museum, were both numerously attended, whilst the Annual Chemists' Ball showed no falling off. The Inaugural Address at the commencement of the session of the School of Pharmacy in October was delivered by Mr. G. W. SANDFORD. Naturally, one of the main topics was the altered conditions under which the Professors recommenced their labours, but it also contained a vigorous assertion to the students of the benefits resulting from thorough and earnest study. The reports of the Professors upon the classes of the previous session were satisfactory, and the distribution of prizes was rendered remarkable by the unprecedented number of honours carried off by one of the Junior Bell Scholars—Mr. SYDNEY PLOWMAN.

The North British Branch of the Pharmaceutical Society has, during the year, made considerable progress towards acquiring the position and appliances to which its representative character in Scotland entitles it. The museum, library, and reading-room in the new premises in St. Giles Street, Edinburgh, had been opened, and a good working code of rules for their regulation had been drawn up. Upon the representation, however, of Mr. J. MACKAY to the Council in London that there was still need for a set of specimens for the examiners, the subject was referred to a committee, with power to make a selection, and arrange for the supply of all that was deemed necessary. A deputation consisting of the PRESIDENT, VICE-PRESIDENT, and SECRETARY of the Pharmaceutical Society was also, in response to an invitation, appointed to visit Edinburgh and inspect the new arrangements, who, on their return, presented a satisfactory report.

In Ireland an attempt has been made to place the unsatisfactory relations of the apothecaries and chemists and druggists towards each other—which have proved incidentally an impediment in the way of the Pharmaceutical Conference visiting Belfast with the British Association—upon a better footing. The first meeting of a "Chemists and Druggists' Society of Ireland," established "with a view to obtain a status similar to that secured by Act of Parliament to England," was held in Dublin in January. The "situation" was illustrated shortly afterwards by a gentleman who was stated to possess the diplomas of the College of Surgeons, England, and the College of Physicians, Edinburgh, but whose name did not appear on the register as an apothecary in Ireland, being fined in two penalties of £20 each for compounding prescriptions. In March a deputation from the newly-formed Society, was appointed to wait upon the Governor and Company of the Apothecaries' Hall, and ascertain their views upon the subject. The Apothecaries' Company met the deputation in a friendly spirit, and suggested the adoption of a Bill drawn up two or three years previously; but it was eventually arranged that the Chemists and Druggists' Association should draft a Bill, and submit it to the Apothecaries' Company. This was done accordingly, and the committee entrusted with the work have recently reported that the Chemists' and Druggists' Association have every reason to be satisfied with the result. If the ATTORNEY-GENERAL should comply with the joint request of the two bodies to introduce this Bill into Parliament next session, it will require, and doubtless receive, the careful consideration of the Council of the Pharmaceutical Society of Great Britain.

The British Pharmaceutical Conference met at Bradford in September, and although the number of members present was not so large as in the preceding year at Brighton, the decrease was no more than might have been expected, through the greater distance of Bradford from London. The papers read were numerous and valuable, but a few of them were not fitted for reading *in extenso*, and would have secured greater interest if short abstracts of them, giving the general results, had been prepared for the occasion. Instead of this, the hearers were overpowered by a multitude of details which but few were competent to deal with, and that not on the spur of the moment. As it is very desirable that nothing approaching to boredom should attach itself to these semi-holiday meetings, the Executive Committee will doubtless consider this point before the next meeting. Up to the present time the Year Book has not made its appearance, although it will probably be published in a few days, but a very full account of the proceedings appeared in this Journal shortly after the meeting. It was resolved that the Conference should next year meet in London, under the presidency of Mr. T. B. GROVES, of Weymouth, and the Council of the Pharmaceutical Society have offered the use of the Society's rooms at Bloomsbury Square for the purposes of the meeting, and have promised to afford every facility for promoting its success. No decision has yet been arrived at respecting the date of the meeting.

Three summonses for breaches of the Pharmacy Act have been heard during the year. In one, where the Pharmaceutical Society prosecuted for the sale of poisons by an unregistered person in Glasgow, it was sought to set up an alleged partnership with a medical

man as a defence, but in the absence of satisfactory corroborative testimony a conviction was obtained; and in another, also taken out by the Society for a similar offence in London, the defendant failed to appear, and was convicted and fined in his absence. The third case was a summons taken out at the instance of a borough coroner against a registered chemist and druggist for selling a strychnine vermin-killer without observing the precautions prescribed in the Pharmacy Act for poisons contained in Part 1 of Schedule A. The magistrate held that an offence had been committed, and inflicted a nominal fine as a warning.

The number of deaths from poisoning recorded in our columns has been below the average. From the date of the publication of a list of poisoning cases in May, 1872, to the end of that year—eight months—41 cases were reported. During the twelve months that are just closing the number has been 38: viz., from aconite, 1; ammonia, 1; arsenic, 2; arsenate of soda, 2; carbolic acid, 4; essence of bitter almonds, 2; hydrate of chloral, 2; laudanum, 6; liquor strychniæ, 1; lotion, 2; medicated oil, 1; morphia, 2; opium, 1; oxalic acid, 1; paregoric, 1; prussic acid, 3; salt of sorrel, 1; spirit of salt, 1; strychnia, 1; vermin killers, 3. It is satisfactory to find that not a single case is attributed to mistake or carelessness on the part of a chemist or druggist. In a case where an assistant to a medical man was tried on a charge of culpable homicide, caused by supplying salt of sorrel in the place of Epsom salts, a verdict of "Not proven" was returned. In one case carbolic acid was administered instead of "senna" by a hospital nurse; and in another it was drunk by a child from a bottle left in a cupboard at a workhouse school. In another hospital prussic acid was dispensed instead of solution of chloral hydrate. One case of poisoning by a lotion and another by solution of ammonia, arose from mistakes on the part of the deceased. It is also worthy of note that since the issue by the Pharmaceutical Council of the notice respecting the conditions under which vermin-killers should be sold, there has been a marked decrease in the number of cases of poisoning by those agents; only 3 cases have been recorded in this Journal during 1873 against 11 in 1872.

The operation of the Adulteration Act has pressed with increased importance upon the attention of pharmacists, not only from the semi-scientific nature of the evidence tendered in many cases, but because of the possibility of this law becoming a source of annoyance and oppression to them. The principal prosecutions under the Act have been recorded in this Journal. Among the cases in which chemists and druggists have been concerned, there have been prosecutions for the sale of quinine adulterated with quinidine, and of mustard adulterated with farina, in which convictions took place; in the charge of adulterating sweet spirit of nitre, which was the most important, the summonses were dismissed. The "citrate of magnesia case," in which a conviction was also obtained, is to be regarded rather as a misapplication of the Act. The proceedings under the Act have fully justified the position taken by the Pharmaceutical Society with respect to the appointment of analysts. Another important prosecution was that by the Excise authorities for an extensive fraud on the revenue laws under the cloak of "perfumed spirit."

During the Parliamentary session several Bills were introduced into the House of Commons presenting features of interest to the pharmacist. Most important of all was the Bill, which was brought in by the Government in February, for the consolidation and amendment of the law relating to juries. It was found with satisfaction that although the tendency of the Bill was to curtail the number of exemptions from jury service, there was an exception in the direction desired by the Pharmaceutical Society, that the exemption at present enjoyed only by pharmaceutical chemists should be extended to all registered chemists and druggists. The Bill was, however, postponed time after time, and ultimately withdrawn at the end of the session. The Shop Hours' Regulation Bill, introduced by Sir JOHN LUBBOCK, was another piece of proposed legislation that attracted considerable attention from chemists and druggists, and in this case generally of an antagonistic character. It was felt that however well intentioned, such a law would be productive of great practical inconvenience. Active opposition to it was organized throughout the country; on the motion of Mr. W. S. BROWN, the Council of the Pharmaceutical Society resolved to oppose the Bill, and the PRESIDENT was authorized to sign a petition against it on behalf of the Society. In face of this opposition, and at the late period of the session, Sir JOHN LUBBOCK found it useless to persevere. A Bill for establishing the metric system of weights and measures after a certain period was again introduced, but it was again unsuccessful, although the advocates of this system may be congratulated upon the valuable report of the proceedings of the International Metric Commission at Paris, an abstract of which appeared in this journal a few months since. A Bill for establishing a registration of the names of the actual members of trading firms, and another for the registration of trade marks, suffered the same unsatisfactory fate, and were withdrawn.

"It's an ill wind that blows nobody good," is a saying that appears likely to receive a fresh application in relation to the subject of unusual doses in prescriptions. An unfortunate occurrence at a well-known seaside resort, where a chemist and druggist refused to dispense an unusually large dose of tincture of digitalis ordered by a prescriber unknown to him and was, therefore, unjustly censured by a coroner's jury as being responsible for the death that followed, attracted the attention of all thoughtful

pharmacists to the unsatisfactory and unsafe circumstances frequently attending the ordering of powerful medicines in doses exceeding those indicated in standard works on posology. It was felt that so long as it was possible to find a medical man who would dogmatically assert that a patient *in extremis* would have recovered had he taken a particular dose, and a member of the medical press that would give colour to such an assertion in the absence of any authoritative rule upon the subject, so long would it be dangerous for a pharmacist to exercise that intelligent caution which his educational training implied. The subject was brought before the Pharmaceutical Conference at Bradford by Mr. R. HAMPSON, in a temperately written paper, and after discussion the subject was referred to a committee to consider. The report of the Committee, which was adopted, recommended that in prescriptions, after any unusual dose, the prescriber's initials, between brackets, should be placed; that with a view to facilitate communication between prescribers and dispensers the prescriber's full name and address should be given on every prescription; and that the dispenser should retain all prescriptions in which initialled unusual doses occur. These recommendations have been recently formally communicated by the Executive of the Conference to the medical profession, and have met with a considerable amount of approval. The *Lancet* accepts the principle of the first two recommendations, and objects to the third, but recognizing the importance of the question, suggests that it should be considered and settled by the College of Physicians, if necessary, after conference with the representatives of the Pharmaceutical Society. The *British Medical Journal* approves of the report as a whole; and the *Medical Times and Gazette*, speaking of the initialling, considers that there "could be no objection to such a rule if it were made universal." So that to this passing cloud there may be a silver lining in the adoption of a rule that will frequently save dispensers much anxiety.

In the first month of the year the fifth of the decennial editions of the United States Pharmacopœia was published, and its merits or failures have been ably discussed by contributors to our pages. We recall here the fact that this pharmacopœia is the work of a committee of delegates appointed by colleges of pharmacy as well as those of medicine, and again we urge the advisability of a similar course being adopted with respect to the British Pharmacopœia. Any attempt to enforce the formulæ and tests of the latter work must be weakened so long as pharmaceutists, who are naturally best acquainted with the practical working of its details, have no opportunity of expressing an authoritative opinion respecting the rules by which they are to be bound. This strange anomaly has just been illustrated. A reprint of the British Pharmacopœia having become necessary it has been resolved by the Medical Council not to make any alteration in the body of the work but to place such additions as may be deemed by it to have become necessary in an appendix. Pharmacists were courteously invited to exercise the privilege of suggesting what preparations should be introduced into their own everyday text-book, and they availed themselves of the opportunity to some extent, but how far their suggestions were accepted and how far declined,—though not for what reason,—they will probably learn for the first time when the book is published, which is expected to be in a few weeks from the present time.

The subject of the proposed Universal Pharmacopœia has been discussed in Paris and Vienna. In the former city, the Society of Pharmacy has reappointed a commission to consider what shall be done, and, if it be thought advisable, to communicate with English pharmacists. In Vienna, the Third International Medical Congress passed resolutions as to the basis upon which such a Pharmacopœia should be constructed, and arranged for the formation of an international commission to which the work should be committed. It may be remarked that the Latin language which is selected for the text is, of the four more extensively used Pharmacopœias, adopted in that of Germany alone; in those of England, France, and the United States the popular tongue being used. The metric system of weights and measures also is chosen, which at present is not adopted in either the Pharmacopœia of Great Britain or that of the United States. Still, if this work is ever to be accomplished, many mutual concessions will have to be made, and certainly these two would appear to be absolutely necessary.

One most satisfactory characteristic of the year is the progress which has been made towards shortening the hours of pharmaceutical labour. Hull, Sunderland, Peterborough, Greenock, and Brighton, and doubtless many other places, have made more or less effort in this direction, and it is to be hoped that the results will be permanent. In the present day, when the tendency in every calling is to shorten the hours of labour, there does not appear to be any valid reason for pharmacists being last in the race, but it is to be feared that the greatest obstacle that lies in their way is that of distrust and jealousy among themselves. While there can be no doubt that the public would exercise the necessary forethought if a proper representation were made to it, still a little unity of purpose and action would considerably heighten its perceptive powers.

One of those hubbubs about the charge for drugs which may be looked for periodically was, early in the year, raised by a writer in the *Globe*, for whose equanimity it was too much to discover that in a first-class dispensing establishment anything more was charged for than the actual drugs used in dispensing a prescription. A raid upon pharmacists and the *Lancet* absent would have been like carrion without flies, and although our contemporary might have been supposed to know more about the merits of the

case than the unknown lay writer, it rushed into the fray with such vulgarity and Donnybrook energy as to make the *Lancet* a mark for the facetiousness of *Punch* and the rebuke of the more staid portion of the medical press. Indeed, so far from overcharge being the rule, our Correspondence columns have several times during the year contained complaints from pharmacists as to the difficulty of providing "things honest in the sight of all men" whilst they have to compete with their "cutting" brethren and co-operative stores.

Another question, intimately associated with that of prices, is the scale of remuneration paid to assistants. In recollection of the repeated assertions as to the scarcity of assistants, some of the statements made respecting salaries offered to examined men have certainly been rather startling; but we fear that both these difficulties must be regulated by the much sneered at law of demand and supply. As to the suggestion which has been frequently made respecting the establishment of a chemists' assistants' association, that is a business which will tax their own energies, for, although employers have proved liberal in providing means of technical education, they can hardly be expected to initiate an organization which they may consider to be directed against their own pockets.

To turn from things political to those of a more technical character. The imperfect state of our knowledge respecting the origin of many articles of the materia medica, which was in the previous year shown in respect to the officinal rhubarb and manna, has received further illustration in the papers on Pareira Brava and Myrrh, by Mr. D. HANBURY, and that on Striated Ipecacuanhas, by Professor PLANCHON. In the paper on Pareira Brava Mr. HANBURY showed that although in the Pharmacopœia that drug is described as the "dried root of *Cissampelos Pareira*," yet the substance usually met with in commerce under that name did not agree with either the root or stem of that plant, but was the product of an undetermined menispermaceous plant; and further, that neither of them was true Pareira Brava, which is the root of *Chondodendron tomentosum*. In the paper on Myrrh, Mr. HANBURY states that although the substance itself has been known to mankind from the remotest period of history, the tree which affords it is almost, perhaps altogether, unknown to botanists. The herbarium specimens represented by EHRENBERG, to have been obtained from trees from which he had also picked very fine myrrh, and described and figured by NEES VON ESENBECK as *Balsamodendron Myrrha*, have proved to be derived from two distinctly different plants. This fact would seem to indicate that this gum resin is furnished by two or three distinct but allied species. The investigations of Professor PLANCHON tend to show that while "striated" ipecacuanha is usually described as the root of *Psychotria emetica*, there are really roots of two entirely different plants met with under that name. One of these ipecacuanhas presents all the characters usually attributed to striated ipecacuanha, but it is not the product of *Psychotria emetica*; the other is the product of that plant, but it does not agree with analyses and descriptions given by various writers on striated ipecacuanha, and notably in the complete absence of starch. The principles laid down in the two valuable lectures of Professor PLANCHON on the study of vegetable materia medica that have been translated for this Journal during the present year could not receive stronger confirmation than in this example and that of Pareira Brava. Another very interesting contribution to the history of ipecacuanha is WEDDEL'S paper on the *Cephaëlis Ipecacuanha* appended to Dr. HENDERSON'S Report on the attempt now being made with every promise of success to acclimatize this plant in India. Professor BAILLON has also questioned the propriety of attributing the balsams of tolu and peru to different species, and advocated a return to the generic and specific name given by LINNÆUS, *Toluifrum balsamum*.

It is also noticeable that from VAN GORKOM'S report some similar confusion appears to have occurred with another important medicinal plant, the cinchona. Although *C. Calisaya* has been in cultivation in Java and India for some years, it was only in 1865 that seeds of the variety *microcarpa*, obtained by Mr. LEDGER, were forwarded from London, and these have produced plants which promise to accord more fully than any yet raised with Mr. MARKHAM'S "glorious Calisaya of the American forests." The bark from these plants is stated to have yielded as much as 9 per cent. of quinine. Notwithstanding mistakes, however, the annual sales of Indian bark are said now to yield a profit of from £4000 to £5000 per annum. Some valuable investigations in respect to cinchona have been recorded during the year. Mr. BROUGHTON has found that the effect of manuring cinchona plants is to increase the total yield of alkaloids (2·81 per cent.), and especially of quinine (4·75 per cent.). Mr. HOWARD reports the total absence of the alkaloids from cinchona leaves; he is of opinion that they do not even commence to be formed there, but that the material for their formation comes from the heart wood of the plant. M. CARLES found that while quinine may exist in all parts of the bark, it is usually present in much larger proportion in the external layers, the proportion diminishing pretty regularly from the exterior to the interior. The locality of cinchonine was not so definitely fixed. An examination of some barks grown in Jamaica gave results which, although small (1·958 per cent. of quinine from *C. succirubra*), appeared satisfactory to Dr. DE VRIJ, considering the recent introduction of the cultivation there. An examination of *C. officinalis* barks from Ootacamund gave in one instance 9·1 per cent. of pure quinine. Dr. DE VRIJ has also described his method of separating the mixed alkaloids. The difficult subject of the estimation of the cinchona

alkaloids has been entrusted by the Paris Society of Pharmacy to a Committee to report upon. A thorough and exhaustive history of the cinchona alkaloids has been published in Germany by O. HESSE, which we propose to present shortly in an English dress. The success of the cinchona acclimatization experiment, although only partial in St. Helena, appears to be sufficiently established in India, Java, Jamaica, and elsewhere ; nevertheless, the quantity exported from Columbia does not appear to decrease. The comparative action of the cinchona alkaloids in combatting fever, and also in resisting putrefaction, have formed matter for two valuable papers.

A contribution to the literature of the oriental aconites by Dr. M. C. COOKE serves to show how little is known as to their botanical origin ; but Mr. GROVES's researches have shown that Bikh root, whatever may be its source, contains the doubted "pseudaconitine." Dr. SQUIBB has suggested a method of testing the value of parcels of aconite. Dr. SQUIBB has also furnished some interesting information respecting aloes. Ammoniacum, which occurred in the list of drugs from Morocco noted by Dr. LEARED, was the subject of a paper by Mr. HANBURY, and also of two others by Mr. JOHN MOSS, in one of which he establishes the absence of sulphur from the Persian and African varieties. Guarana which appears now to have acquired a fair position as a remedy, has been written upon by Mr. HALLAWELL. The Eucalyptus tree, also increasing in importance, has been the subject of several notices, in one of which Mr. BROUGHTON denies that either the bark or leaf contains an alkaloid ; formulæ of preparations of the leaves have also been given. On the other hand, condurango has so completely dropped out of notice as to be a drug in quite another sense. The Indian Simarubae have been described by Mr. A. W. BENNETT, and Mr. POCKLINGTON has continued his valuable papers on the "Use of the Microscope in Pharmacy," dealing this year with the barks of the Pharmacopœia. Mr. BROUGHTON has searched for and failed to find an alkaloid in the bark of the Nim tree, but has described a dark-brown bitter resin, slightly soluble in water, as the active principle. A third alkaloid has been suggested for *Hydrastis Canadensis*. The opium alkaloids have been described by Dr. GUBLER and to close this portion of the list without exhausting it, hyoscyamine has been found by Dr. MERCK to be a liquid alkaloid resembling conia and nicotine. We may say that two more plants—the *Echites scholaris* and the *Garcinia mangostana* –have been added by a Manilla apothecary to the list of those used in medicine ; the "Pituri," an undetermined New South Wales plant, has been mentioned as a stimulant narcotic ; the silphium of the ancients has been identified by OERSTED as the product of a plant which is a congener with that yielding assafœtida, and he proposes to call it *Narthex Silphium* ; Mesquitégum, from the *Prosopis glandulosa* has been used in medicine in America, and the composition of gum Arabic as well as the collection of gum Senegal have been described.

Of plants and substances used or available for the purposes of perfumery, several have been noticed during the year. The *Michelia Champaca* formed the subject of a communication to the North British Branch from Mr. JAMIE, of Singapore ; the "Costus Root" or "Putchuk," used in the East for incense sticks, and the *Liatris odoratissima*, or "wild vanilla," have been described by Mr. JACKSON ; as, also, have patchouli and lavender by other authors. The increased use of true vanilla in Germany, and the curious reason given for it, was recorded only last week. The essential oil known as ylang-ylang is stated by M. GAL to contain an acid apparently identical with benzoic acid, and several oxygenated compounds resembling alcohols, with which probably it forms ethers. The whole subject of perfumes was also dealt with in a paper by Mr. J. PATON.

Probably the chemical preparation which has attracted the greatest amount of attention, certainly that which has given rise to the largest amount of literature during the year has been propylamine, or, more correctly, trimethylamine. A substance under the former of these names, after being introduced into medicine in St. Petersburg, and attracting passing attention in the United States and Italy, fell into disuse until again taken up by Dr. DUJARDIN-BEAUMETZ. Notwithstanding satisfactory reports as to results obtained, it soon became evident that great uncertainty existed as to what the solution used contained, whether propylamine or its isomer trimethylamine, or other compound ammonias, or anything beyond ordinary ammonia. A commission was appointed by the Paris Society of Pharmacy to report on the subject; they identified the substance used under the name of propylamine as trimethylamine, and recommended methods for preparing the solution of more uniform strength, but suggested that the use of the hydrochlorate, which had been prepared as a definite crystallized salt, would be preferable if it gave the same medical results. This plan has been adopted ; but medical men appear yet to be undetermined as to the position this chemical is entitled to take as a remedy. Hydrochlorate of amylamine has also been tested by Dr. BEAUMETZ, and hydrochlorate of propylamine is to be dealt with in its turn. Besides herring brine, several plants, and various decomposing nitrogenous substances from which trimethylamine has been obtained, M. VINCENT has recently reported that the methylamines are produced by the prolonged action of ammonia on acetone during the purification of methylic alcohol. In connection with Dr. BEAUMETZ's experiments, it is interesting to note that early in the year M. RABUTEAU reported to the French Academy that the substitution of the last atom of hydrogen in a salt of trimethylammonium by another molecule of CH_3, converted a comparatively

inactive substance like hydrochlorate of trimethylamine into a powerful poison like iodide of tetramethylammonium. Before leaving the subject of ammonias, we must mention the valuable paper on the rate at which ammonia distils over from weak solutions, by Mr. WANKLYN, and the direct synthesis of ammonia accomplished by Mr. W. F. DONKIN.

Scarcely second in importance as a new chemical remedy stands croton chloral hydrate. Our pages having so recently presented Dr. LIEBREICH'S communication upon this substance, it need only be mentioned here that consequent upon a notice of its action given in the *British Medical Journal* a short time since, a considerable demand for it occurred, which, however, has since diminished. Chloral hydrate—notwithstanding that serious effects have been described as resulting from its continued use—appears to hold its ground, and instances have been given of extraordinary doses administered. Two cases of death from overdose have been recorded during the year, one, singularly enough, of a suicide.

Sulphovinate of soda has come into considerable favour as a gentle purgative, and the changes it was found to undergo led to the publication of a valuable treatise on sulphovinic acid and the sulphovinates, by M. BERTHELOT. Some modifications in the original process for its preparation have been suggested, especially the substitution of the carbonate of baryta by a non-poisonous salt. In the preparation of solutions of magnesia the possibility of using metatartaric acid instead of citric acid has been pointed out by M. LEGER, and there is now a considerable demand in France for metatartaric acid for that purpose. A formula for an effervescing solution of tartrate of sodium has also been given. In connection with the subject of tartaric acid, it has been demonstrated by M. JUNGFLEISCH that it is possible to produce synthetically the varieties possessing rotatory properties, starting from olefiant gas, and without the intervention of any living organism.

The combinations of oleic acid with various metals have been in increasing request, and formulæ for preparing them as well as pure oleic acid, have been forthcoming. The same remark applies to lacto-phosphate of lime, and its preparation as a syrup, or in combination with cod-liver oil.

The comparative solubility of various salts of quinine in water and glycerine was the subject of numerous experiments by M. SCHLAGDENHAUFFEN, and from the published results it appeared that a new salt, the sulphovinate of quinine, was the most soluble. It has, therefore, been thought suitable for hypodermic injection, and has been exhibited in well-defined white crystals at a meeting of the Paris Society. M. SCHLAGDENHAUFFEN also pointed out that tannate of quinine is much more soluble in glycerine than is commonly supposed, and this is corroborated by Mr. BARNES'S note on mixtures containing infusion of roses. We may here refer also to the discussion in our columns respecting the nature of the deposit which forms in tincture of quinine. Another new salt of quinine—the meconate—has been described by Mr. AUSTEN. Meconate of morphia has been recommended by Messrs. T. and H. SMITH as peculiarly well suited for a solution for hypodermic injection. Suggestions have been made for a standard solution of acetate of morphia, and various formulæ have been given for this and similar solutions, but until the method of administering medicines subcutaneously takes a more definite position, pharmacists can hardly hope to have any authoritative formulæ for these preparations.

Preparations of mercury—the mercurous iodide especially—have received unusual attention. M. LEFORT has prepared this unsatisfactory compound by double decomposition, using iodide of potassium and pyrophosphate of soda and mercurous acetate; M. YVON has obtained it in crystals by heating iodine and mercury together in a sealed tube; and Mr. WILLIAMS has suggested an improved method of purifying it as well as of preparing the mercuric iodide. All apprentices who have lost patience and strength in preparing mercurial ointment will thank M. MAGNES-LAHENS for another effort to throw light upon the extinction of mercury in fatty matters. A new preparation, the chloride of mercurethyl, has been the subject of a paper by Professor MAISCH.

Citrate of iron and quinine; and ammonio-citrate of iron, have been dealt with in two valuable papers by Mr. UMNEY. M. GHYSEN has described a new iron preparation which he calls "ferrous mannate;" Mr. BUTLER has published a note on a solution of chloride of iron, and Mr. CREUSE has brought forward a series of new tasteless iron combinations, the nature of which is still under discussion. Nor must M. MEHU'S paper on the tartrates and citrates of iron and their ammoniacal combinations be forgotten.

The notorious uncertainty of strength in solutions of hydrocyanic acid came under the notice of the Pharmaceutical Conference at Bradford, when Mr. GROVES mentioned cyanide of zinc as a salt worthy of attention in this respect. Last week's journal contained a paper on this subject and a suggestion by Mr. TOWERZEY that the cyanide of zinc and potassium would furnish a convenient source of cyanogen. Some interesting results of experiments with cherry laurel water have also been put on record by M. LEGER.

The publication of the new edition of the United States Pharmacopœia, with its numerous fluid extracts, has naturally directed fresh attention to percolation as an operation and to glycerine as a menstruum. The controlling power which glycerine appears capable of exercising over the action of some medicaments—especially astringents—has also been alluded to. Another pharmaceutical operation, the formation of a good emulsion, has furnished a topic for more than one paper. Plaster of paris for suppository moulds, and animal soap, a mixture of stearic and oleic acids, and another of paraffin and theobroma oil, for bases of suppositories, have been recommended by different authors.

Pure stearate of soda has been recommended for the preparation of soap liniment. M. FALIERES thinks that nut oil might play a more important part in pharmacy, and the uses of cherry juice were recounted by Dr. MILLER. Dr. WILKS has spoken of the virtues of copaiba resin. A new formula for liquor bismuthi has been given by M. MEHU. Space will not allow of allusion to all, but amongst the other pharmaceutical novelties described during the year may be mentioned nitrate of zinc as a caustic, a new liniment of glycerate of lime, fluid extract of orange peel, chloroform water, M. LIMOUSIN'S medicated wafers, scales of iodine and blood, iodized tar, carbolized resin cloth, and last but not least, Mr. GERRARD'S phosphoretted resin.

Pepsine—its therapeutic value, and the best modes of preparing and administering it—has been under discussion. Dr. SYMES'S interesting experiments seem to point to Mr. SCHEFFER'S method of preparation as the best and the vinous form of administering it as about the worst. Notwithstanding the doubts recently thrown upon the virtues of this remedy it is probable that much of the disappointment sometimes following its use is due to the uncertain and unsatisfactory way in which it is prepared. Extract of meat has now taken too firm a hold upon the public favour to be much affected by aught said for or against it, but it is noteworthy that perhaps the last production of the late Baron LIEBIG was the defence of this preparation—with which his name will always be associated—that he supplied to our columns last January. Another article of the animal materia medica—cantharides—has been dealt with by Professor MAISCH in his article on Chinese blistering bugs, and the compounds of cantharidin have been described. Mr. POCKLINGTON has examined the colour of the wing cases spectroscopically, and attributed it to chlorophyll, and indulged in ingenious speculations as to the possibility of determining the feeding ground of the insect thereby. Analogous researches to this latter one are those on the chlorophyll bands in the spectrum, by M. CHAUTARD and Mr. POCKLINGTON, and a process for preparing pure chlorophyll has been given by M. HARSTEN.

Many articles on subjects of general scientific interest have appeared in our columns during the year, foremost amongst which must be placed Professor TYNDALL'S lectures on light and Mr. RIGG'S lectures on the measurement of the imponderables, Dr. SPRENGEL'S description of a new method of determining specific gravities, Mr. THORPE'S method of estimating nitric, chloric, and iodic acids, Messrs. GLADSTONE and TRIBE'S new air-battery, and Mr. WILLS' lecture on recent processes for the manufacture of gas for illuminating purposes. Disinfectants, antiseptics, and antiferments have been discussed; an interesting paper on the progress of modern chemical industries has been taken from a foreign source, besides others on the manufacture of potash salts at Stassfurt, and that of bromine in the United States. And to close—but again without exhausting the list—there have been Professor WILLIAMSON'S remarkable address at Bradford, Dr. RUSSELL'S on the colouring matter found in madder, and Professor CLERK MAXWELL'S on "Molecules."

"Of making many books there is no end," and the past year has seen no cessation in the work. Botanists have had Dr. HOOKER'S translation of LE MAOUT and DECAISNE'S splendid work, the concluding volume of DE CANDOLLE'S 'Prodromus,' a fresh edition of DRURY'S 'Useful Plants of India,' and one of BENTLEY'S 'Manual,' besides M. RODIN'S elegant little treatise on the indigenous popular medicinal plants of France, and many others. Chemists have had new editions of FOWNES, VALENTIN, FRESENIUS, and ATTFIELD, and new books from ROSCOE, WAGNER and THORPE. Pharmaceutists have had the new edition of the United States Pharmacopœia, the University College Hospital Pharmacopœia, PROCTOR'S Lectures on Practical Pharmacy, the Year Book, FLUCKIGER'S 'Grundlagen der Pharmaceutischen Waarenkunde,' HOFFMANN'S Manual of Analysis for pharmaceutical chemicals, and FERRAND'S 'Aide-Mémoire de Pharmacie.' Dr. WILSON has published a 'Manual of Hygiene,' and Dr. PARKES a fourth edition of his well-known work on the same subject. And as a relief to the "much study which is a weariness of the flesh" there is Dr. MACLAGAN'S bright and cheerful 'Nugæ Canoræ Medicæ.'

The year has not passed without robbing us of several men whose names are held in reverence by pharmacists. Germany has lost LIEBIG, he who stood head and shoulders above his brethren; France has lost NELATON; America is now grieving over AGASSIZ; and England misses BENCE JONES and CRACE CALVERT. In GEORGE WAUGH and GEORGE DYMOND, men who have done good service to the Pharmaceutical Society at its Council table have passed away, and in JOHN GARLE one who served it faithfully in the examination room.

But we have exceeded the limits originally set for this *résumé*. Numerous as have been the subjects alluded to, many must of necessity be yet unnoticed. We must not, however, omit to express in general terms our obligations for the friendly co-operation and assistance we have received from many quarters in the shape of local news, communication of formulæ etc., answers to queries, and other matters of interest to the trade, either voluntarily supplied or at our request. We appreciate highly the spirit which prompts such efforts to promote the general good, and entertain a hope that it may become much more general, trusting that in time its influence may result in such an increase in the production of original papers on subjects connected with pharmacy that we may cease to appear in this respect at a disadvantage as compared with our continental and transatlantic brethren. It now only remains for us to heartily wish our readers, one and all, a "Happy New Year," and to congratulate them that the prospects of the future appear to have three leading characteristics—better education, increased remuneration, and shorter hours of business.

Transactions of the Pharmaceutical Society.

At a meeting of the Board of Examiners held in London on the 18th of December, 1873, the following Certificates were received in lieu of the Preliminary Examination :—

Certificates of the University of Durham.

Dixon, Richard Dobson .....Sharow.
Naylor, Thomas Hamilton .....Newcastle-on-Tyne.
Taylor, William .....Birmingham.

Certificate of the University of Oxford.

Russon, Henry Albert .....Birmingham.

PHARMACEUTICAL SOCIETY, NORTH BRITISH BRANCH, EDINBURGH.

The second meeting of the present session was held in the Society's Room, St. Giles Street, on Wednesday evening, 24th December, at 8·30., Mr. J. R. Young, President, in the chair.

The following is an abstract of a paper :—

On the Collection and Examination of Potable Waters.

BY DR. STEVENSON MACADAM, F.R.S.E.

The subject of water supply is a very important one, and there are various points regarding the mode of collection and preliminary examination of waters which specially concern pharmaceutical chemists, who may be called upon to take samples for examination, and probably also to give a general opinion as to the purity or impurity of such.

The vessels in which the waters should be placed at the time of collection, and until the chemical examination, ought to be scrupulously clean, and should be washed out twice with the water to be collected before the actual sample is taken. The best vessels for the purpose are Winchester quart bottles, with glass stoppers, but where these cannot be had, then common quart bottles, with fresh corks, may be employed. Stoneware jars are not so suitable, as they are liable to impart certain saline matters to the water, even when they have been carefully cleansed.

In the lifting of the water from the stream or loch, care should be taken not to disturb the banks. A small iron pot, lined with porcelain, and with a wooden handle about five feet in length, will be found very suitable in lifting the water and pouring it into the bottles. If it be desired to lift the water below the surface, say at three or six feet in depth, a galvanized iron cylinder should be used, fitted with tubes and stop-cocks, which can be opened and closed when the cylinder is sunk to the required depth. From greater depths, say 20, 50, 100 or more feet, a galvanized iron cylinder, fitted with valves both below and above, should be quickly lowered with a rope, and thereafter the water may be raised to the surface. In drawing water from a well, the water should be pumped for some time before the sample is taken.

Where the water is taken from a loch or stream, the general nature of the gathering ground should be specially observed. Hill districts as a rule supply purer water than low lying districts. The latter communicate more saline matter and greater hardness upon the water and, as the low grounds are more cultivated, there is more chance of the impregnation of the water by the drainings of highly manured fields. The colour of the water may be observed by lowering a white porcelain plate, or still better, by placing the water in a long glass tube, and looking down through a column of eighteen inches of the water.

The vegetable and animal life in lochs or reservoirs should be noticed. On the banks of all lochs and reservoirs retaining wholesome waters, fresh-water algæ are found attached to the stones, and growing between the stones, whilst distributed through the water during the summer months there are large numbers of "water fleas," principally the *Daphne Pulex* and *Cyclops Quadricornis*. These are very delicate organisms of very minute size, and which can only be seen by looking steadily at a glass full of the water at rest. They can only live in the best natural waters ; are readily killed when any putrifying or sewage matter impregnates the water, or when the liquid is raised to 100° F., or when a little alcohol is added. These vegetable and animal forms are totally different from those found in sewage or impure waters.

The preliminary examination of a natural water may be carried out by the application of the tests for chlorides, viz., argentic nitrate; for sulphates, viz., baric nitrate, and for lime, viz., ammonic oxalate. None of these tests should give more than a faint haziness with the water as collected. When chlorides are abundant they may indicate sewage contamination, and when lime is large the water must be of a hard nature. The organic matter may be of three sources—peaty, marshy, or sewage origin. The first is comparatively harmless, whilst the second, and still more the third sources are positively hurtful.

The action of water upon lead pipes and sheet lead is best determined by enclosing the water in a short length of lead pipe or in a small cistern, and thereafter testing the liquid by dihydric sulphide.

The detailed analysis of a water is necessarily very complex and requires much time and skill.

After some remarks by Dr. Nicol and Mr. Mackay, a vote of thanks was proposed by Mr. Gilmour to Dr. Macadam for his very interesting paper. This was seconded by Mr. Ainslie and carried with acclamation.

The Secretary presented in the name of Professor Douglas Maclagan, the following contributions to the museum :—Maté cup or calabash, used by the natives of Paraguay, for preparing tea ; silver sucking-tube, used in connection with the above ; an oval pocket medicine-case, containing several compartments, used by medical practitioners in Japan.

The Secretary proposed a hearty vote of thanks to Professor Maclagan, which was carried unanimously.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The third monthly meeting of the above Association was held in the Philosophical Hall, Leeds, on Wednesday evening, December 10th, 1873, the President, Mr. F. Reynolds in the chair. Several new members and associates were proposed for election by the honorary secretary (Mr. J. W. Longley), after which a very interesting lecture was delivered by Mr. Louis Siebold, Manchester, on "Fermentations."

Mr. Siebold, in the first place, alluded to the various theories on the action of ferments, showing how difficult it was to explain the numerous different phenomena termed fermentation by any one theory only. He then dwelt on the properties of malt, and its active principle maltine, which he stated to be 200 times stronger in its action upon starch than the article called diastase, which was formerly considered the pure active ingredient in malt. One part of pure maltine would convert 200,000 parts of starch into dextrine and sugar, under suitable conditions. This remarkable and powerful substance was obtained by macerating ground malt with lukewarm water, filtering and precipitating with a solution of tannic acid. Having fully explained the details of saccharine fermentation, the lecturer then proceeded to demonstrate the nature, causes, and results of the alcoholic and lactic fermentations by the description of a series of experiments, showing also that the former hardly ever proceeds without being, to some extent, accompanied by the latter. As well known instances of alcoholic fermentations Mr. Siebold cited the manufacture of beer and spirits, and gave a detailed de-

scription of these important branches of industry, showing it to be the distiller's main object to convert the sugar of the wort as completely as possible into spirit, whereas the brewer does not carry on his fermentation so far, but wishes to retain some of the sugar and dextrine, in order to give flavour and body to his beverage. The lecturer contrasted the English method of brewing with that practised in Bavaria, explaining the main difference to consist in the temperature at which the fermentations are conducted. The English brewer ferments his wort at about 65° F., and finishes it in about a week; the Bavarian brewer requires about six weeks to complete his fermentation which proceeds at a much lower temperature (45° to 50° F.), and in this case, its yeast, instead of separating on the surface, sinks to the bottom and carries down with it every particle of glutinous matter, which, if kept suspended in the beer, would render it so liable to acetification. Bavarian beer, Mr. Siebold said, was richer in body (sugar and dextrine) and in flavour (oil of hops) than the English beer, but the latter was much richer in alcohol. Having given a description of the yeast plant (*Mycoderma cerevisiæ*), and its development, the lecturer next referred to the German and Dutch yeast, as important articles of commerce, of which enormous quantities are used in Yorkshire and Lancashire by bakers, who prefer this pressed yeast to the bitter yeast obtained from the breweries. The fact that this article was imported from Germany and Holland, and not made in this country, had led many people to the erroneous conclusion that, owing to peculiarities in the atmosphere and water, it could not be made here. This idea was quite fallacious, because British distillers might easily skim off yeast from the fermenting wort, wash it by decantation, and press it, and thus obtain an article equal to the best imported. But if they were thus to remove quantities of yeast during the height of fermentation, the produce of spirit would be diminished, and this he could not afford under the present excise laws. In Germany, where the duty on spirit is much less than here, the distiller can relinquish some whiskey in order to obtain a supply of yeast. Either the whiskey is his main product and the yeast merely the by-product, or the reverse is the case. In the latter case in which yeast is the main product, the lactic fermentation is caused to proceed for some time (by keeping the wort at a temperature of between 112° and 95°) before cooling and beginning on the alcoholic fermentation. In this way the product of yeast is increased, but that of spirit is decreased. For this reason the article known as German yeast cannot be profitably manufactured in this country, unless, indeed, a method be found out by which so large a quantity of good active yeast could be obtained from grain, that the distilled liquor could be thrown away, or used for the manufacture of vinegar, instead of distilling spirit from it, and yet a profit realized. The lecturer said he had nearly succeeded in doing this, and showed a lump of yeast of excellent quality made by him in a way which yielded 40 per cent. of yeast from the malt and grain used. This yeast was not of course composed entirely of the *Myeoderma crevisiæ;* but it was equal in strength to the imported article, which generally contained much starch. Mr. Siebold next alluded to fermentations which proceed without the presence or addition of an active ferment provided, and he freely admitted, and quoted experimental proof of the fact that such fermentations are caused by germs floating about in the air, and that air freed from such germs by filtration through cotton wool cannot bring on fermentation in any liquid. The acetic and butyric fermentations, and the action of emulsin upon amygdalin formed the concluding part of the lecture, and were as fully explained as time permitted."

Many questions were asked of Mr. Siebold at the conclusion of his lecture, after which a hearty vote of thanks was accorded him on the motion of Mr. W. Smeeton, seconded by Dr. Heaton.

LIVERPOOL CHEMISTS' ASSOCIATION.

The sixth General Meeting of this Association was held at the Royal Institution, on Thursday evening, the 18th December, 1873; the president, Dr. Charles Symes, in the chair.

Mr. Henry J. Blackbour was elected a member, and Messrs. Arthur C. Jones and Edward E. Rowlands, associates of this Association.

The following donations were announced:—The current numbers of the PHARMACEUTICAL JOURNAL, *The New York Druggists' Circular*, *The Proceedings of the Liverpool Literary and Philosophical Society*, *Journal de Pharmacie et de Chimie*, *Proceedings of the Liverpool Philomatic Society*, and lists of objects ethnological, literary, and antiquarian in the collection of Rev. A. Hume, D.C.L., LL.D.

After the question-box had been opened, and the question contained therein answered, and the miscellaneous communications had been received, Dr. Charles Symes gave an address on "Study."

[This address is printed *in extenso* at p. 529 of the present number.]

Mr. James T. Armstrong, honorary secretary, read a paper on "Pharmaceutical Education."

In the discussion that followed and in which many members took part, it was felt to be very unsatisfactory that so few students were present at the meeting, although 500 circulars had been distributed in the town to the following effect:—"The Council of the Liverpool Chemists' Association are desirous that the subject of pharmaceutical education should not be lost sight of; and for the further consideration of the best means by which they can promote the interests of students in this direction, they have arranged to devote the greater portion of the time at the disposal of the meeting on Thursday evening, December 18th, to the further development of the scheme."

A vote of thanks to Dr. Symes and Mr. James T. Armstrong for their valuable papers brought the meeting to a close.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

A special meeting was held on Dec. 19, 1873, Mr. H. J. Masters, President, in the chair. Mr. G. C. Druce, Secretary, having read the minutes, and referred to some specimens of materia medica, presented by Mr. S. N. Maxwell, the President proceeded to read a paper sent by Mr. W. H. Stott (a corresponding member) on Caoutchouc. The botanical sources were first enumerated, and their habitats named, the methods of obtaining it described, and samples of Pará and African rubber containing various impurities, were shown; the chemical composition and the various solvents explained, the powerfully smelling highly refractive bisulphide of carbon being evidently used in the manufacture of some of the articles exhibited. Explanations were then given of the method of purification, and samples of pure caoutchouc pointed out, to illustrate how completely the purification from stones, dirt, etc., had been carried by the process. Various patents connected with the manufacture and methods for preparing hose piping, solid india-rubber bands, etc., were described, and enamelled rubber shown which remained permanently flexible in all ordinary temperatures. Dentist's rubber was also exhibited, and its applications explained; and the almost universal uses of india-rubber further illustrated by horse shoes, watch chains, machine valves, medical and pharmaceutical appliances, etc., etc. Mr. Stott concluded his paper by wishing every success to the Association, and regretted the distance that rendered his attendance impossible.

A hearty vote of thanks was passed to Mr. W. H. Stott, and to Mr. McLauchlan, of Edinburgh, and Mr. Oliver, of Manchester, for loan of specimens to illustrate the paper.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

On the Energies of the Imponderables, with especial reference to the Measurement and Utilization of them.

BY THE REV. ARTHUR RIGG, M.A.

Lecture VI.

The Energy of Light, especially with reference to the Measurement and Utilization of it.

(*Continued from page* 524.)

That kinetic energy, of a character as important as any found in the other imponderables, exists in light, may be inferred from the fact that if light be extinguished by falling upon such a surface as lamp-black the stoppage of the ray—the consequent absorption of it—produces heat. The motion of the light has been converted into a motion called heat. If, however, the light be stopped by some of the salts of silver, then this motion is converted into chemical changes. The heat and the change are consequences of an energy in light. Nor is it only when influencing different substances that light effects different results. Take, for example, carbon, and note how varied is its behaviour towards light and electricity. When in the form of a diamond, then carbon transmits light and stops electricity; but when in the form of coke, into which the diamond is transformed by heat, then carbon transmits electricity and stops light. No cause has yet been assigned to that which seems almost universally the case, viz., transparent bodies stop electricity; carbon, the metals, and opaque bodies, stop light.

It is a popular opinion that sunlight or sun-brightness extinguishes household fires. May this not be from some hitherto undiscovered energy of solar light, for it is not the heat of the solar beam which thus causes the carbonaceous fuel in our grates to become dim? If the energy of light is to be studied and its value to be estimated and brought within our powers of utilization, it must be done through agencies widely different from those hitherto named. Looking at the order of creation, and watching the behaviour both of the animal and vegetable kingdoms, it seems that through them must be had our knowledge. Allusion has been already made to these. It may be well to investigate more closely the relation of the energy of light to them. No mode of measuring the energy of light in relation to animal life has been suggested, and yet its energy in this respect is more strikingly extraordinary than that of the other imponderables. Take one illustration only. When you knock at the door of a friend's bedroom and receive no answer, how loud, and louder still, becomes the rap ere he awakes. How often are stories told at the breakfast-table of night noises unheard and unheeded by those asleep. Let but a beam of sunlight, or even candle-light, shine on the closed eyelid, and by some mysterious energy on the well-covered retina the sleeper awakes.

The worlds of animal and vegetable life awake and work mainly in consequence of some such hitherto unmeasured energy of light as that now alluded to.

Turn to vegetable life. With respect to this, Professor Helmholtz remarks:—"Take a seed, then look at the tree, and consider from what source has been derived all the material of the tree. Burn the seed, burn the tree, whence comes the different amounts of heat? Chemistry tells us that the heat is produced from carbon, oxygen, and hydrogen; these are derived from carbonic acid and water. Plants cannot obtain these except under the influence of solar light." *

After plants have utilized the light it is not usable again for the same purpose. Take two screens of dark paper with holes in them—say half an inch in diameter—one hole covered with letter paper, the other covered with a green leaf; put pieces of photographic paper behind them, and expose to daylight or magnesium light. Beneath the letter paper is a dark spot—an image of the hole—beneath the leaf is no discolouration. The leaf has utilized the light; the letter-paper has not. The energy of that which passes through the leaf is spent, of that passing through the paper is not spent.

Although in plants a variety of operations take place, which must in some way unknown to us store up a large amount of energy, and although there is to all practical purposes no heat developed, yet we know well that there are thus stored up chemical tensions which give out their true physical value in heat and mechanical work, as the tissues of the plants are destroyed by a process of animal or other combustion. We are as yet quite at a loss to know how the plants do this, or by what elements in light, properly so called, it can be so completely and perfectly done.

Sir John F. W. Herschel, in a paper in the *Philosophical Transactions* for 1842, gives a most interesting account of an extended series of experiments on the action of the solar spectrum on vegetable colours. He operated upon the juices of the leaves, and also upon some of the resinous compounds of plants, and his conclusions have since been confirmed, viz., the action of the solar spectrum is confined to the visible region of it. The chemical or actinic rays act with chief energy upon silver or inorganic compounds, but are, for the most part, powerless upon vegetable colours; so also are the heat rays, or those below the extreme red. Thus Sir J. Herschel, in 1842, separated by a very broad line the luminous portion of the solar beam from the other parts of it. That the energy of the luminous portion of the solar beam is requisite ere plants can exercise their vital functions is well known to all who have made any of the experiments which show the extent to which, under the influence of that energy, plants can effect chemical changes. These changes take place most abundantly in the yellow, or in what our eyes would call the brightest portion of the spectrum.

The energy of this luminous portion may be gathered from experiments made during the last few years by an American. Flowering plants were placed in different colours of the spectrum, and it was soon observed that their action upon carbonic acid gas depended upon the colour of the spectrum. He took a flower, and under the action of a red ray he did not get one cubic inch of gas off, but only 0·33 of an inch. As soon as he submitted that same plant to the orange ray, he got 20 cubic inches, and from the yellow he got 36 inches. But when the same plant was put under green, blue, indigo, or violet, he could not get the plants to act at all in the purification of carbonic acid gas, thereby showing pretty clearly the energy of light in the luminous portion of the spectrum as regards growing plants.

The decomposition, then, of the carbonic acid is effected chiefly by the energy resident in what may be called the yellow rays. It is a somewhat noteworthy coincidence that the eye generally fixes upon the yellow portion of the spectrum as that possessed of the greatest brilliancy; it is also noteworthy that the spectroscope reveals *that* in the atmosphere (viz., sodium) which, on being burnt, always produces a yellow band. It is, to say the least, curious that we cannot get heat by combustion in the air without the production of this yellow light.

It seems, then, that plants and human eyes are most sensitive to the same portion of the solar beam, and this portion is in light properly so-called. May it not be that yellow light is most acceptable to the plant, and most impressive upon us, because carbon is in both cases involved—the retina of the eye being a carbonaceous compound. Had the retina been a salt of silver, the greatest brilliancy would perhaps have seemed to be in the blue rays. This identity in composition between the plant and that part of the animal on which light exercises its chief energy, suggests that in the influence of light on plants (whatever that may be) must be sought the data from which to

* Helmholtz, *Medical Times*, 30th April, 1864, p. 473.

deduce a mechanical rather than a chemical measure of the energy of true light.

The contrast of this energy in its effect upon the metal salts and plants is especially marked as regards time. On the metal salts it may be said to be instantaneous, but on the gums and resins of plants exposure for days and months to clear sunshine is needed to produce any marked action. A patient watching and building up on such scant data as may hitherto have accumulated, will, some day, produce the dynamical equivalent of light.

There is one experiment here which will probably bear out what has been said. You are probably aware that plants, by receiving light, manufacture what we name colour. They manufacture the green material out of which the leaves and the general character of the plant is formed, and that green material is called "chlorophyll." This vessel consists of two beakers with the bottoms cut off, one about an inch and a-half larger than the other. The glass cylinders then left are fixed with marine glue in a wooden ring. The space between them is filled with a solution of chlorophyll, obtained by steeping for forty-eight hours common parsley in any cheap spirit, such as methylated alcohol, and then filtering. It therefore contains the green colouring matter of leaves. This green colouring matter has been made almost exclusively by the yellow portion of light, and not at all by the chemical portion, and, with a view to show this, we must refer to the spectroscope view, namely, that chlorophyll being really manufactured by yellow light, is practically saturated with yellow, and can take up no more. Thus, if a vessel containing a saturated solution of salt had a piece of salt dropped into it, that piece would not dissolve. If, now, there be placed inside this chlorophyll solution anything that produces these other coloured rays, we shall probably find that, whilst sensitive to the one colour, the solution will not be to the other. Here is some lithium, which shall be placed on a little piece of platinum wire and burnt, so causing a beautiful red flame. On putting the flame within the hollow cylinder containing the chlorophyll, you will see the yellow beam alone can pass through the green solution. The green solution having been made with that yellow beam, is thoroughly saturated with it, and can take up no more, but it can take up the other coloured rays, and therefore they do not pass through. In that portion of the flame rising above the green solution, you see the red-coloured flame. Thus, the yellow colour is consequent upon the saturated solution of chlorophyll, and therefore nothing but yellow can come through. The absorption of this yellow portion of the solar spectrum, by the vital energy of the plant and utilizing the same in its composition, might have been inferentially suspected from the fact that leaves become yellow in the autumn, thus restoring in their death what, for want of a better term, we must call "the colour" they had absorbed in their life. The yellow colouring matter of the autmnal leaf is called "xanthophyll." Probably, as "chlorophyll" and "xanthophyll" are more examined and known, so the energy of light may be more appreciated and measured.

This examination of light, properly so-called, has led to another contribution towards an estimate of its energy. That plants grown in the dark are drawn to any crevice through which light enters has long been known. But it has not been so often observed that young plants bend the stems to the indigo portion of the spectrum, *i.e.*, if grown in red, or yellow, or green, they bend in one direction, but if in the violet, then in another direction. They recover the vertical position in darkness. May it not be that the energy in the indigo of the sky produces the vertical character of stem?

Thus light proper produces motion, and so assimilates itself to heat and electricity. The complementary colours of red and green (see the chromatic circle of Newton on diagram) are those which represent the relation of colour between the animal and vegetable kingdoms. Plants reject green and absorb its complementary (red). The blood of animals is red, therefore animals should have green supplied in the fields and in our furniture.

That this energy of light is utilized in vegetation, and that practically we recognize it, may be noted in the ingenious modes by which in our small gardens we try to imitate nature. The nailing of branches on walls—an advance on this in espaliers on lattice woodwork, and the still more recent practice of cutting out the inner branches of orchard apple trees; also training others to hang in umbrella fashion, or the splaying of gooseberry bushes as funnels, all these are devices to permit of the more universal exercise of this unmeasured energy of light.

Light influences the colour of animals and the plumage of birds in tropical climates. In the arctic regions polar bears are white, like vegetables grown out of the influence of light—arctic foxes are white in winter and brown in summer. Fishes inhabiting deep water chiefly are grey, or brown, or black; those living near the surface are of rich and various colours.

That the measurement of the energy of true light should be accomplished by an appeal to its influence on organized matter, and not on inorganic, is a testimony borne by all observations and even suggested by the records of Creation, the earth having been prepared by the creation of light for animal and vegetable life even before they were formed upon it. This measurement has not yet been made.

Parliamentary and Law Proceedings.

The Adulteration of Mustard.

On Wednesday, Dec. 24, Thomas Symth, druggist, 178, Islington, Liverpool, was summoned before Mr. Raffles, under the Pharmacy Act, 1868, and the Adulteration Act, for having sold as unadulterated a quantity of mustard which was adulterated.

Mr. Bremner appeared for the defendant.

Mr. Atkinson, deputy borough solicitor, said this was the first case of its kind, but it was one of some importance to the public. It was a serious thing for druggists to sell anything but pure mustard, as he was told that in many cases where it was prescribed by medical men for poulticing purposes death might ensue if the article was not pure. He, however, wished to say that he did not believe Mr. Smyth had been guilty of the smallest moral fraud, as the article which he had sold for mustard was, in fact, dearer than the genuine article.

Mr. Bremner: And less profitable.

Mr. Atkinson observed that had Mr. Smyth been a grocer he did not think Dr. Browne, the public analyst, would have issued a certificate, but, being a druggist, it was essential in the interests of the medical faculty and the public that the druggists should regard mustard as a drug, unless they stated that it was a condiment. On this occasion the mustard supplied was a very wholesome mixture, and contained a species of farina.

Mr. Raffles: But you mean to say it is wanting in medicinal qualities?

Mr. Atkinson: That is so; as a drug the article is adulterated.

Mr. Bremner: Then the purchaser should ask if it is pure.

Mr. Atkinson said that so satisfied were the prosecution there was no fraud, that he would take the unusual course of asking for only a small penalty.

Mr. Bremner asked that the summons might be withdrawn, as the case would in future be a warning both to the public and the druggists.

John Fitzpatrick, nuisance inspector, proved the purchase of the mustard analysed. The defendant made up the packet in his presence, but put no label on.

Mr. Bremner: Did you ask for mustard only?

Witness: Yes.

Mr. Bremner: Did you say you wanted it for medicinal purposes?

Witness: No; I said nothing about it, but merely asked for mustard.

In answer to a further query, witness said he believed there were four sorts of mustard.

Dr. Browne said he had analysed the mustard purchased by the last witness. He found it adulterated with wheat flour. In the British Pharmacopœia mustard was a drug, and was directed to be made from the seeds of *Sinapis nigra* and *Sinapis alba*, and to be free from farina. If not pure its medicinal effects were lessened.

Mr. Bremner, on the defendant's behalf, did not complain of the summons having been issued, as probably it was advisable that such a summons should be taken out against some druggist for the purpose of raising the question, and also for the purpose of bringing before the public the position in which druggists were under the Act. Persons, no doubt, went to druggists, as such, to buy drugs, but it was a notorious fact that in addition to drugs many druggists sold articles which were in themselves articles of food. He thought that a public officer, when about to perform a public duty, should ask for what he wanted, and not ask a question which certainly bore a double interpretation. If the officer had asked for a pure article to be used as a drug, he would have obtained it.

Mr. Atkinson observed if that had been done, the object of the inspection would have been defeated. They must ask the question in the same terms as would probably be employed by a poor woman who wanted it for a sick child.

Mr. Bremner said that would be just the case in which pure mustard would be asked for.

Mr. Raffles did not think everybody ought to ask for mustard for medicinal purposes when they required it for that purpose, but at the same time thought that when a person went into a druggist's shop and asked for mustard, he was bound to have the pure article. The case was made out, but it was not one where he should inflict a large penalty. The defendant was then fined 5*s.* and costs. —*Liverpool Mercury.*

Notes and Queries.

[379.] DEVONSHIRE OILS.—The following is a receipt frequently used as Pyne's Devonshire Oils in Somerset and Devon :—

℞	Sp. Camph.	℥ss.
	Sapo Mollis.	℥iv.
	Ol. Terebinth.	℥ij.
	Tr. Opii	℥ss.
	Bol. Armen.	℥iij.
	Liq. Ammon. F.	℥j.
	Aquæ Bullien	℥xx.

M.

H. W. Boothby.

[380.] DATE'S OINTMENT.—I send you a formula for "Date's Ointment," as given me some years ago by a Bristol chemist :—

℞	Hydrarg. Ammon. Chlor.	℥xss.
	Bol. Armen.	℥vj.
	Adipis Ppt.	lbix.
	Ceræ Alba	lbij.
	Ess. Limon.	℥i.
	Ol. Origan.	℥iss.
	Ol. Lavand.	℥ss.
	Ol. Olivæ	℥ss.
	Liq. Potass.	℈j.
	Aq. Rosæ	℥ss.

M. S. A.

W. Wilkinson, *Manchester.*

[381.] MEDECIN DE LEROY.—Having noticed in last week's Journal an inquiry from Mr. Fingland respecting the composition of "Médecin du Roi," I think with you that he is mistaken in the name, for I have inquired of several pharmaciens here, and they none of them know it. The "Médecin," or as it is more frequently called, "Purgatif de Leroy," of which you have given Dorvault's formula, is frequently sold here and is a very popular purgative.—Atterton Crundall, *Brussels.*

Correspondence.

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

Voluntary Assessment for the Benevolent Fund.

Sir,—I have read Mr. Barclay's letter in the Journal, wherein he proposes a Voluntary Assessment Benevolent Fund, to be set in force by each member and associate of the society making a voluntary payment of 4*s.* and 2*s.* respectively over and above their annual subscription to the Society.

As relief from the Benevolent Fund is open to all alike, I think a scheme in which all unite would be preferable. I therefore suggest a voluntary assessment on the yearly returns of his business by each member of the trade of, say, 1*s.* on every £100 above £300 per annum. By this means I think a very large return would be added to the fund, and each one would be giving as Providence had blessed him.

I think some such scheme as this should meet with favour throughout the trade.

J. K.

Sir,—Some months since you were kind enough to insert a few remarks from me on the desirability of some *unusual* effort being made towards increasing the Benevolent Fund.

The subject, however, seemed too little exciting apparently to attract any attention or awaken any interest at that time.

It has therefore been with feelings of pleasure that I have read the remarks of Mr. Rimmington and others, and am now hopeful that some plan may be adopted.

It is quite useless these letters appearing at detached intervals of time—what we want is decided action of some sort at once.

Were Members or Associates of the Society alone eligible as recipients of relief, there would be no objection, perhaps, to Mr. Barclay's proposal, but if all Registered Chemists and their widows have an equal claim upon the fund, then I consider the method proposed as a very unfair one, and think it will be obvious that the plan previously suggested of an appeal in each city and town, to the members of the trade individually, is the one which should commend itself as the most fair and most reasonable.

One Who Has Known the Drug Trade More Than Thirty Years.

Salt of Sorrel.

Sir,—The 17th section of the Pharmacy Act says : "It shall be unlawful to sell *any* poison, either by wholesale or by retail, unless the box, bottle, vessel, wrapper, or cover in which such poison is contained be distinctly labelled with the name of the article, and the word poison, and with the name and address of the seller of the poison."

Now in this town almost every grocer sells "salt of sorrel," which all druggists (and even the public) know is a poison, and which they can do with impunity, without either name or address, and with great danger to the lives of the subject, because it is not included in the schedules of the poison list.

Surely the list of poisons requires an "over-haul" when this greatly used article is left out.

I also think a few alterations would not come amiss in the list ; for instance, we can sell gallons of laudanum and sol. muriate of morphia by merely putting on a label marked with the name of the article, the word poison, and the name and address of the seller, whereas if we sell six grains of muriate of morphia, we require to put in the poison-book the name and address of the purchaser, purpose for which it is required, etc. Why there should be any difference in the selling of the above, and some other things in the list that I could quote, I really do not know, as the one will kill as well as the other.

H. F.

Helensburgh, N.B., 22nd Dec., 1873.

Test your Opium.

Sir,—Travellers tales are proverbially subject to discount. I have recently discounted two which it may be advantageous to the trade to have repeated.

A month or two ago a pharmacist with whom I had not previously had any dealings led me to believe that he held a few chests of fine Turkey opium, which he could supply at some shillings a pound less than quoted in the wholesale lists, and thus induced me to buy.

A few days afterwards another traveller called, and without any mention of my purchase he quoted opium, and mentioned incidentally that Messrs. Ferris of Bristol, and Messrs. Southall of Birmingham had both recently bought good-looking opium which they found was not fit for medicinal use, and he did not know what had become of the drug which they rejected.

As I said before, I discounted both these stories, but as I habitually test all my opium there was no fear of a bad parcel escaping detection. When the parcel came under examination, I found it was part rough and part smooth, and I thought it a point worth determining whether they were good and bad mixed together to get the bad off hand. (I need hardly mention that I did not obtain the opium from either of the firms mentioned.)

I was surprised to find that *both kinds were bad*, the yield of morphia being *about* 3 *per cent.*, there being a portion of colouring matter which was more than usually difficult to separate.

The opium was of course returned to the pharmacist from whom it came, and the analysis was entered in my notebook, with a memorandum that the dealer was very unwilling to take the parcel back, and thus the matter was gradually passing out of mind till, on receipt of this week's Journal, I find two of the partners in the firm of Ferris and Co. giving their experience of bad opium at a meeting in Bristol, Mr. Townsend saying that he found less than 3 per cent., and Mr. Boucher having found less than 2 per cent. They describe the sample as having a very good appearance, and the discrepancy between their statements agrees with my difficulty in obtaining the precipitate in a condition in which it could legitimately be called morphia. The results of four determinations gave me—

Smooth Opium:

A . . . . . 3·5.
B . . . . . 3.3.

Rough Opium:

A . . . . . 4·0.
B . . . . . 4·1.

But all these contained so much colouring matter, that I estimate the morphia as being under 3 per cent. in each case.

One remarkable feature in this sample of opium, supposing Messrs. Ferris's to be the same as my own, is the great increase in value between the time it left their hands and came into mine.

To them it was quoted 8*s.*, against a market price of 21*s.*, to me it was quoted 24*s.*, market price being 30*s.*

From these two tales let us draw two morals; first, *always test your opium;* second, *never deal with a firm who will hesitate to take back an unsatisfactory article.*

BARNARD S. PROCTOR.

Grey Street, Newcastle, Dec. 26th, 1873.

A Psychological Curiosity.

Sir,—On Sunday last I was disturbed in my afternoon's nap by the following prescription being brought to me to dispense:—

℞

Potass Bicarb. . . . . ℥ iv.
Spir. Æther. Nit.
Syr. Tolu āā . . . . . ℥ iij.
Mist. Camp. . . . . ad ℨ xii.

M.ft. Mist. Take a 12th part every four hours with equal parts of the Acid Mixture—

℞

Acid. Citric. . . . . ℥ iiss.
Aquæ . . . . . ℨ xii.

M. "The Acid Mixture."

When in reply to my customer's question, How much? I answered—five shillings, he stared at me. You can imagine my staring at him in return when he said: "I have the same prescription made up by my medical attendant in the country for *one shilling!*" Convince him it must have been a mistake I could not, as he could show me the bill, etc., and he evidently left with the idea that I was a "rogue," or that his doctor was a "fool."

I might say that half-a-crown is the recognized charge for a twelve-ounce mixture at the West-End; and, although comparisons are odious, why should Sir William Gull charge two guineas for a consultation when a country doctor might only charge two shillings?

Is there no remedy? Can the Pharmaceutical Society do nothing to put a stop to this evil which corrupts the pounds, shillings, and pence of the pharmaceutical chemist?

I enclose my name and address, and beg to subscribe myself.

A. A. A.

Chemists' Assistants' Association.

Sir,—In addition to a Chemists' Assistants' Association, I would propose that a sort of club be formed for the readers of daily papers, and for amusements.

It would, I believe, prove a great boon to many young men of our profession, as it would be the means to a great extent of keeping them from public houses, music halls, and other popular places of resort, all of which we are fully aware have an evil tendency. An association of the kind proposed is becoming more and more necessary every day. I would therefore strongly urge my fellow assistants, for their own benefit, to form one at once, and not allow the project to be nipped in the bud, as has been the case previously.

We have only to look through the list of advertisements in our Journal to form a correct idea of the paltry salaries that are from time to time offered to qualified men; for instance, such as the undermentioned appeared only a short time ago:—

In town; a gentlemanly assistant of good address and obliging manners; must be neat, etc.; produce unexceptional references as to ability and character. Age from 22 to 30. Enormous salary of £40.

All I can say is that we have it in our own hands if we but unite together. Examinations must be passed to qualify us as pharmaceutical chemists; and then our position demands more remuneration for the care and trouble we are expected to exercise to our employers, setting aside the long hours that we have to devote behind the counter.

At present, as regards salaries, our positions are no better than the common labouring man or policeman, if so good. They, I am informed, earn on an average 30*s.* per week, and, in many instances, are only expected to do eight hours' work a day.

Let me, before concluding, remind my fellow-assistants of the old motto, which they no doubt have so often heard:

"Unity is Strength."

TRUTH.

Homœopathic Concentrated Poisons.—We beg to acknowledge the receipt of letters on this subject from Dr. George Johnson and other Correspondents, and regret that we are compelled to postpone their publication until next week.

"*Excelsior.*"—The new bye-law (section 10, clause 16), as approved by the Privy Council, says, "After the 31st day of December, 1874, no person shall be admitted to the Major or Minor examination who shall not have attained the full age of twenty-one years." (2) It would probably prove sufficient, but in studying any subject it is advisable if possible, to consult the works of more than one author. (3) Ganot's 'Physics,' translated by Atkinson, or Deschanel's 'Natural Philosophy,' translated by Everett.

T. Gresty.—The Pharmaceutical Journal would be supplied weekly, post free, for about 5*s.* per quarter by the publishers, Messrs. Churchill, or might be obtained through any bookseller. Members of the Pharmaceutical Society are entitled to it, free of charge. Particulars respecting applications for membership may be had by applying to the Secretary, Mr. Bremridge, 17, Bloomsbury Square.

Hydrocyanic Acid in Coloured Bottles.—We have received a communication from Mr. Ashton supporting Mr. Stoddart's condemnation of blue glass bottles for holding hydrocyanic acid, and saying that yellow glass would be the best as it interrupts all the chemical rays of light.

Communications, Letters, etc., have been received from Messrs. Place, Brown, Abraham, Howard, Ashton, Freeland W. H. Smith, Inquirer.

THE MEDICINAL EXHIBITION OF PHOSPHORUS.

BY A. C. ABRAHAM.

In the PHARMACEUTICAL JOURNAL of December 6th appeared an article by Mr. Gerrard, in which he recommended a method for combining phosphorus with resin for the above purpose.

The process involves the application of a strong heat under circumstances extremely inconvenient and dangerous to the operator, and calculated to deteriorate the product by the oxidation of the phosphorus, and by its conversion into the amorphous form.

To obviate these disadvantages I would propose to use some resin fusible below the boiling-point of water, and also sufficiently heavy to sink in that liquid. Balsam of tolu will be found to answer both these requirements, and by its use the combination can be effected entirely under water. Experiment has shown that four grains of phosphorus are perfectly dissolved by 96 grains of washed tolu, if melted together under water and well stirred.

The preparation so made, when examined microscopically, does not show any particles of undissolved phosphorus, and when seen in the dark and rubbed between the fingers, it gives off a perfectly *equally distributed* light.

This preparation may, therefore, be formed into pills, with every confidence in the equal distribution and activity of the phosphorus.

Liverpool.

THE MICROSCOPE IN PHARMACY.*

BY HENRY POCKLINGTON.

(Continued from Vol. III., p. 992).

EUCALYPTUS GLOBULUS (*Continued*).

The colouring matters of the leaves of the Eucalyptus, although somewhat complicated, are by no means so numerous, or so complex and varied in their distribution in the leaves at different seasons as in many other plants, notably in the Cinchonas. The three chlorophylls (for definition of these terms I must refer the reader to my *résumé* of Mr. Sorby's researches, published in No. 182 of this Journal) are represented, but in quite different proportions. In freshly gathered leaves blue chlorophyll and chloro-fucine are in much greater proportion than in the dried leaves in which the blue chlorophyll appears to be deoxidized into quite another substance, of which the relations are not at present known to me. The chloro-fucine also partially disappears from the dried leaves by changing into a peculiarly yellow amber-coloured substance, much resembling one of the chromules of the bark. The yellow chlorophyll appears to remain unchanged. Of the xanthophylls little can be said. Orange xanthophyll appears to predominate, but nothing approaching an accurate estimation of their† relative proportions can at present be made. The colours of the erythrophyll group do not appear to be present in either the fresh or dried leaves, neither have I succeeded in producing them artificially. Various modifications of the chrysotannic series may be detected by carefully removing as much as possible the other colouring matters from an ethereal solution; they appear to be products of a substance very similar to pyrocatechin in many of its reactions, and susceptible of very various colour changes under the action of oxidizing or reducing agents and of nascent hydrogen, but as to how far the presence with it of a small residuum of blue chlorophyll is essential to the production of these changes I am not at present in a position to say. The other colouring matters present are in small proportion, and so intimately united with those named that their isolation is not, I think, possible, even in an approximately pure condition.

Of the colouring matters of the bark I much prefer saying very little beyond this, that yellow chlorophyll and an unnamed yellow substance are the more important. Many months of careful observation will be necessary before much can be affirmed of the modification the colouring matters of the leaves undergo, before they find their way, as some of them apparently do, to the bark, and what I have hitherto been able to learn will form the subject of a separate notice of the colouring matters of the leaves and bark of *Cinchona succirubra*.

CINCHONÆ CORTEX.—The barks of the cinchonæ now alone remain unnoticed in these articles, and should long occupy us, but Mr. Howard has so thoroughly worked out the subject, that on looking over my own notes I find there is absolutely nothing to say that he has not already said, with the advantage of accurate woodcuts. For the benefit of those who have not access to Mr. Howard's magnificent microscopical illustrations of Pavon's work, or even his various contributions to this Journal, it may perhaps be worth while to give a general outline of the structure of the three barks most commonly met with, and a note or two as to their preparation for microscopical observation.

The red and yellow barks are frequently very difficult of examination, on account of the toughness and distribution of their liber; but good sections may be cut with moderate ease if a small piece of the bark be soaked for a few hours in a strong solution of gelatine, kept just warm enough to be fluid. The gelatine may be removed from the section by immersing them in warm water, or may be allowed to mix with the glycerine or gelatine medium, if these be used. Tolerably good sections may also be cut if the bark be kept in a damp place for a few days, and these are better adapted for examination when it is desired to study the various cell contents than those obtained from a macerated specimen.

Cinchonæ Rubræ Cortex.—The structure of this bark varies very considerably in different specimens, especially, as Mr. Howard has shown, in those of the renewed growth, after previous barking; but the prominent characteristics are numerous well formed and very tough liber cells, in the midst of a very varied parenchymatous series. Occasionally, but in my experience very rarely, spiral or pitted cells may be met with in the middle layers, and various somewhat unusual modifications of the ordinary type of bark structure. These are probably in part occasioned by accidental causes, but may be to some extent characteristic of the plant.

As Mr. Howard has shown, if sections of the bark be boiled for a very short time in solution of caustic potash, and examined under a moderate power of the microscope, numerous crystals may be seen, chiefly distributed in the middle and inner

* I much regret that the continuation of these papers has, from causes beyond my control, been so long delayed.

† The difficulty experienced in procuring an adequate supply of perfectly fresh leaves is a serious obstacle in carrying out these analyses. My thanks are due to Mr. G. W. Fox, of Penjerrick, Falmouth, for the leaves I have examined in a fresh state.

portions of the bark, and Mr. Howard considers these to be undoubted crystals of the alkaloids of the bark. That the crystals may be seen does not admit of a doubt. I have always found them in suitable sections when I have followed his plan of preparing the specimens, but that they are natural crystals of the alkaloids is quite another matter. Very careful examination of the position of the crystals in the cells of my own preparation, and in Mr. West's admirable drawings, lead me to question whether they are not, after all, chiefly due to the reagent employed. I have produced very similar crystals in sections of some other plants, especially of the common garden mint, and I have always referred them to the action of the potash upon some of the active principles of the plant—one of its colour elements, in fact. There is also this to be said, that although very careful examination of various portions of living plants of *C. succirubra* sent me by Mr. Howard shows exceedingly minute crystalline bodies in the cells near the vascular system (in the petioles and stem most abundantly), which are often aggregated by albuminous matters into pseudo-sphœraphides, are very refractive, intensely doubly refractive, and soluble in ether and in dilute sulphuric acid, it is not possible to produce the crystals figured by Mr. Howard in these cells, or, without very great difficulty, in the cells of the living plant at all. On the other hand the position of the crystals as regards the nature of the tissues in which they are most abundant, supports Mr. Howard's view, and his well-known accuracy and familiarity with this subject cause me to express my non-agreement with his conclusion with considerable hesitation. Unfortunately, it is difficult to apply any very crucial test to them whilst they are under observation.

The amorphous alkaloids, described by Mr. Howard, I have repeatedly observed in the barks of commerce, and most abundantly mixed with proteinaceous and other substances in the petiole and young stem of the living plants. These amorphous alkaloids differ much in their position in the plant from most other cell contents. Crystallized substances, resins, and oils are usually contained in special cells, associated more or less intimately with the fibro-vascular system, but these are found only in semi-specialised cells in the parenchymatous tissues, and are, I think, transitional, undergoing modifications as the growth of the plant advances. They are very numerous in the medulla of the petiole, and in the medulla of the growing shoot, but appear much more sparsely distributed in the medulla of the more mature stem, and are there chiefly confined to the sap-containing cells of the subcortical layers.

The outer corky layers of the bark vary little from the usual type of these layers, the parenchyma within them is composed of rather large, irregularly shaped cells, containing various granular substances and cinchona-red mixed with other colouring matters, a little starch, members of the tannin group chiefly localized near the liber and the boundary of the various years growths, and, in semi-special cells, the amorphous alkaloids just named. The liber cells are distributed somewhat irregularly in the liber zone, are long, much consolidated, have successive deposits of hardening matter, easily seen by aid of a high power, and are curiously transversely marked, and somewhat furrowed at times longitudinally. All these characteristics are subject to endless variations.

Cinchonæ Flavæ Cortex—The differences between the structure of this bark and the structure of *C. rubræ cortex* are chiefly differences of degree rather than of kind, and can only be made clear by aid of numerous and accurate drawings. The bark is rather easier of examination, as there is little need for the removal of the colouring matter, which in the case of the red bark renders accurate observation a matter of difficulty. The toughness of the liber and its feeble adhesion to the surrounding tissues are, however, more troublesome than in the other bark, and somewhat longer maceration is needful to enable us to procure good sections.

Cinchonæ Palidæ Cortex.—The above remarks apply with somewhat less force to this bark, the structure of which may be regarded as a small and revised edition of the red bark without its colouring matters. Those who wish to make themselves fully acquainted with the microscopical characteristics of these, as of the other barks, will derive far more benefit from the careful examination of specimens, and the "illustrations," than from bare text descriptions of their structure. I therefore pass to notice rapidly the structure of the few woods of pharmacy.

COMBINATION OF LIME AND GLYCERINE AND ITS PHARMACEUTICAL APPLICATIONS.*

BY P. CARLES.

The recent publication of a note upon this subject† has induced the author to put on record some experiments, the results of which were communicated orally to the Paris Société d'Emulation pour les Sciences Pharmaceutiques in 1871, but have not hitherto been published.

When distilled water is shaken with lime under normal circumstances it only dissolves 1·251 grams per litre; but this proportion is, however, singularly increased by the intervention of neutral bodies, such as the sugars. That glycerine also acts in the same manner was noticed by the author, and gave rise to the following experiments:—

Into a series of flasks of similar capacity were placed constant quantities of 100 grams of distilled water and 20 grams of pure lime, together with varying proportions of glycerine, 0, 50, 100, 200, 400, etc. The flasks were labelled, 1, 2, 3, 4, 5. After agitation of the mixture for some time at a temperature of 18° C. the quantity of lime passed into solution was estimated alkalimetrically, and found to be—

No. 1	1·251
„ 2	1·865
„ 3	2·583
„ 4	4·040
„ 5	6·569

Now if each of these numbers be reduced by 1·251, the coefficient of the solubility of lime in water, it will be found that an addition of 50 parts of glycerine to 1000 of water augments by nearly one-half the solubility of the lime, and that this solubility is doubled by the addition of 100 parts of glycerine per litre. If the proportion of glycerine be raised beyond 200 parts the quantity of lime dissolved is still sensibly increased, but starting from

* *Bulletin de la Société de Pharmacie de Bordeaux*, vol. xiii., p. 294.

† PHARM. JOURN. [3], vol. iv., p. 321.

that figure it is in proportion irregularly inverse to the quantity of glycerine added. It is the author's opinion that the combination of glycerine with lime, which is a true combination very soluble in water, is on the contrary slightly soluble in glycerine itself. Commencing at experiment 5, it communicated to the liquor a latescence more and more opaque, and whilst the undissolved lime was precipitated rapidly or remained upon the filter, the glycero-calcic compound remained for a long time in suspension, or even passed through the paper. In short, the glycerinate of lime is formed in larger proportion as the quantity of glycerine is increased, but being less soluble in the latter than in water remains in suspension.

These solutions appear to the author to be susceptible of the following applications :—

(1) In a chemical point of view, since they remain unaltered during a long time, they might advantageously replace as alkaline liquors the changeable solutions of saccharated lime.

(2) Pharmaceutically, it would allow of the simplification of the preparation of the lime liniment, and yield a superior product. The Codex orders one part of oil of almonds, and nine parts of lime water, to be agitated together, and the separation of the soap which floats on the top. If, in the place of ordinary lime water, equal parts of almond oil and of lime water containing 10 per cent. of glycerine are simply agitated together, a consistent calcareous soap is produced, which, even after several weeks, loses none of its consistence or homogeneity.

(3) Considered therapeutically, the addition of the glycerine, which besides is produced in small quantity in the ordinary process, appears to constitute an excellent adjuvant.

SAFFRON GROWING IN FRANCE.*

The production of saffron is considerable in France, but it is confined to three departments, of which Loiret produces the largest amount and of the best quality. It is a peculiar industry, and little known even in France.

A saffron field is not in full bearing till the end of the second year, and at the end of three years it is exhausted, and, according to the local proverb, the land is then so poisoned that it cannot be used for the same purpose for fifteen or sixteen years more. The average crop of the second and third year is various, from ten to thirty kilogrammes per hectare, or from 9 to 27 lbs. per acre, of dry pistils ; each acre produces about six to seven hundred thousand bulbs, and each bulb two or three flowers. About 30,000 flowers are required to produce two pounds of fresh pistils, which when dried are reduced to one-fifth of that weight ; the pistils are the only productive portion of the flower, the rest is waste.

The labour of picking such enormous quantities of flowers by hand is great, and when the crop is large and labourers scarce, the flowers are carried into the villages and small towns round about, to be picked by women and children at home. In such cases all the world is busy saffron picking ; artisans, shopkeepers, gentlemen, and ladies all assist in the work, the poor working for their own profit, the rich for the benefit of the necessitous. The farmer has to pay from about 10*d.* to 4*s.* a pound for the picking, according to the abundance of the crop.

When the pistils are separated they have to be dried, and this operation is effected by placing about a pound of fresh pistils at a time in a horsehair sieve suspended over a little charcoal furnace. As soon as it is dry the saffron is ready for sale. Commercial travellers generally buy up the saffron, which goes by the name of the most famous district, Gâtincus, principally for Germany, where it is said to be mixed with Spanish saffron and re-sold as a German product.

Saffron requires a peculiar soil, and the land which suits it is worth three to four pounds per acre, or double the rent of ordinary land in the same district ; but the saffron itself sells, on an average, for thirty shillings to two pounds per lb., and when very fine for double those rates ; in very extraordinary years, which, however, occur only once or twice in a century, saffron is worth as much as £8 per lb. Altogether it is an interesting example of agricultural industry.

* From the *Journal of the Society of Arts.*

A REVOLUTION IN THE MANUFACTURE OF CARBONATE OF SODA.*

BY DR. RUDOLPH WAGNER.

Six years ago, when the international jury at the Paris Exposition expressed their opinion upon the state of the soda industry at that time, all the judges, whether practical or theoretical men, believed that Leblanc's process would hold the field for a long time yet. This seemed still more probable since a process had just been introduced for recovering the sulphur from the soda residues. At that time all the soda in use was prepared by this process, excepting a comparatively small amount obtained from Chili saltpetre and cryolite, although there were already tangible indications that soda could be made on a large scale by another method which would be cheaper than Leblanc's process.

The chemical section of the international jury at the Vienna Exposition, under the presidency of Professor A. W. Hofmann, constituted a congress of chemical technology. By its labours during the course of the summer this congress of scientific men was able to authenticate the very important fact that although Leblanc's process might in the future possess some importance for certain branches of the industry, yet in most places another soda process would be introduced in the immediate future, and entirely supersede that of Leblanc. Since the time of the Paris Exposition this new process has grown from a small germ to a strong tree.

The process in question, and which is called by Professor A. W. Hofmann the ammonia process, is not new from either a chemical or scientific point of view. It belongs to the same class of methods as those in which oxide of lead, bicarbonate of magnesia, quick lime, alumina, silicate of alumina, oxide of chromium or fluosilic acid are employed to decompose chloride of sodium and convert it directly into soda or its carbonate. None of these attempts met with a success deserving of notice, although for a century past efforts have been made to render them practically operative. The new process is founded upon a reaction noticed over thirty years ago—that of bicarbonate of ammonia upon a strong solution of common salt. The greater part of the sodium is precipitated as a bicarbonate, while chloride of ammonium remains in solution, from which the ammonia for a second operation is expelled by quick lime. The carbonic acid necessary to convert the ammonia into bicarbonate of ammonia, and thus make the process a continuous one, is obtained by heating the bicarbonate of soda to convert it into the simple carbonate.

The sensation which the ammonia process has created in industrial circles will render a brief history of its development not uninteresting.

So far as I know, Harrison, Dyer, Grey and Hemming were the first to patent the ammonia process in Great Britain in 1838. "Great expectations" were excited by it, but it soon sank into oblivion. Thirty or forty years ago the manufacture of soda was by no means at the head of the great branches of industry ; at that time, too, ammonia was not to be had cheaply and in immense

* From the *Journal of Applied Chemistry.*

quantities, and that branch of machine building which has furnished the necessary apparatus for chemical industries did not exist. Besides this, Anthon, of Prague, in 1840, claimed to have proved that in the ammonia process a very considerable portion of the common salt remained undecomposed.

After a sleep of sixteen years the ammonia process again entered the field. On the 26th of May, 1854, Turck took out a patent in France, and on the 21st of June, the same year, Schlœsing, chemist of the Imperial tobacco factory at Paris, took out a patent for France and Great Britain. The mechanical portion and machinery for Schlœsing's process were designed by Engineer E. Rolland, director of the tobacco factory. In 1855 a company was organized to work this process. An experimental manufactory was started at Puteaux, near Paris, but owing to its situation and arrangements as well as to the salt monopoly, it could not produce soda cheap enough to compete with the other process, and hence, in 1858, the experiment was abandoned. Schlœsing and Rolland were of the opinion that sooner or later the new process must come into use in making soda.

It must here be noticed that in 1858 Professor Heeren, of Hanover, subjected the ammonia process to a very careful test in his laboratory. From his experiments and calculations it was ascertained that this process was better adapted to the manufacture of bicarbonate than of the simple protocarbonate of soda.

To render this sketch more complete and historically true, it must be mentioned that T. Bell, of England, took out a patent October 13, 1857, for a new soda process, which in principle and practice was almost literally the same as that of Dyer.

It was known when the jury was working at Paris in 1867, that essential improvements had been introduced into the ammonia process by the efforts of Margueritte and de Sourdeval, of Paris, and James Young, of Glasgow. A more important fact, however, is that Solvay and Co., of Conillet, in Belgium, actually exhibited at the Paris Exposition carbonate of soda prepared by this new process.

Since that time the ammonia process has been developed and perfected to such an extent, especially by Solvay, Honigmann, and Gerstenhœfer, that as early as February, 1873, Professor A. W. Hofmann, in his introduction to the third group of the catalogue of the Exhibition of the German Empire, was able to make this remark: "At all events, the ammonia process is the only one which threatens to become an important competitor of the now almost exclusively employed process of Leblanc." The Vienna Exposition has since proved the truth of his assertion.

There are now large soda works in England, Hungary, Switzerland, Westphalia, Thuringia and Baden which employ the improved ammonia process, and some of them make fifteen tons of soda per day.

The advantages of the new process over that of Leblanc are very evident, although the details of the process have not yet been made public. The chief advantage consists in the direct conversion of salt into carbonate of soda, and next in the fact that from a saturated brine only the sodium is precipitated, with none of the other metals of the mother liquor. Beside this, the product is absolutely free from all sulphur compounds, the soda is of a high grade, the apparatus and utensils are very simple, there is a great saving of labour and fuel, and no noxious gases and waste products are produced, which is of importance from a sanitary point of view. The only weak point of the ammonia process is the loss of the chlorine, which is converted into worthless chloride of calcium.

The effect which the general introduction of the new soda process will exert upon large chemical industries in general, and especially upon the consumption of sulphur, the manufacture of sulphuric acid, and the price of muriatic acid and chloride of lime, cannot be overlooked.

RELATIONS OF PLANTS AND ANIMALS TO INORGANIC MATTER, AND ON THE INTERACTION OF THE VITAL AND PHYSICAL FORCES.*

(*Concluded from p.* 516).

BY J. BELL PETTIGREW, M.D., F.R.S., ETC.

In making these statements regarding the non-identity of protoplasm, bioplasm, and the several parts of the germ, seed, or egg, I do not mean to affirm that all the tissues enumerated are contained in the original germ, seed, or egg. Only this: that the original germ, seed, or egg is differentiated sufficiently to inaugurate the first series of changes, and that these inaugurate others in constant and rapid succession, until the plant or animal is completed. The first series of changes provides the materials and forces for the second, the second for the third, and so on, according to the degree of differentiation required in each particular organism. It is initial force and matter that are primarily required. Granted this, development in specific directions proceeds as a matter of course.

Chemistry and physics are not the whole of physiology. These sciences can conjure up an automaton, but are absolutely powerless when an ovum is desired. Dumas, a leading authority in modern chemistry, thus limits its province:—"The chemist has never manufactured anything which, near or distant, was susceptible even of the appearance of life. Everything he has made in his laboratory belongs to 'brut' matter; as soon as he approaches life and organization he is powerless." "Organized matter, not capable of being crystallized, but destructible by heat, the only matter which lives or has ever lived—this matter, a subordinating agent of the vegetating power in plants, of the motion and sensation of animals, cannot be produced by chemistry; heat does not give birth to it; light continues to engender it under the influence of living bodies."†

The pretensions of the physicist may be disposed of even more cavalierly.

No machine hitherto devised by human ingenuity at all resembles or can at all compare in efficiency with a living organism when the consumption of material and the amount of work done are taken as the standard of comparison. A man is as far in advance of a steam-engine in this respect as day and light are of night and darkness.‡ If, then, neither the chemist nor physicist, nor both combined, can produce a living organism, or anything even remotely resembling it, we are forced to fall back upon other than the chemical and physical forces, and the only ones we can under the circumstances fall back upon are the vital ones.

Life, there is every reason to believe, is an heirloom bequeathed from parent to offspring—a something superadded to dead matter; and motion in matter devoid of life is an emanation of force from the store of energy residing in the universe. Life, energy, and matter are equally distinct. Matter may be inert, or it may move under the influence of force, physical or vital. The physical and vital forces, however, are not to be confounded. An automaton is not an animal. While the vital and physical forces are independent, they are nevertheless correlated—*i.e.*, the vital forces work in the same direction, and through the physical ones. A living organism builds itself up in accordance with natural laws, and avails itself equally of inorganic matter and physical force. The life supplies only part of the matter and force employed in building up an organism. The life, for example, appropriates and assimilates matter, but in doing this it does not necessarily interfere with capillarity, chemical affinity, gravitation, osmosis or any of those influences or

* An Introductory Lecture to a Course of Physiology. Reprinted from the *Lancet*, Nov. 15.

† Faraday Lecture.

‡ Rumford long ago showed that a much greater quantity of work could be performed by a horse than could be performed by its food when employed as fuel in a steam-engine.

forces which regulate the distribution of matter in time and space. On the contrary, these are the instruments by which it makes itself known and felt. While living matter may and must be contra-distinguished from dead matter, there is no antagonism between them. What lives now dies hereafter, and the dead particles of a disorganized animal and plant may be, and frequently are, resuscitated. This arrangement equally adapts the organic world for the inorganic, and the converse. A living organism is incessantly taking in new and giving off old particles; it is a mysterious highway, along which innumerable organic and inorganic atoms pass in the economy of an individual and in the natural order of events. Hitherto physiologists have been divided into two great classes—the vitalists and physicists. There is reason to believe that neither are wholly in the right, and that the truth lies between the two. It is illogical to infer with Beale that the vital forces are independent of, and altogether opposed to, the physical forces. It is equally illogical to assume with Tyndall that the physical are the only forces in the universe. If the vital forces act upon inorganic matter (and this is admitted), they cannot destroy the forces which actuate that matter as such. This follows because force, like matter, is indestructible. The vital forces transform matter, but do not destroy it. In like manner they modify, but do not destroy, the physical forces with which that matter is indissolubly associated. That the physical forces are not the only ones is evident from this,—that they cannot of themselves, or in the hands of the most expert physicists, produce a living organism.

The vitalists are for the most part panspermists—*i.e.*, they believe that everything that lives is produced from a parent by a germ, seed, or egg.

The physicists, on the contrary, are as a rule heterogenists—*i.e.*, they are of opinion that matter can assume life in the absence of a parent.

The doctrines of panspermism and heterogeny will be most conveniently discussed together.

Heterogeny, otherwise known as "spontaneous generation," is an old doctrine, supposed to have been scientifically interred once and for all by Pasteur. Pouchet, Pentigazzi, Schaffhausen, Bennett, Bastian, Sanderson, and others, however, have of late been busily engaged in exhuming it. Pasteur, as many of you are aware, showed that if certain infusions were placed in flasks having long-drawn-out and bent but unsealed necks, and boiled, they could, if the necks remained intact, be kept for indefinite periods without producing organisms; but if the necks were broken off short and the atmosphere freely admitted, organisms appeared within a few days from the time the necks were broken. This was considered by the panspermists conclusive proof that the air contained germs, and that the organisms which appeared in the infusions within the flasks when the necks were broken off were due, not to spontaneous generation, but to development from pre-existing germs. The heterogenists, while admitting this to be the truth, deny that it is the whole truth. In other words, they give to Pasteur's experiments a different interpretation to that given to them by himself. They affirm that if other and more concentrated solutions than those used by Pasteur be employed, diametrically opposite results to those obtained by him may be produced; and that, in fact, the production of organisms and the peculiar character of the organisms produced is due, *not to germs* conveyed into them by the air, but to the nature of the infusions and organic solutions themselves.*

Pouchet, *e.g.*, states that when three vessels severally charged with urine, cider, and a mixture of both, are exposed side by side, three distinct kinds of organisms are obtained, but that which occurs in the mixed fluid is a hybrid between the other two, deriving its mongrel qualities, *clearly not from the air*, but from the liquid menstruum.*

Bennett, who believes his experiments to be opposed to the atmospheric germ theory, attributes the production or non-production of infusorial animalcules in infusions less to the presence of infusoria, or their germs in the air, than to the physical conditions of that medium—viz., temperature, density, and other physical qualities.†

Sanderson avers that "liquids which contain no particle distinguishable under the highest powers of the microscope can often be proved to possess the property of evolving microzyms (bacteria, etc.) after being boiled in sealed flasks without contact with external media"; and Bastian affirms that when infusions are of a highly fermentable order, and sufficiently strong, infusorial life is evolved even "*in vacuo*."‡

These statements appear very conclusive as against panspermism, or the germ theory; and if the matter had been allowed to rest here many of us doubtless would have felt ourselves constrained to believe in spontaneous generation. Lister, however, who greatly resembles Pasteur in ingenuity, industry, and philosophical acumen, has, it appears to me, fairly turned the tide against the heterogenists. In a paper communicated to the Royal Society of Edinburgh last winter (1873) he showed that many of the forms believed by the heterogenists to be the result of spontaneous generation were neither more nor less than the transitional or developmental forms of certain fungi which could be planted and raised from germs. Lister in fact succeeded not only in planting the minute fungi in question, but, what is more important, he succeeded in tracing them through all their changes from the germ to the bud, from the bud to the perfect plant, and from the perfect plant back again to the bud. The material first operated upon was fresh—*i.e.*, unboiled urine, procured by an antiseptic process in a perfectly uncontaminated condition. This urine was introduced into two wine glasses, supplied with porcelain lids, both of which had been heated far above the boiling point of water, and allowed to cool. When the wine glass with its contained urine was covered with a lid and placed under a glass shade, it remained for months without shadow of change either as regards the development of organisms or putrefaction. When, however, the glass shade and cover were removed, organisms of various kinds, and among them bacteria, soon made their appearance. The material next examined was Pasteur's solution, to which two drops of water from the tap had been added. When this fluid was exposed to the atmosphere, "a deposit which proved to be a minute filamentous fungus, producing abundant spores (conidia) on its branches, made its appearance. These spores, after separation, often produced young plants like the parents; but there were also seen in abundance precisely similar spores, multiplying by pullulation like a torula; and there were also present multitudes of more slender filaments, which were seen to break up into bacteria; while in several instances these filaments were observed springing from spores undistinguishable from those of the fungus."

The view that some filamentous fungi may give origin to both toruloid and bacteric forms (the latter endowed with vital movements) is new to science, and has done

* Wymann, by working with small quantities of infusions in proportion to the size of his flasks, and consequently with relatively greater volumes of calcined air, hardly ever failed to develop organisms in experiments which, in the hands of Pasteur, had produced none.—'Evolution,' p. 7.

* 'Hétérogénie.' Par F. A. Pouchet. Paris, 1859.—'Nouvelles Expériences sur la Génération Spontanée.' Par F. A. Pouchet. Paris, 1864.

† 'The Atmospheric Germ Theory.' By John Hughes Bennett, M.D., *Edin. Med. Jour.*, vol. xiii., pp. 810-33, 1868.

‡ In No. 6 of his experiments, Bastian states that active protamœbæ and ciliated monads were taken from a hermetically sealed flask, which eight weeks previously had been exposed to a temperature of 270°—275° F., and these very organisms were killed afterwards by a temperature of 140° F.

more towards establishing the truth of the germ theory and annihilating that of spontaneous generation than any experiments with which I am acquainted.*

Lister, in his experiments, employed, in addition to the urine and Pasteur's solution referred to, white of egg, milk, turnip infusion, and other substances ; but in every case with a precisely similar result. The importance of Lister's researches cannot be over-estimated. They are exceedingly interesting and instructive in a scientific point of view ; but their scientific value is indefinitely enhanced by the fact that they have for their ultimate aim the relief of suffering humanity.

Spontaneous generation represents one phase of the "theory of evolution." The other is : given a typical plant, or a typical plant and animal, all plants and animals proceed therefrom by infinite permutations, extending over indefinite periods. In other words, the highest plants proceed from the lowest by a series of gradations ; the highest plants and lowest animals merge into each other, and from the lowest animals the highest are ultimately produced. The latter doctrine is partly, but only partly, true. Plants and animals once created, endowed with vital powers and capable of reproducing themselves, may, under varying conditions and within certain limits, alter their several forms, and even their constitutions. I say within certain limits, for the variation is in no case indefinite. A horse remains a horse, and a dog a dog, whatever be the size, shape, and temper of those animals. While a horse and an ass are fruitful, their produce—the mule and hinny—are invariably barren. An animal may not depart from its original type indefinitely, and hope to perpetuate itself. This would introduce endless confusion. In reality, the limits within which reproduction is possible are exceedingly circumscribed, and confined in all cases to specific differences. The generic peculiarities remain always exactly the same under all circumstances. Civilization is based on the capacity for variation within certain limits. Education proceeds on the possible progression of the individual.

The doctrine of evolution has had an unusually able advocate in Darwin, a gentleman whose industry and learning are only equalled by his integrity and courage. Darwin, with infinite ingenuity and quite a plethora of fact, has endeavoured to show that, given one or more fundamental forms, the innumerable tribes of plants and animals may proceed therefrom by natural selection and by infinite permutation in infinite time. In other words, separate acts of creation are not necessary to produce species, and it is just possible not even genera. Darwin's colossal idea does not necessarily clash with that of a creative agency—it simply regards creation as a progressive rather than a finished work.

External conditions, in Darwin's opinion, modify in the fulness of time both plant and animal, and both advance in the scale of being—*i.e.*, plants and animals improve upon their former selves, the fittest always surviving. Darwin's law of the "*survival of the fittest*" affords another illustration of the interaction of the natural forces, for it shows that climatic, geological, and other physical changes modify the form and functions of plants and animals—in other words, modify and alter within certain limits the form and constitution of organic beings.

Darwin's hypothesis has thrown much light upon the complicated questions of natural affinity, the homologies of organs in various animals, and the recurrence in the embryos of the higher animals of structural peculiarities found in the lower ones. It has connected as by a silver thread the various palæontological forms in time and the several faunas and floras in space. It has endeavoured to establish an actual genealogy and consanguinity of organisms. As time advances, fresh links binding apparently irreconcilable types together are found, and in the old geological records of the past the actual transitional forms may be traced.

Few in the present day will doubt that many of the forms regarded by naturalists as distinct species of the same genus were originally derived from the same primitive form ; but the major question is still *sub judice*. It is not yet determined that "all mammals are derived from one original marsupial, all vertebrates from a primitive lancelet, and all plants and animals from the slimy protoplasm of a protiston." If, however, this should be proved at some future period to be the case, it will simply have the effect of reducing the number of separate creations ; it will not obliterate our belief in a great First Cause. It will neither impeach nor impugn the power of the Creator ; still less will it disprove his continued operation through eternal and immutable laws.

Gentlemen,—I fear I have trespassed equally upon your time and patience. The subject however chosen for this my introductory lecture demanded consecutive treatment. I could not consistently treat of the materials and forces employed in the organization of plants and animals, and omit the great modern doctrine of "natural selection." The points which I have endeavoured to illustrate in the course of my observations are these :—

Firstly. That organic and inorganic matter are correlated and interact.

Secondly. That the vital and physical forces are correlated and interact.

Thirdly and lastly. That living organisms cannot be produced from purely inorganic matter by purely physical forces.

* Dr. Bennett states that "no one can carefully watch the mode in which infusoria are developed without being satisfied that they originate from the coalescence of molecules, and not from ova or spores, as has been imagined." This author regards bacteria as simply oleo-albuminous molecular masses, aggregated by physical forces. This view is, of course, diametrically opposed to that of Mr. Lister.—'On the Atmospheric Germ Theory and Origin of Infusoria.' (*Monthly Journal of Medical Science*, March, 1868).

EAST INDIAN PROGRESS.*

According to Act of Parliament, the Secretary of State and Council of India within fourteen days after the 1st of May, have to present to Parliament an account of the state of Indian finances, and "such account shall be accompanied by a statement prepared from detailed reports from each Presidency and District in India, in such form as shall exhibit the moral and material progress and condition of India in each such Presidency."

From 1858 to 1865 these reports were presented in the form in which they arrived from India, without arrangement or condensation, and thus failed to meet the objects of the Act. It was therefore determined to prepare at the India Office a condensed report, based on those received from India. The present report has been confided to the able editorship of Mr. C. R. Markham, C.B., and is everything one could desire.

The substance of the report is distributed under the following headings :—Administration, Finance, Land Revenue, Agriculture, Irrigation, Communications (railways, roads, canals, harbours, etc.), Forests, Minerals, Trade and Manufactures, Condition of the People, Police and Justice, Education, Political, Military, and lastly, Surveys, etc. A general appendix of tables closes the report.

The most useful measure of legislation mentioned in this report is the creation by Lord Mayo, in June, 1871, of a new "department of revenue, agriculture, and commerce." This department has charge of all questions relating to land revenue, settlements, agriculture and horticulture, and Government aids for their improvement, horse and cattle breeding, silks and fibres, forests, commerce, trade and customs, salt, opium, industrial arts, etc.

* 'East India (Progress and Condition). Statement of the Moral and Material Progress and Condition during the year 1871-72.' Ordered by the House of Commons to be printed, April 28th, 1873, pp. xii., 159, with 15 maps.

It also has the charge of census returns, statistics, surveys, geology, meteorology, and such like questions. The want of such a department had long been felt, and questions relating to the trade of the great staple products of agriculture and manufacture, the development of these and the introduction of new products were scattered through many departments, and their solution, as in all such cases, seemed to be the business of nobody, and thus much loss and waste was the result. But better things are hoped for now that the whole matter is under one special department. Under the head of Finance the following interesting figures are given :—The income for 1871-2 amounted to £50,110,215 made up as follows :—Land revenue, £20,000,000 ; opium, £9,000,000 ; salt, nearly £6,000,000 ; from customs, excise and stamps, over £7,000,000 ; the remainder being made up from taxes on various smaller items. With regard to salt, beside the home production obtained from mines and salt lakes, there is a large importation, chiefly from England. The quantity imported last year into Bengal was 5,765,177 cwt. Opium sales met with much higher rates last year than in the preceding. The other custom duties were on imports of cotton goods chiefly, and to a less amount on liquors and metals. The export dues are chiefly on rice, oil seeds, indigo, lac, and cocoanut oil. The exportation of jute, cotton, silk, tea, saltpetre and sugar is free.

The income-tax, as in England, has given rise to much complaint, and though by raising the minimum taxable income to £100 many objections were removed, yet the announcement of its total abolition has given universal satisfaction.

In Bengal the agricultural yield last year was one of abundance, the rain being very plentiful. The jute crop was an extraordinarily good one, but the indigo crops were much injured, In many places indigo has given place to jute, as the latter is the more profitable to cultivate. In the North-West Provinces the spring harvest of 1871 was good, but the autumn crop was bad ; but the improved means of transport lessened the local dearth. In parts of Madras, owing to the failure of the north-east monsoon, there was a drought, which, but for the prompt importation of grain from Cattack, might have resulted in overwhelming distress.

The important bearing meteorology has on agriculture is beginning to be acknowledged by the administration, and a number of stations are now scattered throughout India under the charge of an efficient staff, and some very important observations have been published.

The various agricultural societies of India have done much good, and some receive annual grants from the Government.

There are some interesting remarks on the cultivation of cotton, jute, rhea fibre, and date palm—the latter grown from seeds and cuttings obtained from the Persian Gulf—and also remarks on sericulture. Beside these and other substances attended to in the plains of India, the cultivation of cinchona, tea, and coffee are important agricultural industries on the mountains. Coffee culture commenced in Wynaad in 1840, and in the last year the value of the export alone amounted to £1,383,416. representing 56,889,888 lbs. In Darjilling there are sixty-two tea gardens, with an outturn of 2,665,821 lbs. ; Asam gave 6,257,643 lbs. ; Cachar, 5,406,400 lbs. ; and Silhet, 4,641,659 lbs.

India can produce a much larger quantity than this ; and if it be remembered that Indian teas are beginning to be now regarded with considerable favour, this industry will appear as one of the most promising. The reports on cinchona place the success of that undertaking beyond all doubt, even in a monetary point of view. Cardamoms grow wild in the Western Ghauts, and the yield in the forests of Mysor alone amounted in 1870-71 to 26 tons, valued at £17,000. Last year instructions were given for the demarcation of such tracts of jungle as were favourable for the growth of this spice, and coffee planters are turning their attention to its cultivation. Several cases of ipecacuanha have arrived in Calcutta in good condition, and will be planted in Sikkim. Carolina rice, which we believe was first obtained from Madagascar, is very successful in India, and cochineal insects, obtained from Teneriffe, have been introduced into Mysor, and promise well.

Fish forms one of the chief articles of food, and in some places the only animal food used at all. The native fishermen in this, as in all other cases, have been very destructive, and Dr. Day, to whom the question has been submitted, recommends that nets with meshes below a certain size should not be allowed, that poisoning streams with various narcotics, a custom very prevalent in India, should be put a stop to, and that a "close time" should be introduced. The attention to be bestowed to agriculture becomes more and more necessary on the part of Government, as it seems likely that in time it will become the only employment left to many who now support themselves by manufacturing articles which are fast being ousted from the bazaars by those manufactured in England.

The question of irrigation is one of the most important questions with which the Government has to cope. The rainfall in India is very different in various parts. There are two dry zones with between fifteen and thirty inches of rain, the "Northern Dry Zone" extending from Sind and Kach to the Panjab, forming a belt from 100 to 200 miles broad, including Agra, Delhi, and Lahor ; and a "Southern Dry Zone," extending from a little below Surat to Cape Cormorin, in the centre of the country, at a distance from the two seas. These regions absolutely require irrigation. The next region has a rainfall between thirty and sixty inches, and includes the upper part of the Valley of the Ganges, Central India, and the Eastern Coast. This region also requires irrigation. The next region has a rainfall between sixty and seventy-five inches, and includes the deltas of the Mahanadi and Ganges, and the lower part of the Ganges Valley. Here irrigation is rather a luxury than a necessity except in extraordinary years. Lastly, we have two belts of excessive rainfall of seventy-five inches and above, one in the north extending from the mouth of the Irawadi, along the east coast of the Bay of Bengal, up the Valley of the Brahmaputra, and along the skirts of the Himalaya Mountains ; and the second belt along the west coast of the peninsula, from the sea-shore to the summit of the ghauts. In these, of course, artificial irrigation is unnecessary. Great irrigation canals have been undertaken wherever there is a deficiency of rainfall, and the Government are carrying out such works in a prompt and systematic manner, in order to guard against failure of crops, and thus obviate such fearful famines as the inhabitants of these parts of India have been more than once subjected to. The effect of such works of construction, even in a moral sense, cannot be over-estimated, as cases are not unknown in which wild, unruly cattle-lifters, who followed such a life through the dryness of the soil not allowing of cultivation, have become thrifty, peaceful and industrious. In the rainy districts it is necessary to keep the banks of the rivers in good repair, as the surrounding land is below the level, and has therefore to be guarded against destructive inundation.

Under the head of Forests we have a very good *résumé* of the subject. The objects of the forest department are to supply building, furniture, and fire-wood for home consumption in towns and on railways, and for exportation, and to meet the demand for lac, catechu, caoutchouc, and other forest products. As the conservation of forests is absolutely necessary to protect the land from destruction and to ensure necessary timber supplies, it is not, therefore, or at least should not be, the immediate object of the Government to make forests a profitable speculation or a means of raising a revenue like that obtained from opium. Indeed, any such surplus forest revenue should always be applied to forest improvement where necessary. Still though forestry in India is in its infancy, yet suffi-

cient has been done to prove it a financial success. Beside the cinchona many exotic plants have been introduced, amongst these the Australian eucalyptus and acacia. The training of candidates for forest appointments has yielded good results. Facilities are now offered for studying forestry in Europe, and we have recently had occasion to speak in high terms in this Journal of reports on German and English forests, by Captain Walker and others. Major Beddome has published a 'Flora Sylvatica' and Dr. Brandis is preparing a 'Forest Flora,' both being destined for the guidance of forest officers.

The main system of Indian railways is nearly completed, bringing all the large towns in communication with each other and with the coast. The good effects of this system have already been recognized by the natives, as when there has been a bad harvest in a certain district the prices have not been affected at all, supplies being promptly brought in from surrounding districts. It also has had and will have greater effects in bringing larger quantities of staple articles to market and thus cheapening them. There is a complete telegraphic service along every railway, thus connecting every important place throughout India. Harbours, anchorages, and marine surveys have too engaged much attention, and great improvements have been made.

The mineral wealth of India is practically confined to its coal seams, its salt mines and iron ore. Indian coal has 10 to 30 per cent. of ash, and 52 per cent. of fixed carbon, and as compared with average English coal, with its 2·7 per cent. ash and 68 per cent. fixed carbon, is capable of only doing one-third to two-thirds of the work which an equal weight of the latter would accomplish. The most important coalfield is that known as the Raniganj to the N.W. of Calcutta. In 1868 out of 497,000 tons extracted in India, 493,000 tons was from this mine alone. Its area is from 500 to 600 square miles, and its available contents are roughly estimated by Dr. Oldham as 14,000,000,000 tons. Iron-producing minerals are widely scattered over India, and consist of magnetic and specular iron ores and red hematite in beds, veins of clay iron ores from the coal-bearing strata, and from surface deposits derived from the waste of metamorphic and sedimentary strata and from laterite. In the Salem district of the Madras Presidency the ores occur in immense beds 50 to 100 feet thick, and the outcrop can be traced for miles. On one hill in the same district there are five beds of magnetic iron ore, from 20 to 50 feet thick, and in other parts of India the supply of hematite, clay, and surface deposit iron ore seems inexhaustible. Natives of a very low caste have smelted iron ore from time immemorial, but all the attempts made by the English in manufacturing iron have hitherto utterly failed. In one case, we are told, after £75,000 had been spent in preliminaries, and all obstacles had been overcome, and the enterprise promised well and might have been most successful, the Government suddenly closed the works and offered them for sale, but without success. The matter has again however been taken up. Salt, copper, lead, tin, gold, silver, antimony, cobalt, and petroleum have been found in greater or less abundance, and in some instances worked largely.

The labours of Dr. Oldham and the staff of the Geological Survey are highly spoken of. In the space of twenty-two years, in spite of climate, inaccessibility of districts, and slowness of travel, they have examined an area about four times the size of Great Britain, and have published the results in a series of 'Memoirs,' illustrated with a superb series of figures and descriptions, maps, and plates, and the organic remains, in the *Palæontologia Indica*.

The trade of India is only represented in a small degree by the returns from the great seaports, for the bulk of the productions are consumed in India itself, and the external commerce is only a fraction of the internal trade. The value of the exports for last year was £64,661,940, the chief items being the following:—Coffee, £1,380,409; cotton, £21,272,430; grains, £4,865,748; indigo, £3,705,475; opium, £13,365,228; seeds, £2,728,127; tea, £1,482,185; and wool, £906,699. The value of the imports is stated at £42,657,560, consisting chiefly of cotton-yarn and goods, machinery, railway iron and stores, raw silk and silk goods, wines, etc. One of the most curious and interesting features of Indian trade is the quantity of gold and silver imported and the small amount exported. Thus £11,573,813 represents the imports of last year, and only £1,476,093 the export. Much is used in ornaments, and large quantities are hoarded up. This has been so from time immemorial.

A census return throughout India gives about 260,000,000 as the number of inhabitants, but there is reason to believe it is somewhat higher, from the difficulties in taking a census amongst a people often so mistaking its object as to believe in some instances that the Government intended to blow the surplus population from guns, and a man was known to hide his babies, lest he should be taxed for them! The returns of births and deaths are at present very unreliable. The wages for skilled labour vary from 3*d.* to 2*s.*, and for unskilled, 1½*d.* to 6*d.* per day. As to the morality of the natives, they are said to be singularly temperate as a rule; chaste, honest, peaceful, singularly docile, easily governed, and patient. There is, however, as one might expect amongst so many races, great diversity of temperament and character.

Emigration takes place to a large extent, and the Government take every precaution to protect the Coolies from injustice and false representations.

Under the head of police and justice there is much to interest one. The lawyers get much practice—at least too much for the people's good. Besides the village watchmen, there are 190,000 constables, who have much to do in looking after hereditary thieves. In the N.W. Provinces there are twenty-nine tribes who have for generations devoted part of each year to the profession of cattle-lifting and such like, as a means of gaining an honest living.

Infanticide, especially of girls, from hereditary custom and habit, is very prevalent, but it is gradually lessening as the people begin to be ashamed of it. European vagrants or "mean whites" give much trouble, and great attention is paid to the jails as to their management and sanitation.

There are numerous colleges and schools founded, and taught both by natives as well as Europeans. The missionaries' labours have been of great value in this field; they have always studied well the vernacular languages, and given a great impulse to literary progress, as the report bears testimony.

We cannot help, in closing, noticing the orthography of the proper names. Great efforts have been made to render the spelling of such names more correct; and the system of Dr. Hunter's, based on that of the late Sir Wm. Jones, is officially recognized. But one has to look twice before old faces are recognized in their new dress, such as Burma or Barmah, Rangun, Panjab, Arakan, Asam, Lacknow, and many others. We trust, however, it will be soon permanently settled. Even in the present report we find the same locality spelt as Burma, Burmah, and Barmah, and these are not the only instances. There are many interesting points before us we should like to notice in this report, so unlike what other blue books through which one has to "wade," whereas this is more like a volume of essays, and, together with the admirable map by which each division is illustrated, forms such a summary that the thanks of all who are interested in Indian affairs is due to Mr. Markam for the admirable manner in which he has accomplished his by no means easy task.

COLORATION OF CHLORALHYDRATE BY OIL OF PEPPERMINT.

It is stated by Carl Jehn that if hydrate of chloral be agitated with oil of pepperment, a reddish colour is

soon developed in the mixture, which gradually darkens to cherry-red. The colour is readily soluble in ether, alcohol, and chloroform; boiling does not destroy it; sulphuric acid heightens its intensity, and, if now chloroform be added, a dark, violet tint is produced. The oils of lemon, bergamot, juniper, crisped mint, rosemary, cloves, anise and fennel, do not produce any coloration with chloral hydrate.—*Archiv. d. Pharm.*

SCALE OF MEDICINES AND MEDICAL STORES

ISSUED AND CAUSED TO BE PUBLISHED BY THE BOARD OF TRADE IN PURSUANCE OF THE MERCHANT SHIPPING ACT, 1867.

MEDICAL SCALE FOR MERCHANT SHIPS.

The annexed Scale of Medicines and Medical Stores for Merchant Ships has been issued and caused to be published by the Board of Trade, and is intended to supersede the Scale hitherto in force.

THOMAS GRAY.

Preparations from British Pharmacopœia, 1867. This column is added for the use of Druggists supplying the Medicines indicated.	Names of Medicines, Medicaments, etc.	Proportion for Ships carrying the undermentioned number of Men and Boys (for twelve months). 10 and under.	11 to 20 inclusive.	21 and upwards.
	Alum	1 oz.	2 ozs.	3 ozs.
Copaiba	Balsam of copaiba	4 ozs.	8 „	12 „
	Bicarb. of soda...	8 „	12 „	16 „
*Mist. Sennæ Co.	Black draught	1 pint	2 pints	3 pints.
Lotio Hydrarg. Nigra	Black wash	1 „	2 „	2 „
A mixture containing in each 100 parts not less than 80 parts of Carbolic (or Phenic) and Cresylic Acids, and their Homologues; and not more than 20 parts of water.	†Carbolic acid, liquid	½ gal.	1 gal.	2 gals.
	Or crystal	½ lb.	1 lb.	2 lbs.
	Castor oil	1 lb	2 lbs.	3 lbs.
	†Chloralum or			
	†Chloride of zinc (solution of)	4 pints.	8 pints	16 pints.
Potassæ Tartras Acida	Cream of tartar	2 ozs.	4 ozs.	8 ozs.
	‡Condy's Crimson Fluid ..	½ pint	1 pint	1 pint.
	Epsom salts	3 lbs.	6 lbs.	12 lbs.
Ess. Menth. Pip.	Essence of peppermint ...	—	1 oz.	2 ozs.
Tr. Zingib. Fortior.	„ ginger	—	1 „	2 „
Liq. Plumbi Subacet. dil.	Goulard's extract	1 oz.	2 „	4 „
	Iodide of potassium	—	2 „	4 „
Tr. Opii	Laudanum	2 ozs.	4 „	8 „
	Linseed meal	—	14 lbs.	28 „
Argenti Nitras	Lunar caustic	¼ oz.	½ oz.	1 oz.
	Nitrate of potash	2 ozs.	4 ozs.	8 ozs.
Ung. Resinæ	Ointment, Basilicon	3 „	6 „	10 „
„ Hydrargyri	„ Mercurial	1 oz.	2 „	4 „
„ Simplex...	„ Simple	6 ozs.	12 „	16 „
	Olive oil	—	8 „	12 „
Lin. Opii	Opodeldoc	3 ozs.	6 „	10 „
Tr. Camph. Co.	Paregoric	¼ „	6 „	8 „
Pil. Hydrarg. ... ... 5 gr.	Pills, Blue	1 doz.	2 doz.	3 doz.
„ Ipecac. c. Scillâ ... ... 5 gr.	„ Cough	2 „	4 „	6 „
„ Sapon. Co. ... ... 5 gr.	„ Opium	1 „	2 „	3 „
„ Coloc. c. Hyosc. ... ... 5 gr.	„ Purging	3 „	6 „	8 „
„ Rhei Co. ... ... 5 gr.	„ do. Mild	3 „	6 „	8 „
Pulv. Rhei. Co.	Powder, comp. rhubarb ...	2 ozs.	4 ozs.	8 ozs.
„ Catechu Co. ... } equal	§ „ diarrhœa	1 oz.	2 „	3 „
„ Cret. Arom. c. Opio } parts	„ Dover's	1 „	2 „	3 „
„ Ipecac. Co.	„ Ipecacuan.	1 „	2 „	3 „
	§Quinine	1 „	2 „	3 „
Sp. Ætheris Nitrosi	Sweet Spirits of Nitre ...	1 „	2 „	3 „
	Sulphate of zinc	1 oz.	2 „	3 „
	Sulphur (sublimed)	2 lbs	3 lbs.	6 lbs.
Tr. Hyoscyami	Tincture of henbane	1 oz.	2 ozs.	3 ozs.
„ Rhei	„ rhubarb	4 ozs.	10 „	12 „
Lin. Terebinthinæ	Turpentine liniment	2 „	4 „	6 „

* Omit extract of liquorice, and substitute aromatic spirit of ammonia, one oz. to one pint of the mixture.

† As antiseptic and deodorizing agents for common use.

‡ For purifying drinking water when necessary.

§ Treble the quantity above indicated to be taken to all tropical ports.

Particulars.	Scales of Medical Stores and Necessaries.	Proportion for Ships carrying the undermentioned number of Men and Boys (for twelve months).		
		10 and under.	11 to 20 inclusive.	21 and upwards.
	Adhesive plaster on unbleached calico in tin case	1 yard	2 yards	3 yards
	Lint	½ lb.	¾ lb.	1 lb.
1 *grain*, 2 *grains*, etc., must be stamped in English figures and words on each respective weight, the word *scruple* must not be used at all (the scruple weight being marked 20 *grains*), the ½ *dram*, 1 *dram*, and 2 *dram* weights must be also marked in English figures and words.	Scales and weights	1 set	1 set	1 set
The fluid drop measure must be marked *dram* and divided into 40 *drops*, the word *minim* being omitted altogether.	Graduated drop measure ...	—	1	1
The fluid 2 oz. measure must be marked 2 *ounces*, 1 *ounce*, 2 *table spoonfuls*, 1 *table spoonful*, and 1 *teaspoonful*.	Graduated 2-oz. measure ...	1	1	1
	6-oz. bottles	½ doz.	½ doz.	1 doz.
	Corks for bottles	1 „	1½ „	2 „
	Scissors...	—	1 pair	1 pair
	Syringes	2	2	4
	Lancet	1	1	1
	Abscess do.	1	1	1
Leg and arm size	Bandages	3	6	6
Triangular bandage, base 48 ins., sides 33 ins. each.	Triangular do.	2	3	4
Flannel bandage, 7 yards long, 6 ins. wide.	Flannel do.	1	1	2
	Calico	3 yards	4 yards	6 yards
	Flannel	2 „	3 „	6 „
	Needles, pins, thread, and tape	—	1 paper	1 paper
	Splints, common	1 set	1 set	1 set
36 in. Single Reversible	Trusses	1	1	1
Printed directions for use	Enema syringe...	1	1	1
	Pewter cup	—	1	1
	Teaspoon (pewter)	—	1	1
	Bougies...	1 set	1 set	1 set
No 8. (*Gum Elastic*)	Catheter	1	1	1
	Bed pan	—	1	1
	Arrowroot	2 lbs.	4 lbs.	8 lbs.
	Pearl barley	4 „	8 „	16 „
	Rice	4 „	8 „	16 „
	Corn flour	4 „	8 „	16 „
	Sago	4 „	8 „	16 „
	Sugar	14 „	28 „	56 „
	Soup and bouilli	6 „	12 „	24 „
	Boiled mutton	6 „	12 „	24 „
	Essence of meat	6 tins. (¼ pint.)	12 tins	24 tins
Preserved	Desiccated soup	4 lbs.	8 lbs.	16 lbs.
	Vegetables dried or compressed	4 „	8 „	16 „
	Potato (if not in scale of provisions)	14 „	28 „	56 „
	Wine (Port)	3 bottles	6 bottles	12 bottles
	Brandy	2 „	4 „	6 „

ESSENTIAL OILS FROM SICILY.

A large export trade is carried on between Sicily and this country in the essences of bergamot, orange, and lemon. The value of these essences, which are chiefly shipped from Messina, amounted in 1871 to £143,500, out of which England took £97,000. The prices of the essences, owing to the increased demand, have risen enormously since 1869, thus, essence of orange has sprung from 5*s.* the pound in 1869, to 14*s.* in 1871, and essence of lemons rose from 8*s.* to 19*s.* the pound.

A large trade is also done in concentrated lemon juice, which is consumed almost entirely by England, a small quantity only being sent to France and the north of Europe. "It is made and shipped principally at Messina, and the total value of the export in 1869 was about £63,000; in 1870, about £75,000, and in 1871, about £90,000. Owing to the increased demand on the one hand, and the lemon disease on the other, the price has advanced greatly during the last few years. In 1869 it was from £25 to £30 the pipe of 100 imperial gallons; in 1870 it rose to £33,000, and in 1871 to nearly £50 the pipe."

The Pharmaceutical Journal.

SATURDAY, JANUARY 10, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

MEDICAL SCALE FOR MERCHANT SHIPS.

The Board of Trade, in the exercise of powers granted to it under the Health Clauses of the Merchant Shipping Act of 1867, has just issued an Amended Scale of Medicines and Medical Stores required to be carried in all foreign-going merchant ships belonging to the United Kingdom. A copy of this Scale will be found in another column, to which we take leave to direct special attention, as many important changes and additions have been made. It is to be observed that Chloralum is now added, and the shipowner is left to choose between this so-called disinfectant and the solution of Chloride of Zinc, one of which must be taken in the medicine chest, in addition to Carbolic Acid and Condy's Fluid, so that, as regards antiseptics, deodorants, and disinfectants, the mind of the ship-captain is likely to be more confused than ever. We are somewhat curious to know whether any attempt to simplify matters on this head will be made in the next edition of the authorized Medical Guide. Great credit was claimed for this Scale of Medicines, when revised in 1867, on the score of simplicity, and it is much to be regretted, on behalf of the non-professional prescribers afloat, that this virtue appears to be now little regarded.

It will be observed that Spirit of Nitrous Ether is now called Sweet Spirit of Nitre, the latter being a more popular and better known designation. Treble instead of double the quantity of Quinine indicated is to be taken to all tropical parts, and a larger quantity of Sulphur is ordered, for, as we presume, purposes of fumigation.

The particulars relative to the scales of medical stores and necessaries set forth that the weights and measures are to be marked in English figures, the words scruple and minim are to be abolished, and the drachm fluid measure is to be divided into forty drops. This plain system of marking weights and measures is, for this special purpose, very important, and we believe that the novel mode of graduating the drachm measure will be found in practice sufficiently accurate, and will certainly simplify the matter to the uninitiated very considerably. Two additional sets of bandages have been added. The triangular bandage was adopted very extensively in the last Franco-German war, and is most useful, but proper directions for its application must of course appear in the Guide. As flannel bandages are wanted for broken ribs, and are specially prescribed for this purpose in the chapter on accidents, it is proper that they should find a place in the chest. We are also reminded that the catheter is to be of gum elastic. Finally, besides desiccated soup, the preserved vegetables carried may be either of the dried or compressed variety, many kinds of both of which are now prepared. We are glad to record a belief that, with the exceptions above-mentioned, the changes and additions made are good and useful, although much still remains to be done in improving the general arrangements of medicine chests. It would be well if the professional advisers of the Board of Trade were called upon to give a report upon this subject, and associated for the purpose with some one of our chemists whose large practical experience would be valuable in such a matter.

It should be remarked that copies of this Amended Scale can be obtained at all mercantile marine offices in London and throughout the kingdom, on application to the superintendents.

SWEET SPIRIT OF NITRE.

WHEN speaking of the opinion recently volunteered by the *Lancet* that sweet spirit of nitre "possesses absolutely no value whatever," we ventured to express a doubt whether the demand for it would be materially influenced by the statement. We are, therefore, not surprised to find that this somewhat superfluous dictum of the *Lancet* has not been accepted as correct by the medical profession. As an indication of this we may mention that Mr. F. H. ALDERSON has written to our contemporary saying that the opinion has astounded him, since, during his student days, Dr. HENRY THOMPSON gave to the students of his class, as one of the questions in the prize competition in materia medica, the mode of preparation and uses of spiritus ætheris nitrici. Moreover, he has always believed the therapeutic effects of nitric ether to be, as NELIGAN states, those of a mildly stimulating diuretic, rendering the action of digitalis, squill, and other diuretics more certain.

Mr. ALDERSON further remarks that if he and others have been mistaken as to the efficacy of the spiritus ætheris nitrici, they may have been prescribing an inert drug, and he is very desirous that this point should be cleared up. He proposes, therefore, that every medical man should have an opportunity of replying to the following questions :—(1) Do you prescribe sp. ætheris nitrici, P. L., or sp. ætheris nitrosi, B. P., or neither? (2) Is sp. ætheris nitrici or sp. ætheris nitrosi in your opinion a drug of any value? (3) What do you consider to be the therapeutical effects of sp. ætheris nitrici or sp. ætheris nitrosi?

We congratulate the *Lancet* upon publishing this contribution to its own stultification.

POISONING BY VINUM COLCHICI.

A REMARKABLE case of poisoning by colchicum wine is reported from Montreal, at least six persons having lost their lives through it. The *Canadian Pharmaceutical Journal,* to which we are indebted

for details, states that a few days before the 27th November, a druggist received from a wholesale house (Messrs. Evans, Mercer and Co.) a bottle containing half a gallon of vinum colchici, but having a sufficient quantity on hand, decided on returning it. On the way, however, it was stolen from the carman to whom it was entrusted, and taken by the thieves to their home in one of the lowest parts of the city of Montreal. There upon examination it was pronounced to be sherry, and was freely supplied to several persons. A boy, to whom a mugful was given, was soon taken ill, and shortly after died. In great consternation medical help was called in, but at the time of writing five other persons,—two men and three women,—had died, and several others were in great danger. The symptoms were those of poisoning by colchicum,—constant vomiting and purging, accompanied by violent abdominal pains. The pulse was weak but rapid, as high as 120 or 130. Consciousness was in general retained almost up to the time of death. It had not yet appeared whether the wine was the *Vinum Colchici*, B. P., prepared from the corms, of which half a drachm is the maximum dose, or the *Vinum Colchici Seminis*, U. S. P., frequently ordered in Canada, of which the maximum dose is two drachms.

THE TRAFFIC IN PERCENTAGES.

The *Canadian Pharmaceutical Journal*, in endorsing the views recently expressed in this Journal respecting the traffic in percentages generally associated in this country with "Philippic formulæ," remarks that in the cities and larger towns of Canada, the percentage system has been largely and openly practised, but is now rapidly falling into disuse. A correspondent writing from Montreal says, that, with two or three exceptions, the leading physicians in that city are pretty well frightened out of the practice, and that if they now accept any pecuniary consideration, it is in the shape of a present at Christmas. This result is attributed to the improved status of pharmacists generally, which has also brought with it an independence of feeling "directly hostile and repugnant to the debasing truckling which characterizes the trade in percentages." Our contemporary is of opinion that "the severance of this self-imposed bond of servility will obliterate the sole remaining sign of medical dominion, erase a most dishonourable blot from the pharmaceutical escutcheon, and remove a cause of ill-feeling which of all others has been a most prolific source of contention." We commend these vigorous contemptuous words to the careful consideration of the few pharmacists who may yet countenance the traffic.

As will be observed by a notice in another part of this Journal, the 'Year Book of Pharmacy' for 1873 is now ready, and it will be issued at once to all members who have paid the current year's subscription. We have been favoured by the Honorary Secretaries with an early copy, and hope to notice the book more fully next week.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

Wednesday, January 7th, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Brown, Greenish, Hampson, Owen, Radley, Robbins, Sandford, Savage, Schacht, Stoddart, Sutton, Urwick, and Williams.

The minutes of the previous meeting were read and confirmed.

Resolved, that the following Pharmaceutical Chemists be elected Members of the Society :—

Bird, Matthew Mitchell .....King's Lynn.
Gibson, Adam .....Leven.
Leake, Thomas Whaplate .....London.
Normand, Claude ..... Shepherd's Bush.
Stewart, James .....Dalkeith.
Gardner, James Richard .....Plymouth.
Troake, Marler Hamilton .....Helston.

Resolved, that the following registered Chemists and Druggists be elected Members of the Society :—

Bowes, Joseph .....Whitehaven.
Hardman, James William .....Leeds.
Harwood, Charles..... .....Folkestone.
Holloway, John.....Wood Green.
Owbridge, Walter Tom.....Kingston-upon-Hull.
Pickburn, George Henry.....Kidsgrove.
Winship, James.....York.
Wylde, George .....Chelsea.

Resolved, that the following, having passed their respective examinations, and being in business on their own account, be elected "Associates in Business" of the Society.

MINOR.

Foster, Harry Pibworth .....Portsea.
Miller, Kenneth .....Pulteney Town, N.B.
Tuck, William James .....Landport.
Williams, Jabez Vivian .....Weymouth.
Williams, William Griffith .....Abergele.

MODIFIED.

Ashton, Alfred .. ..Camden Town.
Clarke, Joseph Adam .....Glasgow.
Greatrex, Henry .....Birmingham.
Jones, Hugh ....St. Asaph.
Kay, John .....Crewe.
Vaughan, William George .....Aberystwith.

Resolved, that the following, having passed their respective Examinations, be elected Associates of the Society :—

MINOR.

Atkinson, John George .....Horncastle.
Barlow, Joseph Alexander .....Rochdale.
Bennett, Henry Charles .....Leigh.
Brown, John Macdonald .....Dunfermline.
Bumpstead, Robert George .....Colchester.
Collins, Thomas Robert .....Leicester.
Dobson, George.....Egremont, Birkenhead.
Fuller, Thomas .....Fallowfield.
Hamond, Joseph .....Peterborough.
Hunt, Freeman William .....London.
Hunter, John Carswell.....Glasgow.
Jones, Walter .....Carmarthen.
Levy, Samuel Edward ... .Liverpool.
Longley, Joseph .....Barnsley.
Luff, Arthur Pearson .....Old Brompton.
Macaulay, Joseph John .....Manchester.
Macmillan, James Laker.....Glasgow.
Pownall, Thomas .....Mold.
Price, James .....Market Drayton.
Read, William .....Havant.

Sawden, Alfred .....Filey.
Smith, Alfred Lambert .....Birmingham.
Stuart, Thomas Peter Anderson Dumfries.
Thomas, Frank .....Boston.
Thompson, Mark Foggett.. .....Thirsk.
White, Robert .....Durham.
Whitlamsmith, Walter.....Uppingham.

MODIFIED.

Banbury, William Walter .....Burford.
Garry, George .....Glasgow.
Lutwyche, Henry John .....London.
Monkhouse, Henry .....Derby.
Wright, John Walter .....Stockport.

Resolved, that the following, having passed the Preliminary Examination, be elected "Apprentices or Students" of the Society :—

Abraham, Alfred Clay .....Liverpool.
Alcock, Frank Harris .....Burslem.
Barrat, Reuben .....Kingston-on-Thames
Biddles, William Byron .....Reading.
Blackwell, Josiah .....St. Austell.
Clower, John.....Nottingham.
Cornish, James Mitchell .....Penzance.
Cridland, Francis Edwd. John..Devizes.
Crook, Herbert .....Gravesend.
Crowden, Samuel Graham .....Buckie.
Cumine, Rupert Henry .....Kingston-on-Thames
Davies, Daniel Rees.....Kilburn.
Davies, John.....Newcastle Emlyn.
Dobson, George Turner .....Holsworthy.
Draper, James William .....Malmesbury.
FitzGerald, John Anthony .....London.
Fowler, George.....London.
Greenough, Hugh Fairhurst ...Manchester.
Grove, Harry Nicholas.....Walsall.
Hall, William.....Portsmouth.
Harmer, James Dorkin .....Kingston-on-Thames.
Haycraft, Henry Robert Howell Glasgow.
Hayton, Peter Bamlett.....Leeds.
Holmes, George.....Sheffield.
Maben, Thomas.....Hawick.
Mitchell, Joe Charles .....Barnsley.
Needham, Francis David.....Dublin.
Northen, Charles .....Thorpe-by-Water.
Ord, Septimus William .....Newcastle-on-Tyne.
Page, Robert Steele .....London.
Parker, John Wortley .....Barnstaple.
Parker, Robert Henry .....Barnstaple.
Powell, John Alfred.....Reading.
Ritson, Fletcher .....Carlisle.
Savery, John Manly.....Loughborough.
Saville, William... .....Leeds.
Sell, William Henry.....Bath.
Smith, Joseph .....Manchester.
Tomlinson, Eldred Edward .....Whitehaven.
Urwick Charles.....London.
Watts, James Orr.....Stafford.
Weston, Benjamin.....Fenton.

Four persons who had neglected to pay their subscriptions within the proper time were restored to their former status on payment of the current year's subscription and a fine, in accordance with the new bye-law.

THE UNIVERSITY OF STRASBOURG.

The PRESIDENT read two letters, one from Professor Flückiger, of the University of Strasburg, and another from the Rector of the University, stating their desire to promote a knowledge of English pharmacy, and asking for a copy of the PHARMACEUTICAL JOURNAL AND TRANSACTIONS.

Mr. GREENISH moved—

"That the request of Dr. Flückiger be complied with, and that the PHARMACEUTICAL JOURNAL be forwarded weekly to the University Library, Strasburg; all the back numbers of the third series, as far as possible, to be sent."

He said he had known Professor Flückiger, who was formerly at Berne, for some time, and had always found him ready to acknowledge and reply to any communication addressed to him on the subject of pharmacy.

Mr. SUTTON seconded the motion and it was unanimously agreed to.

PORTRAIT OF JACOB BELL.

The PRESIDENT begged leave to present to the Society a copy, by Mr. Downard, of the late Sir Edwin Landseer's portrait of Jacob Bell, and, at the same time, with an artist's proof of the engraved portrait of Sir Edwin Landseer himself. Sir Edwin, though not a pharmacist, always took great interest in pharmacy, and was a most intimate friend of the founder of the Society. He (the President) had also been honoured by his friendship, and would esteem it a privilege to be allowed to present to the Society these two memorials.

The proposition of the President was received with acclamation, and after a formal vote of thanks to him had been passed, on the motion of the Vice-President, seconded by Mr. Sandford, the President, Vice-President, and Messrs. Sandford and Williams were appointed a special committee to superintend the hanging and arrangement of these and of the other works of art belonging to the Society.

FINANCE.

The report of this Committee was read and adopted, various accounts and salaries being recommended for payment.

BENEVOLENT FUND.

The report of the Benevolent Fund Committee was read, recommending three grants of £10 each to widows of chemists and druggists. It was moved by Mr. Urwick that in the case of Mrs. Moss, widow of the late Mr. Moss, of Carlisle, a pharmaceutical chemist and local secretary, the grant should be increased to £20.

MR. BROWN said that Mrs. Moss had been an unsuccessful candidate at the late election for annuitants, and if, as some members wished, annuities had been granted out of the annual subscriptions, this lady would certainly have been one of the recipients; he therefore had much pleasure in seconding the motion.

After some conversation the motion was unanimously agreed to, as were the other grants proposed.

LIBRARY, MUSEUM, AND LABORATORY.

The report of this Committee stated that there were now 49 students at work in the Laboratory, 36 attending Professor Redwood's lectures, and 25 attending Professor Bentley's. The Professors reported that though the number of students now attending the classes was less than at the same time last year, they had every reason to be satisfied with their conduct, and were of opinion that when the new system was further known it would work advantageously, as the number of students was gradually increasing.

A letter had been received from Mr. Thompson, superintendent of the Botanical Gardens at Hobart town, offering to supply the curator with such botanical specimens as could not be obtained elsewhere. The Committee recommended that the offer be accepted with thanks. The curator had also reported that he believed persons made use of the Museum who were not entitled to do so, to the inconvenience of the students, and it was therefore suggested that all persons not connected with the Society desiring to use the Museum, should apply to the Secretary for a form of admission, without which they should not be allowed to enter. The following books were recommended for purchase, 'Markham's Memoir of the Countess of Chinchon,' 'Thorpe's Quantitative Analysis,' 'Suffolk's Spectrum Analysis,' also the latest editions of 'Hassall's Adulterations Detected,' 'Fresenius' Quantitative Analysis,' 'Roscoe's Elementary Chemistry,' 'Williamson's Chemistry for Students.' Amended regulations for the library were submitted for the approval of the Council.

Mr. GREENISH, in pursuance of notice, moved—

"That the Library be open every evening, and that publicity be given in the weekly issue of the Journal and Transactions of the Society."

He said that for some time past the library had been opened on two evenings a week, from seven to nine, and the attendance had been fairly good; since the Society had gone to considerable expense in improving the library, he would ask whether it would not be desirable to throw it open as he now suggested. Most chemists in London allowed their assistants one evening a week, but if that did not coincide with an evening on which the library was open it was of no use to them, and he had even found a difficulty himself from not always remembering what the evenings were. He saw no reason why it should not be open every evening except Saturday.

Mr. HAMPSON seconded the motion.

Mr. BROWN, in supporting the proposition, suggested that the library might be closed at five instead of six, if it were re-opened at seven.

The VICE-PRESIDENT said he hoped a record would be kept of the number making use of the library, in order that it might be seen how far the new regulations, which he had no doubt would be adopted, were appreciated.

The motion was unanimously agreed to, and the report of the committee and the following library regulations, as amended by Mr. Greenish's resolution, were unanimously adopted :—

LIBRARY REGULATIONS.

"1. The Library is open from Nine o'clock, a.m., until Five o'clock, p.m., and, in the evening, Seven to Ten o'clock. Saturdays, from Nine o'clock a.m. until Two o'clock p.m.

"2. 'Members' of the Society and 'Associates in business' only may obtain books on making personal or written application for them.

"3. 'Associates' and 'Apprentices or Students' of the Society may obtain books on presenting a recommendation from a Member or Associate in business, the person recommending being responsible for the safe keeping and return of such books. A form of recommendation may be obtained from the Librarian.

"4. No person shall have more than two volumes at a time, nor shall he be entitled to keep any book for a longer period than fourteen days, except country Members and Associates in business who shall be allowed to retain books twenty-one days. But when a book is returned it may be borrowed again, provided it has not been bespoken by any other person. Books which have been bespoken shall circulate in rotation, according to priority of application.

"5. The scientific journals shall not be circulated until the expiration of the month of publication. Works containing valuable plates, and a few standard works of reference, shall not be circulated, except by special permission of the Committee; such books shall be distinguished in the catalogue by an asterisk.

"6. The expense of carriage of books borrowed by country Members and Associates in business, will be defrayed one way by the Society.

"7. If any book be retained by a borrower for one month and be not returned after written application has been made for it, the Council may order it to be replaced, and charge the borrower in default with the amount thus incurred. If any book, when returned by a borrower, is found to have been damaged during the period he has had it, a fine equivalent to the injury shall be paid by the borrower.

"8. The Library shall be closed during the first fortnight in September, to admit of the examination of the books."

THE 'HISTORICAL SKETCH OF PHARMACY.'

The SECRETARY read a letter from Professor Redwood on the subject of the re-issue of Bell's 'Historical Sketch of Pharmacy,' with a continuation to the present time, stating that the proposed work, which the Council had about two years since requested him, in conjunction with Mr. Sandford, to undertake, would occupy a considerable amount of time, trouble, and research, but that if the Council wished it, he was ready to undertake the duty. The letter was ordered to be entered on the minutes, and after some discussion the further consideration of the matter was deferred until next month.

SPECIAL COMMITTEE ON THE PRELIMINARY EXAMINATIONS.

The Report of the proceedings of this Committee was read.

Mr. SCHACHT moved the adoption of the Report. He said the Committee had divided their labours into two evenings' work, the first of which received the approval of the Council at their last meeting, and the proceedings of their second meeting had now been read. In order, however, that members might be reminded of the whole proceedings, he would read the substance of the recommendations of the Committee.

Mr. SAVAGE was very glad that this matter had been brought forward so clearly as it had been; and the only improvement he could suggest was that instead of saying that the candidates should sit a sufficient distance apart from each other, a definite distance should be prescribed, say 4 feet, in order to prevent any possibility of contact or irregularity. He was very glad it was proposed that deputy superintendents should be appointed, because only on Monday last he was present at a Preliminary Examination where the Local Secretary, being a conscientious man, although in exceedingly ill health, was attending to his duties, when, if a deputy had been appointed, he would have been very glad to have left the work to him. He had much pleasure in supporting the adoption of the Report.

Mr. STODDART also supported the adoption of the Report.

Mr. BAYNES remarked that one objection put forward by the Board of Examiners was, that in some cases Local Secretaries or Superintendents would be supervising the examination of their own assistants. There did not seem to be any provision made for meeting this objection, to which he himself, however, attached no importance.

The VICE-PRESIDENT said in the ordinary course of things there would be three or more candidates examined at the same time, and it would be impossible for the Superintendent to give any advantage to one candidate over another without observation.

Mr. ATHERTON said the Committee had not thought it necessary to take any notice of the point mentioned.

Mr. SANDFORD also expressed his approval of the new regulations.

Mr. URWICK suggested the desirability of sending the regulations to the candidates before they came up, in order that they might make themselves acquainted with them prior to taking their places in the examination room.

Mr. BROWN was so thoroughly satisfied with the scheme as a whole, that he would waive any sentimental objection he might have to details. He must say there were some places in the kingdom where the Preliminary Examination had been so conscientiously conducted, and so admirably superintended, that he was sorry to see them omitted from the list of centres, but he could scarcely complain of this because no doubt their importance was not sufficiently great to entitle them to incorporation in the list. He was not quite certain whether it was, under all circumstances, absolutely prohibited that the Examinations should be held in the Superintendent's own house or premises; there might be objections in some cases, but he did not think they were so great as to render the prohibition absolutely essential. At the same time he should not divide the Council upon that point, though he thought in some cases there might be a difficulty in getting a suitable room, and that the examination might be conducted more satisfactorily in the Superintendent's own house.

Mr. Hampson said the Committee had very carefully considered this point, and it was thought better on the whole to insist on the examinations being always held on neutral territory, where a man would feel he was not in his own house, but was exercising a public function for the benefit of the Society.

Mr. Schacht said the point raised by Mr. Urwick with reference to the instructions to candidates was no doubt very important, but probably it would be met by this, that a certain notice had been drawn up which it was proposed to print at the heading of the papers given to the candidates on which they were to answer their questions, calling their attention to the importance and necessity of observing the regulations prescribed to them. It was supposed that this would enlist their good feeling, and at the same time excite their caution. He might add that it was proposed to prohibit the use of any scribbling paper by the candidates except the reverse side of the paper on which they answered the questions, because he understood the examiners were glad sometimes to see the scribbling of the students, in order to form an idea as to whether they understood the questions, and for that purpose it was desirable that these rough notes should be preserved.

On the motion of Mr. Schacht, seconded by Mr. Sandford, it was unanimously resolved—

"That on and after July 1st, 1874, the following be the conditions for the conduct of the Preliminary Examinations, and the Examination for the Bell Scholarships, the Pereira Medal, and the Prize of Books.

"1. That for the year ensuing from the 1st of July next the following places be taken as centres :—

ENGLAND AND WALES.

Barnstaple	Dorchester	Nottingham
Berwick-on-Tweed	Exeter	Oxford
Birmingham	Guernsey	Peterborough
Boston	Hereford	Plymouth
Brighton	Hull	Portsmouth
Bristol	Jersey	Preston
Cambridge	Leamington	Reading
Canterbury	Leeds	Salisbury
Cardiff	Leicester	Scarborough
Cardigan	Lincoln	Sheffield
Carlisle	Liverpool	Shrewsbury
Carmarthen	London	Southampton
Carnarvon	Lynn	Stafford
Cheltenham	Macclesfield	Swansea
Chester	Manchester	Taunton
Colchester	Newcastle	Truro
Darlington	Northampton	Worcester
Doncaster	Norwich	York.

SCOTLAND.

Aberdeen	Edinburgh	Inverness
Dumfries	Glasgow	Perth
Dundee		

"2. That persons be especially appointed by the Council to superintend the Preliminary examination in London and the provinces ; that they be called superintendents of examinations, and be paid fees for each examination ; such superintendents not being necessarily members of the Board of Examiners.

"3. That a deputy superintendent be also appointed by the Council in each centre.

"4. That a fee of one guinea be paid to the superintendent or deputy superintendent on the occasion of each examination.

"5. That wherever it can be so arranged, the local secretary be offered the appointment of superintendent.

"6. That the examinations be held in the months of January, April, July, and October, on the first Monday of the month, at 12 o'clock noon.

"7. That Medical Latin be discontinued in the Preliminary Examination after the end of the year 1874.

"8. That it being objectionable to hold the Examinations in the house of the superintendent, he shall be authorized to engage some other apartment suitable for the purpose, and charge a sum not exceeding ten shillings to the Society on account thereof.

"9. That the Examination for the Jacob Bell Memorial Scholarships be held annually on the first Monday in July, concurrently with the Preliminary Examination, and that on such occasions an extra fee of one guinea be paid to the Superintendent.

"10. That notice be issued in the Pharmaceutical Journal two months prior to the day of holding the Preliminary examination, that such examination will take place, and giving a list of the Centres at which it will be held.

"11. That in future the Examination for the Pereira Medal and Prize of Books be held in London and Edinburgh only.

"12. Candidates for the Preliminary Examination must give notice to the Secretary, 17, Bloomsbury Square, not less than 14 days prior to the day on which the Examination is to be held, of their intention to present themselves for examination, and state the Centre at which they desire to be examined.

"13. That the instructions to Superintendents of Examinations be as follows :—

"Pharmaceutical Society of Great Britain.
"17, Bloomsbury Square, W.C.

"Instructions to Superintendents of Examinations.

"To be read aloud to the Candidates before commencing their writing.

"The Preliminary Examination.

"The Examination Papers, with Special Sheets for the Candidates to write upon, will be forwarded from the Secretary, under cover, to the superintendents, so as to be received by them on the morning of the day fixed for the Examination.

"Writing materials for each Candidate should be provided and all arrangements for the accommodation of the Candidates completed before the hour fixed for opening the packet of questions and papers from the Secretary.

"Candidates must be in their places at the time appointed, and after this time no candidate shall be admitted.

"Candidates should be placed at sufficient distance from each other to prevent copying, and they must not be permitted to bring either books, scribbling papers, or memoranda into the examination room.

"The Examination Papers must be opened by the Superintendent at the appointed time, in the presence of the Candidates and immediately distributed by him.

"He must see that each Candidate signs his papers in the place indicated.

"No Examination Paper shall be taken from the room until the Examination is complete.

"The Superintendent must carefully watch the whole Examination to see that the Candidates do not use unfair means, either by assisting each other, or using books or notes. No person, except the superintendent, should be permitted to be present, and on no consideration shall Candidates be allowed to speak to each other after the papers are distributed.

"A Candidate wishing to ask any question must hold up his hand ; the superintendent will come to him, and satisfy any legitimate inquiry. No explanation will, however, be given on the subject matter of the questions.

"At the expiration of three hours from the time of the distribution of the questions, the written papers of the Candidates with all memoranda and scribblings thereon, must be delivered to the superintendent, who must immediately enclose all the papers in the envelope sent herewith by the Secretary, seal it with

his seal, and forward it by first post thereafter to the Secretary, enclosing the accompanying declaration duly filled in and signed."

The SECRETARY was instructed to communicate with the local secretaries in the proposed centres, asking them if they would undertake the duties of superintendents, and consulting them as to the appointment of deputy-superintendents in the respective districts.

HOUSE.

The report of this Committee was read and adopted. It recommended the payment of the surveyor's fees and the balance due to the contractor for the recent alterations and repairs; also the purchase of furniture and fittings for the Library, and the new Council Room. Ventilators were also ordered to be placed in the Examination Room.

PARLIAMENTARY.

The report of this Committee stated that certain information had been received with reference to alleged infringements of the Pharmacy Act. The Committee recommended that the particulars of one case should be forwarded to the solicitor with instructions to take proceedings in the event of his being able to obtain further and conclusive evidence. The attention of the Committee had been drawn to the prosecution of a chemist for the sale of adulterated musard; and a letter had been received from the chemist's association at Wolverhampton asking what their position was with regard to the sale of sweet spirit of nitre, milk of sulphur, sal volatile, citrate of iron and quinine, and other preparations. The letter had been forwarded to the solicitor in order that he might embody in the case he was about to lay before Counsel the points which had been raised.

Mr. HAMPSON was very glad to find the Council were moving in this matter, which very seriously affected the whole trade. He was somewhat doubtful of the value of the opinion when obtained, but he hoped the Parliamentary Committee would consider the whole subject carefully, and, if they found it necessary, would recommend the Council to go to Parliament for an alteration of the Adulteration Act.

Mr. SANDFORD said the main point, he believed, on which the Solicitor desired to have the assistance of Counsel's opinion was, whether under the Pharmacy Act certain offences were not amenable to the law on the action of the Council of the Society, and if so whether persons so offending were liable to be prosecuted in a Police Court. This was a very important question and required grave consideration, but he did not apprehend the Society was competent to expound the law, and therefore those who put such questions as those sent from Wolverhampton should be recommended to watch the cases as they occurred, and act accordingly.

Mr. HAMPSON said he was only anxious that the Parliamentary Committee should apply themselves to this question, and if they found they could recommend any amendment in the Adulteration Act, to go to the Government as speedily as possible, and, if possible, get the amendment made in the ensuing session.

Mr. WILLIAMS thought this a very good suggestion, and hoped some step would be taken to strengthen the hands of the Government in altering the Act, which he was sure they had no idea would operate as it was found to be doing. If it were to be carried out in the stringent way in which it was now attempted to administer it, it would be impossible for chemists and druggists to carry on their business.

Mr. ATHERTON suggested that a sub-committee should be appointed to wait on the Government on this matter.

The PRESIDENT thought it would be better not to take any active steps until the opinion of counsel had been received and considered.

Mr. BETTY said he believed it was generally known that the operation of the Adulteration Act was not what the Legislature intended it should be, and it was also known that the Society, as a body, was in opposition to it. It could not, therefore, be too widely known that the Council had taken that responsible position upon themselves to defend the interests of chemists and druggists in the matter. He did not think they could ever hope to abolish the Act, but he thought if they used their utmost endeavours they might so amend it that it would be fair to the public, and at the same time would not unduly press upon those who administered to the public wants.

Mr. GREENISH remarked that it had been stated once or twice by Mr. Sandford that there was an understanding with Earl Granville that the Adulteration Act should not affect chemists with respect to medicines, but, unfortunately, that understanding was in no way binding upon the magistrates.

The report of the Committee was then unanimously adopted.

REPORT OF EXAMINATIONS.

December, 1873.

ENGLAND AND WALES.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	4	4	0
Minor	96	54	42
	100	58	42

Four certificates received in lieu of the Preliminary :—

University of Durham	3
University of Oxford	1
	4

APPOINTMENT OF EXAMINERS.

The Council then proceeded to the election of two Examiners, to complete the number of fourteen, and upon a ballot being taken, Mr. George Spratt Taylor, of London, and Mr. Frederick Baden Benger, of Manchester, were declared elected. One Examiner was also required to be elected for Scotland.

The SECRETARY reported that he had received a letter from Mr. Mackay, stating that Mr. Tait, whose intended retirement caused the vacancy, was now willing to continue his services, and he was therefore unanimously re-elected.

LOCAL SECRETARIES.

Mr. WILLIAMS moved the resolution of which he had given notice that the Local Secretaries should be relieved of the duty now imposed upon them of collecting subscriptions. He said he had no wish to press this if there were the slightest idea that it would be offensive to local secretaries; his only motive was, that it was thought by the officers of the society that it would be much more convenient if subscriptions were paid direct, and not in the present round-about manner. As the collector for London had been removed, and all London members were now expected to transmit their subscriptions direct, he thought there could be no objection on the part of the country members to being placed in the same position.

Mr. SUTTON, as a Local Secretary, said he should be very happy to second the motion, because he thought it would relieve Local Secretaries of a great deal of trouble and difficulty.

Mr. ATHERTON also said he should be glad to be relieved of the duty, but at the same time he questioned the advisability of the proposal, and feared it would lead to a falling off in the number of members.

Several other members having expressed themselves to the like effect, Mr. Baynes in particular fearing prejudical consequences would arise to the Benevolent Fund,

Mr. WILLIAMS withdrew the motion for the present.

The Registrar placed upon the table a written copy of the register of Chemists and Druggists, arranged in alphabetical order according to the towns.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING THE MONTHS OF NOVEMBER AND DECEMBER, 1873.

LONDON.

	£	s.	d.
Beedzler, John, 1, Queen's Gardens, Hyde Park, W. ...	0	5	0
Davenport, J. T., 33, Great Russell Street, W.C.	2	2	0

COUNTRY.

Abergele, Hannah, John, Breadlebane House	0	5	0
Carlisle, Foster, James	0	2	6
Crewe, Bayley, W...	0	10	0
Darlington, Swenden, James	1	1	0
Manchester, Lowe, Walter, 21, Rosamond Street West ...	0	10	6
Sheffield, Learoyd, E. R., 21, Washington Road	0	5	0
Southampton, Steady, R. H...	0	2	0
Stowmarket, Sutton, Charles W...	1	1	0
Yarm (*Yorks*), Holden, William Henry...	0	10	0

Provincial Transactions.

GLASGOW CHEMISTS' ASSOCIATION.

SESSION 1873-4.

The fourth general meeting of the Association was held in Anderson's University on Wednesday, the 24th December, 1873, at 9 p.m., Mr. John Currie, president, in the chair. Owing to its being Christmas Eve the attendance was not large.

The minutes of previous meeting having been confirmed, the Chairman stated that it was intended to have the annual festival a month earlier this session, and that the election of members of committee would now be proceeded with. At this point Mr. J. G. McMurdoch suggested that the festival might take the form of a *conversazione*, or of a supper and ball, instead of a *soirée* and ball as on last occasion. Mr. J. A. Clarke strongly objected to having either a *conversazione* or supper and ball, as he feared that a considerable amount of difficulty would attend the getting up of the former, while the pleasure attending the latter could, from obvious reasons, only be participated in by a limited number. He therefore proposed "that the festival take the form of a *soirée* and ball." Mr. Kinninmont seconded the motion. Mr. Murdoch, seconded by Mr. Foster, then moved as an amendment "That we have a supper and ball." On the amendment and motion being put to the vote it was found that the majority were in favour of the motion.

The following gentlemen were then elected as "Festival Committee," viz. :—Messrs. Hunter, Brodie, Fenwick, Murdoch, Fotheringham, Wallace, Galbraith, Young, McDonald, Ritchie, Clegholm, Bardsley, Paterson, Garry and Foster, with power to add to their number.

A discussion on "the Adulteration Act" then followed. Mr. Alex. Kinninmont, in an able and interesting speech, strongly condemned the Act, and said he thought its workings in connection with the drug trade had been so ridiculous and unjust that every chemist in the kingdom should do his utmost to get it repealed. Referring specially to the "citrate of magnesia" prosecution, he did not see how they as chemists had any right to alter the name of such an article as "citrate of magnesia," which had been known to the public by that name only for many years. At any rate he for one did not intend to change it, and he would further state that if any prescription for "cit. mag. eff." should chance to come to him he certainly would give the so-called article ; and that no chemist, in his opinion, would be justified in doing otherwise.

Messrs. Hunter, Brodie, and the Chairman also joined in the discussion, the Chairman remarking that it would be well for chemists to be on their guard in the meantime. He thought that for their own safety they should make some change in their cit. mag. labels in order to keep within the letter of the law.

Parliamentary and Law Proceedings.

ACTION AGAINST A CHEMIST AND DRUGGIST IN SCOTLAND.

In consequence of inquiries having been made respecting the particulars of the law suit referred to at a recent meeting of the Glasgow Chemists' and Druggists' Association (see before, p. 483), we have applied to Mr. Freeland, who has kindly placed at our disposal the following details :—

On the 26th November, 1872, a man of the name of Dawson, and his wife, went into Mr. Freeland's shop in Bathgate, whilst he was at tea, and asked for 3 oz. quicksilver and 1 oz. of nitric acid, to be put into a bottle. A lad, Paris, aged 17, an apprentice in his third year, put the chemicals into a two-ounce bottle, and placed the bottle on the counter with a cork in it ; but observing that the contents commenced to effervesce, he proceeded to ease the cork, when the mixture squirted up into his face, and at the same time a portion of the spray flew across the counter, and fell on Dawson and his wife, and on a woman named Hunter, who was in the shop making a purchase, and who was the female pursuer in the action afterwards brought. One drop fell on the latter person's head, and another on the side of her nose. All the parties immediately washed the acid off with water, a plentiful supply of which was in the back shop. The boy received nearly the whole in his face, and Dawson and his wife received a great deal more than the female pursuer (who, standing farthest off, received very little). Dawson only made a claim on Mr. Freeland for assistance to get a new coat, the one he had on being a little spotted with the acid, and was paid 22*s*., with which he was perfectly satisfied. The lad Paris was back at his work in the course of three days, and has suffered no permanent injury ; and there are no traces now of his ever having received any of the acid on his person.

The woman, Hunter, also made a claim for compensation, which was eventually pressed in the form of an action in the Court of Session, that came on for trial before Lord Mure and a jury on the 18th of November last, and occupied two whole days. The damages were laid at £350. It was alleged on behalf of the pursuer that the lad, Paris, was totally ignorant of the nature of chemicals ; that he placed considerable quantities of quicksilver and nitric acid in a bottle which he stoppered, thus causing an explosion, whereby the female pursuer was seriously burned on the face, arms, and head ; that she suffered intolerable and excruciating pain in the head for several days and nights, and still continued to suffer great pain from the effects of the explosion. Mrs. Hunter deposed that a great deal of her hair had come off, that her health had much changed, and that she was no longer able to work as she did before the accident. Dr. Kirk deposed that he was called in and found Mrs. Hunter, pillowed in bed, suffering much pain, with a good number of copper-coloured spots on the side of her head. In his opinion the symptoms were caused by a burning substance. She had never regained her former robustness.

For the defence, Dr. Longman deposed that he visited pursuer at defendant's request, when she complained of a burn on the head and in the right corner of her left eye. The only spot he observed was on the side of the nose ; and he considered she got off with almost no injury. Nitric acid produced a yellow, not a copper-coloured stain : he had experimented with nitric acid and quicksilver, which produced the same yellow colour, but was not so active as pure nitric acid. Dr. Littlejohn deposed that nitric acid, dropped on the skin and washed off directly, would not cause injury. Would ascribe the symptoms under which the pursuer was said to have laboured to a blow, a fall, or a cold. Dr. Anderson said that he saw pursuer on the 12th of March. On examination he detected a mark below the left eye. He found no trace of any marks on the head, and there was no appearance of loss of hair. She said that her health was very good, that she was well enough, and that she felt nothing permanently wrong with her. Dr. Watson deposed that spots such as described would not cause much injury. He doubted whether the copper-coloured spots had anything to do with the accident at all. If destruction of tissue had

taken place, the mark would have been permanent. No effect would be produced on the system.

After some other evidence the judge summed up, and the jury having retired, returned in fifteen minutes with a unanimous verdict for the pursuer, laying the damages at £12, with expenses. The foreman of the jury stated that they had not been guided in their decision so much by the injury sustained, as by the principle that more care should be taken in dispensing chemicals, and they intended it as a lesson to chemists to provide properly qualified assistants to take charge during their absence.

We are informed by Mr. Freeland that several attempts were made to settle the pursuer's claim without going into court, but unsuccessfully. Although the damages awarded amounted only to £12, it is estimated that the costs—in consequence of the case being carried into the Superior Court instead of being tried in the County Court—will amount to between £300 and £400. Mr. McDonald, of the Glasgow Apothecaries' Company, and other gentlemen, have kindly undertaken to receive subscriptions towards defraying these heavy expenses.

Review.

QUANTITATIVE CHEMICAL ANALYSIS: by Dr. C. REMIGIUS FRESENIUS. Sixth Edition (reprinted from the fourth). Translated from the fifth German edition by A. VACHER.

What we have been impatiently waiting for now fully four years has come at last: a new edition of the only trustworthy book in English on quantitative analysis. In 1870, when the fourth edition had been sold out, the publishers, it is true, at once re-issued the book under the editorship of Mr. Vacher; but, alas, what he gave us was not our trustworthy old friend whom we had learnt to love in spite of the pig-tail of pedantry that was dangling about the back of his head. That pig-tail we had come to consider part and parcel of the man, so that, if the editorial scissors of Mr. Vacher had cut off nothing else, we should even then have felt something like disappointment; but unfortunately, not the tail alone but a good portion of useful hair had disappeared too, and some of the head into the bargain, so that what was finally left was a Fresenius *minus* "Fresenius" *plus* Vacher; and this, both as to the negative and the positive term, was precisely what we did *not* want. We are glad to know that Mr. Vacher has seen the mistake he made at the time and now partly rectifies it. A book on quantitative analysis, if it is to be good for anything, *must* give full information regarding the *practical details* of the methods; because it is just these little things without which, in the execution of the processes, success is not certain, and it is these things which even the most talented student, in general, cannot be expected to find out for himself. And not merely the "student?" Is it not the same with professional chemists in all those cases at least in which they consult Fresenius for actual information, not for merely refreshing their memories? Smile as much as you like at Fresenius' pedantic minuteness in explaining the proper way of managing a sulphate of baryta or chloride of silver precipitate, or the true orthodox way of charging your potash bulbs or drying your combustion tube; still when, in the course of an investigation or a piece of commercial work, you come across a determination which you have never executed before, you may be very thankful to the old schoolmaster for his little bits of advice and turn them to good account. Granted that, if you are a chemist at all, you would have been able to find out all these things for yourself (and a great deal more, possibly, besides); but this is just what one would not have the time to do, and what it would be foolish to lose time over, if another man has done it for you.

To turn to the second point let us simply say, in plain English, that we did not want a book from Mr. Vacher, for the simple reason that we had no evidence of his being competent to write one. We do not wish to be rude to him; in fact, what we have to say against him is not more than what we should not hesitate to assert with regard to nine-tenths of the most eminent chemists of the country, and Mr. Vacher surely cannot feel hurt at his being condemned in such good company. A chemist may be the greatest scientific genius living and yet be utterly incompetent to write a book to supersede the one we have before us. No man should attempt to write a "Fresenius" unless he be a "Fresenius" himself, *i.e.*, unless he has made a speciality of analysis and devoted half his life to cultivating it *for its own sake.*

But stop, we are writing a critique of the fifth edition instead of attending to our immediate business and giving our opinion on the sixth. Well, in turning to the publishers, all we have to say is, that by this new edition they have rendered a great service to the chemical community; but, speaking to the editor, we are sorry to be obliged to say that he has again failed to do the right thing. Chemical science now-a-days, and its helpmate, analysis, with it, progresses with rapid strides, so that a book which was quite up to the mark in 1864, must necessarily, in many of its chapters, be antiquated in 1874. After having kept the public waiting for four years, why not have discounted their patience a little longer and brought out a translation—from the author's manuscript—of the *new* German edition now in course of publication? Or if this was not practicable, why not, by the addition of supplementary notes to the chapters that required them, bring up the book to 1873, a date which, in its present form, it has no right to bear on its title-page. We hope and trust that the publishers will lose no time in issuing a supplement to this book, to bring it up to its proper standard, or else they must not be surprised if some enterprising publisher should one day—by an obvious process—turn *their* book into so much waste-paper.

In the meantime, however, the book, even as it is, is *the* book on quantitative analysis, and none of the many chemists who are not enough of German scholars to read the original will fail to place it upon their laboratory book-shelves. The special part (pp. 541-722) alone is worth all the 18*s*. Here you find a full, accurate, critical exposition of all the best processes (or at least what, in anno so-and-so much, *were* the best processes) for the analysis of waters, silicates, ores of all sorts, manures, soda, bleach, tanning materials, sugar, etc.; and wherever you see the author recommending or condemning a method, depend upon it, his judgment is founded upon a thoroughgoing series of critical experiments, carried out either by himself, or at least under his immediate superintendence by one of his students, in his laboratory.

In fact, in its descriptions and critiques of special analytical methods, the book is simply the best that has ever been written, and it is questionable whether there ever will be a better one. The more purely scientific chapters are rather weak. The author's very lengthy explanations in chemical arithmetic especially are such that, with all our veneration for our old master, we often find it difficult to suppress a smile. *Vide*, for example, the chapter on gasometric calculations, which, without any loss of substance, might have been condensed into one-tenth of their present space, and thereby have been rendered much clearer than it is.

BOOKS RECEIVED.

YEAR BOOK OF PHARMACY, comprising Abstracts of Papers relating to Pharmacy, Materia Medica and Chemistry, contributed to British and Foreign Journals, from July 1, 1872, to June 30, 1873. With the Transactions of the British Pharmaceutical Conference at the Tenth Annual Meeting held at Bradford, September, 1873. London: J. and A. Churchill. 1873.

A CLASSIFIED AND DESCRIPTIVE CATALOGUE OF THE INDIAN DEPARTMENT OF THE VIENNA UNIVERSAL EXHIBITION, 1873. By J. FORBES WATSON, M.A., M.D., F.L.S., F.C.S., etc. London: W. H. Allen andCo. 1873.

Correspondence.

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

Homœopathic Concentrated Poisons.

Sir,—Allow me to remind your correspondent, "A Hater of Injustice," that the object of my recent communication to the Clinical Society was not to discuss homœopathic theories of disease and its treatment, but, by referring to three cases of alarming poisoning by concentrated solution of camphor, to show that modern homœopathic medicines are dangerously concentrated.

The printed directions on the bottles containing the preparation in question are "dose, two to five drops on lump-sugar, which may be repeated every half-hour, or oftener if necessary." So that the patient who took three drops every five minutes was strictly within the limits of the dangerously vague printed directions, while the two patients who much exceeded the prescribed dose probably did so under the erroneous impression that homœopathic medicines are weak and harmless, or they may have mistaken this saturated alcoholic solution of camphor for the much weaker spirit of camphor of the British Pharmacopœia. The mistake made by these patients is likely to be made by others, and, in fact, it has been made by others of whom I have heard. It is therefore obvious that the employment of this and similar concentrated poisonous drugs, is attended with considerable risk, and I repeat that to indicate this unquestionable fact was the sole object of my communication to the Clinical Society.

I venture now to suggest that no such dangerous concentrated preparations ought to be sold without the word "Poison" being plainly written or printed on the bottles which contain them.

George Johnson, M.D.

11, *Savile Row, Dec. 26th*, 1873.

Homœopathy and Allopathy.

Sir,—It is useless to discuss the merits of Homœopathy in the Pharmaceutical Journal, both because the minds of its readers are already settled upon that point, and because its "inappreciable" doses are not subjects for scientific investigation or logical argument. They are in every aspect "inappreciable," and must be swallowed in faith. Under these circumstances I fail to see the advantage of opening the columns of the Pharmaceutical Journal to an *anonymous* champion of an unphilosophical mysticism to attack the upholders of rational practice in such language as this:—

"I am sure no practitioner can honestly test the system without becoming a convert; and that no one could write as the Editor of the *British Medical Journal* does who had really investigated it. There is not a single dispassionate argument throughout either of these articles, which consist of nothing but distorted facts and clap-trap appeals of the most transparent kind. The Editor resorts to the last refuge of the defeated antagonist—a poor trick after all—to slander that which he cannot disprove. . . . He is bound either to establish his position by disproving the homœopathic law of similars, or to retract it, and apologise for having so grossly maligned a truth."

Now, this is simple scolding, of which we have enough at home, without this "Hater of Injustice" intruding himself into our Agapemone. But as I am equally responsible with the author of "The Dying Faith" for the statement of which he complains (See Pharmaceutical Journal for 1870, p. 823), it seems right for me to notice his attack.

He says that he is prepared to substantiate by facts and reasoning "that homœopathy never was a delusion and is not a fraud." I have done my best to extract all the pertinent facts (or opinions put forward as facts) in his letter, but of reasoning I can find none. This is of the less consequence as we none of us desire to dispute (however much we may disbelieve) the merits to which a *bonâ fide* homœopathy is pleased to lay claim: all that we care about is to expose the pseudo-homœopathy, which obtains its results by ordinary agencies, and fraudulently attributes them to veritably homœopathic treatment and infinitesimal doses.

The following assertions contain all that is pertinent to this last issue:—

1. "The dose is always infinitesimal, however concentrated the remedy, that is, it is less than sufficient to produce chemical or physiological action. . . They produce plenty of 'appreciable,' though no sensible effects."
2. "Many homœopathic dilutions do give positive results when chemically tested, but whether they do so or not is no argument against their therapeutic power. The only real test is their efficacy in combating disease, and this is being proved every day and hour."
3. "Five drops" (of Homœopathic Camphor are to be taken) "every 5, 10, or 15 minutes, according to the severity of the symptoms."

It is only necessary to state that fact No. 3 gives as the maximum "*homœopathic*" dose of *Camphor* 24 grains in the first hour (equivalent to 35 ozs. Camphor Julep*), and we cause the above facts to knock one another over like a pack of cards, carrying with them the pretended practice of infinitesimal doses! Our outraged "Hater" further informs us that until he read of it in "The Dying Faith" he had never heard of "pseudo-homœopathy," and he adds, that in his opinion "both systems have their value." Now it seems likely that a man who could swallow 24 grains of Camphor as a homœopathic dose, would scarcely be suspicious enough to discover anything not obtrusively thrust under his nose, but it does not follow that persons whose suspicions are aroused by pretensions which set all scientific conclusions at defiance should be equally obtuse. We also know that it is not uncommon for homœopathic practitioners to hold such opinions *as to the merits of both systems*, and to be willing to play on either string according to the pleasure of their patients. Can we help suspecting that they play *on both strings* for their own advantage? At all events, we know from your correspondent's admission that they give camphor in extreme doses. I have recently learned beyond all question that they give phosphorus in doses of a single drop to an extent which I confess I should be glad to be able to imitate, producing effects which are not only sensible but offensive, and there are few of us who within the limits of our own observation have not known potent remedies such as calomel given in full medicinal doses, under the guise of homœopathic treatment.

In conclusion, I will refer to one accusation brought against us by your correspondent which we often hear alleged by the devotees of homœopathy as a triumphant evidence of its superiority. It is that we have copied their remedies while we abuse their practice. While claiming our equal right to all the resources of nature, by whomsoever discovered or first applied, I would ask in return, and as an *argumentum ad absurdum*, what stock-in-trade homœopathy would have had to commence with if this exclusive rule had always prevailed. When orthodox practitioners copy the *homœopathic system* without acknowledgment they will deserve the obloquy which does somehow appear to be attaching itself to modern homœopathists.

Richard W. Giles.

Sir,—Instead of exposing, as is fashionable just now, the shortcomings of both systems of medicine, I should prefer that we should consider certain things which are common to both.

There are many diseases treated on different systems with equal success, and many cases in which diet and accessory measures are of more service than drugs.

Patients usually consider that they ought to have something administered to them, and are not satisfied without the doctor orders medicine of some kind.

The homœopaths are certainly wiser than the allopaths in not making their Pharmacopœia intelligible to the public, and I believe that more harm than is generally supposed has been done to patients, as well as medical men and chemists, by the publication of the British Pharmacopœia in English. I am very pleased to see that the proposed universal Pharmacopœia is to be printed in Latin, and should like to see the formulæ of our British Pharmacopœia in that language.

It is very desirable to educate the public in chemistry, physiology, and hygiene, so as to make them intelligent

* The equivalent of camphor julep will be found correct when allowance is made for camphor undissolved in the maceration.

patients, but I look upon it as quite another thing, and a very dangerous proceeding, to teach them how to make their own medicines. I do not mind patients reading their prescriptions, but do not think it necessary to tell them how to prepare the ingredients ordered.

From what I have seen of medical men and chemists when they have had the misfortune to become patients, I have been led to the conclusion that they would have derived more benefit from the remedies prescribed if they had not known the composition of them. In the case of unprofessionals, also, whether allopaths or homœopaths, I think this will be found applicable, and maintain, for the patients' sakes, that it is not desirable for them to prepare their own medicines, or to know the composition of them.

FRATER.

Sir,—

"Ill natur'd foes there are, and yet 'tis true
There are as senseless friendly bigots too."

I cannot let the remarks of a "Hater of Injustice," which appeared in your columns last Saturday, pass without a few comments.

The allopath will gain nothing by unfair attacks or unjust assertions, but the letter of your correspondent does not make it clear that the *British Medical Journal* has been guilty of either one or the other, beyond his own *ipse dixit* founded upon his own experience, which so far as the treatment of disease is concerned appears to be rather limited.

Now avoiding theories and disputed points as much as possible, it shall be my endeavour to state my reasons for believing that homœopathy is a delusion and a snare.

For forty years I have more or less been mixed up with the administration of medicine; part of that time in a London hospital and other institutions of a similar character.

Ten years ago, or rather more, my attention was drawn to the practice of homœopathy, and as it *appeared* to have many advantages, on account of the facility of getting fastidious patients to take small quantities of nearly tasteless medicine (the medicines themselves being comparatively without cost) I was induced to make a trial.

I procured some of the best works on the subject, Pharmacopœia, etc., and a good supply of remedies from some of the best homœopathic chemists; but after several years of study and practice, candour compels me to give it entirely up, as it uniformly failed in my hands to produce results at all equal to those obtained from allopathy.

And this has been a conclusion further confirmed by taking notice of its effects upon others wherever I have had an opportunity of judging, and which I have endeavoured to do most impartially.

The homœopath must not be too thin skinned, for the allopathic mode of treatment has received but little fairness at his hands; neither should he be surprised that until his own system is cleared from a good deal of the mysticism and empiricism which now seem to envelop it, that conscientious men who (after patient investigation) believe the definition given by the *British Medical Journal* as neither untrue nor unfair, say so, particularly on a subject of such momentous interest as the health and lives of the community.

And, in conclusion, I boldly affirm that the law of similars is not so unassailable as your correspondent seems to think.

A SEEKER AFTER TRUTH.

THE ADULTERATION ACT IN ITS RELATION TO DRUGGISTS.

Sir,—A Liverpool chemist has been convicted and fined for selling two ounces of mustard, simply because it was not pure *powdered mustard seed*. At the same time the prosecution was obliged to admit that there had been no fraud practised or intended. Does not this make the Act most unjust and oppressive in its application to the plainest comprehension? My own experience is that no one selling or purchasing the ordinary condiment called mustard understands it to be simply powdered mustard seed—this article is not liked by the public as a condiment, it is too sickening, and by no means so suitable for the purposes intended. It is plain from the evidence that the mustard was not sold as pure powdered mustard seed.

Now, as almost every chemist has possibly fifty or a hundred articles in his stock of daily sale which render him liable to the same tyrannical application of the law, is it not time to seek some common protection from proceedings which probably were never intended by the promoters of the Act, and which in the end must really defeat the object in view by bringing such proceedings into contempt? Let no chemist flatter himself that he is safe, and therefore can look with unconcern upon his unfortunate brethren who have been pounced upon. The law as it now stands can be applied in many ways not yet carried out, and certainly in one case already decided—the butter case in Liverpool—Mr. Kelly was put to more than one hundred pounds expenses to prove that his butter *was not* adulterated. I do not believe the House of Commons ever intended such an operation of the Act as this.

J. B.

Birkenhead, Jan. 3rd, 1874.

ERRATUM.—Through an erroneous transposition of words which occurred during the correction of the proofs of last week's number, the following correction is necessary in some copies:—Page 541, column 1, line 18 from bottom, for "as pure oleic acid," *read* "as well as pure oleic acid."

"*An Apprentice.*"—The contract of apprenticeship is at an end, but such a case is eminently suited for an arrangement.

J. N. Place.—Proctor's 'Practical Pharmacy' is published by Messrs. Churchill, price 12*s*.

Enitar.—There are two views entertained by botanists as regards the formation of the *pome:* one considers the fleshy portion outside the scaly or bony part in which the seeds are enclosed, as consisting of the combined epicarp and mesocarp, the former corresponding to the epidermis of the adherent calyx, and the latter to the combined cellular portion of the calyx and ovary; while the other considers this fleshy portion as the enlarged flower-stalk, as in the Rose, united to the calyx. Those who adopt the former view, regard the outer skin of the fruit as the *epicarp*, the fleshy part, which is eaten, as the *mesocarp*, and the core containing the seeds, as the endocarp (Bentley's 'Manual of Botany,' 3rd Edition, page 282); while those adopting the latter view usually regard the part within the outer fleshy portion as forming in itself the entire pericarp. These two views will explain the discrepancies referred to in the two books quoted.

W. H. W.—Please to repeat the question, as in its present form it appears to contain a mistake.

"*Hampton.*"—No; because its physical properties are entirely different.

"*Erin.*"—Professor Graham's original paper on 'The Law of the Diffusion of Gases' is printed in the *London and Edinburgh Philosophical Magazine*, vol. ii. (1833), p. 175; his paper on the 'Molecular Mobility of Gases' will be found in the PHARM. JOURNAL, second series, vol. v., p. 166.

M. P. S.—Yes.

R. J. M.—It is the albuminous seed of a palm, *Phytelephas macrocarpa*. Possibly other species also yield it.

T. A. Appleton.—We think there must have been some misunderstanding. The words of our answer last week were the actual words of the new bye-law, and admit of but one construction.

J. Smith.—At any time a candidate presenting himself must be examined according to the then existing regulations.

"*Plodding Student.*"—(1) Both are correct, one being an empirical, the other a rational formula. (2) Ammonium alum. (3) Yes, but you appear to have mistaken the formula of alumina for that of dried alum. (4) Yes.

Mr. Parkyns (Liskeard).—Your letter and enclosure have been handed to the Secretary. All orders for copies of the Journal should be forwarded to the publishers, Messrs. Churchill, 11, New Burlington Street, W.

"*Spes*" and "*Compositae*" are referred to the rule respecting anonymous communications.

W. H. Smith.—Stem bark is almost invariably present mixed with the root bark. The sample forwarded we consider to be above the average quality.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Lindsay and Blakiston (Philadelphia), Lillard (Nashville), W. M. Rogers, Spring (Brooklyn), R. Edwards, Fingland, Badcock, Gibson, "The Whole Truth," "Apis," "Erin," "Modified," J. H. R.

THE ADULTERATION OF POWDERED IPECACUANHA.

BY JOHN MERCER.

Now, when the Adulteration Act is being carried to such absurd lengths, and sometimes chemists are, without reason, dragged into police-courts, it is of the most paramount importance, if we intend to maintain that reputation for honesty and fair dealing which I believe we have justly acquired, that the greatest care should be exercised by us in taking into stock the various drugs and chemicals which crowd our shelves. None know better than we the difficulties to be encountered in pronouncing definitely upon the purity or otherwise of many substances with which we have to deal, and how absolutely we are in the hands of wholesale houses, and obliged to take their reputation as a guarantee for the genuineness of many drugs in daily use. It is true that microscopy, united with chemistry, will very much lessen the difficulty, but I am afraid the number well up in the former would be very insignificant if compared with the chemists and druggists' register.

I do not for a moment wish to cast any imputation upon the wholesale trade ; on the contrary, I believe the many firms noted for respectability would scorn the idea of entertaining for a moment a desire to adulterate any article ; but what I am about to state will show that, no matter how respectable or whatever reputation wholesale houses may possess, it is not simply within the range of possibilities, but a fact, that they, too, can be deceived, and consequently deceive their retail customers.

This, I believe, will be found to be the case in many instances as regards powdered ipecacuanha. During the early part of last year I bought some pulvis ipecac., but the old stock lasting until a few weeks since, the new was not required. However, the old did not last for ever, and the new was opened for the purpose of making a preparation in which it was necessary that it should be mixed with a proof spirit tincture, and afterwards dried. My surprise may be imagined when I state that in about fifteen minutes a very strong odour of essential oil of bitter almonds was given off. This fact at once aroused my suspicions, and as I was not aware of any substance containing emulsin and amygdalin in such quantities as to give off such a powerful odour of the bitter almond as was the case with the ipecacuanha in question, I concluded that "almond meal" must have been mixed with the powdered root for the sole purpose of adulteration.

My next thought was to examine the product of decomposition for hydrocyanic acid, which was done in the following manner. About 40 grains of the sophisticated powder was rubbed to a cream with water, introduced into a small retort, and digested at about 90° for half an hour. Distillation was then carried on cautiously into a small receiver kept cool, and containing about one drachm of water, into which the delivery tube dipped. This distillate gave convincing evidence of a considerable quantity of hydrocyanic acid upon the application of the "nitrate of silver," "sulphocyanide," "Prussian blue," and "guaiacum" tests.

The remainder of the "powder" was then returned, and a fresh quantity ordered from another source, in which, to my great amazement, the same adulterant was discovered, though not to the same extent.

I have not examined the powdered ipecacuanha in question for the *quantity* of prussic acid it was capable of producing, therefore I am not prepared to say what might have occurred if it had been dispensed for a child, something in this style, which I have frequently seen :—Pulv. Ipecac., 40 grains in a two-ounce mixture, dose one drachm every fifteen minutes, until sickness be produced.

With reference to the sources from which the above two samples of ipecacuanha powder were obtained, it suffices to say that they were both respectable houses, the first from a London house which would consider it an insult to be counted second to any other house in the trade. Both firms were astounded when I returned the powder as adulterated, but upon examination the fact was too clear to be disputed, and upon sifting the matter both arrived at the conclusion that part of the root had been abstracted at the mill by one of the workmen, and its weight made up with "almond meal." How long this roguish trick has been practised, or into how many establishments this rubbish, or worse than rubbish, has found its way I know not, but that the evil may be widespread is evident, and to remedy it as far as possible I have thought it only right to publish the case in this journal.

That each member of the trade may satisfy himself as to whether his pulvis ipecac. is free from "almond meal" or otherwise, it is only necessary to make into a paste with water a small quantity of the powder, and let it stand in a warm place for half-an-hour. If at the expiration of this time it retains the peculiar flavour due to ipecac., it is free from bitter almond meal, but if it has a distinct almond flavour, return it at once to the source from which it came as adulterated.

In conclusion I may add that, having retained a small quantity of both samples of adulterated powdered ipecacuanha, I shall be glad to send a little to any gentleman of microscopic ability, who might wish to examine them.

Preston, Jan. 12, 1874.

A NEW FALSIFICATION OF CINCHONA BARK.*

BY M. BERNATZIK.

The new falsification of cinchonas to which attention is drawn by the author, consists in moistening valueless barks with an alcoholic or acetic solution of quinoïdine. The chemical examination of barks thus treated leads to enormously high figures as representing the amount of alkaloids. One sample analysed gave 5·92 per cent. of bases instead of the 1·24 to 3·45 per cent., indicated by De Vrij for true bark. These cinchonas cannot be distinguished in appearance from non-treated bark of good quality. The sample examined by the author agreed with the type (*cortex chinæ fuscus*, of Java) of the collection of the Institute of Vienna. It consisted of the younger branches of *C. Calisaya*, Wedd., and of *C. officinalis*, L., and was in quills about 42 centimetres long, 1 to $2\frac{1}{2}$ centimetres in diameter, and $1\frac{1}{2}$ millimetre thick.

For the rapid and preliminary assay of these falsified barks M. Bernatzik recommends the careful examination of all suspicious points with the aid of a lens. The fracture of the long pieces and the colour of the inner surface of the small finely rolled quills are noted. The whole of the piece or pieces is then

* *Journ. de Pharm. et de Chemie*, Jan., 1874, p. 49.

reduced to fragments not more than one centimetre long, and these are well mixed. Five grammes of the fragments are introduced into a test-tube, well shaken down, covered with chloroform, and allowed to macerate for half-an-hour, with occasional agitation. The liquid is filtered away and evaporated to dryness on a watch glass. What remains is wetted with one, two, or three drops of hydrochloric acid, and then triturated at first with a little water, afterwards with a larger quantity (1 to 2 c.c.). Again filter and wash the filter with 1 c.c. of distilled water. If quinoïdine is present the liquid is more or less deeply coloured yellowish brown; if absent there is no coloration.

If half of the filtered liquid be mixed with chlorine water and ammonia added, the emerald green colour of the isomers of quinine manifests itself; sometimes a green flocculent precipitate is obtained which dissolves in excess of ammonia, producing the same emerald green. Too much chlorine gives only a yellow colouration. The addition of soda solution to the other half of the filtered liquid causes a turbidity or precipitate which dissolves on agitating with ether.

If the fragments of cinchona treated as above have yielded no quinoïdine, dry them with bibulous paper and treat with cold distilled water, which dissolves the salts of quinoïdine introduced (if they be acetates); at the end of half-an-hour, filter. The filtrate is almost void of colour if the bark be unsophisticated, but is coloured if the bark has been tampered with as above. Soda causes a precipitate in it which disappears with ether.

In those cases where the barks have been only slightly adulterated, or where part of the quinoïdine salts added has been lost by moisture, it is well to unite the products of the two modes of treatment.

Finally, in cases where the falsification has been effected with an insoluble salt, it is expedient to treat a fresh sample with water containing 1 per cent. of sulphuric or hydrochloric acid. At the end of some minutes the alkaloids adhering to the surface are dissolved. In this instance the precipitate formed by caustic soda contains some isomer of cinchonine and does not dissolve completely in ether. Chlorine and ammonia should give no green coloration; otherwise the cinchonidine will not be completely exempt from quinoïdine.

The same procedures may be employed where barks have been falsified by cinchonine or cinchonidine in alcoholic or acetic solution.

THE ALKALOIDS OF THE CINCHONA BARKS.*

BY O. HESSE.

It was in the year 1638 that the corregidor Juan Lopez di Canizares, by his celebrated cure of the Countess Chinchon, attracted the attention of the physician Juan di Vega to the bark of a tree growing in the district of Loxa, and thus became the originator of a literature which, however extensive at the present time, nevertheless, upon many points gives no certain information. This uncertainty arises from the fact that as the subject became gradually more accessible to investigators it was taken up by persons who were not in a condition to surmount the difficulties by which they were met in the investigation of the barks in question. The result was, that the confusion which was originally limited to the domain of pharmacology and botany at last extended to chemistry also. And although the discovery of the active febrifuge principles of these barks—quinine and cinchonine—provided a surer basis for future researches, nevertheless other substances were afterwards frequently confounded with these, and the longest known alkaloids were again announced as new discoveries. Yet they were found to be possessed of peculiarities which had not been noticed in the previously discovered substances, in consequence of the unsatisfactory manner in which they had been investigated.

It seemed to me, therefore, worth the trouble to take in hand a small excursion into this domain, the results of which are given in the following. But before I proceed to the subject itself it will be as well to say a few words upon the cinchona barks.

Under the cinchona barks were included, until the last twenty years, the barks of all the trees and shrubs which, in the "Species Plantarum" (1753), were included by Linnæus in the genus *Cinchona*. Later, Karsten divided this genus into three parts, namely, into *Cinchona*, *Heterasca*, and *Ladenbergia*. Then Weddell* reunited the last two—forming of them the genus *Buena*—and gave the following characters as those by which the species belonging to the genus *Cinchona* might be distinguished from allied plants:—the dehiscence of the seed capsules from the base upwards, the felted clavate hairs which cover the corolla-limb, the fragrance of the flowers, and the yield of the true alkaloids from the bark of the trunks. Relative to this latter character, which he considers of great importance in the diagnosis of cinchona bark, Weddell adds, Howard informed him in November, 1869, that experience had confirmed that the yield of the true cinchona alkaloids is restricted to the barks of the *Cinchonas;* and he is therefore of opinion that it is an axiom so surely founded that it cannot be overthrown by any objection brought against it.

The species of the genus *Buena* would therefore yield only such barks as do not contain alkaloids, or at least not the same as are contained in the true cinchona barks. As, on the other hand, the cinchona barks or true quinine barks, received by us as such from South America, present a constant similarity in their anatomical structure, wherein barks from the genus *Buena* essentially differ, there would appear to be a constant relation between the chemical and morphological properties of the plants.

Meanwhile, I have before shown that the "china cuprea," which in its physical structure differs considerably from the true cinchonas, yet contains quinine and other alkaloids which are met with in the cinchona barks. It also appears that genuineness of the cinchona bark does not altogether depend on the yield of quinine, for Karsten,† studying the cinchonas growing naturally in their native country, has demonstrated the fact, which I have also confirmed here,‡ that sometimes the bark of a *Cinchona* contains not a trace of alkaloids. He has also shown, by numerous experiments upon *C. lancifolia* and *C. corymbosa*, that the alkaloidal yield is probably not conditional upon the individual species of the plant, but that the soil and the climatic conditions upon which depend the nutrition and development of the plant call them into existence. These variations, however extend not only to the relative quantity of each alkaloid, but, as has been shown in the *C. succirubra* cultivated in the East Indies, also to their entire nature.

We may, therefore, expect to see the continued experiments made in different places upon the acclimatization of the cinchonas lead even to the production of new alkaloids.

I. Quinine.

Quinine was discovered in 1820 by Pelletier and Caventou, who especially investigated closely its combination

* Translated from the 'Vierteljahresschrift für praktische Pharmacie,' vol. xxii., p. 366.

* *Note sur les Quinquinas.*

† *Die Medicinischen Chinarinden Neu-Granada's*, s. 17 and 20.

‡ *Ber. Deutschen Chemischen Gesellschaft*, iv., 818.

with sulphuric acid, the properties of which allowed of its easy and convenient separation from other free bases occurring simultaneously in the cinchona barks. At first they employed in the preparation of this compound, bark which contained quinine principally, and only a small proportion of the other cinchona alkaloids, so that from such it was easy to obtain a pure sulphate of quinine. Even thus early, however, other amorphous cinchona alkaloids were confounded with quinine, because that portion of the alkaloids which was soluble in ether or chloroform, was, without any further attempt at separation, simply taken for quinine. But this error did not hinder the production of the sulphate of quinine, because in the preparation of that salt the foreign substances remained in the mother liquor. Only in a few cases where barks contained a considerable quantity of cinchonidine, it might, perhaps, happen that the sulphate of quinine would not be free from sulphate of cinchonidine. The statement, therefore, of Broughton and others, that before 1854 sulphate of quinine could not have been prepared in a state of purity, because it was not known how to separate quinine from quinidine, is not in accordance with fact, and requires modification.

Quinine forms with sulphuric acid three combinations : a neutral salt, which crystallizes from water with $7\frac{1}{2}H_2O$,* and from alcohol with $2H_2O$; a salt containing one equivalent of acid, and one containing two equivalents of acid. Upon quinine and its salts I have before reported at length, so that at present I will confine myself to only a few remarks respecting them.†

The sulphate of quinine with one equivalent of acid, known in commerce as bisulphate, had already been prepared by Baup. According to Gerhardt, its formula is $C_{20}H_{24}N_2O_2$, $H_2SO_4+7H_2O$; but according to Kraut‡ it would be $C_{20}H_{24}N_2O_2$, $H_2SO_4+7\frac{1}{2}H_2O$. The numbers given by Baup, however, do not agree with either of these formulæ. This salt, prepared by myself in fine crystals by dissolving sulphate of quinine in dilute sulphuric acid, was carefully freed from the adhering mother liquor, and the perfect uneffloresced crystals were analysed.

0·893 gram. of this salt lost, at the ordinary temperature, in an exsiccator, 0·177 gram H_2O, and at 100° to 115° 0·0275 gram H_2O ; the salt was then anhydrous. These figures testify to the correctness of the formula of Gerhardt, and indeed of the seven molecules of water of crystallization, six are given off in the exsiccator ; the seventh is only driven off at 110° or 115° C.

Calculated according to the formula, $C_{20}H_{24}N_2O_2$, $H_2SO_4+7H_2O$.		Found by Hesse.		Baup.
SO_3 . . .	14·59	14·57		13·70
$6H_2O$ . .	19·71 } 22·99	19·82 }	22·90	24·66
H_2O . . .	3·28 }	3·08 }		

This salt dissolves at 13° C. in 11 parts of water, as was found by Baup ; in absolute alcohol, on the contrary, it dissolves with considerable difficulty. The crystals of this salt become opaque at about 25° or 30° C., when they lose one molecule of their water of crystallization.

The sulphate with two equivalents of acid is obtained by dissolving the preceding salt in an excess of moderately dilute sulphuric acid, and concentrating the solution over sulphuric acid. At a low temperature this compound is deposited in delicate white prisms, which may be purified easily by crystallizing them from a little hot water. It is very soluble in cold water, more soluble in hot water, less soluble in alcohol, and quite insoluble in ether. Its aqueous solution shows very clearly the known fluorescence of quinine. Under the influence of light the crystals quickly become a red-brown colour. Analysis of these crystals gave the following results :—

(1). 0·973 gram, dried in the air, lost in the exsiccator 0·1715 gram H_2O ; then at 100° C. 0·0205 gram H_2O : in all, 19·63 per cent. of water, besides 0·7125 gram of sulphate of baryta.

(2). 0·875 gram lost in the exsiccator 0·147 gram, then at 130° C. 0·023 gram H_2O.

(3). 0·9745 gram lost in the exsiccator 0·1645 gram, then at 100° C. 0·023 gram H_2O.

These numbers lead to the formula, $C_{20}H_{24}N_2O_2$, $2H_2SO_4+7H_2O$, corresponding in proportion of water of crystallization with the quinine sulphate with one equivalent of acid.

Calculated.			Found. I.		II.	III.
$2SO_3$ . .	24·69		24·61		—	—
$6H_2O$.	16·67 }	19·46	16·62 }	19·72	16·80	16·88
H_2O . .	2·79 }		2·10 }		2 63	2·36

Among the remaining salts of quinine I shall only mention the hydrochlorate, which has recently, through a substitution, or as Hager* thinks, an admixture with hydrochlorate of morphine, given rise to some unfortunate accidents. But as the two salts react very differently with dilute nitric acid (1 of acid to 4 of water) it is easy to discover whether hydrochlorate of quinine is pure or not. Hydrochlorate of quinine, dissolved in that acid, has a scarcely perceptible yellow tint, which does not change when the solution is exposed for some minutes to a temperature of 50° to 60° C. But if the suspected salt contain morphine the solution takes a colouration varying from yellow to orange red, according to the quantity of morphine present. If, for example, the salt of quinine contain 5 per cent. of hydrochlorate of morphine, the solution is coloured orange red ; if it contain only 1 per cent. the colour is dark yellow, and even if it contain only 0·2 per cent. a well marked change in the colour of the solution occurs. To prevent any mistake the following method of performing this test is recommended :—

Take two test-tubes of colourless glass, and of equal diameter, and introduce into each of them about 0·05 gram of the suspected but well-mixed substance, and pour into one about $\frac{1}{2}$ c.c. of dilute sulphuric acid, and into the other the same quantity of nitric acid diluted as above. Place both the tubes in warm water (from 50° to 60° C.) contained in a white porcelain or colourless glass vessel, so that any change of colour can be well noted. If the salt be free from morphine, at the end of five minutes both solutions will still be of the same tint ; but if it contain morphine salt, the nitric acid solution will change its appearance after a few moments, while the sulphuric acid solution does not vary in that respect. When therefore hydrochlorate of quinine tested in this manner presents a difference in the colour of the two solutions it should be excluded from use. It may be remarked however that other bases beside morphine give this reaction ; several of the opium alkaloids especially react in the same or a similar manner.

(*To be continued.*)

* *Annalen der Chemie und Pharmacie*, vol. cxix., p. 361. I consider it probable that sulphate of quinine crystallized from water, and absolutely free from efflorescence, would contain eight molecules of water of crystallization. As before pointed out, the salt which appears to contain $7H_2O$ has so evidently effloresced that this can be observed by the unassisted eye. Nevertheless, the formula with $7H_2O$, which Regnault proposed for it, is still frequently used, which shows how easily an error can become established.

† *Annalen der Chemie und Pharmacie*, vol. cxxxv., p. 325.

‡ *Gmelin organische Chemie*, vol. iv., p. 1703.

SIXTY-FIVE YEARS OF PHARMACEUTICAL LIFE IN FRANCE AND AMERICA.

In August last there died in Philadelphia a pharmacist, in the person of Mr. Elias Durand, who for sixty-five years had been closely connected with pharmacy, first in the eastern, and afterwards in the western hemisphere. At the last semi-annual meeting of the Philadelphia College of Pharmacy, a portrait of the deceased gentleman was presented by his son to the College, and its acceptance was made the occasion for reading a very interesting sketch of his eventful life. To this document, printed in

* *Chem. Centralblatt*, 1872, p. 727.

the *American Journal of Pharmacy*, we are indebted for the following abstract :—

ELIAS DURAND.

Elias Durand (*Elie Magloire Durand*) was born in the town of Mayenne, France, on the 25th of January, 1794, second year of the French Republic, in the midst of the most trying times of the Reign of Terror, and was the youngest of fourteen children. His father, André Durand, was Recorder of Deeds at Mayenne, a man much respected, and though a royalist in opinion, he retained his position as recorder through the varying scenes and parties of the Revolutionary struggle and the Empire till his death in 1810, being forced at times to secrete himself with the funds and records to save them from the party in temporary power.

During the period between 1794 and 1808 young Durand lived in his native town, and being placed in due course at the Collegiate school, passed through the regular studies. About this time his interest was attracted to the study of chemistry, then claiming a large share of scientific attention, which was probably the cause of his becoming a pharmaceutist, as, in October, 1808, he was entered as an apprentice to M. Chevallier, of Mayenne.

During the first winter of Durand's apprenticeship he pursued the study of natural philosophy and chemistry; in the spring he applied himself to botany. During the second winter his attention was directed to practical chemistry and the manipulations of the shop laboratory, his preceptor explaining from time to time the chemical reactions and combinations taking place during the operations carried on. The third winter was devoted to the study of materia medica and pharmacy, in connection with the collateral branches, mineralogy, geology, and entomology.

In 1812, when Napoleon was preparing the means for his invasion of Russia, young Durand, having completed his apprenticeship, and attained the age of 18 years, became eligible for the army, and, not wishing to be conscripted into the ranks, made prompt application to the Minister of War for the position of *Pharmacien* in the army, and immediately proceeded to Paris to prepare himself for examination before the Board of Examiners. There he attended the lectures of Thenard, Gay Lussac, Lefèvre, Ginault, and a course of lectures on French literature by the celebrated Andrieux. Having received notice from the Minister of War that the 10th of January, 1813, was appointed for his examination, he presented himself accordingly, and the next day was informed by M. Parmentier, the Chief of the Pharmaceutical Department of the Army, to whom all the answers of the candidates were submitted, that he had passed at the head of the list.

On the 2nd of February he received his commission as *Pharmacien sous-aide* in the 5th Corps of the Observation of the Elbe, with orders to cross the Rhine on the 15th of March. On the appointed day he presented his commission to Marshal Kellerman, commanding at Mayence, who ordered him to proceed at once to Magdeburg, the head-quarters of the 5th Corps. He joined a detachment of fifty men from the Military Hospitals at Mayence, commanded by young officers from the Military School of St. Cyr, and was eleven days *en route* to Magdeburg, chiefly on foot. On arriving, the men were nearly all entered in the 5th Corps, commanded by Prince Eugene Beauharnais, then numbering 70,000 men. Young Durand was assigned to the 3rd Division, under La Grange, near Magdeburg, and continued in the army fourteen months, till the abdication of Napoleon, having been present at the battles of Möckern, Lützen, Bautzen, Hanau, Katzbach, and Leipzic. During this brief period he experienced many severe hardships incident to a soldier's life, largely increased by the nature of the contest, which was virtually a retreat through a hostile country until they recrossed the Rhine. He was once taken prisoner at Hanau, but managed to escape.

In his capacity of pharmacien he was very little exposed to danger, unless voluntarily. His duty was to follow or precede the army, according as it advanced or retreated, and assist in the establishment of military hospitals when needed, so that when the army was in motion his duties were light, and being on horseback during battle, he was frequently an eye-witness to very important movements.

On the 3rd of April, 1814, Durand tendered his resignation as *Pharmacien aide-major* to M. Lodibert, the Pharmacien in Chief of the Corps (and afterwards President of the Société de Pharmacie), although urged by him strongly to remain in the army.

After a short visit to his home he went to the City of Nantes, and obtained the situation of head clerk in the store of M. Frétaud, one of the principal apothecaries, where he remained two years. At this time he gave his leisure to the study of botany, passing all his vacations in botanical excursions with the principal botanists of the place. During a part of this time he directed the Society's laboratory, called *Laboratoire du Jardin des Apothécaires*, and delivered a course of lectures on medical botany, during the summer months, to the apprentices in pharmacy, on the different medicinal plants cultivated in the garden. This laboratory was used in common by the principal pharmaciens of Nantes, to prepare their chemicals, and was so conducted that the management went by rotation, the materials contributed by different stores, say for calomel, nitrate of silver, ether, or other medicine needed, were made up together, and the products divided *pro rata*. In this way a great variety of costly apparatus was available to each member, quite beyond his ability to possess, and his advanced apprentices were afforded opportunities to assist and acquire practical knowledge.

On the return of Napoleon from Elba, Durand joined the National Guard against the Royalist party of La Vendée during the 100 days. After the battle of Waterloo, and Napoleon's final abdication, he returned to his duties at Nantes, but, being strongly suspected of Napoleonic proclivities, he was placed under military surveillance, and compelled to present himself every morning at the police station. This tyrannical order interfered very much with his business duties and caused great annoyance to his employer; disgust at the treatment he received determined him to abandon his country and seek beyond the Atlantic the freedom denied him at home. He reached New York on the first of July, 1816, and at once proceeded to Boston to visit Bishop Chevrus, afterwards Cardinal Chevrus, a distant relative, through whose influence he became acquainted with several scientific men of that city. Mr. Perkins, a druggist, made him an offer to establish a laboratory for medicinal chemicals, with the prospect of a partnership. He accepted the offer, started the works on the French plan, and began the manufacture of Rochelle salt, tartar emetic, spirit, water of ammonia, ether, etc., but he afterwards determined to leave Boston for Philadelphia, the city of his choice, where he took charge of the laboratory of a German, named Wesner, and manufactured chromates from the native ores of Maryland and Delaware. These salts were being successfully made, when Wesner, desiring to extend his business, engaged in the preparation of mercurial salts. This occupation occasioned Durand a spell of illness, accompanied by profuse salivation, which induced him to abandon the laboratory and return to his legitimate business, pharmacy.

Mr. Durand next went to Baltimore, and applied to Mr. E. Ducatel, a prominent pharmaceutist of that city, who would have engaged him but for his inability to speak the English language, and who advised him to devote himself to the study of that language, which he did for three months, at Belair, with considerable success. Returning to Baltimore, he hoped to enter Mr. Ducatel's store, but was disappointed. Not discouraged, however, our young adventurer set out on foot to find Dr. Gerard Troost, of Cape Sable, Maryland (afterwards the first Professor of Chemistry in the Philadelphia College of Pharmacy in

1821), who was engaged in making iron salts. It was in the midst of winter, the ground covered with snow, and the road unfrequented and difficult to find, owing to dense forests intervening, with only two houses on the road after leaving the vicinity of Baltimore. Having reached the first house noted on his paper about one o'clock, he applied for dinner. The appearance of the inmates was anything but favourable, and the wall of the room was hung with coloured pictures of Indian massacres, which impressed his imagination strongly. After paying for the ill-relished meal of pork and beans, he continued his forest journey about two miles, when he saw coming towards him some ten or twelve persons, strangely attired, quite different from anything he had seen before. As they came near it became apparent that they were wrapped in blankets, had painted faces, carried bows and arrows, and, in fact, were the counterpart of the pictures, being the first live Indians he had seen. With his ideas excited by the pictures he had just examined, aided by the uncouth character of the people at the house, he had some doubts of his personal security when thus brought face to face with the red skins in the forest, and for a moment felt undecided whether to advance or retreat, but, going towards them, one of the chiefs came forward and presented a paper for his perusal, which proved to be a recommendation from the President of the United States, stating that the chief and his warriors had been faithful to the country during the war of 1812 on the frontier. Our traveller, greatly relieved from his embarassment, gave the chief some money, shook hands with each of the troop, gave a hearty hurrah ! with his hat off, to which the Indians responded and passed on their way. Continuing his journey, the snow increased, night set in before attaining his destination, and seeing a light in the distance, he went towards it for shelter until morning. He was kindly received, and, on inquiry for Dr. Troost, was informed that he was four miles out of his way, and was invited to remain. A death had occurred in the family, many relatives had gathered to attend the funeral on the morrow, and no other place could be offered him for lodging than the room where the dead man was laid out. Having attended the funeral, the first country burial he had seen in America, he was greatly surprised to find the dinner feast which followed on the return of the guests to the house, and of which he partook, reminding him more of a marriage occasion. His host kindly sent him to Dr. Troost's, with a negro guide.

Mr. Durand was kindly received by the Doctor, who, however, did not need his services, as the rough processes of the copperas manufacture were chiefly conducted by negroes, but invited him to remain and keep him company as his guest, being much in need of social intercourse in his isolated home. He found Dr. Troost a learned chemist, mineralogist, and geologist, with a general acquaintance with the sciences, and when urged, accepted the hospitable invitation to remain until the end of winter.

About this time he received proposals from Mr. Ducatel to take charge of the pharmaceutical part of his business, and on the 5th of April, 1817, he entered on the duties of his new position. His professional knowledge was appreciated, business flourished, his employer was well satisfied, and extended towards his new clerk many acts of kindness as well as his love and affection. Mr. Durand often spoke of the social advantages he received whilst resident with Mr. Ducatel, among which was meeting with eminent Frenchmen in exile. It was during his stay in Baltimore that he began to study American botany, and to form the nucleus of the great herbarium which he afterwards acquired.

On the 20th of November, 1820, he married the daughter of his friend and employer, Miss Polymnia Rose Ducatel, who died on the 18th of February, 1822, leaving an infant daughter, who lived to the age of fourteen years.

In May, 1823, E. Ducatel retired from business, leaving his establishment to his son, Jules Ducatel (afterwards Professor of Chemistry in the University of Maryland), and his son-in-law, E. Durand, who entered co-partnership as E. Ducatel and Sons, which continued only a year, Durand retiring, with the view of establishing himself in Philadelphia. He also determined to visit France, to procure his *matériel*, and in July, 1824, he left New York for Havre in the ship "Sylvie de Grace," arriving on the 14th of August. His time was employed in selecting stock, apparatus, and bottles (which were duly labelled for use and of the heavy French pattern), together with everything needful for a first-class French "officine," and returned in the same vessel to New York on April 22nd, 1825.

The house then existing at the south-west corner of Sixth and Chesnut Streets, where the "Ledger" office now stands, was for a consideration of 500 dols. ceded to Durand for a ten year's lease. On the reception of his goods he fitted up the store at considerable expense, using French glass ware, porcelain jars, mahogany drawers and marble counter, in a style unique and attractive in that day. But the most important part was the stock of drugs and chemicals he had selected, including many novelties, and the apparatus for making and vending carbonic acid water. Coming well recommended from Baltimore, as well as from abroad, the principal physicians, Physic, La Roche, Monges, Bache, Jackson, Griffith, Dewees, and others, were prompt in patronizing the store, and its enterprising proprietor soon had a flourishing business.

In 1825, Mr. Durand married a second time, Miss Marie Antoinette Berauld, daughter of a merchant of Norfolk, Va., one of the French refugees from the St. Domingo Insurrection. (He had four children by this marriage, all of whom died young, except his son, Alfred B. Durand, who survives him.)

In 1825 he was elected a member of the Academy of Natural Sciences of Philadelphia. This brought him into contact with men of science and opened a field of usefulness for his botanical talents, which he cultivated with great zeal and success, and corresponded with many botanists in Europe, by which his collection of plants was greatly extended. In the same year he became a member of the Philadelphia College of Pharmacy, and in 1832 was elected a corresponding member of the Société de Pharmacie of Paris, and contributed valuable original articles to the journals of both Societies. In fact, he wrote the first article of the first regular series of the *American Journal of Pharmacy*, and others are scattered through the following ten volumes. In 1829, in connection with Dr. Togno, he translated and published Edwards and Vavasseur's 'Manual of Materia Medica and Pharmacy,' to which he made many additions of a pharmaceutical character, before the publication of the 'United States' Dispensatory.'

At the period when Durand opened his store, French pharmacy stood confessedly far in advance of that of all other countries, whilst his thorough education and recent visit to France for stock, etc., gave him such great advantages that his store became an important centre of pharmaceutical information, which directly and indirectly had much to do with the introduction of scientific pharmacy into Philadelphia. Many of the finer medicinal chemicals were made first by Durand, which gave him a prestige in the United States, and his great skill as a pharmaceutist, his untiring industry, close attention to business, and social and scientific qualities attracted the most eminent physicians to his store, which became the daily resort of such men as Drs. Horner, McClellan, Mitchell, Meigs, Mütter, Bache, and Goddard. The possession of a good library, and the monthly reception of important foreign journals, enabled him to study new medicines promptly; and many new preparations, as solution of iodide of iron, kermes mineral as now made, iodide of arsenic, iron by hydrogen, etc., were first introduced through his store. This devotion to his profession soon rendered "Durand's drug store" well known to the general public, and gave a great impetus tohis prescription business.

Durand took pains in training his apprentices; and some of the best American pharmaceutists emanated from his counter. He required of them daily study of articles in the Dispensatory, and it was his custom to examine the packages of drugs for stock when received, making it the occasion to point out to his boys and assistants the faults and merits of the articles. Looking at pharmacy as a profession, requiring education and training for its success, he taught them to respect their business, and always manifested a warm interest in their progress. One of his *élèves* has said "he never required those in his employ to do that which he would not willingly do himself, and his intercourse with them was not that of master, but of a genial friend." The writer (Professor Procter) remembers gratefully when, in early life, he was engaged in investigations under great disadvantages for want of accurate instruments, his friend Durand imported a set of French metrical weights, and presented them to him with a word of encouragement.

In 1835 Durand was the first to introduce the bottling of mineral waters in the United States, and opened a large establishment in Sixth Street above Arch. The apparatus for manufacturing the waters, and especially that part of it for bottling under pressure, was of his own invention and superior to any then in use in France. He afterwards sent the apparatus to the Société de Pharmacie, and it was adopted into use in Paris. He also at this time extensively manufactured vinegar from cider by a quick process, by which air was forced through the cider and rapidly acetified it. This business was in full and successful operation when the money crisis of 1837 prostrated the commercial community, and with it this branch of his business, with great loss to the manufacturer, who afterwards adhered closely to his legitimate profession until his retirement.

About this period, and for many years after, various valuable contributions to American pharmacy came from Durand's store, through the late Augustine Duhamel, who was a *protégé* of Durand and identified with his store, having been for many years his chief clerk. The *process of displacement*, now called percolation, was there first introduced to America by Duhamel, and his active pen placed on record, in the *American Journal of Pharmacy*, from vol. vi. to vol. xviii, many valuable evidences of his industry and research.

A peculiarity of Durand's business was the number of specialties he introduced, original or of foreign origin, partially growing out of the patronage of particular physicians. His long experience had given him considerable knowledge in therapeutics, and his medical friends willingly availed themselves of his hints in his efforts to render their prescriptions elegant and acceptable as well as efficient compounds.

Through all the varied engagements, disappointments and losses of Durand, his interest in botany never wavered, and it appears to have been a source of great pleasure and satisfaction. In 1837 he made an expedition to the Great Dismal Swamp of Virginia, where he acquired many interesting specimens. His friendly relations with Joseph Bonaparte (Count Souvilliers) caused him often to visit the fine country seat of the latter, at Bordentown, famous for its botanical treasures, where he met and was useful to many of his countrymen in exile in their inquiries regarding American institutions. He spoke of the Count as a man of mild and polished manners, unaffected, and gifted with a most agreeable flow of language. Possessing great erudition, he yet suited his conversation to the person conversing with him, making intercourse with him pleasant and agreeable, and he seemed to be perfectly familiar with all the natural sciences.

In 1840, when the Philadelphia College of Pharmacy was invited to assist in the revision of the U. S. Pharmacopœia, Durand was one of the committee appointed to that service, in which he took part and contributed valuable suggestions to the work, several of which yet remain after three successive revisions. The writer served with him on this committee, and well remembers his valuable labours and counsel given on that occasion.

In 1844 Durand was elected Vice-President of the College of Pharmacy. In 1851 Mrs. Durand, who during twenty-six years had been his companion and friend, died at their home in Ninth street, which event induced him to retire from business in favour of his son, and devote his leisure time entirely to botanical studies. Though so long a resident of the United States, and possessing an excellent command of the English language so as to write it fluently and correctly, his conversation was always marked with a French accent, and sometimes with French idiom. He was a good Latin scholar, wrote with great facility in a close set handwriting, and was the author of several biographical and scientific memoirs. In 1854 he was elected a member of the American Philosophical Society, and was subsequently one of its curators.

In 1855 he published, in connection with Dr. Hilgard, a memoir on the plants collected in the expedition of Lieut. R. Williamson, U. S. Engineer, to California, and another called 'Plantæ Prattenense' on an extensive collection of plants made by Mr. Pratten in Nevada and adjacent territory. In 1856 he published an enumeration of the plants collected in Dr. Kane's first expedition to the Arctic regions, in the Journal of the Academy. About this time he wrote and read before the Philosophical Society a biographical memoir of the late François André Michaux, the author of the 'Sylva Americana,' who willed a sum of money for the establishment of a park of American forest trees, which is now existing in Fairmount Park, and known as the "Michaux Grove." In 1857 he commenced the work of separating the North American plants in the herbarium of the Academy of Natural Sciences, and forming them into a distinct collection, which occupied him several years, often working four hours daily in the botanical room of the Academy. His labours in connection with this valued institution will, however, be more fittingly enlarged upon by a special memorialist appointed by the Academy. In this year he was elected an honorary member of the American Pharmaceutical Association. In 1859 he published a memoir entitled, 'A Sketch of the Botany of the Basin of the Great Salt Lake of Utah.'

In 1859 his friend, Dr. Thomas Nuttall, author of the three volumes in continuation of Michaux's 'Sylva' and other works, and so many years the botanist in chief of the Academy of Natural Sciences at Philadelphia, died in England. The memoir written of him by Durand is said to be one of the best notices of that distinguished botanist and ornithologist, of whom he was the successor in the botanical department of the Academy.

In 1860 Durand visited France a second time, and derived great pleasure from intercourse with his relatives, and many friends who had been with him in "*The Grand Army.*" He also for the first time visited England, and was greatly pleased with the gardens and museums of London and vicinity. Whilst in Paris he had occasion to examine the herbarium of the "Garden of Plants," and finding the collection of North American plants very incomplete, he determined to remedy the deficiency by sending over his own fine collection. Ascertaining, however, on his return, that he could yet make valuable additions to his collection, rendering it more complete, he subscribed to all the botanical expeditions, and set to work himself to collect, making excursions every summer, returning always with rich harvests of plants. Finally, in 1868, after putting his herbarium in order by arranging the new specimens in proper position, he packed the whole carefully and shipped it to France, following it on the 26th of June, in company with his son and daughter-in-law, in the "Ville de Paris." Durand's collection, the work of many years, contained over 10,000 species and over 100,000 specimens from all parts of North America. This munificent gift to his native country was fully appreciated, especially by the professors at the Garden of Plants

Museum, where it has been arranged in a special gallery, and labelled "*Herbia Durand.*"

About the year 1858 Mr. Durand presented to the Philadelphia College of Pharmacy a general herbarium of about 12,000 specimens, which forms the nucleus of the present collection in its museum.

After his return from France in 1869, he wrote an elaborate article on the genus *Vitis*, of North America, and the relation of the cultivated varieties of the grape to the natural species, together with remarks on the wines made in the United States, and sent it as a contribution to the proceedings of the Linnean Society of Bordeaux, France. This essay attracted considerable attention abroad, and was reprinted by the Société d'Acclimatation, of Paris. He subsequently was elected to membership by both societies.

As a citizen, Durand took but little part in political or municipal affairs. His social and scientific qualities endeared him to all who came in close contact with him. One who knew him intimately says "he was a man of generous impulses, and his private charities were numerous." He was an active member of the French Benevolent Society, Philadelphia, took an interest in rendering it available to his needy countrymen in this city, and remembered it in his will.

After his last return from Europe he continued his interest in botany in favour of his collection at Paris, but feeling that age was advancing, and that he had worked industriously and effectively during his long life, he gradually relinquished his scientific engagements. Finding his bodily powers and faculties depreciating, he quietly retired from his usual walks, and after a season of depressed intellectual vigour, he slowly faded away in the eightieth year of his age, and died on the 14th of August, 1873, at his residence in Broad Street, Philadelphia, honoured and respected by all who knew him.

PREPARATION AND COATING OF IODIDE OF IRON PILLS.

In an article in the *Journ. de Pharm. et de Chimie*, (vol. xviii., p. 328) M. Magnes-Lahens discusses the conditions most favourably for the preparation of iodide of iron pills. Some of the variations from the Codex recommended are already adopted in the B. P. The operation, he thinks, should be conducted at a temperature of 50° to 60° C. (122° to 140° F.) slight excess of iron should be present, and an iron dish should be used in preference to glass or porcelain vessels. His formula is as follows :—

Pure iodine	4·10	grams.
Powdered iron	1·90	,,
Powdered sugar . . .	2·50	,,
Powdered gum arabic .	2·50	,,
Distilled water. . . .	2·50	,,

Put the water and the powdered iron into an iron dish, add the iodine gradually, and assist the reaction by stirring with an iron spatula and gentle heat; when the reaction is complete, add the gum and the sugar, then heat to about 50° C., stirring continually, until the mass ceases to drop when a little is taken up with the end of the spatula. The mass may then be readily converted into pills or dragées.

To obtain the pills, incorporate into the mass 5 grams of powdered liquorice root, and if the consistence require it, heat it for some minutes; divide into one hundred pills, roll them in powdered gum, and, if desired, coat with mastic and tolu.

For sugar-coated pills (dragées), incorporate with the mass 7·50 grams of powdered gum arabic, then heat very slightly to soften it. The hundred pills obtained are rolled in powdered gum arabic, heated, and agitated with a circular motion in a suitable vessel, until of the proper hardness, after which they may be sugar-coated.

Each pill and each dragée contains about 5 centigrams of iodide of iron and one centigram of powdered iron.

The pills contain iodide of iron in a state of perfect purity. Put into cold water some months after their preparation, they will dissolve, save the excess of iron, without colouring it.

The following is the mode of coating proposed by M. Magnes-Lahens: Roll the pills quickly, about fifty at a time, with the hand in a clear mucilage of gum arabic spread thinly in a saucer; when they are completely moistened throw them into a basin containing a mixture of sugar, 9 parts, with gum arabic one part; agitate them until they are covered with a layer of the powder, heat them for about eight or ten minutes, at first very slightly, and afterwards increase the heat, rotating the pills continually. After cooling, coat them a second and then a third time, following the process just described. These pills may thus be prepared in small or large quantities; in the latter case they should be put in the drying closet after each coating. Made with this precaution they will keep a long time in a good condition.

SALT TRADE IN INDIA.

In the 'East India Progress and Condition Report' we find some interesting notes on this subject. The consumption of salt in India is given as 9½ lbs. per head in Bengal, and as high as 12 lbs. in Madras. In Bengal for a long period salt was obtained by an expensive process of evaporation, conducted along the coast of the Bay of Bengal. The Government bought all the salt so manufactured, and stored it up in warehouses, and thus had the monopoly of sale. This system, however, was found to be a bad and expensive one, and was abandoned in 1863, when the price fell 50 per cent. Last year 5,765,177 cwt. was imported, chiefly from England, but some also came from France, Bombay, Sind, and the Persian Gulf. The total revenue from salt for the same year in Bengal amounted to £2,578,134. Recently some of the richer inhabitants suggested the raising of the tax, but the Lieutenant-Governor "declared he would rather cut off his right hand than be a party to increase the tax on a first necessity of the poor, which is already enormously high."

Throughout India the feeling is that the tax is as high as it safely can be, and a desire is spreading to equalize the tax throughout India, since it varies much in different parts. In the North West Provinces the salt is obtained from "salt lakes," which during the rainy season overflow, and leave behind, when they recede, a thick incrustation of salt. The revenue for the year was £803,285, and the expenses £88,562. In the Panjab salt is obtained from mines and salt lakes, and yielded a revenue during the year of £800,236, with expenses of £78,490. The Salt Range in the Panjab is practically inexhaustible, the principal beds being 150 to 200 feet thick. The mines are worked by galleries and excavations, or, when the salt is near the surface, by quarrying, Dr. Oldham states, that nowhere else in the world are salt deposits known of such vast extent and purity. In Bombay the revenue for the year was £657,289, from the Government monopoly and import duty. Much, however, is smuggled.

In British Burma the net revenue was £11,477. In Madras the net income amounted to £1,153,425. There, too, the Government has a monopoly; they contract with the manufacturers at the different salt works, store up the salt, and fix the price at which it shall be sold. The sum of £40,000 is paid annually to the French Government at Pondicherry not to manufacture salt, but to buy its supplies from Madras, and sell the salt at the same price as it is sold at in Madras. The abolishment of this monopoly does not, however, appear to be contemplated.

THE PHYSIOLOGICAL AND THERAPEUTIC ACTION OF EMETINE.

BY DR. A. E. D'ORNELLAS.

Under the above title the author has written a lengthy memoir; the following are some of the conclusions which he has formulated :—

1. Emetine is the active principle of ipecacuanha, to which its powerful physiological and therapeutic action is due.

2. The fat odorous nauseous principle is but an accessory.

3. In medical practice emetine should not be substituted for ipecacuanha, as it is not so perfect a medicament.

4. Emetine has an irritating topical action upon the mucous membrane, and upon denuded flesh, but not upon the intact skin.

5. Emetine injected hypodermically into animals or human subjects induces vomiting, as when administered by the stomach, but more slowly and in larger doses.

6. Emetine introduced into the circulation is always eliminated by the gastro-intestinal mucous and liver, and it causes vomiting up to the moment of its elimination.

7. Emetine during its elimination by the intestinal mucous causes stools more numerous in proportion as its emetic action has been less energetic.

8. In moderate doses, emetine diminishes the respiration and, slightly, the circulation; it lowers the animal temperature, but does not change directly the vascular tension. In emetic or nauseating doses the action is the same but more energetic.

9. Emetine has an anticonvulsivant action, and by the relaxation it produces in the voluntary muscles combats effectively the convulsions caused by carbolic acid or strychnia.

INFLUENCE EXERTED BY CERTAIN GASES AND OTHER BODIES UPON THE PRESERVATION OF EGGS.*

BY F. CRACE-CALVERT.

Some time since, the late Dr. Crace-Calvert forwarded to a friend, for the purpose of being communicated to the French Academy, two papers giving the results of experiments made relative to the influences of various gases and other bodies upon the preservation of eggs. Circumstances delayed the accomplishment of the author's wish, and it was not until the occasion of the announcement of Dr. Calvert's death to the Academy by the Perpetual Secretary that these papers were read. The principal points contained in them were as follows :—

Oxygen acts very differently, according to whether it is dry or humid. An entire egg placed in dry oxygen is not altered; but placed in humid oxygen it is after three or four weeks covered with a white mould, composed of filaments about one centimetre long, supposed to be the *Penicillium glaucum* or a mycelium. When broken, the egg shows no sign of decomposition, although an examination of the gas in the apparatus reveals the presence of a considerable quantity of carbonic acid and a little nitrogen. If a hole be made in the extremity with a fine needle, the egg then undergoes decomposition in dry oxygen, and gives a large quantity of nitrogen and carbonic acid; a little mycelium appears on the surface of the egg, and the contents, which have become putrid, contain a large quantity of vibrios and microzymes. In humid oxygen the decomposition is still more complete, as shown upon the analysis of the resulting gaseous mixture; the *Penicillium* penetrates to the interior and gives to the albumen a creamy appearance. In the yolk microzymes are found, but no vibrios; and from this and other experiments the author concludes that the *Penicillium* prevents the development of vibrios, either simply by its presence or by the carbonic acid that it produces.

In humid *Nitrogen*, both pierced and intact eggs were preserved three months. The contents of the former were a little decomposed; under the microscope no filaments of *Penicillium* could be seen, but vibrios were present; no foreign gas was produced. The intact eggs were covered with a slight down of *Penicillium*, but the interior remained sound.

In *Hydrogen*, the eggs, both pierced and whole, became covered with a slight down, but the contents remained sound.

In *Carbonic Acid*, both dry and humid, pierced and whole eggs were perfectly preserved, no trace of *Penicillium* appearing upon the surface. Common *Coal Gas* gave the same results as carbonic acid.

Chlorine.—Eggs kept in a 5 per cent. solution of chlorine in a stoppered bottle during eight months underwent no visible alteration; but being replaced in the same solution, and the bottle left unstoppered, seven days afterwards they were covered with *Penicillium glaucum*.

Hypochlorite of Lime.—Eggs placed in a 5 per cent. solution of hypochlorite of lime on the 18th April were covered with *Penicillium* by the 28th; on the 8th May this was considerably augmented, and on the 8th June, when the experiment was concluded, the yolk could be seen through the shell to be displaced, and the microscope showed the presence in the interior of numerous filaments of *Penicillium*.

Lime Water.—These eggs were examined at the same dates as the preceding. On the 28th April no change was observed; on the 8th May they were covered with *Penicillium*; and on the 8th June there were present besides in the interior other moulds. The contents were decomposed; in the white much *Penicillium* was present, and in the yellow a great quantity of microzymes. Solution of *Sulphite of Lime* (5 per cent.) gave the same results.

Carbolic Acid.—Eggs immersed in a 5 per cent. solution of carbolic acid on the 18th April presented no change up to the 8th June. At that time they were slightly covered with *Penicillium*, but the interior was perfectly sound.

* *Comptes Rendus*, vol. xxvii, p. 1024.

FERRIC CARBONATE.*

BY R. ROTHER.

Chemists at the present day conclusively accept the non existence of ferric carbonate. But the writer has succeeded by means of a peculiar manipulation in producing a ferric compound which contains the veritable body, although not in an absolutely definite condition.

The process under consideration admits the generation of this exceedingly useful compound in any desirable quantity with comparatively equal convenience and despatch.

The method of preparing the iron combination containing the ferric carbonate is so remarkably simple and expeditious that the writer believes henceforth the troublesome ferric hydrate will be, at least for most all pharmaceutical purposes, for ever superseded by the admirably adapted ferric oxycarbonate.

This new combination differs chemically, physically, and technically from the ordinary ferric hydrate in the following particulars: It is, firstly, although but partially a real carbonate, and therefore probably not susceptible of conversion into medicinally unavailable and pharmaceutically inapplicable inert allotropic modifications.

The adverse property which imparts the peculiar tendency to abandon water of hydration and assume inactive forms, and therefore so seriously detracts from the efficiency and general utility of the gelatinous ferric hydrate precipitated by ammonia, does not seem to be possessed by this carbonated ferric base.

Ferric oxycarbonate (an expression which the writer merely employs as a distinguishing term) when yet moist, differs characteristically from the hydrate by the copious effervescence of carbon dioxide when treated with acids. Furthermore, its solution in acids is immediate and perfect, definite and exact saturation being a predominant feature.

Normal salts are thereby only permissible, as basic compounds are wholly precluded, since an excess seems to remain undissolved, and therefore the point of saturation is attained without loss of time.

* From the *Pharmacist*, vol. vi, p. 353.

Another point of distinction is found in the remarkable fact that certain organic acids, as citric, for example, do not act energetically on it in the cold, shown by the feeble effervescence, but that the application of a moderate heat determines a combination almost instantaneously attended with a profuse evolution of carbon dioxide, and the production of a perfect solution at once.

Secondly, ferric oxycarbonate differs diametrically from the hydrate in form. It is not gelatinous, but compact, yet not granular, and not exceedingly heavy. It possesses a remarkable evenness of structure and aggregation, being miscible with water to the production of a uniform fluid, holding the precipitate regularly suspended during the course of its deposition when placed at rest.

It differs from the hydrate decidedly in colour; whilst the hydrate is brownish-red this is bright red when moist, approaching to scarlet when dry.

In its practical bearing ferric oxycarbonate, owing to its compact form, readily subside sand deposits rather firmly, rapidly, and closely. This presents the incalculable advantage possessed by such precipitates in being readily washed by decantation; the most perfect method of washing precipitates at present known. After perfect washing by this method, the precipitate separated from water as nearly as practicable by decantation, is poured upon a filter and allowed to drain. This removes all the water except that confined within the interstices of the particles, a quantity which is surprisingly small. The washing is completed in 4 to 6 hours, during which time the water can be renewed 4 or 5 times; after the last decantation the washings drained from the filter do not react with barium chloride.

The precipitate, when removed from the filter and dissolved with the aid of gentle heat in citric acid, for example, forms a solution stronger than the officinal solution of ferric citrate, and therefore requires dilution instead of considerable evaporation, as is usually required by the ordinary method.

The writer having found a decided advantage to accrue from the application of concentrated solutions which were mixed by pouring the iron solution as neutral as possible into an excess of concentrated ammonia, concluded that perhaps the ammonia could well be replaced by sodium carbonate.

Thereupon the writer employed crystallized disodic carbonate in small fragments and in slight excess, and treated this directly and by the aid of heat with the undiluted solution of ferric sulphate. The resulting precipitate was the ferric oxycarbonate.

The writer's process for preparing ferric oxycarbonate is as follows:—

Take of Ferrous sulphate cryst. .	24 troy ounces.
Sulphuric acid	4¼ „
Potassium chlorate . . .	848 grains.
Disodic carbonate. cryst. .	44 troy ounces.
Water sufficient.	

Pour the sulphuric acid into two pints of water with constant stirring, and add the ferrous sulphate; with continued stirring now add the potassium chlorate, a little at a time at first, but more rapidly in proportion as the ferrous sulphate dissolves. Then place the sodic carbonate into a capacious vessel and add about one-fourth of the solution of ferric sulphate; or better, use first a similar volume of water, apply heat immediately, and when nearly all the carbonate is dissolved add the remainder of the solution, one-fourth at a time, with constant stirring. Dilute the mixture with six to eight times its volume of water, let the precipitate subside, and remove the supernatant liquid by means of a syphon, mix the residue again with water as before, and repeat the washing as at first, three or four times, or until the washings give no precipitate with barium chloride. If large vessels for this purpose are not convenient the precipitate may be divided among a number of smaller vessels and thus washed with equal rapidity and perhaps greater facility in the manipulation. Lastly, pour the precipitate after the final decantation, upon a filter, drain off the surplus water, and spread the residue out to dry in the open air.

The writer now prepares solution of ferric citrate as follows:—

Take the washed and drained precipitate of ferric carbonate obtained from 24 troy ounces of ferrous sulphate as above.

Citric Acid, Cryst.	18 troy ounces.
Water, if required, sufficient.	

Place the citric acid into a capacious capsule, add the precipitate gradually and heat the mixture; after solution is complete add water, if necessary, to the measure of three pints and strain through muslin.

The moist ferric oxycarbonate is most conveniently dried by the method used for the production of drop chalk and other material exhibited in that peculiar form. It dries without shrinking unevenly, and therefore presents no fissures in the dried mass. When dried between folds of paper it does not adhere, but drops off readily in friable fragments which crumble under mild pressure to an almost impalpable powder. It is therefore most easily powdered by rubbing in a mortar. The powder retains the original bright colour. The fine appearance readily distinguishes it from the dried hydrate, as the latter is nearly black in the unbroken fragments, which are exceedingly hard, gritty, and difficult of pulverization.

The writer believes that this oxycarbonate is a great improvement over the officinal subcarbonate of iron in many respects.

For the preparation of ferric acetate solutions, it is particularly adapted, firstly, since it can be so perfectly washed; secondly, so rapidly and thoroughly freed from most of the adhering moisture, which is an especial point of importance, because the solutions should be from the first at their utmost concentration, as heat is not admissible in connection with an absolutely pure ferric acetate; thirdly, that definite and exact saturation can be speedily attained; and fourthly, that absolutely pure ferric acetate can thus be produced from a ferric compound which presents the iron in its normal and active state, and consequently the resulting salt will not be so prone to generation of insoluble basic acetates.

The approximate composition of ferric oxycarbonate was determined as follows:—

The precipitate was thoroughly dried between folds of bibulous paper, then powdered, and finally exposed for several days in the dry open air.

One hundred grains of the powder was now weighed off and allowed to remain on the balance: after twenty-four hours it was observed that the weight was regularly and constantly diminishing. The original weight was then restored by a further addition of the powder, but after six or eight hours another addition was required to restore the equilibrium.

In the course of three days, the powder having constantly decreased in weight, it was found that between 2 and 3 grains of the powder had been successively added to counterbalance the original weight.

At this juncture 50 grains of the powder was treated with chlorhydric acid in an apparatus for the estimation of carbonic acid; when it was found that only 3·4 grains of carbon dioxide was present in the combination; 100 grains, therefore, contained 6·8 grains carbon dioxide.

Twenty-five grains of the powder was then heated to redness for a short time in a platinum crucible, weighed, again heated to redness for a short time, and re-weighed. The first and second weighings were identical in result. A dark brown residue of 16·25 grains remained, leaving 8·75 grains for carbon dioxide and water. However, on cooling, the weight of the residue increased ·2 of a grain, which must therefore be deducted as hygroscopic moisture in the original substance, yet this inference is only approximative, as the altered body may possess a different disposition in this regard when compared with the first substance and its relative quantity. The brown residue

remaining after ignition of the oxycarbonate is utterly insoluble in chlorhydric acid, and the non-appearance of effervescence now conclusively shows that the precipitate was free from any adhering sodium carbonate.

One hundred grains of the powder therefore contains 65 grains ferric oxide, and 35 grains carbon dioxide, water of hydration and hygroscopic moisture. Deducting the 6·8 grains carbon dioxide and 28·2 grains remain for water of hydration and hygroscopic moisture, subtracting ·8 grains as atmospheric humidity absorbed by the powder, and 27·4 grains is left as water in actual combination. Hence 99·2 grains of the absolutely dry iron compound contains 65 grains ferric oxide, 6·8 grains carbon dioxide and 27·4 grains water of hydration.

Now dividing the number indicating the weight of the ferric oxide 65, by its equivalent number 160, and ·40625 results as a quotient.

Dividing 6·8 the number denoting the weight of the carbon dioxide by its equivalent 44, and ·15454 is obtained as a quotient. Likewise dividing 27·4, the weight of the water, by 18 its equivalent, and 1·52222 results.

Now dividing each of these numbers by the first quotient and we have in succession 1, ·38 and 3·75, or approximately 1, ·4 and 4.

But in consideration of the constant dissipation of carbon dioxide during the drying of the powder, we can safely write 1, ·5 and 4, which may then be formulated thus :—

$$Fe'''_2\,3(CO_3)\ .\ 4(Fe'''_2\,6(OH))\ .\ Fe'''_2O_3.$$

This formula assumes the presence of normal ferric carbonate and normal ferric hydrate in combination with anhydrous oxide.

The proportion of carbon dioxide actually present is, however, only one-sixth of what would be needed to form normal ferric carbonate with all the iron contained in the compound. It is, however, highly probable that twice the indicated amount of carbon dioxide exists in the freshly precipitated carbonate, since during the process of washing bubbles of gas continually rise, and moreover the copious effervescence of the moist fresh precipitate when heated with citric acid goes far to aid that supposition.

The moist precipitate could also be determined with great accuracy, comparatively, by operating upon a definite weight of pure ferrous sulphate and estimating the carbon dioxide in the moist magma immediately after thorough washing. The result would, however, be only interesting in so far as to how much more firmly the moist body retains the acid than the dry.

By changing the order of mixing the solutions, and otherwise altering the method of manipulation, distinctly characteristic products are obtained. If, for instance, the whole of the ferric solution is poured upon the carbonate in the cold, a deep red solution will result at first, even after much effervescence has occurred and a large quantity of the carbonate has dissolved ; if now heat is applied to the mixture, precipitation takes place, and although the resulting compound contains ferric carbonate, it nevertheless is more bulky, much darker coloured, and generally inferior to the bright coloured oxycarbonate.

If the solution of ferric sulphate is first heated and then treated with sodium carbonate by gradual addition, a deep ruby red liquid results, which on the further increase of heat sets to a stiff transparent ruby red jelly, which when further treated with alkaline carbonate forms a bulky gelatinous precipitate, probably containing alkali. Much carbonate can be thus added to the iron liquid, and if the heat is timely removed the solution will remain intact, and perhaps a tolerably pure and concentrated solution of a highly basic oxysulphate could be prepared from it by dialysis.

THE DILUTION OF ALCOHOL.

The following table, showing the proportion of distilled water required to reduce alcohol of certain degrees of strength to those of greater dilution, has been compiled by M. Berquier, and is published in the *Répertoire de Pharmacie* (vol. i., p. 628). Opposite to the figure representing the degree of strength of the alcohol which is to be diluted will be found the proportion of alcohol and water to be used to reduce it to the strength at the top of the respective columns. Thus if it be desired to prepare alcohol of 80° from that of 94°, the figure 94 is sought for under the heading "Strength of Alcohol employed," then to the right under the head, "Strength required, 80°," will be found the figures 808 and 192, indicating that 808 parts of the said 94° alcohol and 192 parts of distilled water are required to prepare 1000 parts of alcohol of 80°. For the convenience of English pharmacists the specific gravities corresponding to the different percentages of alcohol have been added.

TABLE INDICATING THE PROPORTIONS BY WEIGHT OF ALCOHOL OF DIFFERENT STRENGTHS AND OF DISTILLED WATER REQUIRED TO PRODUCE 1000 PARTS OF ALCOHOL OF LOWER STRENGTH.

Strength of Alcohol employed.		Strength Required.										Strength of Alcohol employed.	Specific Gravity.	Strength Required.			
		90° = sp. g. 8228.		85° = sp. g. 8357.		80° = sp. g. 8483.		60° = sp. g. 8956.		56° = sp. g. 9047.				60° = sp. g. 8956.		56° = sp. g. 9047.	
In degrees corresponding with per centage of Alcohol.	Specific gravity.	Alcohol.	Water.	Alcohol.	Water.	Alcohol.	Water.	Alcohol.	Water.	Alcohol.	Water.			Alcohol.	Water.	Alcohol.	Water.
100°	7938	857	143	795	205	735	265	522	478	482	518	78°	8533	732	268	677	323
99	7969	871	129	807	193	747	253	530	470	490	510	77	8557	744	256	688	312
98	8001	885	115	820	180	759	241	539	461	498	502	76	8581	756	244	699	301
97	8031	899	101	833	167	771	229	547	453	506	494	75	8603	768	232	710	290
96	8061	913	87	846	154	783	217	555	445	514	486	74	8625	781	219	722	278
95	8089	927	73	859	141	796	204	564	436	522	478	73	8649	794	206	734	266
94	8118	942	58	873	127	808	192	573	427	530	470	72	8672	807	193	747	253
93	8145	956	44	886	114	820	180	582	418	538	462	71	8696	821	179	759	241
92	8172	970	30	899	101	832	168	590	410	546	454	70	8721	835	165	772	228
91	8199	985	15	913	87	845	155	599	401	554	446	69	8745	849	151	785	215
90	8228	,,	,,	927	73	858	142	609	391	563	437	68	8769	864	136	799	201
89	8254	,,	,,	941	59	871	129	618	382	571	429	67	8793	880	120	813	187
88	8279	,,	,,	955	45	884	116	627	373	580	420	66	8816	896	104	828	172
87	8305	,,	,,	970	30	893	102	637	363	589	411	65	8840	911	89	843	157
86	8331	,,	,,	985	15	912	88	646	354	598	402	64	8863	928	72	858	142
85	8357	,,	,,	,,	,,	926	74	656	344	607	393	63	8886	946	54	874	126
84	8382	,,	,,	,,	,,	940	60	667	333	616	384	62	89 8	963	37	891	109
83	8408	,,	,,	,,	,,	955	45	677	323	626	374	61	8932	981	19	907	93
82	8434	,,	,,	,,	,,	969	31	687	313	636	364	60	8956	,,	,,	925	75
81	8459	,,	,,	,,	,,	994	16	698	302	646	354	59	8979	,,	,,	943	57
80	8483	,,	,,	,,	,,	,,	,,	709	291	656	344	58	9001	,,	,,	961	39
79	8508	,,	,,	,,	,,	,,	,,	720	280	666	334	57	9025	,,	,,	980	20

The Pharmaceutical Journal.

SATURDAY, JANUARY 17, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ.'*

PUBLIC ANALYSTS.

LONG before the existing Adulteration Act was introduced into Parliament, and when the appointment of public analysts was first mooted in the bills brought before the House of Commons in reference to sanitary legislation, we gladly took the opportunity of expressing the opinion that much good might result from the institution of a department of State Chemistry. The cultivation of sanitary science naturally inaugurated from a medical point of view, and carried forward with so much benefit to the country under the direction of Mr. SIMON and his colleagues, had indeed demonstrated the necessity for a constant and systematic exercise of chemical skill in regard to many matters affecting the health and well-being of individuals as well as of communities. The analysis of water supplied for domestic use, the investigation of chemical points involved in various questions affecting the health of towns or districts, the examination of articles supposed to be adulterated, had each and all of them come to be evidently services which were indispensable throughout the country. It was not, in our opinion, to be expected that medical officers of health should perform the duties of analyst, even if they possessed the technical competence to enable them to do so, for they would require an amount of time and attention inconsistent with the performance of the other duties of medical officers of health.

Apart also from the chemical work required in connection with public health affairs, there were many other cases, such as the testing of gas, in which the services of the chemist would be useful in every town, and we hoped that the appointment of a staff of public analysts would tend at once to benefit the public, and to promote the more general cultivation of a science which receives far too little attention in this country, notwithstanding its importance.

But we must confess to looking with great regret at the mode in which the appointment of public analysts has generally been carried out in connection with the Adulteration Act. By a strange confusion of ideas the requirement of medical knowledge in the analyst, according to the terms of the Act, has led to the appointment, in most instances, of medical men to the office; very frequently indeed the office has been combined with that of medical officer of health, and in such instances the natural result has been either an absence of any real work of a chemical nature or the work has been done by deputy. An advertisement that appeared last week in our own advertising columns was very suggestive as to the amount of chemical knowledge that might sometimes be possessed by the deputy in such cases.

Even in those cases where chemists have been appointed the action they have taken has been singularly unfortunate, as we have had occasion from time to time to record in these pages. That this has been in no small part due to the vagueness and uncertainty of the Act and its provisions we readily admit, but though we make full allowance for such difficulties, we cannot avoid the conclusion that those chemists who have accepted appointments under the Act are themselves mainly to blame for the complications in which they have been involved in the discharge of their official functions.

Under the circumstances therefore, though we do not think it wise, it is not surprising to find a public analyst coming forward to call attention to the difficulties experienced in the discharge of the official duties connected with his post, "hoping by this means to enlist some sympathy for the analyst." It is with this object that Dr. THOMAS STEVENSON appears as the writer of an article in the current number of the *Practitioner*, contending that the merits of public analysts are too little appreciated, their difficulties too little weighed, and their failures too highly magnified. Considering the large number of examinations made by public analysts, Dr. STEVENSON thinks "these gentlemen may be congratulated on the fewness of the instances in which their certificates have not stood the test of a second analysis." We do not know how far Dr. STEVENSON is entitled to speak as the representative of the class to which he belongs, but we cannot help thinking he suggests the application of the proverb, "*qui s'excuse s'accuse.*"

Dr. STEVENSON first draws attention to the obscurity involving the term "adulteration," and to the difficulties resulting from the absence of any established standards of purity. No doubt these difficulties have been serious; but we think that as regards the analysts they have been self-imposed, and do not in any way call for sympathy with those who have been entangled in them. They seem to result from that confusion of ideas we have already referred to, by which medical qualifications, properly speaking, were required of analysts in addition to that special qualification which they ought to possess for performing the work of chemical analysis. To decide whether or not an admixture of any material with articles of food, drink, or drugs is prejudicial to health, or even whether it is a fraudulent increase of weight or bulk, is no doubt a very important duty, but we cannot perceive that it is any part of the analyst's function to perform that duty. Whether the use of alum in making bread is objectionable as regards the health of consumers of such bread is a question which no amount of analytical skill or

chemical knowledge could decide. Such questions, we conceive, are purely for the medical officers to deal with, and it is by such co-operation between those officers and competent chemical analysts that the interests of the public can best be secured without prejudice to the trading community. In like manner the questions whether the admixture of flour with mustard or sugar with cocoa, are adulterations or fraudulent, require no chemical knowledge to decide them. In these cases, and in many others it seems more a matter of evidence whether in regard to general usage, and the prices of the articles in question, the presence of the admixtures certified by the analyst should be deemed adulterations.

Dr. STEVENSON refers to the "citrate of magnesia" case in terms which would seem to indicate a belief on his part that citrate of magnesia was really an article used in this country, for in terms it a case of the sophistication of effervescing citrate of magnesia, though we should imagine he ought to know perfectly well that the preparation generally known by this name consists essentially of tartaric and citric acids, carbonate of soda and sugar. He objects to the opinion of Mr. ARNOLD that sweet spirit of nitre is not a drug, and to the distinction drawn between drugs and medicinal compounds. As regards this point, it is unnecessary to enter into any philological discussion, and we will simply refer Dr. STEVENSON to the price-list of any wholesale druggist to ascertain what distinction is customarily made between drugs and pharmaceutical preparations.

As regards the conduct of Dr. DUPRÉ in the witness-box at the Westminster Police Court, Dr. STEVENSON somewhat patronizingly expresses the opinion that it did him infinite credit. We cannot share that opinion, and though we unhesitatingly confess our belief that, in giving evidence, Dr. DUPRE said nothing which was not prompted by honest conviction, we cannot, now that this subject has been raised, refrain from expressing our regret that so able a chemist should have placed himself in such a false position as he did on that occasion. Dr. STEVENSON feelingly and even plaintively laments that "the exemplary costs awarded to the defendant in this case will, alas, deter other local boards from taking any proceedings for the adulteration of drugs," and he erroneously jumps to the conclusion that in future "the sale of medicines and medicinal compounds will be subject to no adulteration law." He seems to think "Othello's occupation's gone!" We need not remind our readers that there is no foundation for his statement, though we congratulate them on the probability that the acknowledged impropriety of the "Citrate of Magnesia" case, and the unwarrantable nature of the prosecution for the sale of Sweet Spirit of Nitre, will operate as a bar to interferences with legitimate trade which have no kind of justification.

Among his other lamentations, Dr. STEVENSON refers to what he terms "the shameful practice of selling citrate of iron and quinine containing 7 instead of 16 per cent. of quinine." Far be it from us to object to the application of Dr. STEVENSON's adjective to the substitution of the inferior article and its sale as the other; but with all due respect for his righteous indignation, we venture to suggest that he should abstain from such abusive declamation against the vendors of drugs and pharmaceutical preparations until he has certified himself that the "shameful practice" is not a creation of his own fancy, or that if it does prevail he should take the trouble to ascertain the conditions under which it occurs. We feel sure that in any earnest endeavour to detect and repress practices of such a nature Dr. STEVENSON or anyone else will always command the sympathies and support of the Pharmaceutical Society and of the general body of pharmacists throughout the country, but we hope they will never lend themselves to the promotion of mere sensational outcry which can be of no real service to anyone.

Finally, as regards public analysts, we estimate too highly the possible services they might render, to suggest any disparagement of them individually, or as a body. We hope, however, that in the interests of the public, as well as of chemists, that the functions of those officials will be properly restricted. We desire to see these important appointments filled by chemists competent to make trustworthy analyses, to see that those who undertake the duties of the office are adequately remunerated for their services and that they are relieved from the necessity of submitting to the vulgar badgering of witness-box examination in regard to matters of opinion with which the chemist has properly no concern.

THE CHEMISTS' BALL.

THE annual Chemists' Ball has now become so firmly established as one of the events of the Pharmaceutical Year, and has been so highly enjoyed by those who have attended it in former years, that probably it will be lost labour to remind many of our readers that the Chemists' Ball for this year will take place next Wednesday. Doubtless the date of this gathering was "made a note of" in numerous diaries as soon as announced. Still, some may be so bound up in the cares of business that there is a danger of their missing, through oversight, this opportunity of relaxation, and for their benefit we repeat here, what has been stated in our advertising columns for some weeks past, that the Annual Ball will be held at Willis's Rooms, King Street, St. James's Street, on Wednesday next, the 21st inst. For a list of the Stewards, and particulars as to where tickets may be had we must refer to the advertisement.

BY a decree of the French Minister of Public Instruction, M. CHATIN, member of the Academy of Medicine and Professor at the Paris School of Pharmacy, has been named director of that School, in the place of M. BUSSY, who had retired. The chair of chemistry in the same institution has also been declared vacant.

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

The usual monthly pharmaceutical meeting of this College was held on Tuesday afternoon, November 18th, 1873. Mr. Peter Williamson in the chair.

Prof. Maisch presented to the College cabinet a beautiful specimen of the leaves and fruit of *Chondodendron tomentosum*, which had been sent by Mr. Daniel Hanbury, of London.

Mr. Richard V. Mattison read a paper on Pancreatin, in which he detailed a process of preparation analagous to that of E. Scheffer's for making Pepsin. The solution of Pancreatin was found to possess the property of emulsifying cod liver oil readily. The paper will be published in a future number.

Prof. Maisch read the following paper on Emulsifying Cod Liver Oil, by W. M. Rice. A sample was exhibited made by this process, in which the taste of the oil was thoroughly disguised.

Emulsion of Cod Liver Oil.

BY WILLARD M. RICE, JUN.

The high and important position occupied by cod liver oil in the lists of the materia medica, has induced many pharmacists and others to turn their attention to perfecting some mode by which this nauseous remedy may be rendered palatable and acceptable. Many of the formulæ so elaborated have been published in this and other pharmaceutical journals, while it is to be regretted that others have been withheld, thus placing their authors in the constantly increasing lists of nostrum venders. But none of the efforts thus far made have succeeded in *completely* masking the unpleasant fishy taste and smell of cod liver oil, although some approach very nearly to this "consummation devoutly to be wished."

After a series of experiments, at the request of, and assisted by, a medical friend, the writer of this has perfected the following formula, which he offers to his professional brethren, hoping that it may prove useful :—

Oleum morrhuæ	fl. ℥viij.
Tragacanth	℥j.
Sacchar. alb.	℥iv.
Ol. gaultheriæ	gtt. lx.
„ sassafras	gtt. l.
„ amygd. amar.	gtt. x.
Aquæ	fl. ℥viij.

The tragacanth and sugar are to be dissolved in the water and the mucilage strained. In this is to be incorporated first the essential oils and then the cod liver oil. This makes an elegant-looking emulsion, not too thick, containing fifty per cent. of the oil, and of a rather pleasant taste and smell.

Many manufacturers combine the lacto-phosphate of lime, etc., with the cod liver oil mixture, but as physicians often consider this decidedly objectionable in a medicine intended, as this is, in most cases, for continued use for a considerably protracted length of time, the author has been induced to omit it. It can be added, however, by a slight modification of the above formula.

A discussion arose as to what, in the opinion of the members present, constituted a good emulsion.

Mr. Jas. T. Shinn advocated thin emulsions, and did not favour the dispensing of thick emulsions, for he thought that the patient could readily incorporate the water and oil that had partially separated by standing, and would prefer to do it rather than take a thick emulsion.

Mr. Jos. P. Remington stated that he had made and dispensed a cod liver oil jelly, made on the same principle as the emulsion of Mr. Rice's, from the formula given by Mr. Rogerson in the London Pharmaceutical Journal of March 8th, 1873. This jelly eemed to give satisfaction wherever it was used ; but it was necessary to use only the finest and freshest oil.

Prof. Maisch spoke of the use of alkaline solutions in emulsions, and of the tendency of such to spoil, if kept too long, and become disagreeable to the taste.

A Member wished to know of Mr. Rice whether a smaller quantity of tragacanth could not be used in the formula.

To this Mr. F. Stryker Boisnot replied that both Mr. Rice and himself had tried various proportions, and found that they could not use less.

Mr. R. V. Mattison said that gum arabic and sugar had proved to be the best in his experience for thick emulsions, and solution of pancreatin for thin ones.

Dr. A. W. Miller read an interesting paper on Cosmolin, and exhibited a number of specimens :—

Cosmolin and Paraffin Ointment.

BY A. W. MILLER, M.D.

This preparation is by its manufacturers explained as being purified and concentrated petroleum. According to the most trustworthy information which we were able to obtain, it is made by distilling crude petroleum so as to remove successively the gasolin, benzin, burning oils and the lighter machine oils. The residuum is then subjected to still greater heat, and its vapour is brought into contact with a jet of superheated steam, for the purpose of expelling the last traces of light hydrocarbon. After this it is still further purified and deodorized by the action of hot animal charcoal. We are consequently forced to conclude that cosmolin is simply impure paraffin, or a mixture of paraffin with varying proportions of the heavy oils which are nearest allied to it. These oils are known to the trade as paraffin oil, neutral oil, lubricating oil, spindle oil, etc. Although the manufacturers claim cosmolin to be a simple body, this is refuted by their own statement, namely, that they furnish this one simple body in the form of cerate, which remains firm at 95°, as a jelly which is fluid at 85°, and also as a liquid which is still fluid at 32°.

Taking advantage of the fact that paraffin is only very sparingly soluble in alcohol, we dissolved cosmolin in ether and in benzin, from both of which solutions the paraffin was readily precipitated by the addition of alcohol. Cosmolin is turned dark brown, like caramel, by sulphuric acid, but this is no doubt due to its impurities. Nitric acid produces no reaction in the cold, but when heated turns it yellow, and finally orange colour. Muriatic acid and liquor potassæ have no effect upon it, either cold or hot. All of these tests point to the presence of paraffin.

As cosmolin appears to possess some merits, and is certainly gaining favour with physicians, it would be desirable to contrive a formula for its preparation.

With this object in view a number of experiments were instituted for the purpose of obtaining a combination having similar physical and chemical properties. The substances which seemed most suitable were pure paraffin, and the so-called neutral oil, of the best quality, which possesses less of the peculiar coal oil smell than any other kind examined. The gravity of this oil is 869 to 864, and its boiling point is somewhere about 500°. Coal oil dealers claim that this oil is free from odour, though this statement is only relatively true. In order to deodorize it still more, it was percolated through hot animal charcoal.

One part of paraffin was melted and three parts of the oil, prepared in the manner described, were added to it. This compound, has the same behaviour towards reagents as cosmolin. Like that substance it melts at about 95°, does not evaporate below 400°, and of course will not turn rancid. Its odour is rather stronger than cosmolin ; the colour is somewhat different, though this is most probably due to using pure paraffin, as some of the impure grades have the same peculiar amber colour as cosmolin. Both preparations when burned emit the characteristic smell of coal oil, and give off a copious black smoke ; ignited drops of both fall

down with a peculiar hissing sound. The chief difference appears to be in the mode of preparation, as the manufacturers of cosmolin claim to use no chemicals, while it is well-known that both paraffin and the heavy oils are purified by sulphuric acid and soda. Still, as the compound, which may be appropriately called "paraffin ointment," was boiled in distilled water without making it either acid or alkaline, the much dreaded chemicals have evidently been completely removed.

Cosmolin is vended at the somewhat exorbitant price of 1 dol. per lb., while paraffin ointment can be sold at a very fair profit for one fourth of that price.

The above formula for this substitute for cosmolin is not offered as the best that may be devised, but only for the purpose of directing inquiry to this subject. The varieties of heavy coal oils in the market are so numerous that it becomes a tedious task to examine them all. We were, in fact, promised a sample of a purified paraffin oil made in Boston, which was represented as being almost identical with cosmolin, but it has not yet arrived.

In conclusion we would state that cosmolin does not appear to be so entirely free from all irritating properties as it is claimed to be. A case has been communicated to us by Dr. Louis G. Bauer, one of our members, in which he applied it for an aggravated and obstinate form of eczema, occurring on the upper lip. It was productive of a high degree of inflammation and considerable tumefaction, although citrine ointment and similar preparations had been previously employed without such results.

President Williamson remarked that petroleum, paraffin, cosmolin, etc., etc., had all come up since his day; but even in old times they had petroleum. An article called Seneca oil used to sell freely for 11*d.* per ounce, which was petroleum collected by the Indians. It was found floating on the water in certain parts of Pennsylvania, and by absorbing it by a blanket and wringing it out, it was collected in small quantities and commanded a good price. It was used for linimcnts, etc.

Mr. J. P. Remington read a note on Aromatized Waters, advocating the use of the compound waters in preparing elixirs, etc.

Prof. Maish spoke of a process for preparing distilled water which had been communicated to him over a year ago by Mr. George G. Percival, of Waterville, Me., but, at the author's request, was not published then. Mr. Percival found that volatile oils are very freely soluble in boiling water, so that he has taken a patent for obtaining volatile oils on a large scale by a process based thereon. He suggests to dissolve the volatile oils in hot distilled water; on cooling, a turbid solution results, showing that the water is a saturated solution. By filtering, as perfect an aromatized water as can be made from volatile oils is obtained.

Mr. Jas. T. Shinn preferred distillation, and said that he made an imitation of Curacoa cordial by distilling the oils with water and then mixing with sugar, and colouring.

On the motion of S. M. McCollin, the above papers were referred to the Publication Committee.

The meeting then adjourned.

SOCIETY OF ARTS.

On the Energies of the Imponderables, with especial reference to the Measurement and Utilization of them.

BY THE REV. ARTHUR RIGG, M.A.

Lecture VII.

*On the Energy of Heat, with especial reference to the Measurement and Utilization of it.**

The energy of heat has, in one form or other, attracted more notice than that of any of the other imponderables with which this course of Cantor Lectures has to deal. Various explanations of the cause of heat being possessed of energy have been given, but it was not until the closing years of the last century that views on this question were first enunciated, which have since borne such good fruit. Count Rumford, in 1798, by an experiment in the boring of cannon in the arsenal at Munich, and Sir Humphrey Davy, in 1799, by the liquefaction of two pieces of ice by the friction of each on the other, laid the foundation of that explanation which has been so successfully generalized, and which even now is hopefully pursued.

The first question that presents itself to us is, "What is heat?" And in order to present the modes suggested for measuring it which are diagramically expressed on the wall, it will be needful to make some preliminary statements. In the general table of energies the sources of heat are represented as the sun and fuel. That term fuel might with very good reason have been omitted, for the one source of heat is the sun; fuel is a secondary source, having its primary in the sun. Heat is obtained from the sun, and the circumstances under which it is obtained, are foreign to the subject of this lecture. Heat obtained from fuel, and also from the sun, is kinetic, or capable of producing motion when it is radiant, or passing from place to place; and it is potential, or stored up, when it is absorbed. Now it was absorbed in those primeval times when there was an immense mass of vegetation on the face of the globe; that vegetation absorbed the heat. In these primeval forests it has been preserved, and in such fuel as coal it is restored. In being so restored or returned, that is given back to the earth which was absorbed perhaps before the creation of man. These buried forests are now a-glow with light, and heat, and vigour—unmistakable types of resurrection from a grave. Let us turn to that received from the sun. Refer to the diagram of the spectrum and consider how it aids in illustrating the question of heat. In the last lecture an endeavour was made to explain how it was related to the phenomena and energies of light, and incidentally to the phenomena and energies of chemical affinity. One portion is related to the energy of light, properly so-called; another portion is related to the energy of affinity, properly so-called; and in this portion, which is perfectly obscure, and which escaped notice until recent years,—in this which is invisible to the human eye, although it may be visible to the eyes of other animals, lies that which we call solar heat. You observe that to the spectators' left-hand of the portion marked with the usual prismatic colours, there is a shade of red extended to a length equal at least to that marked with such decided colouring. It is not far from the truth to say that in this lies all the heat from which we obtain our stock of motion. It may be desirable to explain how we know that the heat lies there, and why the diagram is there drawn, and extending to such a distance from the visible portion of the spectrum, and that in such portion lies the greatest amount of heat. It is done in this way. We take a little instrument called a line thermopile, composed of a number of strips of metal laid edge to edge, and soldered at the alternate ends. The two metals are usually antimony and bismuth. The pile is in the form of a straight line, because it is to be used for determining the heat at a particular portion or line across the spectrum.

Thermometers for heat purposes may be said to be use less, and, perhaps, before going further, it may be well to state why they are so. A thermometer is an instrument which, by the expansion of a fluid, as air, or a liquid, as alcohol, mercury, etc., or by any other means, tells us the difference in temperature between two bodies. If a thermometer be placed in water, it would tell us how much the temperature of the water is above the freezing point, or how much below the boiling point. But freezing and boiling points are neither of them standard

* Cantor Lecture, delivered March 17, 1873; reprinted from the *Journal of the Society of Arts.*

points. There is heat far below the freezing point, and there is heat still higher than the boiling point; and indeed there is no approachable zero from which to commence the graduations of a thermometer. We want, too, another thing, not relative heat but absolute heat. Another means for obtaining records of heat is by the use of the thermopile and the galvanometer. This galvanometer is connected with the thermopile, and the speck upon the screen is that to which we have to look. If two short thin wires, one silver and the other copper, be taken, one wire attached to one end of that round the galvanometer, and the other to the other end, questions in relation to heat and electrical phenomena in connection with it may be made clear. If the free ends of the silver and copper wire be placed in contact and held between a finger and thumb, or placed near a lamp-flame, the speck immediately moves, and travels over a large space. No thermometer is so delicate or sensitive to heat as this combination of instruments. The heat which in a thermometer would be employed in expanding the liquid, is in this case converted into an electrical current which affects the galvanometer. Heat in the one case is measured by the expansion of a liquid, in the other by being converted into electricity, and the electricity is measured, as explained in a previous lecture, by the galvanometer. The speck is now steady, but on taking hold of the junction of the wires the speck moves in consequence of the simple touch of a finger. If the junction be once waved near the flame of a lamp, the speck moves directly—evidently there is a real and measurable energy in the heat which has passed. It should be remembered that this galvanometer requires quantity of electricity, and not what is called intensity. That motion, therefore, by being properly measured, enables us to get, inferentially, at the quantity of heat. The measurement of heat by differences of temperature is called "thermometry." The measuring of an absolute quantity of heat is called "calorimetry."

These metals thus indicating heat by the conversion of it into electricity are applied here in a line, and if this apparatus is placed in front of a real spectrum, of which that on the wall is a pictorial diagram, and moved gradually along by means of a fine-threaded screw, the line thermopile passes into successive portions of the spectrum, and according to the amount of heat in each portion, so the galvanometer deviates. If, therefore, the galvanometer at one portion is sent further aside than at another, we know it is owing to a larger quantity of heat being converted into electricity. Such an arrangement was carried out, and the largest amount of heat was found to be where that high mountain is marked on the drawing. This much must at present suffice for showing how to determine and measure the quantity of heat.

Now let the consideration be how this heat is converted into motion. Motion, we know, produces heat, but here the converse question is presented—heat producing motion. If we can show that heat produces motion, and if we know that motion produces heat, those two are mutually interchangeable. That no motion can take place without the development or absorption of heat may be made manifest by an experiment. Here is a thermopile, rather more delicate than the one hitherto used. Here is an air-pump, connected with which are two copper vessels separable by a tap. If, now the air be exhausted from one of these vessels, the one nearest to the air-pump, it then becomes empty, and if the thermopile be caused to touch the other vessel, or to touch this one, which is empty, and the speck of the galvanometer is stationary; then, when the tap that separates the two is opened, air rushes from one into the other, and the galvanometer speck indicates a change in the heat relationships of the two vessels. These changing heat relationships result whenever action takes place. If a thermopile having a larger surface, intended for the purpose of investigating very delicate changes of temperature, be attached to a condenser which serves to increase the surface and so to magnify the result, it would be found that by merely touching one portion the speck of the galvanometer moves. Now, if a fan be caused to act in front of and upon the thermopile, the impression would be that we should withdraw heat. The withdrawal of heat may be produced by the blast of air, but this air, striking on the thermopile causes the spot of the galvanometer to move in the direction indicating an increase of heat. The question is, whence comes that increase of heat? The answer is, that heat comes from my arm, and is produced by muscular energy being converted into mechanical power, which is then transformed to heat, which is changed into electricity. In this case the energy passes direct from my arm through the fan, and propels a current of air against the thermopile. If, however, the draught of air upon the thermophile, instead of being direct from my hand had been treated in this way—If a close vessel had been taken, and by means of a condensing syringe, air had been forced into it, and allowed to remain for a few minutes, and then jetted against the thermopile in the same way as the air from the fan, we should find, after the first impact of air, that cold, and not heat, had been produced. Therefore, the one blast blows hot, and the other blast blows cold. Thus, Æsops's fable of the man and the satyr appears to be realised. Much confusion has arisen from the use of the word cold, as though it was something distinct from heat. "Cold" is only a condensation of the phrase, "decrease of heat." Conflicting views would sometimes be harmonized were this word disused, and the word "heat" employed with a proper prefix.

There is a very good reason to be given for these results. The case of a blast producing decrease of heat may be illustrated thus:—In this iron bottle there is some condensed carbonic acid gas, which is under a pressure of about 700 lbs. on the square-inch. Now, it might be expected that as the blast from the fan produced heat, so the blast from this bottle of condensed gas would also. A jet of this condensed gas is now directed to the thermopile; the reflected light of the galvanometer by its motion indicates that the current has produced cold. It certainly appears remarkable that in the case of one blast heat is manifested, and in the other cold is produced. The explanation is this:—In neither case can the air be put into motion, except by the expenditure of heat. In the case of a fan the heat is at once expended in causing a blast of air, but in the other case the heat is expended in the previous act of condensation. When this condensing syringe has been used for two or three strokes, the cylinder of the syringe has become hot. The process of heat radiation is continuous. As soon as that bottle was filled, the heat accumulated in the work of condensation began to radiate. In other words, the muscular energy which condensed the gas into the bottle was dissipated in the form of heat. The contents of the bottle require an expenditure of that which may be represented by as much heat to get out of the bottle as they required to put them in; therefore, this heat must be drawn from some source or other, and the first supplies are drawn from the contents of that which was in the bottle. The paradoxical and apparently contradictory phenomena are, however, reconcilable in a most instructive manner. In the case of the fan the blast carries the muscular energy converted into heat direct to the thermopile. In the case of the bottle this heat has been dissipated by radiation.

Let us now consider and describe how Mr. Joule obtained that which has become the basis of our calculations, and the arithmetical measurement of heat, namely, 772 foot-pounds as the mechanical equivalent of the amount of heat required to raise one lb. of water through one degree Fahrenheit, or 1390 foot-pounds for raising the same quantity of water through one degree Centigrade.

His experiments extended over about seven years, and

the first apparatus used was the one shown in this diagram. There is a small vertical shaft, capable of being rapidly turned by a handle, across or through the shaft is a short glass tube, in which were introduced a number of bars of wrought iron. These were covered with oiled paper, so separating them electrically one from the other. The bundle was wrapped round with copper wire and then inserted into the glass tube, which was closed at one end with a cork, and capable of being closed at the other. That glass tube was coated with tin-foil, so that, in fact, the tube was very like what is called a Leyden jar. It had an electrical coating inside and out, the only peculiarity being that a slit was cut along the coating on the outside of the vessel to prevent electrical induction. The tinfoil was then covered by strips of wood parallel to the tube, and bound all over with silk. The ends were corked, and also covered with oiled silk, so as to close it thoroughly. From the inside of the tube two wires passed down and dipped into two mercury cups, which were connected with a galvanometer, so that currents of electricity, if any were produced in the interior metal bars, would be manifested by the galvanometer. On each side of this short glass tube were fixed two arms of wrought iron, bent in the form of a horse-shoe, and as nearly in contact with the ends of the glass as possible. This wrought-iron horse-shoe had a coil of copper wire round it, and by the usual means it could be converted into an electro-magnet. A certain weight of water was put into the short glass tube along with the bars, and having rotated the instrument for a quarter of an hour, the temperature of the water when examined was found to be hotter than before. The galvanometer being observed it was known what electricity had passed, and this, combined with the change that had taken place in the temperature of the water after fifteen minutes' rotation of the shaft, at the rate of six hundred rotations per minute, sufficed for determining the amount of electricity converted into heat. Thus, approximate data were obtained on which to found other experiments. Such experiments were made and remade, they failed, and were again renewed; and to note how Mr. Joule overcame one difficulty after another until he succeeded, furnishes a beautiful example of perseverance. Sometimes where he expected to find a substance had gained heat, he found, on the contrary, it had lost. Such anomalies, however, were afterwards completely accounted for.

Research in science claims the exercise of much ingenuity under unexpected and baffling conditions. The perplexity just described became an element in success. Mr. Joule availed himself of the process of "interpolation," and so adopted what proved of great assistance in future experiments. What has been described was the earlier of many processes. Next, he found it needful to measure the energy exerted upon the handles, because if in this vessel a quantity of heat had been generated which produced an observed increase of temperature in the water, it was desirable to know what was the value of the mechanical energy which had caused that heat to be so generated. If motion be given by the hand only, there is no means of measuring that value. The earlier object was to see if heat could be obtained; then the next object was to measure the heat obtained, and also to measure the mechanical energy by which it had been obtained. The apparatus now assumed this form. He gave up the electrical process, and began to take a vessel, similar to the one shown in this diagram, which had brass plates in it, and brass bars fixed to the inside of the vessel, and running across, so that paddles could rotate between the bars. The vessel was filled with water, and therefore when the paddles rotated the fixed bars stopped the whirl of the water, and heat was developed. The sea, as those who are accustomed to bathe know very well, is warmer on a windy day than on a calm day, simply because the motion of the water caused by the wind is converted into that motion of the molecules of the water which we call heat. So in the experiments with this apparatus the motion of the water in the vessel is converted into the motion called heat. Of course all possible means were adopted to prevent heat passing by radiation from the exterior of the vessel. Hence the vessel was enclosed in another, and that again in another. The contrivances for ascertaining a measure of the mechanical effort made to keep the paddles rotating at a uniform rate were very simple.

The little vertical shaft on which the paddles were fixed was prolonged upwards, being divided across and reconnected in line by a piece of vulcanite, which, in common phraseology, would be called a non-conductor of heat. Wound round the upper part of this shaft were two cords, the ends of which passed over two pulleys on opposite sides. To these cords were fixed weights, by the descent of which motion could be given to the paddles. The cords were two in number, and on opposite sides, in order to obviate as far as possible the heating effect of rubbing friction on the shaft journals. With this apparatus, and others constructed upon similar principles, a series of experiments enabled him to arrive at certain definite conclusions.

(*To be continued.*)

Parliamentary and Law Proceedings.

Alleged Poisoning by Morphia and Suicide by Strychnia.

On Thursday, January 8th, Mr. W. Tomalin, the deputy coroner for the county of Northampton, held an adjourned inquest at West Haddon, on the body of Mrs. Alice Gulliver, late of Creek, who died on the 23rd of November last, and whose body was subsequently disinterred.

The inquest was opened by the Coroner on the 23rd ult., and, some evidence having been taken, was adjourned till Thursday in order to give time for an analysis of the contents of the stomach.

Mr. J. Becke, of Northampton, solicitor, attended on behalf of the relatives of Mrs. Gulliver; and Mr. R. T. Rea, solicitor, Worcester, appeared in the interest of Mr. Waters, surgeon, of Worcester, whose wife was visiting the deceased at the time of her death. Mr. Waters was also present.

The deceased, it appeared, lived alone, and was supposed to be possessed of a large property. In the middle of November last Mrs. Gulliver wrote to Mrs. Waters, wife of a medical practitioner living at Worcester, and a relative of the deceased, asking her to pay her a visit, and on the 20th of that month Mrs. Waters arrived. On Saturday morning, the 22nd, two days afterwards, Mrs. Gulliver was seized with sudden illness, and Mrs. Waters called upon Mr. Walker, surgeon, of Creek, and asked him to visit her aunt in the evening. Mr. Walker offered to see her at once, but she begged him not to go then as her aunt was asleep. He accordingly went about five o'clock in the evening, and found the deceased very ill—much worse than he expected to find her. He had paid her a friendly visit on the Friday evening, and had then found her unusually well. He prescribed for her, and saw her again on Sunday morning, when he found her much better. Soon after he had left, however, she was again taken very ill, and a servant deposed that she heard Mrs. Waters open the windows, and, as she thought, shut the door. On going upstairs she found her mistress was dead. Mrs. Waters sent for Mr. Walker, who found the bedroom door and window and staircase window open, and there was a "tremendous current and draught." Mrs. Waters said to him, "Oh, I am so sorry now I was here." He asked her why, to which she replied, "Oh, Mrs. Gulliver made a will in favour of my husband, and the other family know nothing about it." She afterwards said, "I

suppose there will be a 'rumpus,'" or "a row." Mr. Walker gave a certificate of the death. He believed at the time that death resulted from valvular heart disease.

Professor Rodgers, of the London Hospital, said :—On the 24th of December last he received three jars from Inspector Bailey, containing the viscera of a human subject—stomach, with the œsophagus attached, liver and kidneys. In the œsophagus he found a quantity of the same material as that found in the stomach, proving that immediately before death there must have been an effort to vomit. On opening the stomach he found no appearance of irritation, and he found, on analysis, that there was no mineral poison in the contents of the stomach. He had the means of detecting the presence of alkaloids, and he found the presence of an alkaloid in the stomach, liver, and æsophagus. He had not quite finished the analysis of the kidneys. He found that that alkaloid was morphia ; he had no doubt of it. He found morphia in the stomach and its contents. In the liver and the blood he found the presence of an alkaloid, but there was not sufficient to enable him to determine its character. The alkaloid in the liver might be harmless, but that in the stomach might cause death, according to the dose that was given. Having heard the statements made by Mr. Walker, the surgeon, as to the state in which the deceased was during the Saturday—a state of stupor approaching to coma—and also the evidence as to the appearances presented on the *post mortem* examination, he would say that in his judgment the condition in which the deceased was on the Saturday could not be attributed to the disease which was apparent in the *post mortem* examination. Those appearances were consistent with the supposition that a narcotic poison, such as morphia, had been administered. Taking into consideration the fact that morphia was found in the body, and the condition of the deceased on the Saturday, that would account for her condition. The vomiting would account for so small a quantity of morphia being found, if there had been a larger quantity administered. The facts would tend to show that the deceased was recovering from the effects of this narcotic poison. The circumstances actually attendant on death were not such as would lead him to form an opinion as to the immediate cause of death. He was not prepared to say whether death arose from natural causes or not, but, in his judgment, a dose of morphia producing such effects as were observed in the deceased must necessarily tend to hasten death. Death was not the result of a narcotic poison administered on Saturday ; but, from the appearances observed, he was equally positive that death did not arise from the state of the heart. The statements of the medical and other witnesses as to the condition of the deceased, with the result of the *post mortem* examination and his own analysis, justified him in coming to that conclusion. The high temperature of the body negatived that idea, but something such as prussic acid, and which now could not be detected, would cause death. Death must have been accelerated by the administration of morphia, but the actual cause of death was the administration of some other volatile noxious substance which could not be detected after so long a period.

Dr. Buzzard was next examined. Having heard the evidence of Professor Rodgers and the result of his analysis, and taking that in connection with the state of the deceased on the day before her death, as detailed by Dr. Walker and the other witnesses, he considered it highly probable that the state of the diseased was attributable to a dose of morphia. He would not state it with absolute certainty. He could suggest another cause producing the effects described. A dose of morphia sufficiently strong to produce such effects would accelerate death, especially in a person with a heart like that of the deceased. He believed that death was accelerated by a dose of morphia, but he could not state that with absolute certainty. She did not die from the direct effects of morphia though it was possible she died from its indirect effects.

Mr. Walker was also recalled, and said that, having heard the result of the analysis, it appeared to him that the state of his patient on the Saturday was the result of morphia. Morphia administered to his patient in her condition of a diseased heart would, when administered in such quantities as had been detected, be injurious, and would accelerate death. He was not at all aware that the deceased was in the habit of taking morphia.

After some further evidence, the Coroner briefly addressed the jury, and after a short retirement, they returned a unanimous verdict that the deceased did not die a natural death, but that her death was caused by poison, but by whom administered there was not sufficient evidence for them to determine.

An information having been sworn, a warrant was afterwards issued by the magistrates to take Mrs. Waters into custody.

Meanwhile, Mrs. Waters had been taken very ill, and shortly afterwards the doctors in attendance pronounced her dead. On being communicated with by Mr. Waters and his attorney in another room during the inquiry, she became much excited, and was seized with what appeared to be an epileptic attack, to which she succumbed in less than an hour.

On Friday an inquest on the body of Mrs. Waters was held at the Crown Inn, West Haddon. Mr. Alfred J. Gulliver Waters deposed that he was a surgeon, practising at Worcester, and husband of the deceased. He accompanied his wife and his solicitor, Mr. Rea, from Worcester to West Haddon, and attended the inquest on Mrs. Gulliver. The deceased was in another room. The witnesses having given their evidence, he and Mr. Rea went to Mrs. Waters. Mr. Waters told his wife what had been proved by Professor Rodgers—the detection of morphia in the body of Mrs. Gulliver. She replied, "I never gave her anything, that I am sure." They had scarcely been two minutes in the room before she suddenly caught hold of witness's hand and said—"I shall have a fit. I know I shall ; I told you so this morning ; I feel it coming. It is paralysis—just like I had before, only not so violent." Witness asked her if he should send for one of the medical men, but she replied, "No, no ; it's only a slight shock—slight, slight ; there, it's going." Witness could scarcely release his hand from her grasp. With the other hand he was feeling her pulse, the state of which alarmed him. The deceased then released her hold, and in about a minute threw herself back in the chair. He noticed that there were violent tetanic spasms, and every indication of poisoning by some means. Another medical man was fetched, and shortly afterwards deceased said to Mr. Waters, "Alfred, I have taken ——" but before she could finish the sentence, another spasm came on and she died. Before this, Professor Rodgers asked for the keys of a little black bag which she had brought with her. Witness gave them to him from her pocket. In the bag were found two small bottles ; one was empty, and the other, a very small one with a glass stopper, contained about two teaspoonfuls of some fluid. Professor Rodgers smelt it, and said, "I fancy she has taken brucia" (or brucine) or some preparation of nux vomica milder than strychnine.

Mr. Dicks, surgeon, of Long Buckley, described the symptoms as those resulting from having taken some preparation of nux vomica.

At this point the Coroner requested Mr. Dicks to make a *post mortem* examination. In the meantime evidence was given by the people in the house which showed that the poison could only have been taken at the time when some tea was given to Mrs. Waters, after the adjournment for lunch, and before the Coroner addressed the jury.

Mr. R. T. Rea, solicitor, and Coroner and clerk of the peace for the City of Worcester, was then examined. He described the interview with Mrs. Waters, when the Coroner was about to address the jury in the inquest-room downstairs. He informed Mrs. Waters, at her husband's desire, of the effect of Professor Rogers' evi-

dence, and asked her what became of the morphia which Dr. Walker said she obtained from him for a poor woman three months ago. She answered, "I took it myself; I can't live without it, I have some here to-day. I always have had some with me since that attack." She alluded to a paralytic stroke which she had about three years before. Witness said it was at least very unfortunate that she should always have had of late the very poison in her possession which the analysis indicated. She replied, "I never gave any of it to her, that I am sure." Immediately afterwards she was seized with the symptoms described by Mr. Waters, which ended in her death.

The *post mortem* examination having been completed, Mr. Dicks handed in his report to the Coroner. There was no natural cause of death, and he expressed his belief that the deceased had died from poison, and that that poison was strychnine.

Mr. Waters being questioned as to the state of his wife's mind, said she had been very desponding for the last three years, and that some of her relatives had been confined in a lunatic asylum. The jury found a verdict of "Felo de se," and the Coroner ordered the body to be buried without the rites of the Church between 9 and 12 p.m., and within 24 hours from that time. The body was therefore interred on the same night in West Haddon, a few hours after the close of the inquest.

Adulteration of Bread.

In a case which was decided at Uxbridge on Monday, the 12th inst., a baker was accused of adulterating bread with alum, to the extent of 45 grains to a 4lb. loaf. Evidence was produced by the defendant to show that that quantity of alum was not present, and the magistrates in giving their decision said they did not feel called upon to say whether the alum was there or not, as the evidence on that point was conflicting, and they considered that the prosecution had failed on another point, namely, the form of the summons, which was taken out under the third section of the Act, relating to the admixture of "any other substance with intent fraudulently to increase its weight or bulk." It had been assumed by the prosecutors that the addition of alum to bread caused it to retain an increased quantity of water and thus to become heavier, but the scientific evidence of Dr. Redwood and Mr. Wanklyn tended to negative this assumption. The summons was therefore dismissed.

Reviews.

Year Book of Pharmacy, comprising Abstracts of Papers relating to Pharmacy, Materia Medica and Chemistry, contributed to British and Foreign Journals, from July 1, 1872, to June 30, 1873. With the Transactions of the British Pharmaceutical Conference at the Tenth Annual Meeting held at Bradford, September, 1873. London: J. and A. Churchill. 1873.

A little later than has been usual with its predecessors the 'Year Book of Pharmacy' has made its appearance, and it will soon be under the inspection of some thousands of pharmacists throughout the country, from whom it will doubtless meet with the welcome accorded to an established favourite. For although about two-thirds of the articles quoted in the 'Year Book' proper have already appeared more or less fully in the pages of this Journal, as well as the whole of the Transactions of the Conference at Bradford, and they will therefore be familiar to our readers, many of them, as well as others whom our pages do not yet reach, will be glad to see these papers brought together in such a compact form.

The new 'Year Book' fairly represents the literature of pharmacy during the twelve months mentioned on the title-page, and although many of its articles partake rather of the nature of excerpts than that of the abstracts of the German Jahresbericht, yet as this has also been the case in former years it may reasonably be supposed to represent the instructions under which the editor compiled the book. We are at a loss, however, to guess why in some cases a foot-note is appended stating the article is printed entire, since the remark would equally well apply to many others in the volume. For instance Mr. Hanbury's article on African Ammoniacum, so noted is preceded by one of Mr. Pocklington's, from which only two introductory lines are necessarily omitted, and it is followed by Mr. Moss's paper on Ammoniacum, minus only about a dozen lines,—in which however happen to be included the fusing point and one of the operations of washing the resin,—and this is succeeded at an interval of a page by M. Planchon's paper on Striated Ipecacuanhas *in extenso*. We would only further remark of this portion of the book,—which numbers about forty pages less than that of last year,—that if some of the subjects are rather far removed from pharmacy, they are unfortunately not beyond pharmacist's requirements, a fact of which we have daily experience.

Of the editor's introduction, however, we cannot speak so favourably. Probably this must be ascribed to the fact that last summer Mr. Wood received the appointment of quinologist to the Indian Government, and was called upon to leave England at an unexpectedly short notice, before even the MS. of the book was placed in the printer's hands. In the words of Ovid he might have said—

"Sine me, liber, ibis in urbem."

And the result has been a summary much wanting in the precision and accuracy which made that of last year so valuable. For a justification of this assertion we proceed to make the following notes, and their confirmation may generally be found in the book itself. The first hundred lines contain so many inaccuracies that it is difficult to point them all out without incurring suspicion of hypercriticism. To commence, we question the propriety, in the face of what appears in another part of the book, of such a sentence as "propylamine, or as it has also been called trimethylamine." Nearly twenty years ago Hofmann stated that the base found in herring brine was trimethylamine, and not propylamine, and this has been fully borne out by recent investigations. The adoption of this misnomer leads further on to the use of "hydrochlorate of this base" (*i.e.*, propylamine) being attributed to Dr. Beaumetz, a statement that would surprise that gentleman. Again, 'Nouvelles Recherches sur la Triméthylamine' was not the title of the report of the Commission appointed in France to investigate the subject, but of a brochure by Dr. Beaumetz, published by Masson, dealing with the medical aspect of the question. Moreover, neither from this treatise, nor from the report of the Commission, did it become "apparent that there were three substances having the same ultimate composition (C_3H_9N), and consequently isomeric," since this was known long before, and the Commission only professed to collate such information as already existed. Further, it is incorrect to say that Rabuteau "has found as the result of experiment that one, two, or even three of the atoms of hydrogen in ammonia may be replaced by compound alcohol radicles," etc., that fact having been discovered, and several salts of these compound ammonias prepared, by Adolphe Wurtz in 1849 (*Comptes Rendus*, vol. xxviii. p. 223), and the subject was followed up by Hofmann; indeed, there is nothing to indicate that Rabuteau himself even prepared the chemicals for his experiments, which were purely physiological, and Rabuteau states in his original paper that they were supplied to him by F. Wurtz. So much for the subject of the compound ammonias!

A few lines further on, departing from the accuracy of M. Jungfleisch—as shown in the abstract of his paper—the statement is made that Pasteur prepared racemic acid from [ordinary] tartaric acid, by the action of heat upon "tartrate of cinchonine." In his original paper (*Comptes Rendus*, vol. xxxvii. p. 162), Pasteur says he prepared it from tartrate of cinchonicine—which, as D. Howard has

shown (PHARM. JOURN. [3] vol. ii., p. 765), can also be prepared from cinchonidine—the point being that in this modification of these alkaloids the one dextro and the other lævogyrous, their optical properties appear to undergo a change analogous to that which probably takes place in the formation of racemic acid. With the same absence of accuracy Mr. Umney is made to suggest that "the chlorinated lime of commerce should be guaranteed to contain 33 per cent. of available chlorine;" the result of such researches as Dr. Wright's is that "the chemist is at last enabled to prepare the alkaloids themselves synthetically;" Mr. Allen's recent experiments have "led him to conclude that exhausted tea-leaves . . . had been added to genuine tea, in confirmation of which," etc. (then Mr. Allen must have been very late in making up his mind); Carles's experiments on cinchona barks are described as "chemical and microscopical."

Finally, in respect to Mr. Howie's test for turmeric in rhubarb, it is stated that "the colouring matter obtained [by chloroform] from turmeric is imperceptibly different in tint from that of rhubarb." What Mr. Howie does say (p. 563) is that "with really fine, bright-coloured East Indian rhubarb this stain is scarcely perceptible;" while the brilliant yellow stain, akin to that of turmeric, is yielded by the inferior East Indian and English rhubarbs.

Some of these misstatements may be due only to a want of precision in the language used, and may not have been intended by the writer to bear the construction now put upon them. But they can only be taken as they appear; and judged by Mr. Wood's own standard of last year, we think they are blemishes. Moreover, the fact that so many occur in sixteen pages is calculated to raise doubts as to the abstracts and translations, where so much depends upon an author's meaning being clearly grasped and precisely stated; doubts, however, that in this case, so far as we are able to judge, would have no foundation.

GEOLOGICAL STORIES: a Series of Autobiographies in Chronological Order. By J. E. TAYLOR, F.G.S. 12mo. Hardwicke, London, 1873.

In his 'Geological Stories' Mr. Taylor has endeavoured to strike into a new line of teaching so far as science is concerned, and on the whole, we think, with considerable success. Most of our readers must be familiar with certain children's books in which a pin, or a needle, or a fragment of old timber is made to relate the incidents of its existence from the first extraction of the metal from the mine, or the first shooting of the acorn, to the final catastrophe of whatever kind that has brought its useful days to a close. Mr. Taylor has applied this same method to the teaching of the first outlines of geology. In successive chapters fragments of granite, quartz, slate, limestone, sandstone, coal, salt, jet, Purbeck marble, chalk, clay, and lignite are made to tell their own stories, and these with one or two other chapters relating to the crag of the eastern counties, to boulders and gravel-pits, furnish an excellent sketch of the principles of stratigraphical geology. Of course there is a little absurdity involved in this mode of treatment, arising principally from the circumstance that the typical fragments, if we may call them so, selected by the author, are made to talk about general phenomena, of which, granting their consciousness, they could know no more than a private soldier does of the great movements of the army of which he forms a part; but this is a consideration which is not likely to occur to those young minds for whose instruction and delectation the little book is particularly intended.

Apart from this Mr. Taylor seems to have done his work conscientiously and well. His book is throughout in accordance with the most modern views of the different subjects of which it treats: it is pleasantly and very clearly written, and will certainly escape the charge of dryness which is the most fatal of all to a popular scientific treatise. With the help of the appendix, which contains a table of British formations and an illustrated explanation of some of the common technical terms, the young reader of 'Geological Stories' may easily gain not merely a general notion, but a very precise knowledge of the principal geological facts and theories. The woodcut illustrations, which are numerous, are for the most part very good.

BOOK RECEIVED.

THE HALF-YEARLY ABSTRACT OF THE MEDICAL SCIENCES: being a Digest of British and Continental Medicine, and of the Progress of Medicine and the Collateral Sciences. Edited by WILLIAM DOMETT STONE, M.D., F.R.C.S. Vol. lviii. July to December, 1873. London: J. and A. Churchill.

Obituary.

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

On the 25th September, 1873, Mr. Henry Bloye, Pharmaceutical Chemist, of High Wycombe.

On the 30th December, 1873, Mr. William Charles Targett, Chemist and Druggist, of Leicester.

Notes and Queries.

[377.] OBSCURE FORMULÆ.—In answer to Notes and Queries No. 377, I think I can solve two out of the four difficulties mentioned.

1. "Tinct. Testæ."—A West End Physician used to order the shell of a species of Tortoise, the *Emys Guttata*, macerated for three months in rectified spirit. The formula was, I am almost positive, ℥ij of the shell to Oj of S.V.R., and ℥iv of this tincture (?) with ℥iijss of Aq. Dest. was prescribed. The dose of this potent mixture was one teaspoonful, given in cases of consumption, and, it is almost needless to add, with no very marked effect. About three years ago I frequently made up the above prescription.

2. "Pil Aloes Glacial."—These pills are prepared by Corbyn and Co. I have had occasion to procure them once or twice for a prescription.—JOHN N. PLACE.

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[383]. CHILLI PASTE.—*D. B.* asks for a recipe for making Chilli paste.

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[384]. COLOURS FOR CARBOYS.—Will any reader oblige me with a couple of good receipts (royal blue and green) for show carboys?—*J. R. H.*

SYRUP OF THE BROMIDE OF IRON.—Take of bromine three troy ounces; iron (in the form of wire) 350 grains; distilled water, three fluid ounces; citrate of potash, six troy ounces or q. s.; syrup, a sufficient quantity. Put the iron, with the distilled water, in a flask, and add of the bromine two troy ounces in small portions at a time, allowing the mixture to cool, if necessary, before the addition of each fresh portion. When the odour of bromine has disappeared, warm the mixture gently, until it assumes a green colour; filter and add the remainder of the bromine. Transfer the resulting solution of ferric bromide to a porcelain mortar, and add gradually, with constant trituration, citrate of potash, until the colour of the mixture changes from brown to green; finally, add simple syrup to make up thirty fluid ounces. The syrup thus prepared corresponds nearly in strength with the syrup of the iodide of iron, and may be administered in doses from twenty to thirty drops. It is elegant in appearance, not disagreeable in taste, and is not incompatible with alkalies, or with tannic acid.—*Med. and Surg. Reporter and Canadian Pharm. Journ.*

PALATABLE DRINK OF CASTOR OIL.—Dr. H. Trevcrton Bond, writing to the *Druggists' Circular*, recommends the following plan of dispensing castor oil and converting it into a palatable drink. Pour into a tumbler about six drachms of syrup of sarsaparilla, add a small quantity (about 20 grains) of bicarbonate of soda, stir with a spatula, add about a tea-spoonful of a saturated solution of tartaric acid, and again stir well; this produces a heavy viscid froth. Pour down the side of the tumbler, so as to sink to the bottom and not mix with the froth, about an ounce of water; then add the oil. The whole is to be drank without agitation. The water is at the bottom, the oil in the centre, and the froth on the top. The drink so prepared is said to be tasteless, and the oil is all taken, as after dispensing the glass can be washed clean with water, showing that no grease adheres to its sides.

IMPURITY IN TARTARIC ACID.—In the United States tartaric acid has been found by two observers to be sometimes contaminated with sulphuric acid. The consequence was that seidlitz powders prepared with such acid were unsatisfactory, the rochelle salt being decomposed, and sulphate of soda and cream of tartar formed. The deposit of the latter towards the conclusion of the effervescence was the occasion of the detection of the impurity.

Correspondence.

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

Fresenius's Quantitative Analysis.

Sir,—We observe in the Pharmaceutical Journal of Jan. 10th, a review of the edition just issued by us of 'Fresenius' Quantitative Analysis,' and as there are one or two statements made which might give your readers a wrong impression, we, as proprietors of the English copyright of the work, must ask you to allow us to make the following explanation.

You ask why we, as publishers, have not brought out a translation from the author's manuscript of the new German edition now in course of publication. Our answer is, that Dr. Fresenius, as far as we can learn, has no such manuscript yet ready, and that the fact of the German edition being delayed is exactly the reason why we considered it would be a boon to those who wanted the book, if we were to publish a reprint of the fourth edition. It is quite true, as you say, that a book which was up to the mark in 1864, must necessarily in some of its chapters be somewhat antiquated in 1874. In the present instance, however, this is a matter over which we have no control, and our apology (if any be needed) for reprinting the fourth English edition must be, that for some time past second-hand copies have been in demand at an advance on the published price.

When Dr. Fresenius shall have completed his work of revision we shall be in a position to bring out a translation, with the latest additions and improvements.

We should like to add, that advertisements of the work distinctly state that the sixth edition is merely a reprint of the fourth.

J. and A. Churchill.

11, *New Burlington Street, London, W.*,
Jan. 12th, 1874.

[*** We give insertion to the foregoing letter simply because its tone seems to convey the impression that the writers consider they have a right to be heard, and because we are willing to meet their wishes, though we do not agree with their opinions.

As regards the question put to Messrs. Churchill in the review, we regret they have not furnished a more satisfactory reply. From their point of view we can understand their publishing a reprint of an old edition of a work that was in demand at a premium. From the editor's point of view and from our own we still cannot understand why that portion at least of the new German edition, published as long since as March, 1873, should not have been reproduced, even if it was not possible to obtain the subsequent half of the work, and we can only express our regret that Messrs. Churchill have been unable to obtain the manuscript of the second portion of that edition, which we should imagine from the lapse of time must be now far advanced towards completion, if not already fit for the press.—Ed. Ph. Journ.]

Chemists' Assistants' Salaries.

Sir,—On this subject an assistant who signs himself "Truth" addresses you in terms of complaint, and says "our positions are no better than the common labouring man or policeman." Will you allow me to say to him that assistants are more likely to get better paid when they are better educated; and that one of the best tests of education is the ability to write English without falling into the blunders of a "common labouring man." I presume your correspondent means that the position of assistants is no better than *that of* a labouring man. In instituting a comparison as to their remuneration "Truth" does not tell the whole truth. For instance, last winter I had an assistant to whom I was paying a salary of nearly £100 a year. He was taken ill and laid up at home for six weeks, during the whole of which time he received his full salary. In addition to this, during the six years he has been with me he has had a fortnight's holiday each year, for which also he always received his salary in advance. In addition to this he has had many and many a day and half-day to himself. Now a labouring man, such as a joiner or mason, would not have been paid for a single hour of the time during which he had thus been absent from his employment. In this respect I doubt not that I describe the conduct of druggists in general towards their assistants. If so, then it is not true "that the position of the chemist's assistant is no better than (that of) a common labourer."

The Whole Truth.

January 5, 1874.

The Sale of Poisons.

Sir,—I desire to call the attention of the pharmaceutical authorities to the fact that hawkers go about the country selling "white precipitate," thus infringing the Pharmacy Act of 1868. Now that the law compels examinations which involve expense and study I think it nothing but right that this hawking of poison should be stopped.

"Modified."

Grantham, Jan. 5th, 1874.

Date's Ointment.

Sir,—I observe in your Correspondence column that a writer wants the form for preparing Date's Ointment. I cannot help thinking that the query is nothing less than a snare to induce some unwary but confiding former assistant to divulge a previous employer's secret, and the sooner such practices are nipped in the bud, the better for the *bona fides* which should, "but too often do not exist," between master and servant. The ointment in question is prepared from a private form attached to an old-established business in Bristol, the proprietor of which has been a member of the Pharmaceutical Society from its foundation.

R. Edwards.

January 3rd, 1874.

[*** We should be sorry to conduce in any way to such a practice as our correspondent mentions, and in this case if he refers to p. 547, he will find that the formula has been given with every appearance of *bona fides*.—Ed. Ph. Journ.]

R. H. Swinburn.—Yes, it is, no doubt, a ferruginous concretion of the kind you imagine.

A. A., A. P. S.—The immature fruit of the orange; used as issue peas.

W. H. W.—You will find numerous formulæ for cements in vol. iii. of this Journal, p. 607. The difficulty in understanding your question arose from the fact that you had plainly written "grass," and not "glass."

G. Foster.—The fee for the Minor Examination is £3 3*s*.

"*Alpha*" is referred to the rule respecting anonymous communications.

Communications, Letters, etc., have been received from Messrs. W. Tearle, J. Mackay, "Plodding Student," "Cruciferæ," C. A. B.

THE AMORPHOUS ALKALOID IN CINCHONA BARKS.

BY DR. J. E. DE VRIJ.

Every chemist who has analysed cinchona bark will agree with me that a smaller or a greater part of the mixed alkaloids obtained from them is not only amorphous, but also its compounds with acids cannot be crystallized. Whilst the quinologists agree on the existence of this amorphous substance, they differ widely in their opinion on its real nature. Dr. O. Hesse, for instance, whose opinion deserves every consideration in this matter, contends in his remarkable paper, "Studies on the Alkaloids of the Cinchona Barks,"* that the amorphous substance in question is either cinchonicine or quinicine. Mr. D. Howard, in his very interesting paper on "Quinicine and Cinchonicine, and their Salts,"† says about this subject the following:—"The question now arises—Is the uncrystallizable alkaloid obtained from cinchona bark quinicine, or is it yet another alkaloid really uncrystallizable? Hitherto the most careful purification has failed to obtain crystalline salts from it such as have been described.‡ When quinicine is present it will, as has been stated, crystallize out of the mixture, but the bulk of the quinoidine, however carefully purified, refuses to crystallize, even after many months' standing. It seems highly improbable, though of course it is possible, that this is owing to some impurity which hinders the crystallization, for we find that quinicine salts prepared from crystallizable alkaloid crystallize entirely with comparative freedom, even when the heat used in its formation has been considerably above the point needed, and sufficient to decompose a portion, and there is no sign of any amorphous modification being formed."

For myself, I have already, twenty years ago, when Pasteur described his quinicine and cinchonicine, been convinced that the amorphous alkaline substance obtained from cinchona barks is not identical with these products of the modification of quinine, quinidine, cinchonine and cinchonidine, called quinicine and cinchonicine by Pasteur, though I was unable to prove satisfactorily that my opinion was right. After the publication of Mr. Howard's paper, however, I was still more confirmed in my opinion, for although I succeeded in obtaining the amorphous substance almost colourless, I was unable to obtain any crystallized compound from it, whilst the oxalate, hyposulphite, and bitartrate of quinicine, or cinchonicine, may easily be obtained crystallized. I considered, therefore, the amorphous substance to be an alkaloid or a mixture of alkaloids *sui generis*, which requires still further investigation. My investigations of this subject are still far from being complete, and although they can not therefore yet be published, I recently met with a fact which seems to me to prove indubitably the non-identity of the amorphous substance with quinicine or cinchonicine. I am indebted for this fact to a paper recently published by Dr. O. Hesse, on "The Action of Chloroform on the Sulphates of Quinine, Quinidine, Cinchonine, and Cinchonidine."§ Being struck by the great solubility of the sulphate of quinidine in this solvent, which Hesse had observed, I was led to try the action of chloroform on the oxalates of quinicine and of cinchonicine, for which preparations I was indebted to the kindness of Mr. D. Howard, and on the oxalate prepared by me from an amorphous alkaloid soluble in ether, obtained from Indian red bark. These preparations were dried on a water-bath before subjecting them to the action of chloroform. The results were very striking, as the action of chloroform on these three oxalates proved to be very different.

The oxalate of quinicine was sparingly soluble at the ordinary temperature, but dissolved freely at a temperature of 61° C. The solution in cooling deposited the greater part of the oxalate in crystals. It would be interesting to investigate whether these crystals contain chloroform in chemical combination, as I suppose they do.

The oxalate of cinchonicine dissolved freely at the ordinary temperature. By adding a few drops of water on the surface, the solution was transformed within a few minutes into a solid mass.

The oxalate of the amorphous alkaloid dissolved in the largest quantity at the ordinary temperature. By adding a few drops of water on the surface, the solution remained limpid, but the water attracted a part of the oxalate from the chloroformic solution.

Besides these facts, the dried oxalates behave quite differently on exposure to the air. Those of quinicine and of cinchonicine remain unaltered, but the other oxalate attracts moisture. This hygroscopic character is a property of all the compounds of the amorphous alkaloid which I have hitherto investigated, viz., the sulphate, hydrochlorate, acetate, oxalate and sulphocyanate. All these compounds, with the exception of the sulphocyanate, are soluble in all proportions of water, and, if they are as pure as possible, these very concentrated solutions, which have an alkaline reaction on red litmus paper, retain their limpidity even if they are mixed with a large quantity of distilled water.* These facts confirm my old conviction, and I remain therefore still of opinion that the discoverer of morphia, Dr. Sertürner, was right when about half a century ago he described, under the name of *Chinioïdine*, an amorphous alkaloid *sui generis* discovered by him in the bark of *C. Calisaya*. If this and other cinchona barks contain an amorphous alkaloid, of which the compounds with acids are equally amorphous, it is clear that it must accumulate in the mother-liquors of the quinine manufactures, so that the quinoïdine precipitated from these mother-liquors by an alkali must contain Sertürner's amorphous alkaloid, contaminated with other substances whose real nature is still unknown. I have some reason to suppose that the amorphous alkaloid in question is easily decomposed, so that it is very possible that the substances by which it is accompanied in the quinoïdine of commerce are partially the products of this decomposition.

The Hague, January 10th, 1874.

* 'Annalen der Chemie und Pharmacie,' vol. 166, p. 273.
† *Journal of the Chemical Society*, February, 1872; and PHARM. JOURN. [3] vol. ii., p. 765.
‡ Viz., of quinicine and of cinchonicine.
§ This Paper will shortly be published in this Journal.

CHINESE CAMPHOR.

According to a report issued upon this subject, the trees which produce "Chinese camphor" are not found within the district marked on maps of Formosa as Chinese territory. They occur only within the country of the aborigines, or upon the immediate border.

* If a concentrated aqueous solution of sulphate or another compound of the ordinary quinoidine of commerce, having a slight alkaline reaction, is mixed with a large bulk of water, a dark coloured resinous matter is precipitated.

The destruction of the trees is rendered necessary by the manufacture of camphor, and the trees are never replanted. Consequently, as the country becomes denuded the aborigines gradually recede, a corresponding encroachment being effected by the Chinese. The result of this state of affairs is that the border-country is the scene of continual disturbances, and fearful outrages, it is said, are committed by both sides, on every possible opportunity. A gentleman who recently penetrated into the interior states that, on entering the hut of one of the aborigines, he was proudly shown no less than six Chinese queues, or tails hanging behind the door, the possession of each queue indicating the capture of a head, and the scalping process. When they have been visited by foreigners, however, the aborigines show a desire to be friendly, but they seem to heartily abhor the Chinese, the hatred between the parties being a veritable war to the knife. The following incident is related in explanation of this unsatisfactory state of things. A member of a local foreign hong recently paid a visit to the camphor district, near San-Koh-ying, and on entering a hut belonging to one of the large dealers he found two aborigines confined in the interior. In answer to inquiries he was informed that the captives had been induced to meet a body of camphor dealers with the object of coming to an agreement about the purchase of certain trees, but as they had declined to agree to the precise terms proposed by the Chinese, they had been plied with sam-shu, and then seized and bound. If they did not yield, death was their only fate, but it was expected that they would think better of it, and come to terms. Under these adverse circumstances the production of camphor succeeds in maintaining itself at about the same annual rate without showing any very great progress or retrogression, but it may be noticed that the year 1872 showed a slight advance as compared with 1871. The production in the San-Koh-ying district, owing to the frequent attacks of the aborigines on the distillers, has slightly decreased of late, but not materially; while few districts show any augmentation of production. The country round Kiam-chai-ang has furnished an irregular supply of from 200 to 300 piculs per month. A very large proportion of the total production is, of course, exported in foreign vessels to other countries, where the article is in great demand. The price realized of late has shown a profit of two or three dollars per picul to the producers. A rather new feature is described as being a great increase at the dirtricts of production in the number of the buyers for the Hong Kong market, this being attributed to the increased facilities for transport afforded by regular steamers. It is stated that foreign buyers, not being able to compete with these Chinese dealers, who can live and work much more cheaply, have not bought so much of late as they used to do in former years. It is further mentioned that no attempt has been made to renew the monopoly of former years, and that the trade has lost much of the danger which its pursuit once involved.

MEDICATED WATERS.*

BY F. W. REINHOLD, JUNR.

THE notion that medicated waters should be made by distillation has still a strong hold in the views of many pharmacists. Recently a modification of the distillatory process has been advanced, and that is, to distil the volatile oils with water, instead of the herbs, barks, etc If the volatile oil be pure there is certainly an advantage in this change. Defenders of the methods by distillation would lead us to believe that medicated waters, particularly those made from fresh herbs, are very superior in the characteristic flavour, strength, and general permanence. But the best authorities on this question rather confirm the popular supposition that such distilled products, on the contrary, possess a very disagreeable herbaceous rankness, the peculiar leaf-odour and taste which is anything but desirable. Waters of this kind must always have age, during which time the rankness disappears, leaving them a natural and pleasant fragrance. Medicated waters prepared from dried but not too old herbs, yield pleasanter products than the fresh. Many volatile oils, when freshly distilled, have the same peculiar rankness, which disappears after some time. But the same volatile oil may later again become rank through oxidation, if not properly protected against atmospheric action. Pharmacists generally are not so much in love with the retort business as to extend its utility to the medication of waters. Medicated waters are prescribed so largely and so indiscriminately, that many pharmacists would have to keep a special medicating laboratory of stills in constant action for their required supply. Besides, waters thus prepared would entail extra and unnecessary expense on the consumer, without a really intrinsic value in return. The plea that the distilled waters are far the strongest is vain. Water will only dissolve a certain amount of volatile oil to become saturated, and therefore no manipulation will impregnate or supercharge it with more. Water can be easily saturated with any particular volatile oil without taking refuge in the retort.

So-called concentrated waters are also used, especially in England. These waters are said to be stronger than the officinal. They are sold to retail pharmacists for the purpose of making the ordinary medicated waters. But such traffic, in its very nature, is fraudulent in the last degree. When the officinal waters are already assumed to be saturated, how, in the name of reason, can simple water then dissolve sixteen times its saturating proportion of volatile oil? But the case is made plain when we know that diluted alcohol will just do this very thing. Most volatile oils will form a perfect or nearly perfect solution with diluted alcohol, or a mixture of equal parts of the strongest alcohol and water, in the proportion of four minims, or eight drops, to the fluid ounce. This solution, when poured into about 15 fluid ounces of water, will form a clear solution in most cases. A pint of this kind of medicated water will then contain additionally half a fluid ounce of alcohol, equal to about three per cent.

The best way to make these concentrated waters is to dissolve the oil in half the alcohol and mix the remainder of the alcohol with twice its volume of water, and then pour into this the first solution, with constant stirring. After standing a few hours the solution is filtered, if desirable, through magnesia alba.

To make concentrated camphor water, 16 grains of camphor are dissolved in 2 drachms of alcohol, and poured with rapid stirring into a mixture of 2 fluid drachms of strongest alcohol and half an ounce of water. This makes a clear solution. On pouring this into 15 fluid ounces of water it also makes a clear solution on shaking. The water then contains one grain of camphor to the fluid ounce, which makes it rather stronger in camphor than usual. The reason is, that water containing even so little as three per cent. of alcohol is a better solvent than pure water. This also holds good in regard to volatile oils. Medicated waters containing a trace of alcohol are not so apt to become turbid, in contact with saline substances, which is a very annoying feature, particularly with camphor water, which throws out abundance of camphor and assumes an unpleasant appearance when certain salts are dissolved in it. For the prevention of this precipitation the presence of a little alcohol is especially good.

* From the *Pharmacist*.

I believe, however, that the best way after all to make the medicated waters is to prepare them by simple maceration. That is, to shake the volatile oil with the water, then set it aside for a day or two, and shake the mixture occasionally and finally filter. I find that this saturates the water completely, and avoids the presence of magnesia and alcohol. The results I deem superior to the distilled waters, if care is taken to use pure and good oils. I find that the solubility of oils of bitter almond and gaultheria is far greater than that of the other volatile oils proper. The act of solution is almost instantaneous in each case, so that no time is required to arrive at complete saturation of the water. The oil of bitter almond seems to be the most soluble of the two.

One minim of volatile oil of bitter almond will dissolve perfectly and instantly in 6 fluid drachms of water, without the addition of alcohol or magnesia alba. According to this, the originator of the U. S. P. officinal aqua amygdalæ amaræ did not immortalize himself much when he concocted a formula which employed a quantity of magnesia alba for no purpose at all, and then used only 6 minims of oil to 12 fluid ounces of water, when the same quantity of water would have completely dissolved 16 minims of oil without the aid of magnesia alba.

In making camphor water the camphor is first pulverized and then shaken with the water, similar to the manner of making the other waters. The camphor can be powdered, with the addition of a few drops of alcohol, but even this alcohol is not required, because the addition of the same amount of water will accomplish the purpose equally well.

THE ALKALOIDS OF THE CINCHONA BARKS.*

BY O. HESSE.

(*Continued from p. 571*).

Quinine possesses the power, as was shown by Bouchardat, of deviating to the left the plane of polarized light. Bouchardat† found that at 22·5° C., $\alpha r = -121{\cdot}5°$, and at 16° C., $\alpha r = -129{\cdot}59°$. It appears therefore that the specific rotatory power of quinine is diminished by an elevation of temperature. De Vrij and Alluard,‡ being of opinion that Bouchardat, like themselves, had operated upon impure quinine, repeated his experiments. Both chemists therefore prepared absolutely pure quinine from herapathite, and they then found that at 25° C., $\alpha r = -141{\cdot}33°$, consequently a considerably higher figure than Bouchardat's. If the corresponding numbers for the yellow ray be taken, the values given by Bouchardat will be respectively $\alpha j = -158{\cdot}5°$ and $\alpha j = -169°$; for the number given by De Vrij and Alluard $\alpha j = -184{\cdot}35°$.

In order to be able to form a surer judgment upon these ratios, as well as those of the other important cinchona alkaloids, I have made numerous experiments with the aid of a remarkably large Wild's polarimeter. The whole of the experiments, except where the contrary is stated, were made at a temperature of 15° C. The source of the light used was the monochromatic sodium flame, and as solvents for the respective substances, such liquids were always used as did not themselves exercise any action upon polarized light. In that which follows l represents the length of the liquid column expressed in millimetres; p the proportion in volume of the substance contained in 100 volumes of the solution; and by α the angle of rotation observed, deduced from the mean of eight to twenty observations. Experiments were made with quinine prepared in various ways.

(I.) Sulphate of quinine, possessing the properties required by the German Pharmacopœia, was dissolved in dilute sulphuric acid and the base precipitated from the very dilute aqueous solution by excess of ammonia. When the precipitate had become crystalline, it was collected upon a filter, well washed and dried, first in the air and then in the exsiccator.

For $p = 2{\cdot}054$ (the substance being anhydrous*) and $l = 200$, $\alpha = -6{\cdot}70°$.

(II.) As in the commercial preparation of sulphate of quinine it is difficult to prevent the adherence of traces of foreign matters present in the mother liquors, which could only be removed by repeated crystallizations, it was interesting to ascertain what influence a single crystallization of the quinine of experiment (I.) would have, especially as De Vrij and Alluard had stated that absolutely pure quinine could only be obtained from herapathite. Some of the sulphate of experiment (I.) was therefore crystallized from boiling water, and the quinine precipitated as before described.

For $p = 3{\cdot}874$ (anhydrous and in alcoholic solution) and $l = 200$, $\alpha = -12{\cdot}86°$.

(III.) Finally, after converting the same kind of sulphate into herapathite, it was placed in water treated by H_2S, the deposited sulphur removed, excess of sulphuretted hydrogen driven off, and the acid liquor so obtained precipitated with ammonia. As the precipitate was slightly grey it was redissolved in dilute sulphuric acid, the solution decolorized by animal black, and the base precipitated afresh.

a. For $p = 4{\cdot}269$ (anhydrous and in alcoholic solution) and $l = 100$, $\alpha = -7{\cdot}07°$.

b. At a temperature of 25° C., for $p = 1{\cdot}0341$ (anhydrous and in alcoholic solution) and $l = 200$, $\alpha = -3{\cdot}36°$.

Calculated according to these figures, the results are :—

	Experiment.			
	I.	II.	III*a*.	III*b*.
$\alpha j =$	$-163{\cdot}09°$	$-165{\cdot}97°$	$-165{\cdot}61°$	$-162{\cdot}46°$

It appears from this that in order to prepare absolutely pure quinine it is by no means necessary first to convert the sulphate into herapathite, if the quinine sulphate will pass Kerner's† test, since in this case a single crystallization of the salt from boiling water was sufficient to reduce the traces of foreign matter which adhered to it upon the drying of the mother liquor to so small a quantity that the quinine so obtained differed in no way from absolutely pure quinine. We have, therefore, the following results from absolutely pure quinine, prepared by either of these two methods :—

At 15° C. $\alpha j = -165{\cdot}79°$ (mean of experiment II. and III*a*.)

At 25° C. $\alpha j = -162{\cdot}46°$.

The specific rotatory power of quinine in alcoholic solutions diminishes, therefore, in proportion as the temperature is raised, but this diminution is not so great as that stated by Bouchardat. Otherwise these results accord satisfactorily with Bourchadat's, but differ notably from those of De Vrij and Alluard. Probably the latter chemists had left a point somewhere unconsidered and were thus conducted to erroneous conclusions.

The rotatory power of the salts of quinine depends upon the nature of the salt and the proportion of acid that it contains, as is shown in the following examples :—

The sulphate of experiment (II.) was dissolved in concentrated alcohol : $p = 1{\cdot}9181$ (anhydrous) and $l = 220$, $\alpha = -8{\cdot}08°$, which gives for the anhydrous sulphate $\alpha j = -191{\cdot}47°$.

The same salt was dissolved in water and 6 equivalents of SO_3‡ added : $p = 2{\cdot}6662$, l 220, and $\alpha = -13{\cdot}42°$; calculated $\alpha j = -228{\cdot}78°$.

Thus when anhydrous sulphate of quinine is dissolved

* Translated from the 'Vierteljahresschrift für praktische Pharmacie,' vol. xxii., p. 366.

† Gmelin, organische Chemie, vol. iv., p. 1692.

‡ Chem. Centralblatt (1864), p. 1116.

* The determination of the water of crystallization was always made by a special experiment, in order to avoid the possibility of operating upon a substance that had acquired altered molecular conditions.

† 'Annalen der Chemie und Pharmacie,' vol. cxxxv., 327.

‡ The prepared acid contained 4 per cent. by volume of SO_3.

in the same liquid with six equivalents of SO_3 under the form of a dilute acid the specific rotatory power of the salt is augmented 37·31° ; or, the rotatory power of quinine in combination as a neutral sulphate is $\alpha j = -220·43°$, and in acid solution containing for each molecule of quinine $3\frac{1}{2}$ molecules of SO_3, $\alpha j = -264·66°$. De Vrij and Alluard found for the sulphate of quinine, which they termed "trois cachets," and which they dissolved in sulphuric acid (but how much ?) $\alpha j = -255·6°$, which gives for quinine $\alpha j = -293·1°$. On the other hand, for pure quinine, which they dissolved in an also unrecorded quantity of sulphuric acid, they found $\alpha j = -273·03°$. Obviously these differences were occasioned solely by the quantity of acid employed.

It may be mentioned that Bouchardat likewise determined the rotation of the neutral sulphate of quinine, and found that in a feebly acid solution, $\alpha r = -147·7°$. or $\alpha j = -192·5°$, figures very near to those I have obtained.

Another important specific rotatory power belongs to the quinine sulphate with one equivalent of acid.

With this it was found:—

(I.) $p = 1·7671$ (crystallized salt in alcoholic solution), $l = 200$, $\alpha = -5·54°$.

(II.) $p = 6·6869$ (another specimen of crystallized salt in aqueous solution), $l = 200$, $\alpha = -20·96°$.

It appears consequently from this experiment—

	I.	II.	Mean.
For $C_{20}H_{24}N_2O_2$, $H_2SO_4+7H_2O$ $\alpha j =$	$-156·75°$	$-156·72°$	$-156·73°$
For Quinine ... ... $\alpha j =$	.....	.....	$-264·30°$

From these experiments this interesting fact appears : that quinine in its combination with sulphuric acid in the proportion of one molecule of base to one of acid, possesses the same rotatory power as in a solution of the neutral sulphate in concentrated sulphuric acid. When, therefore, this latter is dissolved in dilute sulphuric acid, it only passes into the state of acid sulphate. But the rotatory power of quinine in the crystallized monacid salt can be augmented by a further addition of sulphuric acid. From this crystallized sulphate with one equivalent of acid were obtained :—

(*a*) $p = 4·054$, $l = 200$, $SO_3 = 1$ molecule, in aqueous solution ; $\alpha = -13·33°$.

(*b*) $p = 4·054$, $l = 200$, $SO_3 = 3$ molecules, also in aqueous solution ; $\alpha = -13·50°$.

Calculated from this experiment :—

	a.	b.
For the crystallized salt $\alpha j =$	$-164·40°$	$-166·5°$.
For quinine ... ... $\alpha j =$	$-277·23°$	$-280·77°$.

Finally, the sulphate with two equivalents of acid, in alcoholic solution, gave when $p = 4·9896$, and l 200 ; $\alpha = -14·40$ therefore :—

For $C_{20}H_{24}N_2O_2$, $2H_2SO_4+7H_2O$ $\alpha j = -144·30°$.
For quinine ... ... $\alpha j = -287·62°$.

When this salt was treated with dilute sulphuric acid, no considerable difference in the rotatory power was any longer observed. But it appears from these experiments also that when the monacid sulphate is treated with an excess of sulphuric acid, it by no means passes at once into the state of diacid sulphate, but that this combination is formed only after the lapse of time.

When quinine is combined with hydrochloric acid, still different results occur. Thus :—

(*a*) $p = 9·979$ (crystallized salt in alcoholic solution), $l = 100$, $\alpha = -13·57°$.

(*b*) $p = 4·7043$ (crystallized salt dissolved in water, with addition of much hydrochloric acid), $l = 200$, $\alpha = -19·02°$.

These numbers give :—

For $C_{20}H_{24}N_2O_2$, $HCl+2H_2O$ ... ... $\alpha j = -135·98°$.
For quinine ... ... $\alpha j = -166·41°$.
For the salt in hydrochloric solution ... $\alpha j = -202·15°$.
For quinine in combination with HCl, in hydrochloric solution ... ... $\alpha j = -247·39°$.

It will thus be seen that in the determination of the rotation of the plane of polarization induced by quinine, much depends upon the nature and quantity of the solvent ; the temperature also influences the rotatory power of a quinine solution. If it be remembered besides, that quinine becomes strongly electric by friction, it will be evident that for such quinine, so long as it retains that condition, there would be found a molecular rotation different from normal quinine. It will be, therefore, understood why I have formerly* objected to the estimation of quinine by means of the polarimeter. Although I, nevertheless, at that time made the proposition to prepare the quinine tartrate from the mixture of cinchona alkaloids, and with this to test the rotatory power, I can only now, after performing the above recited experiments, express my sincere regrets at having made the suggestion.

I may mention here, also, that the γ-quinidine of Kerner,† appears to be nothing else than crystallized quinine. This alkaloid crystallizes in small efflorescent needles, and its sulphate resembles sulphate of quinine, which, like it, gives an oily and resinous precipitate with iodide of potassium. If water, at 32° C., be added to a warm alcoholic solution of quinine, until a milky turbidity is produced, the liquid, upon clearing, deposits above the resinous precipitate white prisms of quinine. At the same time the resinous cake gradually takes also a crystalline structure. These crystals, which are obtained with difficulty and only at a low temperature, are hydrate of quinine. Dried in the air,—

(1). 0·4640 gram of non-effloresced matter heated 120° C. gave 0·0690 gram H_2O.

(2). 0·374 gram of another specimen lost at 120° C. 0·0578 gram H_2O.

Calculated for $C_{20}H_{24}N_2O_2 + 3H_2O$.	Experiment I.	Experiment II.
$3H_2O$ 14·28	14·87	14·55

This hydrate of quinine appears under the form of white, shining, slender prisms, gradually becoming dull in dry air, which are often obtained of considerable length (7 centimetres). These crystals, at any rate, have not the pearly brilliancy which characterizes those of cinchonidine. I am, therefore of opinion that Duflos,‡ when he stated that he had obtained crystals with a pearly lustre from an alcoholic solution of quinine, had made his experiment upon quinine containing cinchonidine, and his crystallized quinine would therefore be only crystallized cinchonidine.

Finally, the substance called quinine by Reichardt,§ and many other chemists who have practised the analysis of cinchonas, must be mentioned. This substance was but an extract obtained either by means of ether or of chloroform, of which no ultimate analysis was made. It probably, therefore, in some cases—for instance, when obtained from certain huanuco barks—may not have contained any quinine at all, consequently, would not merit the name of quinine.

(*To be continued.*)

NOTES ON PANCREATIN.‖

BY RICHARD V. MATTISON.

The increasing popularity of pharmaceutical preparations of this valuable substance induces the writer to offer to the profession a few notes on the subject, hoping they may be of service in the elimination and proper exhibition of it in a medicinal form, which will be pleasant and agreeable both to the sight and palate.

Prefacing these remarks, a short notice of the pancreas and its action will be found intercsting. This is situated within the curve formed by the duodenum, and opens into

* *Berichte der deutschen chemischen Gesellschaft*, iv., 693.
† *Zeitschrift für Analytische Chemie*, vol. i., p. 150.
‡ *Handworterbuch der Chemie*, 2. Aufl. ii., 1016.
§ 'Reichardt, über die chemischen Bestandtheile der Chinarinden.' Brunswick, 1855.
‖ *American Journal of Pharmacy* [4] vol. iii., p. 531.

the intestine by a duct common to itself and the liver. In its anatomy it closely resembles the salivary glands, and the fluid elaborated by it, called *pancreatic fluid*, appears almost identical with ptyalin. Like that secretion, pancreatic fluid, when pure, is a colourless, transparent, and slightly viscid liquid, alkaline when fresh, quickly, however, on standing, becoming first neutral and then acid, differing, however, from saliva in containing no sulphocyanogen. It resembles albumen in being nearly wholly coagulated by heat, and also by the mineral acids, especially when concentrated; precipitated also by alcohol. When this precipitated coagulum is separated from the liquid, and water added to it, it is soluble, thus essentially differing from albumen.

Its specific gravity is from about 1·008 to 1·009, and contains from 13 to 19 per cent. of solid matter, of which, according to Schmidt, about 12½ per cent. is pancreatin.

The action of this peculiar principle upon starch is to change it to glucose, and upon fatty and oily substances to quickly emulsify them, thus rendering them easily absorbed and assimilated by the lacteals.

Bernard supposed the fat to be decomposed, and Fownes also states that the fat is resolved into fatty acid and glycerin. This is denied by most recent writers, and such is certainly not its principal action, no saponification apparently taking place, which fact may be easily proved by thoroughly mixing, with agitation, a solution of pancreatin with cod-liver oil. After emulsification, which almost immediately occurs, the oil may be separated by simply agitating the emulsion with ether or petroleum benzin.

This *emulsification* is the *essential* purpose of the pancreatic fluid, thus breaking up the fatty globules and allowing assimilation to proceed with rapidity, and in this respect is greatly superior to either saliva or albumen. Liquid fats are insoluble in the aqueous albumino-saline fluid, with which the vascular tissues are saturated; consequently no absorption can take place, and the oil passes from the patient in the same state in which it was administered. This occurs most frequently during the administration of cod-liver oil to phthisical patients, and the association of this oil with pancreatin offers a valuable and natural method of administration.

At the time when the subject was brought to the writer's notice, he was largely engaged in the manufacture of saccharated pepsin by the process of Mr. E. Scheffer (an excellent one, by the way), and the idea suggested itself that perhaps a solution of sodium chloride would precipitate pancreatin in the same manner as it does pepsin. After some preliminary experiments, the following was adopted as furnishing the best result :—

The pancreas is dissected and macerated in water acidulated with hydrochloric acid for about forty-eight hours, then separated, and the acidulated solution of pancreatin passed through a pulp filter until it is perfectly clear. To this clear solution is then added a saturated solution of chloride of sodium and allowed to stand until the pancreatin is separated. This is carefully skimmed off and placed upon a muslin filter and allowed to drain, after which it should be washed with a less concentrated solution of sodium chloride, and then put under the press. When all the salt solution has been removed, and the mass is nearly dry, it is rubbed with a quantity of sugar of milk, and dried thoroughly without heat, after which it is diluted until ten grains emulsify two drachms cod-liver oil. To this may be given the name of "saccharated pancreatin."

An elixir being suggested for the exhibition of this in an elegant form, the following formula was devised, and we think will be found very agreeable :—

Pancreas	No. vj.
Hydrochloric Acid	f℥iv.
Glycerin	q. s.
Water	Ciss.

Macerate the dissected pancreas for three days in the mixture of water and acid with Oiiss of glycerin added; then separate the liquid, strain and add f℥iiss oil of orange and a sufficient quantity of glycerin, to make the liquid measure Ciiss; this is then filtered until perfectly transparent. The result is a sweet acidulous elixir, one fluid drachm of which will easily emulsify half a fluid ounce of cod liver oil—a valuable addition to the number of preparations combining efficiency with pharmaceutical elegance.

METHENYL IODIDE.*

BY R. ROTHER.

Iodoform is best prepared by the process of Wittstein, which consists in gently heating a mixture composed of dipotassic carbonate, two parts; iodine, two parts; alcohol, 95 per cent., one part; and water, five parts, until the liquid becomes colourless. The bright yellow scaly precipitate is rinsed upon a filter, washed, and dried in the open air.

The yield is 17 per cent., or one-sixth of the iodine used.

It will be seen that this is not an economical process when reference is only had to the iodoform product, but Wittstein providently directs the purification and saving of nearly all the iodine which has passed into other combinations through the resulting reactions.

By evaporating the filtrate to dryness, mixing the residue with charcoal, calcining at a red heat, dissolving in alcohol, filtering, and again evaporating, nearly all the wayward iodine is secured as pure potassic iodide.

There are other methods somewhat different in principle, which give a greater yield of iodoform from the iodine employed, but Wittstein's process, for simplicity and general economy, excels them all.

Wittstein, in remarking upon the diverse reactions which the process determines, shows, firstly, that a large amount of iodine is lost to the iodoform yield by reacting directly with the carbonate, and thus producing potassium iodide and potassic iodate, as shown in the following reaction :—

$$3(K_2CO_3) + 6\,I = 5KI + KIO_3 + 3CO_2.$$

Secondly, that a portion of the iodine reacts directly with the alcohol, generating ethyl iodide, which escapes as vapour and hydric iodide, which, reacting upon the carbonate, forms potassic iodide and carbon dioxide evolved with effervescence. Ethyl iodide is quite appreciably given off, and entails a direct loss of iodine, which can not be recovered in an available form, unless some use can be made of it in this condition; however, ordinarily it would scarcely repay the effort of collecting.

Thirdly, appears the direct coalition between alcohol, potassic carbonate, and iodine, emerging again as methenyl iodide, potassic iodide, potassium formate, water and carbon dioxide, which he explains thus :—

$$C_2H_6O + 8I + 3(K_2CO_3) = CHI_3 + 5KI + KCHO_2 + 2OH_2 + 3CO_2.$$

Now since the product for which the process is worked is so small, therefore a large amount of expensive material has to be manipulated, and although both products are useful and staple, nevertheless the large manufacturers always charge a price for iodoform which approaches the total cost of the iodine consumed; hence the large producer pockets a gain he is not justly entitled to, and as the dispenser must adjust his price according to the manufacturer's demand, the consumer is consequently burdened ultimately with an exaggerated cost for a fictitious value, which, under the circumstances, seems like extortion in the last degree.

With a view to alleviate this irregularity and render the process less expensive and more productive, the writer resorted to a trial with various bases, believing that a less energetic metallic base would not seize the iodine so voraciously as to leave but a small remnant available for

* From the *Pharmacist*, vol. vi., p. 357.

the objective compound. For this purpose calcium carbonate, borax, and disodic carbonate were tried. However, none seemed to answer at all; disodic carbonate showed more disposition than the first two. However, the iodine during the digestion was held so loosely that a considerable portion sublimed into the neck of the bottle.

Upon this the writer's first impulse was to employ bromine to replace the iodine, in the stronger combinations with the potassic base, but in view of the fact that a great probability existed for the generation of an undesirable bromiodoform, the writer also abandoned this project.

Attention was next directed to the uselessly combined iodine, for a continuation of the process, and for this purpose the writer proposed to liberate this iodine and cause it to react a second and third time, or until consumed as iodoform if possible. Now, it is known that when a mixture of an iodide and iodate is treated with an acid so as to produce hydric iodide and hydric iodate, these new bodies will react upon each other, resulting in their total disruption into free iodine and water, thus :—

$$5HI + HIO_3 = 6I + 3OH_2.$$

Or, in case of potassic salts treated with chorhydric acid, thus :—

$$5KI + KIO_3 + 6HCl = 6I + 6KCl + 3OH_2.$$

Therefore, if after the separation of the generated iodoform, the colourless liquid is acidulated with chlorhydric acid, all the iodine combined in the first instance will again be freed; however, this treatment still leaves that which was absorbed in the second and third stages in an occluded state. To render this also available, the writer employed chlorine indirectly, or rather in a nascent state, by causing acid potassium chromate to act upon the potassic iodide in the presence of chlorhydric acid, which results in the liberation of the iodine and the formation of chromic chloride, thus :—

$$6KI + K_2CrO_4.CrO_3 + 14HCl = 6I + 8KCl + Cr_2Cl_6 + 7OH_2$$

Or

$$K_2CrO_4.CrO_3 + 14HCl = Cr_2Cl_6 + 2KCl + 6Cl + 7OH_2$$

And

$$6KI + 6Cl = 6KCl + 6I.$$

Therefore, the writer has modified the process in accordance with these results, and succeeded in converting the iodine wholly (excepting that carried off as ethyl iodide) into iodoform, by repeatedly freeing and allowing it to decompose additional alcohol.

The writer conducts the process as follows, and in order to secure a uniform product for each repetition, about one-sixth of the original amount of iodine is regularly added after each operation.

Four troy ounces of iodine; 4 troy ounces of dipotassic carbonate; 2 troy ounces of 95 per cent. alcohol, and 10 troy ounces of water are mixed in a comparatively large flask, and warmed in a water-bath until the solution is decolorized; the clear liquid is now decanted and the precipitate rinsed, with the addition of a little water, upon a capacious filter. The decanted liquid is now treated with chlorhydric acid, adding this gradually at first, and an excess of 2 or 3 ounces is then added, together with $\frac{1}{4}$ to $\frac{3}{8}$ ounce of acid potassium chromate, in powder; after a few moments, dipotassic carbonate is carefully added to neutralization, and then 4 troy ounces more is introduced, together with about $\frac{3}{4}$ of an ounce of iodine and 2 ounces of alcohol; this mixture is again digested in a water-bath, and when effervescence has ceased in the green solution, the supernatant liquid is poured off from the precipitate, and further treated as before. The precipitate is rinsed into the filter with the first product, and when the process is discontinued, the gathered crystals are well washed with water, and spread out in the open air to dry.

Thus the process may be continued indefinitely or until the saline accumulation becomes too great. When after several repetitions, the liquid gets too bulky, it may be condensed by evaporation.

The potassic carbonate does not seem to precipitate chromic hydrate from the solution, the formic acid renders this soluble in the alkaline liquid.

Wittstein has found that an excess of the carbonate is not injurious, but seems rather to be an advantage.

The writer finds also that an excess of chromate exerts no opposite tendency, and to judge from limited observations, it would seem that with this in the alkaline liquid in presence of sufficient alcohol, the iodine is not so largely absorbed by the alkaline base, as the yield of iodoform under these conditions is greater.

The only additional expense in this process is the chromate and chlorhydric acid, but the required quantity of the former is small, and the substance itself is cheap.

The ordinary commercial chlorhydric acid can be used, and therefore the additional outlay in this case is also trivial.

The most satisfactory results, however, are obtained by the use of wood spirit. In this case the iodoform yield at each operation exceeds one-third of the weight of iodine used. The reaction evidently differs from that with ethyl alcohol. An exceedingly irritating gas (to the eyes) is simultaneously evolved.

It will be apparent that this method, put into general use, ought to bring the price of iodoform within reasonable limits.

PHOSPHATE OF IRON AND ITS COMBINATIONS.*

BY CHARLES GEISSE POLK, M.D., OF PHILADELPHIA.

Iron has long deservedly held a very high place in the lists of tonics. At least one hundred different combinations have been proposed, and more than one-third of that number are now incorporated into the different pharmacopœias. These are divided into two chemical classes, the proto-salts and the sesqui-salts, designated ferrous and ferric salts, the former being universally esteemed as the more powerful remedial agents, the latter as the more easily managed pharmaceutical products. Of the former the proto-carbonate, the iron reduced by hydrogen, the proto-sulphate, the proto-citrate, and the proto-phosphate are especially esteemed. Of the latter the chloric tincture, the ammonio-citrate, the pyrophosphate, and alkaline tartrates receive high consideration. Notwithstanding the numerous objections very justly urged against the tincture of ferric chloride, it is, and probably ever will be, the most valued and most extensively used of the preparations of iron. The preparation I especially desire to consider in this paper, the phosphate of iron, although by no means a modern one, is scarcely ever used in its officinal form. Uncombined it has never gained much favour. The preparation is, however, a good one, and is capable of being combined so as to form some excellent chalybeate pills. The following formulas are very popular ones with me :—

℞. Ferri Phosphatis . . . . . ℥ i.
Quiniæ Sulph. . . . . ℥ ss.
Ext. Ignatiæ Amaræ . . . . gtt. vj.
M.

Divide in pills No. xxx. Take one three times a day.

℞. Ferri Phosphatis . . . . . ℈ ij.
Quiniæ Sulph. . . . . ℈ i.
Ex. Belladonnæ Alcoholic. . . . grs. v.
Ex. Aconiti Alcoholic. . . . . grs. iij.
Ex. Cannabis Indicæ . . . . . grs. x.
M.

Divide in pills No. xx. One pill three times a day.

℞. Ferri Phosphatis . . . . . ℈ ij.
Quiniæ Sulp. . . . . ℈ i.
Acid. Arseniosi . . . . . grs. i.
Morphiæ Sulph. . . . . gr. i.
M.

Divide in pills No. xx.

* From the *Druggists' Circular and Chemical Gazette*, January, 1874.

But, however valuable a pilular form of iron may be, it is not that which will hold the popularity of a solution, either in the form of a syrup, tincture, or elixir. Even the iron reduced by hydrogen, which is unquestionably the best restorer of iron to the blood, is comparatively little used. The proto-carbonate still holds the preference of the grey-headed members of the fraternity, while the soluble scaled salts with ammonium-citrate are preferred by the younger members of the profession; the choice is between the citrate and pyrophosphate, with perhaps a predominating preference for the latter. The bibasic phosphate constitutes the iron ingredient in nearly all the proprietary elixirs, sold under the names of Elixir Phosphate of Iron, Quinia, and Strychnia; Elixir of Calisaya ferrated, and Elixir of Gentian; the tribasic phosphate being ill adapted for the purpose, and a solution in an alcoholic menstruum being very unstable.

The theory, or rather theories, upon which the phosphates and hypophosphites have grown into the esteem of the medical world may thus be briefly stated:—Phosphorus, as is well known, is an important element in the brain and nervous system, the expression, "thoughts that burn," being a physiological fact as well as a poetic figure. Dr. Churchill, an American physician practising in the capital of France, conceived the idea that phthisis pulmonalis emanated from a deficiency of phosphorus in the system. This deficiency he proposed to remedy by introducing phosphorus into the system by means of hypophosphorous acid in the salts of lime and soda. The idea was fascinating, and infatuated a very large portion of the profession. They dreamed that the hitherto relentless upas of human existence was at length mastered, that no longer was its touch withering and its impress death, but that under the life-giving power of the hypophosphites the hectic flush would depart, the cough cease, the emaciated frame resume its former proportions, and as the cause upon which these accrued was removed, health and strength would be restored, and science would, indeed, be triumphant over the foe which heretofore had baffled human skill, and annually consigned to the grave the beautiful and lovely of earth. This beautiful dream, however, proved delusive; consumption still continued its ravages, and the hypophosphites were found to be less efficient than cod-liver oil, yet capable of greatly enhancing the curative power of the latter. But if the hypophosphites did not confirm those high hopes and lofty expectations, they proved to be a powerful remedial combination, capable of giving beneficial results in wasting diseases hitherto unattained by any known agent. They yet retain the esteem of very many intelligent physicians, although, I believe, the present estimate of them is below their intrinsic value. A preparation I have long esteemed, containing two grains of the hypophosphite of iron, one grain of the hypophosphite of quinia, and one forty-eighth of a grain of the hypophosphite of strychnia in each drachm, I make thus:—

℞.	Ferri Hypophosph.	grs. 192
	Quiniæ (alkaloid fresh)	grs. 96
	Strychniæ	grs. ij.
	Acid. hypophosph.	gr. i.
	Syrupi, q. s.	℥ xij.

Take the freshly precipitated hypophosphite of iron, the freshly precipitated quinia, and the strychnia, and add sufficient hypophosphorous acid to form a solution; mix it with sufficient syrup to measure twelve ounces; bottle and carefully cork. This preparation is a very valuable tonic, and seems to me to be more important than any other combination of the hypophosphites. Mixed with equal parts of the syrup of soda and lime hypophosphites, its value seems to be greatly enhanced. Sometimes, combined in equal proportions with the syrup of the hypophosphite of manganese, it proves a powerful restorer of lost strength and vigour.

This formula has proved sometimes very satisfactory:—

℞.	Ferri Hypophosph.	℈ ij.
	Manganesii Hypophosph.	℈ i.
	Quiniæ	℈ i.

Divide into twenty pills. Take one pill three times a day.

During the summer of 1857 I devoted especial attention to the study of tuberculosis, and having imbibed the doctrines of Dr. Paine, of the University of New York, directed my attention to the brain and nervous system, with especial regard to their influence over the respiratory system. Analyses of twenty autopsies of the victims of phthisis gave evidence of a marked diminution of the amount of phosphorus in the brain and nervous system, with apparent atrophy of the cerebellum, medulla oblongata, and pneumogastric nerves.

(*To be continued.*)

PROPOSED PHARMACEUTICAL BILL FOR IRELAND.

Deputation to the Chief Secretary.

On Thursday afternoon, January 15th, a deputation from the Apothcaries' Hall and the Chemists' and Druggists' Association of Ireland waited on the Right Hon. the Chief Secretary, at the Castle, for the purpose of impressing on his lordship the desirability of the Government passing a Pharmaceutical Bill for Ireland, similar in its provisions to that now in force for England. The deputation comprised—Dr. O'Neill, governor of the Apothecaries' Hall; Dr. Ryan, T.C., deputy governor; Dr. Leet, secretary; and Dr. Collins, Dr. Montgomery, and Dr. C. F. Moore, directors; Mr. E. M. Hodgson, President of the Chemists' and Druggists' Association; Mr. J. M. Goodman, treasurer; Mr. Wm. Hayes, secretary; and Mr. W. Ledger Erson, J.P.

Dr. Leet, on behalf of the Apothecaries' Hall, explained the object of the deputation, which was to endeavour to enlist the co-operation of the Government in having a legislative enactment passed regulating the profession of pharmacy in Ireland, similar to that adopted in England. It was of the most urgent necessity, for while it gave the apothecaries and druggists no pecuniary advantage, it would be a great benefit to the public at large. He mentioned the fact that what they now wanted was merely the second part of a bill introduced by Baron Dowse when Attorney-General, the first part of which (known as the Poisons Act) had already passed into law. He believed that, had time permitted, or were it not that Mr. Dowse had been meanwhile promoted to the bench, the measure would have been carried in entirety, as it seriously concerned the safety of the public. There were to his knowledge between 20 and 30 of the most important market towns in Ireland, with populations varying from 10,000 to 50,000, wherein there was no apothecary or competent person duly qualified to compound medicine, consequently causing great inconvenience to all classes. The General Medical Council, seeing the peculiar circumstances of the case, had adopted a resolution expressing their approval of such an act as they now sought, which was intended to enable the Apothecaries' Hall to grant certificates to persons who properly qualified themselves by a prescribed examination to compound medicines. The diploma of the Hall at present not only gave the recipient authority to compound medicine but also to practice as a physician—in fact, it was for all practical purposes equal to a degree for surgery. In Tyrone, Armagh, and other large populous districts in the North of Ireland, there were very few apothecaries. It was strange that though they annually sent out the usual number of apothecaries there was a great dearth throughout the country of persons qualified to compound medicines. But that was accounted for by the introduction of the Medical Charities Act, under which dispensary doctors were appointed, and that apothecaries having such high qualifications sought other spheres of practice. To meet that want they conceived the proposed bill was necessary, so as to give the public a guarantee that the persons who received a modified qualification

from the Apothecaries' Hall were competent to make up prescriptions—namely, by granting them a pharmacy licence, without having to undergo the present apprenticeship, which carried the double qualification. To be able to compound medicines required a certain scientific knowledge and education, a great deal of intelligence, and a considerable amount of training, and that would be looked after by the Apothecaries' Company before granting any certificate. Any opposition that had been previously offered to the bill as introduced by Mr. Dowse had been since withdrawn, and the Druggists' Association now gave the proposed measure, as altered in one clause so as to meet their views, their fullest concurrence.

Mr. Hodgson, as representing the Chemists and Druggists' Society, intimated to his lordship that that body deeply felt the necessity for the adoption of the proposed bill, which was simply a modification of the qualifications at present required by the Apothecaries' Company. Those who obtained certificates in pharmacy would not be entitled to practice medicine; and while thus the privileges of the medical profession would not be infringed upon, the public throughout the country would, through the druggists possessing such certificates, have the advantage of there being in the various towns persons fully competent to make up prescriptions. On the part of his association, he felt himself at liberty to state that the chemists and druggists of Ireland would offer no opposition whatever to the measure promoted by the Apothecaries' Hall.

In answer to the Marquis of Hartington,

Dr. Leet explained the powers conferred by the Act of Parliament in 1792 on the Apothecaries' Hall Company, with jurisdiction throughout Ireland, and stated that the additional power now sought was to grant pharmaceutical licences alone.

The Marquis of Hartington called the attention of Dr. Leet to his suggestion in a communication to that gentleman to the effect that the bill should be introduced by a private member. No better man could undertake such a measure than Sir Dominick Corrigan. Had he been consulted on the matter?

Dr. Leet replied that the draft vote had been submitted to Sir Dominick, who had expressed himself satisfied with it.

The Marquis of Hartington asked had any overtures been made to Sir Dominick with reference to the introduction of the bill?

Dr. Leet said the deputation concurred that the bill ought to be taken up by the Government.

The Marquis of Hartington said perhaps it ought, but the Chief Secretary had a great many matters at present to occupy him, and hitherto he had not given his attention to the medical question. He had listened with great attention to what had been stated. He admitted that there appeared to be a very strong case made in favour of legislation upon this subject. It would be necessary for him to make some further inquiries and to get some assistance, which he would ask from the medical department of the Privy Council in London.

Dr. Collins said that, from the support given to the measure by Mr. Warren when Attorney-General, he believed the Government were pledged to take up the question now.

The Marquis of Hartington did not think that the present Government were bound by Mr. Warren's action. If he saw his way to the passing of such a bill, and that there was no very serious opposition, he should be very glad to introduce such a measure; but he would immediately place himself in communication with the medical department of the Privy Council, and having got all the information he required from them, he would, if necessary, communicate with the Apothecaries' Society, through Dr. Leet, and the Druggists' Association, through Mr. Hodgson.

The deputation then retired.

THE CHEMISTS' BALL.

The Annual Chemists' Ball was held on Wednesday last at Willis's Rooms. There were about 320 persons present, and the gathering was a very successful one.

After supper the chairman of the evening (Professor Attfield) spoke as follows:—Probably few of those present are here for the first time, while many have met in these rooms at the Chemists' Annual Ball for eight consecutive years, for this is our eighth annual ball. The origin of the first of these agreeable parties was twofold—namely, a desire often expressed by students and other of the younger followers of pharmacy for an annual ball, and a suggestion made by our first secretary (Mr. Henry Smith) that such a gathering might be held for the benefit of the Benevolent Fund of the Pharmaceutical Society of Great Britain. This desire and this suggestion were warmly taken up, were at once encouraged by several of the elder followers of pharmacy, who are always ready to support whatever promotes good feeling and good fellowship amongst their brethren, and, most important of all, were raised from the region of desire and suggestion into that of reality and vitality by the personal approval of a large number of ladies. Since then nearly 300 ladies and gentlemen have annually assembled at the ball; primarily to enjoy a good dance in one another's society, and also on the understanding that any surplus receipts should be handed over to the Benevolent Fund already mentioned—a fund the aid of which every chemist and druggist in Great Britain has the right to invoke, though we pray that few may have the occasion. With regard to the first object, enjoyment, there can be no question that the chemists' ball has been a great success, while we have been able to contribute to the Benevolent Fund an average of twenty guineas yearly, or a total of about £150. This satisfactory result has been brought about by the co-operation of the many friends who simply come to the ball, by the efforts of the stewards, who alone distribute the tickets, by the members of the committee who make all arrangements for holding the ball, by the zeal and activity of one of the committee who does most of the hard work of the executive—the secretary, Mr. Watson—and above all, by the kind presence at one ball or another, in several instances at the whole eight, of so many ladies. The present gathering is as successful as those which have preceded it, indeed, as regards numbers, it is above the average; let us unite in wishing the ball, in wishing this additional rallying-point for the followers of our common calling, continued success, and after our usual and only toast give three hearty cheers for the ladies. "Success to the Chemists' Annual Ball" was them proposed and responded to by all present, and the cheers for "The Ladies" were given with a most hearty "three times three."

SOME PROPERTIES OF HYDRATE OF CHLORAL.*

BY M. FAITHORNE.

When heated above a spirit lamp hydrate of chloral does not inflame as the alcoholate does. The aqueous solution [of the alcoholate?] gives a precipitate with subnitrate of lead. When hydrate of chloral is agitated with the same liquid, a limpid solution is obtained.

Hydrate of chloral produces a notable lowering of temperature when mixed with sulphuric acid. It dissolves morphine, quinine, cinchonine, strychnine, veratrine, aconitine, and atropine. It both dissolves phenic acid and increases its solubility in water; the odour of the acid being much enfeebled at the same time. When mixed with glycerine, a crystalline substance is formed after some hours.

If warm nitric acid is added to hydrate of chloral mixed with potassium dichromate a blue coloration gradually makes its appearance; on the addition of ammonia this coloration passed to red. Caustic soda added to the same mixture, colours it bluish green; potash colours it blue.

* *Journal de Pharm. et de Chimie*, Jan. 1874, p. 78.

The Pharmaceutical Journal.

SATURDAY, JANUARY 24, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ.'*

THE MEETING OF THE BRITISH PHARMACEUTICAL CONFERENCE FOR 1874.

AN idea in connection with the meeting of the Conference for the present year has been for some time past regarded with considerable favour, that the deviation from usual custom which will be made this year in holding the meeting in London, might be still further extended to altering the time of the meeting from the autumn to the spring, so as to make it coincide with the anniversary meetings of the Pharmaceutical Society. By such a course it was thought that several advantages would be gained both for the Conference meeting and for the meetings of the Society: the attractions of the Conversazione, it was thought, would induce many to come up in May to attend the Conference meeting who might not otherwise be disposed to do so, and on the other hand it was thought that, by bringing together, in time and place, the meetings of the two bodies, some regular attendants of the Conference meetings would also have a more convenient opportunity of taking part in the annual proceedings of the Pharmaceutical Society.

We must confess to having looked upon this arrangement as a very desirable one in many respects, although it is obvious that in the event of it being carried out, the consequent amount of business as well as pleasure which would have to be got through in the short space of one week, was somewhat formidable. We understand that this idea has been discussed at the late meeting of the Executive Committee held for the purpose of settling the time of the Conference meeting, and that its consideration has led to the recognition of several practical difficulties, which were deemed sufficient to make the alteration in the time of the meeting impossible.

Chief among these was the time requisite for organizing the Exhibition which is to be held in connection with the meeting for 1874. Next to this was the difficulty of getting papers prepared in time for a meeting in May. The deliberations of the Executive Committee consequently resulted in a unanimous resolution that the Conference meeting should be held in August, and on the Thursday and Friday immediately following the Council meeting of the Pharmaceutical Society, on the 5th of that month.

The proceedings reported upon the preceding page suggest the possibility that by the next time the British Association visits Ireland there will no longer be any obstacle to the simultaneous gathering of the Pharmaceutical Conference at the same place, in accordance with the practice which has been hitherto followed.

We also learn that Mr. L. SIEBOLD, of Manchester, has been selected from a number of candidates to fill the office of Editor of the Year Book, and we gladly take this opportunity of congratulating the members of the Conference, as well as British pharmacists generally, that the business of editing this useful volume has been placed in the hands of one whose acquirements so well qualify him for the duty.

THE ADULTERATION OF FACT.

IT is strange to find that those who have to deal especially with the subject of adulteration and its repression not unfrequently manifest a striking ignorance of matters with which they ought to be well acquainted in order to do their work effectively and equitably. A notable instance of this deficiency has recently been presented by our contemporary, the *Anti-Adulteration Review*, in an article on the "citrate of magnesia" case. The number of errors and misstatements contained in less than a column of that journal devoted to dealing with this case is so great that it is no wonder the writer comes to the conclusion that the conviction was just, and that "if misrepresentation be fraud, there can be no doubt as to the character of this particular case." By way of friendly warning as regards the future, we venture to correct some of these false premises. First, then, the fact that the application of the term "citrate of magnesia" to a certain article which is not citrate of magnesia is a misnomer is not in any way an indication that the conviction in the case referred to was just. The article commonly sold under the misnomer of "citrate of magnesia" is not only innocent and harmless, but it is entirely incorrect to state that it is "not the thing asked and paid for." Whether the preparations sold under this name really contain any magnesia or not is perhaps really a matter of very little importance so far as affects the question of adulteration or of fair and honest dealing, and to any one having the most general knowledge of the subject, it is simply absurd to suppose that the presence or absence of magnesia in this preparation can have anything to do with "cheapness" or the possibility of "underselling competing traders." We regret to see a journal whose object we sympathize with riding a hobby-horse in such reckless disregard of fact.

THE CANADIAN ESTIMATE OF THE CITRATE OF MAGNESIA QUESTION.

MR. PARTRIDGE'S decision respecting the sale of the so-called "citrate of magnesia," after disturbing the equanimity and exercising the ingenuity of English pharmacists, is now furnishing a topic of discussion to our American brethren. In the January number of the *Canadian Pharmaceutical*

Journal is given a short *résumé* of the case, and to this are appended the following editorial remarks :—

"As far as our own convictions are concerned, we cannot confess to any sincere regret at what has occured, although we sympathize with the pharmacist who has been made to suffer for the combined offences of a community. The matter might, certainly, have been better arranged, put in a less offensive form, or been made to rest upon the shoulders of a more deserving sinner, but, as the blow has been struck, and as it has been levelled at the flagrant representative of a system the existence of which all conscientious pharmacists must deplore, we see no great reason to complain.

"As citrate of magnesia, the commercial salt is a falsity and a humbug, and if the public have been ten or fifteen years in finding out this interesting fact, we can only blame them for their obtuseness. The trade in this salt has been built upon the reputation of another article. People had a high opinion of the virtues of magnesia, a compound bearing that name was prepared for them, they eagerly received it as citrate of magnesia, while, in reality, they have been taking a compound, which, in most instances, contains no magnesia, or at best, a trace of Epsom salts, and differs little from flavoured soda powders.

"We, as a community of pharmacists, have tolerated and perhaps upheld this state of things, while, at the same time, we have been advocating a high standard of trade morality, and discussing nice points of nomenclature—whether, for instance, *Magnesiæ citras* would not be more correctly rendered *Magnesii citras*. Truly we have been straining at a gnat and swallowing a camel, and it is no more than we deserve if the meal proves indigestible."

CYRENAICAN DRUGS.

Reporting upon the trade and commerce of Bengazi, in the Regency of Tripoli, Mr. Vice-Consul Henderson refers to some of the indigenous products of the Plain of Barka and the Peninsula of the Cyrenaica, which he describes as a magnificent and fertile country. The most precious product of this district Mr. Henderson considers to be the plant called by the natives "driâs," which, during a visit to the upper regions of the Cyrenaica in the autumn, he found growing in the greatest abundance. He thinks there can be little doubt that this plant is identical with the silphium, from which was extracted the laserpitium, esteemed by the Ancients as a remedy for nearly every disease, and at one time valued at its weight in gold. Mr. Henderson says that the "driâs' is a most deadly poison, at once fatal to camels and horses eating it; but that beyond doubt it possesses marvellous medicinal properties, he, himself, having seen most inveterate sores and wounds quite healed in a few days by its agency. During the spring of 1872 a French physician spent some considerable time in the Cyrenaica collecting the plant, and he shipped a large quantity to Paris, where it is reported to have been used with great success.

The plant known by the native name of "driâs," is the *Thapsia Silphium*, of Vivani, or *Laserpitium Derias*, of Pacho, which is sometimes considered to be only a form of the *Thapsia gigarnica*, L., of Southern Europe. In representing it to be identical with the ancient silphium, Mr. Henderson is in accord with most writers on the subject. Lindley, in his 'Flora Medica' (p. 53) says it is the only umbelliferous plant inhabiting these regions which will at all answer to the figures struck on Cyrenaican coins. But in a paper by Oersted, recently published in this Journal,* in which silphium is referred to a species of *Narthex*, at present unknown, one of the grounds for rejecting *Thapsia Silphium* is that the celebrated plant of antiquity was wholesome to cattle, whilst the "driâs" is poisonous, and has frequently proved fatal to camels. But it is curious to note that this author only speaks of camels being killed by it, a peculiarity that occurs also in other authors, whilst Mr. Henderson only speaks of it as being fatal to camels and horses. Strictly, neither of these can be called cattle. However this may be, there can be little doubt that the "driâs" is a plant possessing powerfully active properties, worthy of closer investigation than they have yet received.

Amongst the other indigenous products of the Barka and Cyrenaica country are the olive, date, caroub, juniper, cedar, arbutus, cypress, fig, myrtle, and numerous useful and beautiful evergreen shrubs, one of which, the "baturne," yields a medicinal berry. The climate is represented as one of the finest in the world—dry, healthy, and bracing—and for pulmonary complaints Mr. Henderson thinks it would be preferable to Madeira.

HOMŒOPATHIC POISON.

Another case of poisoning by so-called "homœopathic medicines" is reported in the *Medical Times and Gazette* (Jan. 3) by Dr. Henry Lewis, of Folkestone. He states that on the 15th of December he was called to see a lady whom he found in a state of stupor. When roused the pupils were seen to be widely dilated and she was incoherent in her speech. At the time she denied having taken anything to ease neuralgic pain from which she had been suffering, but the next morning she produced a bottle from which she confessed she had dosed herself, and which was labelled "tincture of aconite," with the name and address of a well-known "homœopathic chemist."

A QUERY AS TO SMELLING BOTTLES.

A correspondent writing under the name of "Pill Roller" informs us that some stationers in the North have been fined heavily for selling silver and gold pencil-cases without a licence. He suggests that it is worthy of consideration how far chemists and druggists are exempt from risk when selling smelling bottles with silver and gold tops.

At the close of the Vienna International Exhibition the collection of chemical and pharmaceutical articles exhibited by Messrs. John Bell and Co., and for which a prize was awarded by the jurors, was presented to the museum of the Austrian Pharmaceutical Society by Mr. T. H. Hills, who we learn has received from the Council of that Society a letter expressing their best thanks for the gift, and offering him, as a mark of their high respect, the diploma of Honorary Membership.

* Pharm. Journ. [3] vol. iii., p. 1012.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

January 13th, 14th, and 15th, 1874.

Present—Messrs. Ainslie, Buchanan, Gilmour, Kemp, Kinninmont, and Young.

Professor Maclagan was present on the 13th and 15th, on behalf of the Privy Council.

MAJOR EXAMINATION.

One candidate was examined, and passed, and was declared qualified to be registered as a Pharmaceutical Chemist :—

*Thresh, John Clough .....Pontefract.

MINOR EXAMINATION.

Twenty-three candidates were examined. *Eleven* failed. The following *twelve* passed, and were declared qualified to be registered as Chemists and Druggists :—

Hicks, William King .....Harrow Road.
MacPherson, Colin Allen .....Edinburgh.
Jeans, Thomas Robert .....Mansfield.
Reid, James Arthur .....Bathgate.
Bray, William .....Dumfries.
Burley, William .....Edinburgh.
Fidler, John .....Liverpool.
Murdoch, John McGill.....Glasgow.
Blades, Josiah Brunt .....Leek.
Thom, Robert .....Glasgow.
Smith, Walter James .....Rochdale.
Holden, William Henry .....Staithes.

The above names are arranged in order of merit.

MODIFIED EXAMINATION.

Six candidates were examined. *Three* failed. The following *three* passed, and were declared qualified to be registered as Chemists and Druggists :—

Croydon, Edward Henry .....Hartshill.
Paterson, Archibald.....Glasgow.
Scott, John Gladstone .....Dumfries.

PRELIMINARY EXAMINATION.

The following is the result of the Preliminary Examination, held on the 5th inst :—

ENGLAND AND WALES.

Two hundred and thirty-two candidates presented themselves for examination, of whom *one hundred and seventeen* failed. The following *one hundred and fifteen* passed, and have been duly registered as Apprentices or Students :—

FIRST DIVISION.

Allen, Henry.....London.
Stevens, Alfred Jesse .....London.
Roper, Robert Frances.....Plymouth.
Hawkins, Frederick Robert.....Plymouth.
Equal. Greenwood, W.....Settle.
Equal. Jones, Jonah.....Aberdare.
Equal. Stroud, William .....Bristol.
Chaplin, John Henry .....Wakefield.
Townsend, Joseph Edward .....Peterborough.
Shenstone, James Chapman ...Colchester.
Equal Fawcett, Christopher Airey ...Ambleside.
Equal Kent, Benjamin John .....Boston.
Lance, Henry .....London.

SECOND DIVISION.

Equal. Equal. Broad, Henry James .....Stourbridge.
Equal. Equal. Hudson, James.....Harrogate.
Equal. Equal. Musgrave, Nesbitt .....Newark.
Equal. Bell, Robert .....Lancaster.
Equal. Dickinson, Charles William ...Stamford.
Biggs, Walter Lyle .....Hampstead.
Equal. Barker, Alfred William .....Saffron Waldon.
Equal. Bucher, William Henry .....Crediton.
Equal. Dolbear, John .....Torquay.
Equal. Hessell, James .....Rye.
Equal. Marshall, John David .....Boston.
Equal. Nicholls, Alfred.....Manchester.
Equal. Plant, Charles Plantagenet .....Leicester.
Equal. Welch, Henry .....Staunton-on-Wye.
Equal. Wolstenholme, Robert.....Bury.
Langdon, Frank Bowers .....Penny-come-quick.
Ford, Robert .....Plymouth.
Equal Davies, John.....Carmarthen.
Equal Lawson, Arthur .....Whitby.
Equal Ryle, Samuel.....Moses Gate, near Bolton.
Golding, John Frederick.....London.
Hunt, Tom George .....Snaith.
Equal. Bignold, Walter .....King's Lynn.
Equal. Fresson, Frederick Henry .....Stevenage.
Stonham, William Burne.....Maidstone.
Equal. Clarke, Willoughby .....London.
Equal. Jones, John Edward.....Swindon.
Equal. Phillips, Albert William .....London.
Equal. Taylor, Philip Neville .....Great Bridge.
Equal. Williams, Charles Edward .....London.
Equal. Willis, Joseph Darrington .....Northampton.
Morgan, Rees David.....Cwmbach.
Wholey, Thomas .....Gainsborough.
Ingall, Elfric Drew .....Greenhithe.
Equal. Borman, William Alan .....Lincoln.
Equal. Bousfield, William .....Hull.
Equal. Collins, Henry .....Ashton-under-Lyne.
Equal. Elliot, John Sebastian .....Woolwich.
Equal. Hartlande, Charles .....Oldbury.
Equal. Parkin, Joseph .....Selby.
Equal. Rowe, John Bullen .....Ilfracombe.
Equal. Stedman, Walter .....West Malling.
Equal. Williams, Hugh .....London.
Holdsworth, Arthur Thomas ...Birmingham.
Jones, John James .....Kidderminster.
Equal. Halstead, Harry .....Blackburn.
Equal. Jelley, George William .....Coventry.
Equal. Lloyd, Richard .....Carmarthen.
Wyatt, John .....Stourbridge.
Evans, John .....Carnarvon.
Equal. Brook, Charles Mytton .....Saltaire.
Equal. Gastrell, Horace Edwin .....Cheltenham.
Equal. Greatorex, Edward John .....Stapleton.
Equal. Hanson, Edward Albert .....Leeds.
Equal. Newsholme, Henry Wilkinson Hellifield.
Equal. Parker, Benjamin ..... Leeds.
Equal. Phillips, Alfred James .....Truro.
Equal. Roberts, John Richard.....Liverpool.
Equal. Roberts, William .....Beaumaris.
Equal. Toon, Frederick.....Eccleshall.
Long, John .....Southport.
Equal. Allwork, Frank..... .....Brighton.
Equal. Bethel, Arthur .....Manchester.
Equal. Bowker, Joseph.....Radcliffe.
Equal. Bridgewater, Francis Foster ...Deal.
Equal. Chadwick, Charles Edward.....King's Lynn.
Equal. Chamberlain, Charles John.....Portsea.
Equal. Cornwell, Thomas Chinsura ...Penzance.
Equal. Cowap, John William .....Stockport.
Equal. Darch, Alfred .....London.
Equal. Daubeny, George .....Sutton-in-Ashfield.
Equal. Dring, Herbert Johnson .....St. Neots.
Equal. Ewell, Richard Michael .....Sandwich.
Equal. Freeman, John Henry.....Ipswich.
Equal. Fry, Edward Alfred Augustus Taunton.
Equal. Harman, Arthur .....London.
Equal. Harsley, John William .....London.
Equal. Hermes, Eduard Siëgfried .....Chester.
Equal. Horne, John .....Wednesbury.
Equal. Hughes, Benjamin .....Denbigh.
Equal. Jervis, Arthur .....Sheffield.
Equal. Jevons, Wallis Byron .....Market Rasen.

* Passed with Honours.

Equal.

Kiloh, James .....London.
Laverty, Joshua .....Jersey.
Lister, Amos.....Bradford.
Mortashed, Henry Charles .....London.
Nicholson, William .....South Shields.
Parker, Selby.....Gainsborough.
Phillips, John A. .....Swansea.
Portway, Arthur Cyril.....London.
Priestland, Arthur .....Ross.
Quibell, Joseph Layne.....Gainsboro'.
Rhodes, John.....New Cross.
Rosson, John Henry.....Manchester.
Shorrock, John William .....Over Darwen.
Smith, Joseph Layburn .....Keighley.
Southey, Charles .....Belper.
Tanner, Richard Douglas .....Andover.
Wilks, Robert .....Skipton.
Williams, Thomas.....Bristol.
Wimshurst, Frederick .....Southboro'.
Wood, John ....Oldham.

SCOTLAND.

Twenty-seven candidates presented themselves for examination; of these *thirteen* failed. The following *fourteen* passed, and have been duly registered:—

FIRST DIVISION.

Dalziel, Alexander Logan. .....Kilmarnock.
Cummings, Charles .....Glasgow,
Paris, Walter.....Bathgate.
Porteous, William Nicol .....Edinburgh.
Colvin, John .....Kilmarnock.

SECOND DIVISION.

Whyte, Joseph A. F. .....Aberdeen.
Dickson, Samuel Clark .....Edinburgh.
Midgley, James Herbert.....Edinburgh.
Gammie, William.....Turriff.
Young, Andrew .....Glasgow.
Hicks, Henry Frame ... .Rothesay.
Singer, Robert .....Insch.
Andrew, John .....Catrine.
Shum, Arthur George .....Edinburgh.

The questions for examination were as follows :—

Time allowed : Three Hours.

LATIN.

N.B.—Candidates are not required to translate more than two paragraphs, and are recommended to select either Nos. 1 and 2 or Nos. 3 and 4.

Translate into English two of the following sentences :—

1. Planities erat magna, et in eâ tumulus terreus satis grandis. Hic locus œquo fere spatio ab castris utriusque aberat. Eò, ut erat dictum, ad colloquium venerunt. Legionem Cæsar, quam equis devexerat, passibus CC ab eo tumulo constituit.

2. Cæsar, quod neque colloquium, interpositâ causâ, tolli volebat; neque salutem suam Gallorum equitatui comittere audebat; commodissimum esse statuit, omnibus equis Gallis equitibus detractis, legionarios eo milites legionis decimæ, cui maxime confidebat, imponere; ut præsidium quam amicissimum, si quid opus facto esset, haberet.

3. Emplastrum et saponem simul liqua, et paulo antequam concrescant immisce salem in pulverem tenuem tritum. Extensum super alutam, parti affectæ quamprimum applicetur.

4. Misce, et lenum calorem adhibe, donec liquetur Hydrargyrum. Liquorem decoque; et quod restat tere in pulverem. Hunc in vas quam minime profundum conjice; tum ignem lenem adhibe, eumque paulatim auge, donec vapor ruber prodire cessaverit.

5. State the infinitive, perfect, and supine of the following verbs—lavo, augeo, jubeo, uro.

6. What cases do the following verbs take?—do, fio, interest, licet, rogo, utor, vescor.

7. Parse "Dico te posse vincere Romanos."

ARITHMETIC.

8. Reduce 2 weeks, 2 days, 19 hours, 12 minutes to the fraction of a month of 28 days.

9. Find the decimal of 15/10½ and state the value of ·625 of a cwt.

10. How many cubic feet are contained in a case measuring 10 ft. 6 in. long, 6 ft. 8 in. wide, and 4 ft. 10 in. deep?

11. How long would a fly be going round the earth at the rate of 10 yards a minute, supposing the circumference of the earth to be 24,857½ miles, and 365 days being equivalent to one year?

12. What is the value of 4 hogsheads of sugar, each weighing 6 cwt., 2 qrs., 14 lbs., at £2 8*s.* 6*d.* per cwt.

ENGLISH.

13. Parse the following :—

"The tender grace of a day that is dead
Will never come back to me."

14. Write from fifteen to twenty-five lines on *one* only of the following subjects :—

Fortitude.
Telegraphs.
Education.

The following is a list of the Towns at which the Examinations were held, with the numbers of Candidates annexed :

ENGLAND AND WALES.

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdare	2	2		Knutsford	1		1
Andover	1	1		Lancaster	2	2	
Ashton-under-Lyne	1	1		Leamington	1		1
Bangor	2	1	1	Leeds	3	3	
Barnstaple	1	1		Leicester	2	1	1
Bath	1		1	Lewes	1		1
Belfast	1		1	Lincoln	4	2	2
Belper	1	1		Liverpool	4	2	2
Berwick	2		2	London	39	19	20
Birkenhead	1		1	Manchester	17	7	10
Birmingham	3	1	2	Merthyr Tydvil	4		4
Blackburn	6	2	4	Newark	1	1	
Bolton	2	1	1	Newcastle-under-Lyne	1		1
Boston	3	3		Northampton	1	1	
Bradford	3	3		Norwich	3		3
Brighton	3	1	2	Nottingham	5	1	4
Bristol	7	3	4	Oxford	1		1
Burnley	2	1	1	Penzance	1	1	
Burslem	1		1	Plymouth	4	4	
Buxton	1		1	Portsmouth	3	1	2
Cambridge	1	1		Reading	1		1
Cardigan	1		1	Rochester	2	1	1
Carnarvon	1	1		Rye	1	1	
Cheltenham	1	1		Selby	2	2	
Chippenham	1	1		Sheffield	4	1	3
Colchester	1		1	Shields	2	1	1
Coventry	1	1		Southampton	1		1
Deal	2	2		Southport	1	1	
Denbigh	1	1		Stafford	1	1	
Derby	2		2	Stamford	1	1	
Doncaster	1		1	Stockport	2		2
Dover	1		1	Stourbridge	1	1	
Dudley	1	1		Sunderland	2		2
Exeter	2	1	1	Swansea	5	3	2
Flint	1	1		Torquay	2	1	1
Gainsborough	5	3	2	Truro	2	1	1
Guernsey	1		1	Tunbridge Wells	1	1	
Harrogate	1	1		Wakefield	3	1	2
Hereford	3	2	1	Warrington	1		1
Hitchin	1	1		Wednesbury	1	1	
Huddersfield	1		1	Wellington	1	1	
Hull	3	1	2	Whitby	3	1	2
Huntingdon	1	1		Whitehaven	1		1
Ipswich	3	1	2	Wigan	1		1
Jersey	1	1		Winchester	1		1
Kendal	2	1	1	Wolverhampton	2	1	1
Kidderminster	2	2		Wrexham	1		1
King's Lynn	2	2					

Scotland.							
Aberdeen	5	2	3	Edinburgh 10	5	5	
Banff	2	1	1	Glasgow 6	3	3	
Dundee.....	1		1	Kilmarnock 3	3		

Proceedings of Scientific Societies.

NEWCASTLE-UPON-TYNE CHEMICAL SOCIETY.

At the third ordinary meeting of this Society in the theatre of the College of Physical Science, held December 18th, 1873, the following paper was read on—

Errors of Weighing, and their Influence on Results.

BY H. R. PROCTER.

In the following paper I cannot pretend to lay before the Chemical Society any new or original results, but have merely attempted to notice in a concise form the most important errors of weighing, and to give short details of the methods of correction, since, clearly as the principles involved are explained in most text-books, I have for my own part found their actual application rather puzzling.

I think it is only fair to myself to say that I had not seen the chapter on the subject in Professor Thorpe's text-book until my paper was in print, and it was too late to remodel it, or I should certainly have avoided going over so much of the same ground. As it is, I am encouraged to let it stand, since the methods I have given are not exactly the same as his; and since I find that, even in the last German edition of Fresenius, no notice is taken of the method of weighing by vibrations, and no detailed rules are given for the correction of weights.

In weighing, as in all other kinds of accurate measurements, the result is vitiated by errors of two kinds; first, those arising from inexact observation and incidental causes, and which are variable in each weighing. These we may call "*errors of observation.*" Secondly, we shall have errors arising from faults in the balance, unequal length of its arms, inaccuracy in the weights, and defects in the mode of weighing, which will occur constantly in all weighing, and which may be called "*instrumental errors.*" Errors of observation may be almost got rid of by taking the average of a large number of experiments; for though each observation will be more or less in error, it will happen that some of the values will be greater and some less than the truth, and the errors will counteract and destroy each other's influence on the mean result. This, it is obvious, will not be the case with the instrumental errors, for it will generally happen that these will occur constantly on the same side, and so cannot correct each other, but will remain uneliminated in the final average result. Before examining the special corrections which are necessary to remove these, we will consider a little more closely the variable or observation errors.

We have said that the most probable value is obtained by adding all the results of a series of experiments together, and dividing the sum by the number of observavations. This mean value will probably differ more or less from each of the individual results. From these differences we may calculate the accuracy of our experiments. If we square each of these differences, add them together, divide them by the number of observations less one, and take the square root of the quotient, we obtain the *mean error of a single observation*, and dividing this by the square root of the number of observations we obtain the *mean* or average *error of the final result*. The "*probable errors*" in each case are about $\frac{1}{5}$ less than the *mean errors*, and are obtained by multiplying the latter by $\frac{2}{3}$, or more accurately by 0·6745. The "probable error" is equally likely to be greater or less than the actual but unknown error. Without here considering the rather intricate reasoning which has led to these rules, we may employ them to estimate the scientific value of our determinations.

In the ordinary method of weighing, in which weights are put on until the pointer swings to equal distances on each side of the zero, there are several sources of inaccuracy of observation, even supposing the balance were perfect. In the first place, it is not possible exactly to hit the right weight in any finite number of trials, although we may come as near it as we please. Secondly, as the swing of the balance gradually diminishes, it is difficult to tell when the exact zero is obtained.

A much better method, more rapid, as well as more accurate, is as follows:—After adding weights in the ordinary way, till we are, say less than a milligramme below the weights required, we note the limits of an uneven number, say 5, consecutive swings of the balance. Finding the average limit of swing on each side, and again taking the average of these two we obtain the position in which the index would settle if the balance were at rest. This will be at some little distance to one side of the zero of the unloaded balance. Adding now 1 milligramme to the weights, another position of rest may be observed. Then, by rule of three, as the distance of the first point from the zero of the unloaded balance is to its distance from the point with 1 milligramme added, so is the fraction of the milligramme required to the whole milligramme put on. A numerical example will make this clearer. To avoid minus quantities we reckon the scale of the balance from the side on which the weight scale is hung, so that the centre of the scale will count 10 instead of 0, and additional weights will give greater readings. Fractional parts of divisions are estimated, which is very easy if the balance swings only once in 15 or 20 seconds. Suppose that with the weight w on the scale, our successive turning points are

				Means.	
Right	7·5	7·6	7·8	7·63	Position of rest.
Left	11·4	11·3		11·35	9·49.

and that we have similarly obtained 10·34 as the position of rest of the unloaded balance, and 11·29 with $w + 1$ mgr.; subtracting 9·49 from these we obtain the differences 0·85 and 1·80, and our required weight will be $w + \frac{8.5}{18.0}$ mgr., or $w + 0{\cdot}47$ mgr. Though this method looks rather complicated, it is really done very quickly, since there are no useless trials, as in the ordinary way; but the labour may be still further lessened by the construction of a table of deflections of the balance for 1 mgr., with different loads. Then for any observed deflection from zero the corresponding weight may be at once taken from the table. As specimen of such a table I give one constructed for my own balance at the end of the paper. Such table must be verified occasionally, as the sensitiveness of a balance is liable to slight variations. It is also necessary frequently to determine the zero point when heavy loads are used, whatever mode of weighing be adopted.

So far we have assumed that when the pointer was at the zero of the unloaded balance the two loads were truly of equal weight, but in order that this may be the case the two arms of the balance must be of exactly equal length, a condition which is never rigorously fulfilled. Indeed it is impossible that it should, since an error of only 1-10,000th of an inch in a balance with 14 inch beam would cause an error of nearly $1\frac{1}{2}$ mgr. with a load of 100 grms. For chemical purposes where only relative weights are required, this may be neglected, if the weights are always placed on the same scale. Where absolute weighing is necessary, as, for instance, in testing a set of weights, we must eliminate the error. I need scarcely advert to the methods of doing this by substitution and double weighing. In the first case the weights are tared, and the substance to be weighed is then placed on the same scale, and weights removed till a balance is again obtained. In the second, the substance is weighed first on one scale and then on the other, and the mean of the two results is taken, and the errors being equal and in opposite directions will balance and destroy each other. Another way is once for all to determine the ratio of the arms, and then the true weight is obtained from any observed weight by multiplying by this ratio; or still better, a table may be constructed giving the calculated corrections for different loads. As the ratio is very small it is best found by observing the deflection in the following manner:—The zero of the balance when oscillating

unloaded is observed; then two approximately equal large weights are put on—say 50 grms. on each scale, and the zero observed again. The weights are changed to the opposite scales to eliminate any small inaccuracy in their quality, and the process is repeated, finishing by observing the zero of the unloaded balance a second time. Then the means of the two loaded and two unloaded zeros are taken, and the difference between these, reduced to mgr., as described before (p. 189), is the correction to be added or subtracted for the load employed; and the ratio of the two loads so corrected is the same as that of the *opposite* balance arms. I need scarcely say that the addition must be made to the load *towards* which the pointer is deflected, or the *subtraction* from the *opposite* side. Having found the correction for any load, that for any other may be found by rule of three. Thus, if that for 100 grms. is 3 mgr., that for 50 will be 1·5 mgr. In my own balance, a very good one by August Sauter, of Ebingen, it amounts to about 2 mgr. per 100 grms., and consequently the ratio of the arms is as 1 to 1·00002. As the correction is small it is never necessary to apply it to the smaller weights, and indeed a table of values for every 5 or 10 grammes would generally be sufficient.

Another and still more important source of instrumental error is the inexactness of the weights; and no ordinary set, even of the best makers, is really accurate. It is, therefore, always necessary to examine them and make a table of corrections. The simplest way of doing this is to assume provisionally that the smallest weight, say the cgr., is accurate, and then to determine all the rest in terms of it, preferably by double weighing. Of course weights of the same name must be distinguished by marks of some kind—dots made with a centre-punch are as good as any. It will be easy to weigh one 1 cgr., against the other, and then with these to weigh the 2 cgr., and so on. Suppose the second cgr. is found (by deflection or the use of the rider) to weigh say 10·01 mgr., the two together must be called 20·01 mgr., and the error may go on accumulating till with the largest weights it amounts even to grammes; but this is of no consequence. If we have no normal weight with which to compare our set, it is generally best to assume the sum of the large weights as correct. Suppose, now, that they weigh 103·754 grm. in terms of the 1 cgr. weight instead of 100 grm., the true amount, we must divide all our observed weights by 1·03754 (or multiply by its reciprocal) in order to obtain a series of numbers which shall accurately represent the relative values of our weights, and which will add up to exactly 100 grm. That they do this is a proof of the correctness of the numerical work. If we always use the weights in the same order it will now be easy to make a table showing the whole correction to be added to any observed weight. As an example, I subjoin that for my own set. It will be seen that in some cases it amounts to almost half a milligramme, quite an important error in an organic analysis.

A source of error almost universally neglected is that caused by the weighing being conducted in air instead of in vacuo. To illustrate the principle by an extreme case, we know that while a cork weighed in water would weigh less than nothing, a lead bullet would lose comparatively very little. In a less degree the air has exactly the same effect as the water, and in weighing bodies of low sp. gr. with dense weights, such as brass or platinum, the loss may amount to something considerable. For instance, in weighing 100 c.c. of water with brass weights it would amount to 10·6 mgr. If absolute accuracy were required it would be necessary also to take account of the changes of density of the air as shown by temperature and barometric pressure, but for chemical purposes this could scarcely be important except in determination of vapour densities. I, therefore, content myself with giving at the end of the paper a table for correcting weighings with brass weights at ordinary temperatures, and refer for further information to special articles on such determinations. To show the importance of at least a rough correction even in ordinary chemical work, Professor Kohlrausch points out that in the common case of determination of Ag as AgCl in a weighed quantity of a dilute solution, the correction may influence the result as much as $\frac{1}{10}$ per cent.

In conclusion, I must say a few words on the influence of errors on results. It is but rarely that we can directly weigh the substance we are estimating, but in most cases we have to weigh some compound, and multiply the observed weight by a factor, to reduce it to that of the substance required. The errors will obviously be multiplied at the same time, and hence, other things being equal, the smaller the factor, or, in other words, the larger the atomic weight of the compound weighed, the less influence errors will have on the result. Thus, in an organic analysis, an error in weighing the substance at first goes directly into the result, while 1 mgr. error in the weight of the potash bulbs will only make $\frac{3}{11}$ mgr. and in the calcic chloride tube $\frac{1}{9}$ mgr. difference in the result. We should always, at least in scientific work, make a rough estimate, at any rate, of the probable influence of the various corrections, and only neglect them when we find their amount small compared to the probable error from other sources. This will frequently be the case, but not always, and the information as to the amount of accuracy we may expect from our results is often very important; as, for instance, in fitting an empirical formula to an analysis. Let us take the common case of sulphur determination as baric sulphate, say in a pyrites containing 50 per cent. Suppose I use 1 grm. of the substance, the probable error of weighing with my balance (as estimated from the differences in a series of ten weighings of the same mass) will be about 0·1 mgr. or only 0·01 per cent., the correction for inequality of balance arms, and the reduction to vacuo practically *nil*, as baric sulphate and pyrites are both weighed on the same scale and are nearly of the same density; while the error of weights may amount to nearly 0·05 per cent. Here we see that while all the other corrections may be disregarded, it would be quite inadmissible scientifically, whatever it might be commercially, to carry the percentage result to two places of decimals while neglecting the error of the weights. To sum up, the inequality of balance-arms may be neglected in all ordinary chemical work, the reduction to vacuo is only necessary when the substance has to be weighed in two forms of very different density, but the weights must always be corrected, and the zero point of the unloaded balance constantly observed, since its variation is one of the principal sources of observation error. It is well to estimate the probable amount of the latter by occasionally doing a series of weighings of the same mass and observing the unloaded zero-point each time; and, whenever we have a series of analyses of the same substance, we should calculate the probable error of the final results by the rules given above. If this were done it would, I venture to think, be found that only in very rare cases it is scientifically allowable to carry percentage results to two places of decimals, since even the errors of weighing alone, with excellent instruments and great care, will seriously falsify the last figure.

With load of	Deflection of Balance Corresponding to									
	0·1 mgr.	0·2 mgr.	0·3 mgr.	0·4 mgr.	0·5 mgr.	0·6 mgr.	0·7 mgr.	0·8 mgr.	0·9 mgr.	1·0 mgr.
Grm.										Div.
0	0·26	0·51	0·77	1·02	1·28	1·53	1·79	2·04	2·30	2·55
10	0·24	0·48	0·72	0·96	1·20	1·44	1·68	1·92	2·16	2·40
20	0·19	0·38	0·56	0·75	0·94	1·13	1·32	1·50	1·69	1·88
30	0·19	0·38	0·56	0·75	0·94	1·13	1·32	1·50	1·69	1·88
40	0·19	0·38	0·57	0·76	0·95	1·14	1·33	1·52	1·71	1·90
50	0·17	0·34	0·50	0·67	0·84	1·01	1·18	1·34	1·51	1·68
60	0·16	0·33	0·49	0·66	0·82	0·98	1·15	1·31	1·48	1·64
70	0·16	0·32	0·47	0·63	0·79	0·95	1·11	1·26	1·42	1·58
80	0·16	0·32	0·47	0·63	0·79	0·95	1·11	1·26	1·42	1·58
90	0·13	0·26	0·40	0·53	0·66	0·79	0·92	1·06	1·19	1·32
100	0·13	0·26	0·38	0·50	0·63	0·75	0·88	1·00	1·13	1·25

TABLE OF CORRECTIONS OF SET OF WEIGHTS.

Add to Weight observed.

cgr.	mgr.	cgr.	mgr.	grm.	mgr.	grm.	mgr.
1	—·01	10	+·03	1	+·00	10	+·14
2	—·04	10'	+·03	2	+·08	20	—·20
3	—·05	20	—·05	3	+·08	30	—·06
4	—·06	30	—·08	4	+·08	40	+·11
5	+·03	40	—·05	5	+·08	50	—·28
6	+·02	50	+·01	6	+·08	60	—·14
7	—·01	60	—·02	7	+·16	70	—·48
8	—·02	70	—·04	8	+·16	80	—·34
9	—·03	80	—·07	9	+·16	90	—·17
10	—·03	90	—·04	10	+·14	100	—·00

REDUCTION OF A WEIGHING WITH BRASS WEIGHTS TO WEIGHT IN VACUO.

△.	K.	△.	K.
0·7	+1·57	2·0	+0·46
0·8	+1·36	3·0	+0·26
0·9	+1·19	4·0	+0·16
1·0	+1·06	5·0	+0·10
1·1	+0·95	6·0	+0·06
1·2	+0·86	7·0	+0·03
1·3	+0·78	8·0	+0·01
1·4	+0·71	9·0	—0·01
1·5	+0·66	10·0	—0·02
1·6	+0·61	12·0	—0·04
1·7	+0·56	14·0	—0·06
1·8	+0·52	16·0	—0·07
1·9	+0·49	18·0	—0·08
2·0	+0·46	20·0	—0·08

$$\frac{k}{1000} = 0{\cdot}0012\left(\frac{1}{\triangle} - \frac{1}{8{\cdot}4}\right)$$

If the weighed body has the density △, and its weight in air be m grammes, mk mgrm. must be added to reduce the weighing to vacuo.

On the motion of the President, the thanks of the meeting were given to Mr. Procter.

SOCIETY OF ARTS.

ON THE ENERGIES OF THE IMPONDERABLES, WITH ESPECIAL REFERENCE TO THE MEASUREMENT AND UTILIZATION OF THEM.

BY THE REV. ARTHUR RIGG, M.A.

Lecture VII.

*On the Energy of Heat, with especial reference to the Measurement and Utilization of it.**

(*Continued from page* 584.)

In a research of this kind, made with apparatus contrived as new thoughts and new experiments suggested, it was not to be expected that the tabulated results should speak with one consenting voice. They did, however, seem to proclaim this—that the mechanical equivalent of heat competent to give an increase of temperature of 1° Fahrenheit to 1 lb. of water was between 500 and 800 foot-pounds. Detecting and eliminating those elements which seemed to affect the accuracy of the result, he was enabled at last to come to this conclusion, that 772 lbs. was the exact number which was the mechanical measure, or, as it is commonly called, the mechanical equivalent of heat. That means this—he found how much a known quantity of water was raised in temperature by a recorded mechanical exertion, and he deduced the measure of that exertion needful to raise 1 lb. of water 1° on Fahrenheit's thermometer. Thus he found that that heat, applied to raise weights would lift 772 lbs. through one foot; that is, if you had 772 lbs. weights here, and lifted them a foot high, it would be the same thing exactly as applying the same force to 1 lb. of water, and raising the temperature 1° Fahrenheit.

There is a table written out mathematically, by means of which the 772 lbs. are deduced. Mr. Joule having made these experiments, others followed, and we have a table showing the means used, air, friction, steam, Daniell's battery, electro-magnetism, etc.; also the names of the experimentalists, and the mechanical equivalent of heat as determined by them. Although the results differ from Mr. Joule's 772 lbs., yet his figures are now generally adopted.

MECHANICAL EQUIVALENT OF HEAT BY DIFFERENT METHODS.

Means used.	Experimentalist.	Ft. lbs. per 1 deg. F.
Air	Regnault	776·47
Friction	Joule	774·73
Steam	Hirn	752·78
Electrical Induction.	Joule	823·86
Daniell's Battery	Weber	765·54
Electro-Magnetism	Favre	807·46
Current in Wire	Quintus-Icilius	729·08

The title of this lecture includes the words measurement and utilization. The utilization of heat is so important a commercial as well as scientific question, that there are one or two matters bearing upon it which may be worth present attention and much future thought from all. That we do not obtain in a steam-engine more than a quarter of the heat we expend in the furnace is now generally recognized. There is a table here, based upon Mr. Joule's calculations, which gives the number of horse-power—a technical term, meaning 33,000 units of work—which could be obtained by utilizing the heat required for passing nine pounds of ice through its physical and chemical changes. If we have 9 lbs. weight of ice, and attempt to melt and convert it into liquid, a certain amount of heat is absorbed, or rendered "latent," as it is called. At any rate, there is a quantity of heat that does not show itself upon the thermometer. Then, after it is converted to water, if we gradually raise the temperature to 212° there is another large quantity of heat rendered "latent" in the conversion of this water into vapour; and if we then convert that vapour which comes from the water into its elemental gases, viz., oxygen and hydrogen, another large quantity of heat is absorbed or rendered "latent." Now, take that process backwards; assume we can take this 9 lbs. of oxygen and hydrogen and reconvert them back again into ice, and that it was in our power to use the heat which had been given off, then we get the quantity shown in the table. If we burn a quantity of hydrogen in oxygen, it is converted into water; if one part of hydrogen and eight parts of oxygen are combined by an electric spark or other means, and converted into water at 212°, a number of units of heat equal to 1,451 horse power are obtained. If, then, we pass it still further into the form of water at 32° we should obtain 38 horse-power more; and if we then pass it from the form of water into the form of ice, we should obtain 30 horse-power. Therefore, if in obtaining 8 lbs. of ice from its primeval elements, viz., 1 lb. of hydrogen and 8 lbs. of oxygen, we could utilize as a mechanical agent all the heat set free, then from the data given we see that there would be obtained 1,519 horse-power of work. But we cannot obtain this. What becomes of the heat, where it goes, and why we cannot contrive to utilize it, are inquiries which yet perplex scientific students. Various surmises have been made, but none of them have been accepted, except as the vague guesses of an unsolved riddle, the best of which are taken, though there remains a lurking feeling that none of them are right.

The following is a copy of the table to which allusion has been made in the previous paragraph :—

MECHANICAL VALUE OF HEAT, DEVELOPED AS NINE LBS. OF WATER PASS FROM THE GASEOUS TO THE SOLID STATE.

		Units of Work.		Horse Power.
1 lb. of hydrogen and 8 lbs. of oxygen to water at 212°	develop	34,462 × 1390 (C.)	or	1451

* Cantor Lecture, delivered March 17, 1873; reprinted from the *Journal of the Society of Arts*.

Water from 212° to water at 32°	develop	180 × 9 × 772 (F.)	or 38
Water from 32° to ice	develop	143 × 9 × 772 (F.)	or 30

Total horse-power developed..... 1,519

There is another table bearing on this question, viz., the advantage of using steam at a higher pressure than what is called low-pressure steam. If we take water at 33°, that is just above the temperature of ice, and that be warmed until it attains the temperature 213°, it would occupy a bulk 1669 times as large as it was in the form of water. There is a relation between the pressures and temperatures which must be maintained, in order to preserve the whole of the water in the form of steam. These relations are expressed in the first two columns in the following table. The third column expresses the resulting volume of steam. The fourth column is the product of the pressure and the volume, and, therefore, represents the mechanical value of our unit of water. How much and at what rate this value or power increases with an increase of heat and a correspondent increase of pressure may be known by considering the figures in this fourth column. These figures represent the advantage of using steam at high pressures, and, therefore, high temperatures :—

STEAM FROM WATER.

Pressures.	Temperatures.	Volumes.	Pressure multiplied by volume.
lbs.	Deg. Fah.		
15	39	1	
15	213	1669	25,035
25	240	1042	26,050
35	260	765	26,775
45	275	608	27,360
55	288	506	27,830
65	299	434	28,210
75	308	381	28,575
85	317	340	28,900
95	325	307	29,165

The reason why we cannot work steam at some of these very high temperatures is this, that when we super-heat it, we thereby prevent any of it being converted into vapour, and if it is not so converted into vapour we have no means of lubricating the faces of our slide valves, and the consequence is, the metals being heated, they soften, then scratch and tear each other's faces, and the engine is soon destroyed. As soon as we can get slide valves made of some material which will bear this higher temperature without abrasion or scratching, then, probably, we shall be able to work super-heated steam economically.

The amount of steam converted into visible vapour, and cause of excessive loss of power in ordinary steam-engines may be made clear in this way. There is in the receiver of the air-pump a piece of sponge with a little water on it; if a portion of the air saturated with vapour be pumped out, a small portion of the water is converted into vapour, which you see deposited in a film on the glass. This is caused by the air being rarefied and becoming colder, therefore not competent to hold in solution as much vapour as it had previously done. Now, what takes place in this receiver is taking place in hundreds of steam-engine cylinders, and wasting pounds and pounds of fuel. As soon as the steam enters the cylinder it fills it, or rather it fills the part of the cylinder below the piston. Arrangements are usually made that a portion of the stroke may be accomplished by the expansive action of the steam. Now, as soon as the opportunity for expansion is presented, there is at once this deposit of moisture, and the deposit is indicative of a sacrifice of heat.

Now, this action of heat is not confined to liquids, it also extends to solids. Here is a piece of unannealed glass. Those present who have to deal with steam-engines know that it very often happens from some apparently unnaccountable cause that what are called the water-gauges of the boilers are broken. These breakages are in consequence of the glass tubes being unannealed; and if you are aware of the process by which tubes are made, you will see at once they cannot, without some special arrangements, be annealed. They are made by taking a solid ball of glass out of the pot; this is then blown into a globe; then a second man puts a pipe with a molten nodule of glass upon it on that part of the globe which is opposite to the pipe by which it was blown. The men run asunder, and so the globe is lengthened out into a tube and laid along the floor. This long pipe is then cut into gauge-tube lengths, and generally so sold. If one of these tubes be cleaned with an iron wire, having a piece of cotton wool wrapped round it, the wire being pushed up and down as is usually done, and the clean tube be restored to the boiler, it may, in two or three days or weeks, fall to pieces without any one being to blame, except those who put the wire through the tube. Here is a piece of glass very thick and strong, and in all respects very good glass, but unannealed. It is really a simple piece taken out of the melting-pot as a sample, to guide the manufacturer respecting the quality and colour of the articles that may be made from it. Now, in all probability, if this piece of quartz, less than the size of an ordinary pea, be allowed to drop gently into the sample flask, this strong flask (the glass is nearly one half an inch in thickness) may fall into pieces. There! You see the bottom has immediately dropped out, notwithstanding the thickness, and if it were left here all night it might crumble into half-a-dozen pieces before the morning. On one occasion I cleaned out a glass tube, about three feet long, connected with an air-pump, and in a thoughtless moment took a wire, attached some cotton wool to it, and drew it through the tube. In about half an hour there was a slight click—in a few minutes another click. On looking at the tube it was seen to be cracked. The slight but instructive noises continued, click after click, and crack after crack, and in the morning the tube was separated into many hundred pieces, though no one touched it. Workmen and servants are often blamed for the breakage of glass, which breakage arises from such a cause as this.

What are called Prince Rupert's drops are obtained by allowing molten glass to fall into water, and so falling the drops are suddenly cooled on the outside, and the consequence is that the molten glass in the interior is firmly bound beyond its power of resistance, even though it has a large amount of heat in it. If it had been free, the molecules of glass would have crystallized and arranged themselves according to the law which governs them; but being bound by the external film they cannot so arrange themselves. The heat contained in them cannot do the works of crystallization it was competent to do—it has become stored up or potential. Therefore, as soon as ever the equilibrium of the shell of the bulb is destroyed this heat gives out its work. In the interior of this bulb there is a large amount of potential energy; and if the equilibrium be destroyed by cracking off the end, in the same way as it was destroyed in the other case by dropping a little bit of quartz into the thick glass, we shall find it will manifest itself, and very possibly will break the glass bottle in which the Rupert's drop is placed.

(*To be continued.*)

Parliamentary and Law Proceedings.

POISONING BY STRYCHNINE.

An inquest was held at Stoke, last week, before Mr. Coroner Bone, respecting the death of Mr. Thomas

Whittle. Mr. Metham, surgeon, said he had known the deceased between two and three years. He had been constantly on his list mostly through occasional outbreaks in drinking. The frequent excesses of drink no doubt produced an injurious effect on the brain. The witness saw the deceased on the previous Saturday, when he appeared to be more than usually depressed. On Sunday witnessed visited deceased at his residence, when he complained that he was suffering violently from spasms. On the witness asking him for particulars, he requested his wife to leave the room. He then had a violent spasm and afterwards told witness that he had taken strychnine and prussic acid, which he said he had bought in Plymouth at several places. The witness remained with the deceased until he died. When the witness asked the deceased why he poisoned himself, he said, "I don't know why I did it; I was mad."

Mr. Joseph Allen, chemist, carrying on business in Bedford-street, stated that the deceased came to his premises on Saturday, stating that he had a favourite dog, which he valued very much, and as it was getting old he wished to poison it. He asked which was the best poison, whereupon the witness informed him that strychnine was the best. The witness served him with two grains (in weight) of strychnine, and the deceased signed the register book of sales of poison with his name and address.

Mr. Frederick Henry Foster, carrying on business at 2, Bank of England-place, said the deceased came to his shop about a month ago, and applied for some strychnine to kill a dog. Witness told him two grains would be sufficient to kill a dog, whereupon the deceased expressed a desire to have the dog killed as soon as possible. Witness then supplied deceased with five grains.

Mr. John Dampney, a chemist at Millbay, said the deceased came to his shop on Saturday, and was supplied with a quantity of prussic acid, for the purpose, as the deceased stated, of poisoning a dog.

After some evidence as to the circumstances of the deceased, the jury returned a verdict that the deceased died from the effect of administering to himself a quantity of styrychnine whilst in a state of temporary insanity.

Privilege of Peerage.

At the Westminster County Court, on Thursday, Jan. 15th, before Mr. F. B. Bailey, judge, an application was made, in the case of "Savory and Moore v. the Earl of Winchilsea and Nottingham."—Mr. Venn, solicitor, appeared for the plantiffs; the defendant was not represented.—In July last plaintiffs (who are the well-known druggists, of New Bond-street) obtained a judgment against defendant in this court for goods supplied, and as this judgment remained wholly unsatisfied, the present summons has been issued under the 5th section of the Debtors' Act, 1869, calling upon defendant to show cause why he should not be committed to prison for a term not exceeding six weeks for default in payment.—His Honour. intimated to Mr. Venn that it would be useless to call evidence or proceed with the hearing of the summons, as the defendant, being a peer, enjoyed immunity from arrest. —Mr. Venn said that owing to recent legislation this point was now open to discussion, but that if defendant relied upon his privilege, he was bound either to appear to the summons and claim his privilege, or to sue out his writ of privilege. By the 5th Section of the Debtors' Act, 1869, the court was empowered to commit to prison, for a term not exceeding six weeks, "any person," who made default in payment of any debt due from him in pursuance of any order or judgment. The words "any person" as quoted, were positive, comprehensive, and without any exception expressed, and therefore the "onus" rested upon defendant to prove conclusively that he did not come within the operation of the enactment. In support of this particular view, he cited the judgment of Lord Westbury in the case of the "Duke of Newcastle, appellant v. Morris, respondent, 40 Law Journal Reports," where the argument as to the liability of a peer to be adjudicated bankrupt rested upon the interpretation of the 69th Section of the Bankruptcy Act, 1861, which enacted that "all debtors, whether traders or not," should be subject to the provisions of that act, and where, upon giving judgment, Lord Westbury said that the onus rested upon the appellant to prove that he was not included within the comprehensive words "all debtors, whether traders or not," and in that case the decision was adverse to the privilege of the peer, and the adjudication in bankruptcy was confirmed.—His Honour remarked that, notwithstanding the liability of a peer to be adjudicated bankrupt he was still privileged from arrest or attachment for non-payment of money.—Mr. Venn admitted that at common law, and under certain decisions of an early date in the Term Reports, this privilege had been recognized, but contended that now the privilege must depend upon the interpretation of the two statutes at present in force —viz., "the Bankruptcy Act, 1869," and "the Debtors' Act, 1869," which for this purpose must be construed together. It was clear that under the 120th section of "the Bankruptcy Act, 1869," a peer could be adjudicated bankrupt, and dealt with generally under that Act as if he had no privilege whatever; and inasmuch as in the interpretation clause of the Debtors' Act, 1869, it was expressly set forth that the Debtors' Act should come into operation on the same date as the Bankruptcy Act, and that words and expressions defined or explained in the Bankruptcy Act should have exactly the same meaning in the Debtors' Act, he contended that a "person" coming within the provisions of the "Bankruptcy Act" must fall within the words "any person" in the Commitment Clause of the Debtors' Act.—His Honour here remarked that there was some doubt as to the due service of the summons, but, upon inquiry of the registrar, it appeared that defendant had called with the commitment summons at the court and said that he hoped they would imprison him, and his Honour suggested that, as defendant had plenty of leisure, he might not object to imprisonment.—Mr. Venn said he hoped that his honour would not disappoint the defendant on this head, as it was clear that he had received the summons and was determined not to pay his debts; but in any case defendant should be required to set up and prove his alleged privilege.—His Honour replied that, notwithstanding defendant's omission. the privilege still existed, and, in his judgment, it would be of no avail to have defendant committed, as he might subsequently claim his release and perhaps take legal proceedings for his arrest.—Mr. Venn remarked that plaintiffs would accept the risk if the Court would commit defendant, or even compel him to come there and rely on his privilege. He was quite able to pay plaintiffs' claim, but would not do so.—The application for committal was refused.—*Standard.*

Adulteration of Bread.

At the Tonbridge Petty Sessions, on Wednesday, a baker named Featherstone, who had traded in the town for 45 years, was charged with selling bread adulterated with alum. The inspector produced a certificate from Dr. Tidy, the county analyst, stating that in the sample 2lb. loaf left with him there were 14·8 grains of alum. Mr. Warner, who defended, wished to call the defendant to deny that any alum was used, but the magistrates (Mr. J. S. Talbot, M.P., and Mr. C. Powell) refused to hear him. The man who always makes the defendant's bread was then called. He deposed that no alum was ever used by defendant, who was a contractor under Government for supplying the staff of Royal Engineers in the town with bread. The same bread was served out to them as to the general public. The second officer in command said the defendant's bread was tested from time to time by the War Office chemist at Woolwich, but no trace of adulteration had ever been found. Mr. Warner asked that the case

should be adjourned to enable him to have an independent test. The Bench refused, saying they were willing that Dr. Tidy should re-analyse the half loaf produced in court. The defendant could not see that it was at all likely Dr. Tidy would, under the circumstances, alter his opinion. The Bench thereupon fined him 10s. and costs.

Review.

La Matière Médicale chez les Chinois. Par M. Le Docteur J. Léon Soubeiran et M. Dabry de Thiersant. Paris : G. Masson. 1874.

The opening up to commercial enterprise of China—a country of which so little has been known until within the present century—has naturally led, among other things, to inquiries concerning the materia medica and medical notions of that shrewd and ingenious people. During the past seventy years several works have been published upon those subjects, among which none have exceeded in value the laborious researches published by our own countrymen, Daniel Hanbury and Porter Smith.

The practical results of investigation of this kind, although sometimes not immediately apparent, are often of great importance. It is only necessary to review our own materia medica to see that many of our most valued drugs have resulted from the scientific researches of former investigators. The difficulties which beset the student of materia medica in China are greater than is perhaps generally known. The language itself must be no slight obstacle to the identification of the various substances met with. Several names are often applied to the same drug, according to the district from which it is derived, the quality of the article, and the different modes of its preparation. In other cases the same name is applied to different drugs similar in appearance, but derived from different sources. The tendency to sophisticate, which may be called the besetting sin of the Chinese, the jealousy of the natives, and unwillingness on their part to give the slightest information which they may imagine to be likely to diminish their profits, all operate to the same end. The flora of China also is not so well known as that of other countries, and there is therefore considerable difficulty in determining some of the drugs with certainty. Many of the roots also are only to be obtained in a sliced or comminuted state, and thus present still further obstacles to their identification. Considering these difficulties, then, the knowledge already attained in this subject is very considerable. The present attempt to increase our knowledge of Chinese materia medica has met with the appreciation which scientific investigations always deserve, and but rarely obtain—the results having been published at the expense of the French Government, by the recommendation of the Paris Academy of Medicine.

The work is prefaced by the report upon it read before the Academy of Medicine. This preface contains a good deal of interesting information, but a translation having already appeared in this Journal* there is no necessity for further notice of it here. The various articles of materia medica are classified under the heads of minerals, animals, and vegetables. The minerals are arranged under the elements of which they are compounds, with the exception of the silicates, which do not appear under silicon, but form a separate group—probably on account of their variable composition. A third group under the head of minerals, includes various fossils.

The animal substances are arranged in the following classes—Mammalia, Aves, Reptilia, Pisces, Mollusca, Insecta, and Arachnida. The vegetable substances are arranged according to their natural orders, commencing with Algæ and ending with Leguminosæ.

At the end of the volume there is a table of the contents representing the arrangement above-mentioned. Following this is a Chinese-French vocabulary, in which the Chinese names of the drugs are spelt as they would be pronounced in French, and explained by their French and Latin equivalents. No figures of any of the drugs are given, and the Chinese characters in no case appear, although to have had them would have added greatly to the value of the work. The Chinese characters would have been valuable, because the same syllable may be represented by several different characters, each with a different meaning. In describing each article of the materia medica its Latin name is first given (or when not determined, its supposed generic name), and then its Chinese name, spelt according to the French pronunciation, followed by the Chinese name as spelt by other writers, those most frequently quoted being Tatarinov, Hanbury, Porter Smith, and Debeaux ; only the French renderings of the Chinese names are given in the vocabulary. The above arrangement, though an excellent one in a scientific point of view, yet lacks the thoroughness of detail which is essential to every scientific work. Thus, we find toads, frogs, and salamanders under Reptilia ; iulus and scolopendra under Insecta ; crabs, woodlice, leeches, sea urchins, sea cucumbers, medusæ, corals, and sponges all included under Arachnida. We have experienced considerable difficulty in endeavouring to discover what arrangement of the natural orders of plants has been followed in the work, and have come to the conclusion that it must be a special one of the authors'. Although it appears in some respects to approach one or two of the methods followed on the Continent, yet in none of them do we find Orchidaceæ placed between Graminaceæ and Cyperaceæ ; Saxifragaceæ followed by Menispermaceæ ; or Violaceæ placed between Nelumbiaceæ and Pangiaceæ.

The neglect of these matters necessarily depreciates the value of the work, for as there is no alphabetical index to the work, the table of contents has to do duty for it, and an index is valueless if not easy of reference. Still, the attempt at a natural arrangement is a step in advance, and it presents the Chinese materia medica under a new aspect. The large number of substances at present undetermined, renders a classification of this kind by no means an easy task. This fact led us to suppose that the learned authors might have succeeded in determining many of those doubtfully named in the last work upon the subject ; this hope, however, has not been realized. Some of the errors in that work have found their way into the present one, probably owing to the authors not having seen Porter Smith's specimens. Thus *Lycoperdon squammatum* (*sic*) should have been *Lycopodium ;* the seed described by Porter Smith under the name of *Bungtalai*, and doubtfully referred by him to *Nephelium* or *Erioglossum*, is still referred to the same, although Hanbury has shown* that it is the seed of *Scaphium scaphigerum*. Our authors are, however, not alone in this oversight, as an article has very lately appeared in a French journal, giving as a fresh discovery that which was known in 1862. *Iris florentina* is said to be found in all the provinces south of Yang-tse-kiang, and to have yellowish-white flowers and reddish leaves. In this case there appears to be a double error, for the root is that of a dicotyledonous plant, which, judging from its appearance and strong odour resembling that of lovage or fenugreek, is probably a species of *Levisticum* and the description as given by the authors scarcely applies to *Iris florentina*, which De Candolle describes as having bluish-white flowers and glaucous leaves.

Lycoperdon giganteum is still retained under that name, although Cooke has shown that it is a *Polysaccum*.† The article described by Porter Smith as Bitter Bean, but which is Fenugreek seed, is omitted from the present work.

In some cases the same drugs appear twice over as being the products of different plants, apparently owing

* Vol. iii., p. 501.

* Pharmaceutical Journal, vol. iv., 2nd series, p. 110.
† Ph. Journ., vol. ii., 3rd series, p. 160.

to the authors not having seen specimens, or to a desire not to omit anything mentioned by other authors. Thus Tchuen-kiang is described as an *Angelica*, after Porter Smith, and in another place as an *Apium*, after Hanbury; Yu-shuh, which is evidently identical with the *Atractylodes alba* of Porter Smith, is described under that plant and again under Umbelliferæ, after Hanbury; *Lycium* in one place is described as derived from a Berberidaceous plant, and in another as a Solanaceous one; Kuen-pe appears first as a fungus, and afterwards as one of the Lycopodiaceæ, although Porter Smith's description evidently points to the latter, notwithstanding that it has been called a fungus by him. The identity of *Barkhausia repens* with *Picrorhiza Kurroa*, Royle, has not been noticed.

On the other hand, we notice that some of the mistakes in the last work upon the subject have been rectified. Thus *Oxalis acetosella*, which is not known to occur out of Europe, is replaced by *O. corniculata*, a thoroughly cosmopolitan species. *Eschscholtzia* is rightly altered to *Elsholitza* and *Smilax chinensis* now appears as *S. china*, and various generic names have been altered to meet the progress of science, the older names being given in parentheses. About 900 articles of materia medica are given in the work, of which nearly 200 appear not to have been noticed by English authors. These additions belong chiefly to the animal and vegetable kingdoms, and for the greater proportion of them simply the scientific names of the substances identified, with the Chinese names attached are given, without any description of their appearance or account of their properties. This is more especially the case with the vegetable products. As a scientific work the book must be considered a failure, the amount of information new to science contained in it being very small. As a compilation of the knowledge hitherto published the work is excellent, being more comprehensive and better arranged than any one of the kind yet published (excepting, perhaps, that of Hanbury, which is a model of arrangement and completeness, although it includes but a small proportion of the drugs of China), and it needs only a complete index to make it an useful book of reference to those interested in Chinese materia medica. A good deal of interesting information, brought up to the present date, is to be found here and there throughout the work, more especially with regard to those drugs which form articles of commerce. Among these we notice musk, edible swallows' nests, isinglass, insect wax, trepang, the vinegar medusa, rhubarb, camphor, opium, and tea.

BOOKS RECEIVED.

The Treasury of Botany, a Popular Dictionary of the Vegetable Kingdom, with which is incorporated a Glossary of Botanical Terms. Edited by John Lindley, M.D., F.R.S., F.L.S., and Thomas Moore, F.L.S. Illustrated by numerous Woodcuts. New and Revised Edition with Supplement Part I. a—k. Part II. l—z, London: Longmans, 1874. From the Publishers.

The Chemical History of a Candle. A Course of Lectures delivered before a Juvenile Audience at the Royal Institution. By Michael Faraday, D.C.L., F.R.S. Edited by William Crookes, F.C.S. London: Chatto and Windus. From the Publishers.

The Various Forces of Nature and their Relations to each other. A Course of Lectures delivered before a Juvenile Audience at the Royal Institution. By Michael Faraday, D.C.L., F.R.S. Edited by William Crookes, F.C.S. London: Chatto and Windus. From the Publishers.

A Course of Analytical Chemistry (Qualitative and Quantitative), to which is prefixed a Brief Treatise upon Modern Chemical Nomenclature and Notation. By William W. Pink and George E. Webster. (Weale's Educational Series). London: Lockwood and Co., 1874. From the Publishers.

Adulterations of Food, with Short Processes for their Detection. By Rowland J. Atcherley, Ph.D., F.C.S. London: W. Isbister and Co., 1874. From the Publishers.

Obituary.

Notice has been received of the death of the following:—
On the 28th December, 1873, Mr. George Baigent, Chemist and Druggist, of High Street, Winchester.

Correspondence.

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

Prices of Proprietary Articles.

Sir,—I presume a trade journal is the correct medium to ventilate trade grievances, and I shall appreciate a small space in your publication to express my disapproval of a practice on the increase lately, with a view to seeing if my opinion is entertained by others in the retail trade. I allude to the considerably increased price charged to us by some manufacturers of proprietary articles without proportionate increase of selling price. I am fully aware of the enhanced value of material and labour, but I cannot see the justness of making the retailer bear the whole burden, when the profit is, as it often is, not very large considering the stock kept, carriage, etc. I will not mention the articles to which I refer; it would not strengthen the case, but I cannot help thinking the maker should be careful how he reduces the retailer's profit if he considers or knows how much he depends upon him for keeping up the sale of his articles, however valuable they may be. The makers of many every-day articles are not known to us, and I take this opportunity of making known my grievance, hoping it may elicit a satisfactory explanation or an expression of others' views on the matter.

W. T. Gardiner.

Norwich, Dec. 20th, 1873.

[*** The matter our correspondent refers to no doubt presents the aspect of a grievance from the retailer's point of view; but there are other ways of looking at it which lead to the conclusion that little practical good can be done by discussing it. However, the tone of our correspondent's letter is so temperate that we readily afford the opportunity of expressing his views.—Ed. Pharm. Journ.]

Date's Ointment.

Sir,—In reply to Mr. Edwards, I beg to say that in sending the form for Date's Ointment, I had no intention of betraying anybody's secret; indeed, I did not think it was a secret at all. The form was given to me more than twenty-five years ago, by a person who had left Bristol at least twenty years before that, and I have no doubt it is pretty well known in that part of the country. Most of these secret forms do get known, but I greatly doubt whether the knowledge benefits any one except the proprietor. I have seen a good many of them in my time very jealously guarded, and kept under lock and key, so that the prying eyes of the apprentice or assistant should never see them, but all in vain; by one means or another they do get copied, and they are handed from one apprentice to another, with wonderfully little advantage to any of them, so far as I could ever see.

W. Wilkinson.

263, *Cheetham Hill, Manchester, Jan. 19th*, 1874.

Sir,—Possibly there was a time when Turner's Cerate, Turlington's Drops, and Trooper's Ointment were each a "proprietary article." Their day as proprietaries, however, has long since ended, as well as that of Date's Ointment, and now this, in common with the other above-mentioned, and divers others *once* proprietary, are prepared by every chemist, at least in Bristol.

Argus.

Bristol, Jan. 19th, 1874.

Hunter *v.* Freeland.

Sir,—Referring to the report of the above case which appeared in the Journal of the 10th inst., in which it is stated that although the damages awarded amounted to only £12, it is estimated that the costs, in consequence of the case being carried into the Supreme Court, would amount to between £300 and £400, I am now glad to inform you that a considerable deduction from that sum has been made. The auditor of the Court, in taxing pursuer's account, has struck off a sum of £50, and the Lord Ordinary who tried the case, when it was again brought before him, for the purpose of applying the verdict, after considering the whole circumstances of the case, has so far exercised his power of modifying expenses by striking off other £45.

The following letters from Dr. Littlejohn and Dr. Patrick Heron Watson, Edinburgh, which they kindly addressed to my agent a few days after the trial, will show the readers of the Journal the opinion which these eminent medical gentlemen formed of the case.

John Freeland.

Bathgate, January 18th, 1874.

[Copy].

Sir,—I am much gratified by your remembrance of me, but I must decline the fee you send me, as the sufferer is a druggist, and in my opinion has been unjustly treated.

(Signed) Henry D. Littlejohn, M.D.

Police Chambers, Edinburgh, Nov. 25th, 1873.

[Copy].

Dr. Watson presents his compliments to Mr. Officer, and begs to thank him for his kind note, and for its enclosed fee for professional services in the above case. Dr. Watson feels that the circumstances of the case are so much those of a member of his own profession that he does not feel himself at liberty to accept of any fee, and at the same time wishes to express his pleasure in having had an opportunity of rendering any services to one so nearly connected with his own profession, in circumstances when he seemed, through a misfortune, to have been laid open to a very vexatious prosecution.

16, *Charlotte Square, Edinburgh, Nov. 25th*, 1873.

Chemists' Assistants' Salaries.

Sir,—In last week's Journal (17th) a correspondent who signs himself "*The Whole Truth*" addresses you on the above subject.

I will not stop to quibble on grammatical errors, into which we are all liable to fall, but which do not affect the main points of the question.

I wish to express my opinion that I think your correspondent "*Whole Truth*" can have had no experience as an assistant, and not much as an employer, or he would not have taken it for granted that because he paid his assistant nearly £100 per annum, besides giving time, etc., others did likewise.

I will put it as a question to "*Whole Truth*" how many years had the said assistant been engaged in the business before entering his employ? what salary did he commence at, and how long before he rose to receive nearly £100 a year? what is his age (how many of the best and brightest years of his life has he spent in attaining this height of competence!), and is he manager of an establishment, or senior over any other assistants? (if so, how many of these latter receive less than £50 a year?)

"*Whole Truth*" is, I believe, quite right that assistants are allowed a fortnight's holiday every year by respectable houses. No doubt his allowing his assistant time and paying his salary during a lengthened illness was an act of unselfish kindness (which carried with it its own reward), but which, I am in a position to say, is far from being the practice of druggists generally.

In bringing to mind how many days and half-days he has given his assistant, does "*Whole Truth*" remember how often his assistant may have had to work long after *so-called* business hours (but this was a matter of course; the poor assistant being expected to be, like a "jack towel," always behind the door)?

Let us have the *whole truth* and hide nothing under the pretence of candour.

The position of chemists' assistants might perhaps have been better contrasted with that of mechanics, most of whom earn their £3 a week, some more, some less (having to provide themselves) and work far less hours. I will ask, can my fellow-assistants say, as a rule, that they get as much, or its equivalent? I lament to say that the rule is verified in places very few and far between (when found, make a note of), and to be looked on with awe and veneration.

To give my own experience: I have been eight years in the business, have had to undergo an expensive (to me) education to pass the examinations, and have succeeded; but still, cannot command nearly the sum "*Whole Truth*" names (he will find on inquiry that that (and generally less) is the sum given to assistants to live outdoors, and considered ample remuneration), and yet I am better off than nine-tenths of my fellow-assistants, and know many who are worse off than myself.

If "*Whole Truth*" gives an assistant entering his employ nearly £100 a year (how much less?) I am sure he will always have plenty of first-class men to choose from; I fancy I see many eager pairs of eyes glistening at the expectation of the coveted prize.

In conclusion, I think the proposition of "*Truth*" for forming a Chemists' Assistants' Association or Club well worthy the immediate consideration of my fellow-assistants; and if anyone will take it up, I shall be happy to subscribe towards it; and should be glad to hear from any gentlemen of a like opinion and position, and beg to remind them that "Those who would be free themselves must strike the blow."

Pharmacist.

London, January 20th, 1874.

We have also received a further communication on the above subject from "*Truth*," in which, after demurring to the importance of the point of grammar, urged by "*The Whole Truth*," he says:—"With regard to salaries we are not to be guided by what the minority of assistants are receiving, that is putting the cart before the horse, but by the majority. It is a well-known fact that chemists' assistants are the worst paid set of men under the sun, taking into consideration the heavy responsibilities, etc., that rest upon them; it is high time steps were taken for their improvement in this respect; and unless my fellow-assistants unite together they will always remain slaves to their employers."

"*Common Sense*" has also favoured us with a communication, in which he desires to inform "*The Whole Truth*" "That the picture he draws of the treatment his assistant receives at his hands is far from being a criterion of things in general, as at present existing between chemists and their assistants, but a solitary case in a thousand. And, moreover, were such really the case, as he assumes, the condition of chemists' assistants would not be equal in many respects to that of the working man." We do not print the whole of this letter, partly because the statements contained in it are mainly the same as those given above, and partly because we do not think that the tone of the language in which they are made would be conducive to the end the writer has in view.

G. P. W.—(1) Yes. (2) Yes. (3) Next October.

W. S. T.—(1) We cannot tell the names of plants from such imperfect specimens as those sent. (2) Messrs. Butler and McCulloch, Covent Garden.

H. A. is referred to the rule respecting anonymous communications.

C. B. A.—Briefly, because of the rule by which *c* becomes soft like *s*, before *e*. The question whether the Greek derivation of the word "pharmacentical" should entitle it to be made an exception to the English rule, you will find discussed and decided in the negative in the Pharm. Journ. 1st Series, vol. i., p. 178.

Dr. W. Handsel Griffiths writes to say that his attention has just been drawn, by an article in the *Canadian Pharmaceutical Journal*, to an error or misprint in his letter in this Journal of November 1st, relative to the removal of nicotine from tobacco-smoke, where he is made to say, "I substituted a solution of *tartaric* and citric acids for the water." It should have been *tannic* and citric acids. We may remark that the error did not occur through a misprint, but was due to Dr. Griffiths having written plainly "tartaric acid," and not tannic acid, in the MS. of the letter referred to.

Communications, Letters, etc., have been received from Mr. Hayes, Mr. Barnett, Harper, Phœbus, N. S. A., F. B.

ON QUINAMINE.

BY DR. J. E. DE VRIJ.

This new alkaloid of cinchona was discovered in the beginning of 1872 by Dr. O. Hesse, in the bark from *C. succirubra*, exported from British India. This discovery was mentioned in the *Chemical News* of April 29, 1872, p. 191, where the new alkaloid is described in the following terms :—"A well crystallized substance, not containing any water of crystallization, readily soluble in ether, in warm alcohol, and in petroleum ether (refined benzoline); and insoluble in water, in ammonia, and in caustic potassa; the alcoholic solution exhibits an alkaline reaction. With acids this alkaloid forms salts, which are readily soluble in water; the chlorhydrate is an amorphous substance, and the neutral sulphate is difficultly obtained crystalline. Quinamine does not exhibit fluorescence of its solutions, and with chlorine and ammonia does not yield the well-known reaction of quinine; in strong sulphuric acid quinamine dissolves without giving rise (unless heat be applied) to a coloration of that acid; when dissolved in nitric acid, the latter is first turned yellow by the quinamine, and next orange-red, after which the colouration disappears. Quinamine fuses at 172°; it is hardly bitter, tasted by itself, but its salts are somewhat so."

A year later Dr. Hesse published a remarkable paper on the cinchona-alkaloids,* in which he describes more fully his new alkaloid. He states that he found it in the red bark from Darjeeling, which contains generally only traces of it, so that it requires much exercise in this kind of investigation to prepare it. In rare cases he obtained about 0·1 per cent., and only once he obtained a sample of bark, of which one pound yielded 1·3 gramme, or about 0·3 per cent. pure quinamine.

In October, 1872, I was requested by his Grace the Secretary of State for India, to undertake the analysis of two samples of red cinchona quill bark, which had been received from the plantation in British Sikhim for that purpose. After having terminated my analysis of these samples, I stated in my report, dated 30th October, 1872, that these barks contained, besides the mentioned quantities of quinine, cinchonidine, cinchonine, and amorphous alkaloid, also the new alkaloid discovered by Dr. Hesse.

At that time I was only acquainted with that which had been published in the *Chemical News*, about this new alkaloid, so that I could ascertain its existence, but was not yet acquainted with the means to obtain it quite pure. When, therefore, Dr. Hesse published in April last his paper, in which he gives, not only an elaborate description of the properties, etc., of his new alkaloid, but also describes accurately how to prepare it, I applied his process on the small quantity of impure quinamine which I had preserved from the above analysis of the red bark from Sikhim, and succeeded in obtaining it pure. The experience which I had now obtained led me to investigate whether I could not find a more simple process, and as I was happy enough to find one, I suppose that its publication will enable every chemist who is in possession of red bark from British Sikhim to obtain this new alkaloid easily. I insist that the red bark must be for this purpose really originally from that locality, as I have failed to find even a trace of quinamine in the "uncrystallizable portion of the alkaloids from Indian red bark," of which Mr. D. Howard was kind enough to send me a good quantity at my request. As these uncrystallizable alkaloids did not yield a trace of quinamine, I am convinced that the red bark from which they are obtained must be from another locality. This is the more probable, as the Darjeeling red bark, although tolerably rich in mixed alkaloids, contains too little quinine to allow its use for the manufacture of quinine.*

My process for the preparation of quinamine is the following :—The mixed alkaloids obtained from the before-mentioned red bark are transformed into neutral sulphates, and the solution treated with Rochelle salt, whereby the tartrates of quinine and of cinchonidine are separated. After collecting these upon a filter, the filtered liquor is shaken with caustic soda and ether. By this process the amorphous alkaloid and the quinamine are dissolved by the ether with slight traces of cinchonine, whilst the bulk of this last alkaloid remains undissolved. After distilling the ethereal solution the residue is transformed into neutral acetate, and the solution of this mixed with a solution of sulphocyanate of potassium. By this reagent the sulphocyanate of the amorphous alkaloid is precipitated in the shape of a yellow, soft, resinous substance, whilst the sulphocyanate of quinamine remains dissolved. After subsiding and filtering, the solution is clear and quite colourless, and by addition of caustic soda the quinamine is precipitated. It is then collected upon a filter, washed, and dried. It can now easily be obtained crystallized by dissolving it in boiling spirit, from which it crystallizes in cooling. By this process I obtained from 135 grammes of the above mentioned red quill bark 0·51 grammes = 0·38 per cent. of pure quinamine.

The Hague, January 10th, 1874.

* *Annalen der Chemie und Pharmacie*, vol. 166, p. 267. This paper is now being republished in our columns.

* The mixed alkaloids hitherto obtained by me from red Darjeeling bark, were dextrogyre, whilst those obtained by me from red bark from Ootacamund were laevogyre.

PHOSPHATE OF IRON AND ITS COMBINATIONS.†

BY CHARLES GEISSE POLK, M.D., OF PHILADELPHIA.

(*Continued from page* 595.)

I also found that the excretion of the phosphates was very large during the progress of phthisis, and that whatever arrested the progress of the disease also diminished the quantity of these in the urine. I inferred from this that the pathological lesion consisted in some aberration, not of the phosphorus assimilating, but of the phosphatic eliminating function, and intimately connected with the functions of the pneumogastric nerve, spinal accessory, phrenic, and hypoglossal nerves. I became convinced that the seat of the disease was in the medulla oblongata; that through the pneumogastric nerve was transmitted, as by a telegraph wire, the morbid impression by which the digestive and assimilating function became impaired, and the tubercle originated in the lungs. It also appeared very probable that the great sympathetic was also deeply involved in this trouble, and contributed a liberal share of the fatal agency. While I regarded the diminution of phosphorus in the system in tubercular consumption as a concomitant and a coincident intimately interwoven with the origin of the disease, I have never viewed it as the disease *per se : autochthonic* in itself complete, and as to the cause sufficient, irrespective of co-operating and co-ordinating powers, impressions, or influences. I, nevertheless, deemed it proper to resort to the use of phosphoric acid with a twofold purpose, to secure the tonic influence

† From the *Druggists' Circular and Chemical Gazette*, January, 1874.

on the digestive powers, and the nerve stimulant effect it so promptly gives, hoping thus to reach important indications. Fifteen years' experience has justified my view. A very similar combination to one now highly esteemed was formed. Out of my speculating grew my syrup of the phosphate of iron, quinia, and strychnia, which, although not fulfilling my early sanguine expectations, is yet highly valued by myself and a dozen or more physicians. I prepared it thus :—

℞.	Sulphate of Iron	grs. 800
	Phosphate of Sodium	grs. 1280
	Sulphate of Quinia	grs. 384
	Dilute Sulphuric Acid	q. s.
	Aqua Ammonia	q. s.
	Strychnia	grs. 10½
	Syrupy Phosphoric Acid . . .	℥ iij.
	Syrup sufficient to make . . .	℥xxxij.

Dissolve the sulphate of iron in three ounces of boiling water, and the phosphate of sodium in six ounces of boiling water. Mix them and wash the precipitated phosphate of iron until the washings cease to be affected by a solution of the chloride of barium. Dissolve the quinia sulphate and the strychnia in two ounces of water by aid of dilute sulphuric acid, and precipitate the alkaloids by slowly adding ammonia water, and carefully wash them. Rub the phosphate of iron, quinia, and strychnia with four ounces of water, add the syrupy phosphoric acid and dissolve them. Then filter the solution into sufficient syrup to make thirty-two fluid-ounces. In the formula published in the *Druggists' Circular* it is directed that the syrupy phosphoric acid be mixed in ℥ xvi. of distilled water, the iron, quinia, and strychnia dissolved in the solution, and ℥ xviij. + ℥ ij. of sugar be added.

The formula here given produces rather a finer pharmaceutical product, and seems less impressible to atmospheric exposure. The formula given in the *Druggists' Circular*, however, will produce *quite satisfactory results* and answer every purpose. Easton's formula, published originally in Aitken's 'Practice of Medicine,' and by some erroneously called Aitken's formula, is prepared thus :—

℞.	Sulphate of Iron	℥ v.
	Phosphate of Soda	℥ i.
	Quinia Sulphate	grs. 192
	Dilute Sulphuric Acid . . .	sufficient.
	Aqua Ammonia	sufficient.
	Strychnia	grs. vi.
	White Sugar	℥ xiv.
	Dilute Phosphoric Acid . . .	℥ xiv.

Dissolve the sulphate of iron in one ounce of boiling water, and the phosphate of soda in two ounces of boiling water. Mix them and wash the precipitated phosphate of iron until the washings are nearly tasteless. Dissolve the sulphate of quinia in two ounces of water by the aid of dilute sulphuric acid, and precipitate the quinia by aqua ammonia, and carefully wash it. Dissolve the phosphate of iron and the quinia thus obtained, as also the strychnia, in the dilute phosphoric acid ; then add the sugar and dissolve the whole without heat.

This formula, the one having semi-officinal recognition, is somewhat defective, and precipitates the iron in a few weeks, so as to modify its therapeutical powers, and seriously impair its pharmaceutical beauty. The dilute phosphoric acid is not sufficient to dissolve the iron, quinia, strychnia, and sugar, and hold them in perfect solution ; the amount of sugar is not sufficient to preserve the preparation from deterioration by age and atmospheric influences, while the preparation by the above formula of mine seems to be free from these objections.

Being desirous of forming a concentrated syrup of much greater strength than the above, so as to be more convenient for use on the tented field, I devised the following formula in 1864 :—

℞.	Freshly Prec. Phos. of Iron . .	grs. 600
	Quinia, freshly precipitated . .	grs. 96
	Strychnia	grs. iij.
	Syrupy Phosphoric Acid . . .	f. ℥ iv.
	Water	℥ xiv.
	Syrup (very dense), q. s. ad . .	f. ℥ xij.

Mix the phosphate of iron, quinia, and strychnia in the syrupy phosphoric acid previously diluted with fourteen drachms of water, and dissolve them. Add sufficient syrup to measure twelve fluid ounces, and bottle with a tight-fitting stopper, so as to exclude the air entirely.

Each drachm will represent above five grains of the ferrous phosphate, one grain of the quinia, and one thirty-second of a grain of strychnia phosphate. There are about three grains of free phosphoric acid and about ten grains in basic combination of the same. Although a good preparation for an army surgeon, it is rather too powerful for private practice. Outside of my military practice I have never used it, although it was a great favourite of mine in the army hospitals.

In compliance with the wishes of several physicians, Mr. Theodore A. Polk, of Seaford, Delaware, prepares the syrup thus :—

℞.	Freshly prec. Phos. of Iron . .	grs. 192
	Phosphate of Quinia	grs. 64
	Strychnia	grs. 2
	Dilute Phosphoric Acid . . .	℥ x.
	Sugar	℥ viij.
	Essent. Tinct. Orange . . .	℥ iij.
	Oil of Cardamom	gtt. viij.

Dissolve the phosphates of iron, quinia, and strychnia in the dilute phosphoric acid. Rub the essential tincture of orange and oil of cardamom with the sugar. Mix altogether, and dissolve without heat.

LACTO-PHOSPHATE OF IRON AND LIME.

℞.	Freshly prec. Phos. of Iron . . .	℥ iij.
	Syrupy Phosphoric Acid	℥ vi.
	Concentrated Lactic Acid	℥ ij.
	Freshly prec. Phosphate of Lime .	℥ iij.
	Syrup of Orange Flowers, q. s. . .	♁ xij.

Add the phosphate of iron to the syrupy phosphoric acid, previously diluted with two ounces of the orange-flower syrup. Mix the phosphate of lime with the concentrated lactic acid, previously diluted with two ounces of orange-flower syrup, and dissolve. Lastly, mix the two solutions together and add sufficient syrup to measure twelve ounces.

I believe this formula, or a similar one, is destined, at no remote day, to attain the very zenith of professional confidence. I believe it possesses rare intrinsic merit, and embodies curative powers unequalled in certain forms of debility. In convalescence from acute diseases it promises much. Phosphate of lime is well known to be an important element in the human organism, a real essential in the phenomenon of life. Experiments made of depriving animals of it, by removing it from their food, have been attended with rapid prostration and exhaustion, while the restoration to the food restored them to their former condition. The waste of the phosphate of lime is very great during fevers and inflammations, and the depleted organism demands its restoration. True, nearly every article of food contains it in a greater or less degree, yet the stomach is weak, the digestive and assimilative powers impaired. The emaciated frame demands it in a more readily assimilable form, and this very condition is very excellently filled in the syrup of the lacto-phosphate of iron and lime. If given with an elixir of cinchona, the result would be greatly enhanced.

SYRUP OF THE PHOSPHATE OF IRON AND AMMONIA.

Heat phosphate of soda to redness. Take of the pyrophosphate of soda so obtained ℥ ij. Dissolve in one pint of water. Take of the sulphate of iron ℥iv. Dissolve in twelve ounces of water. Mix the solutions, collect, wash, and dry the precipitate at a gentle heat over a water-bath. Take of this precipitate ℥ i., liq. ammonia ℥ iss., water q. s. Dilute the ammonia water with an equal volume of distilled water, and rub it with the phosphate of iron in a mortar until the latter is dissolved. Then dilute to

seven ounces, and prescrve gentle heat until it is evaporated to six ounces, and add ten ounces of dense syrup. Each drachm contains four grains of the phosphate of iron with ammonium. The syrup is quite permanent and remarkably free from inky taste. It is no doubt a very good preparation. My partiality is, however, very strong for the following preparation :—

SYRUPUS FERRI ET AMMONII CUM QUINIÆ ET STRYCHNIÆ PHOSPHATI.

℞.	Ferri Sulphatis Granulati . . .	℥ vi.
	Sodii Phosphatis	℥ x.
	Acidi Phosphorici Anhyd. . . .	℥ xij.
	Acidi Nitrici, c. p.	℥ iij.
	Quiniæ Sulphatis	℥ i.
	Acidi Sulphurici Dil.	q. s.
	Aquæ Ammoniæ Concent. . .	q. s.
	Strychniæ Citratis	grs. xiijss.
	Sacchari Albi	℥ xxx.
	Aquæ Destillatæ, q. s.	℥ xlviij.

Prepare the anhydrous phosphoric acid by igniting phosphorus in dry oxygen. As soon as the combustion is completed dissolve twelve ounces of the white anhydrous phosphoric acid in sixteen ounces of distilled water ; add the nitric acid, place on a sandbath and apply heat until the fumes of nitric acid cease to be evolved. Dissolve the sulphate of iron in ℥ x of boiling water, and the phosphate of sodium in twenty ounces of boiling water. Mix the solutions and carefully wash the magma until the washings are tasteless. Dissolve the quinia and the strychnia in four ounces of water, and precipitate the alkaloids by slowly adding a weak solution of ammonia water, and carefully wash them. Add the phosphate of iron to six ounces of the solution of phosphoric acid, and apply gentle heat until dissolved. Dissolve the quinia and the strychnia in four ounces of the solution of phosphoric acid. Saturate the remaining solution of the phosphoric acid with the concentrated ammonia water. Lastly, add the solutions of the phosphate of iron, the alkaloids and the phosphate of ammonium together in a bottle of the capacity of three pints, introduce the sugar and sufficient water to complete the measure of forty-eight ounces.

The same result can be obtained by using twelve ounces of syrupy phosphoric acid. The iron, quinia, and strychnia being disolved in six ounces of the syrupy phosphoric acid and the remaining six ounces saturated with the concentrated ammonia water, mix them, and then add the sugar and water as above directed. The only objection that can be urged against this preparation is the very large amount of phosphoric acid, but when we consider that it is nearly all in basic combination, the objection is less than it first appears. I regard this ammoniated syrup of the phosphates as a very valuable addition to our list of remedial agents.

Each drachm contains five grains of the phosphate of iron, six grains of the phosphate of ammonium, one and one-fourth grain of the phosphate of quinia, and one-twenty-eighth of a grain of the phosphate of strychnia. If therapeutically inferior to the syrup of the phosphates of iron, quinia, and strychnia, as a tonic, the phosphate of ammonia adapts it to an especial range of diseases. The permanency of the syrup also entitles it to important consideration. This formula differs very much from one previously published, and seems to be a better one.

(*To be continued.*)

THE ALKALOIDS OF THE CINCHONA BARKS.*

BY O. HESSE.

(*Continued from p.* 592).

II. CONCHININE.†

The first information upon the cinchona alkaloid which I have named conchinine, we owe to Van Hejningen,* who, during the examination of a specimen of quinoidine, discovered this beautifully crystallizing base. Later, Pasteur† recognized its presence in commercial sulphate of cinchonidine, but as Henry and Delondre‡ had already given the name of quinidine to a base which they afterwards found to be identical with their quinine,§ Pasteur thought that those chemists were mistaken, and that in reality they had observed an isomer of quinine, identical with his alkaloid, and so he continued to give it the name chosen by those chemists. Not only Delondre,‖ after him, willingly adopted the erroneously named discovery, but many other chemists followed, so that this error extended, and was gradually introduced into all the chemical works speaking of this alkaloid.

Van Hejningen was of opinion that the β-quinine, as he called conchinine, was quinoidine in the purest form, and following him Strecker¶ also held it to be crystallized quinoidine. Later, Hlasiwetz** having found this alkaloid in commercial cinchonine, and not being able to decide whether he was dealing with a modification of quinine or crystallized quinoidine, rightly proposed for this body a new name, cinchotine. This alteration of name, as we know, found no acceptance ; but it was the occasion however of a treatise on the subject by Delffs.†† The memoir of Hlasiwetz also induced Hirschberg‡‡ to search for "cinchotine" in his "cinchonine," and indeed apparently with success, though the dull crystals that he obtained might well have been only cinchonine.

Finally this alkaloid was described by Kerner§§ under the name of β-quinidine, and Koch,‖‖ who named it β-quinine, first gave certain information that it existed in the bark of *Cinchona Pitayensis*. Although Stenhouse¶¶ retained for his alkaloid the name chosen by Pasteur, and J. E. Howard in his 'Nueva Quinologia' of Pavon, also adopted it, the latter chemist by wide and long experience has been gradually led to the conclusion that Pasteur's designation was very ill chosen, for he says, "All this (the research of Pasteur upon quinidine) is very excellent, with the exception of the terminology, for I can but say that I wish the name could have been retracted."

In the course of his memoir Howard said that a real relationship might happen to exist between conchinine and cinchonine, but not between quinine and cinchonine, since the cinchonine-yielding *C. mierantha* of Peru produced in the East Indies a large proportion of conchinine. From considerations based upon the possibility of such a relation, to which the chemical properties of both alkaloids especially testify, I had already*** named the alkaloid in question conchinine, and later††† made known the etymology of this word. The name conchinine for this base is

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* Translated from the 'Vierteljahresschrift für praktische Pharmacie,' vol. xxii., p. 366.

† As will be seen, Dr. Hesse proposes to discard the name "quinidine," on the ground that it has been used for so many different substances that its retention would prolong the confusion. In its place he suggests the name conchinine for the alkaloid known as "Pasteur's quinidine." We think the advisability of this step is open to great doubt, and that it would have been preferable to have endeavoured to limit the well known term "quinidine" to one definite substance, and this the more especially as the new name "conchinine" is not so suggestive of similarity to quinine in its English as in its German form. We have also received a letter from Dr. De Vrij strongly deprecating the introduction of Dr. Hesse's new name.—ED. PHARM. JOURN.

* *Annalen der Chemie und der Pharmacie,* lxxii., 302.

† *Comptes Rendus,* xxxvi., 26.

‡ *Journ. de Pharmacie,* xix. 623.

§ *Journ. de Pharmacie,* xx., 157.

‖ 'Quinologie,' par Delondre et Bouchardat, 37.

¶ 'Lehrbuch der organischen Chemie,' 2 aufl , 317, § 415.

** *Annalen der Chemie und Pharmacie,* vol. lxxvii., p. 49.

†† *Chem. Centralblatt,* 1859, p. 751.

‡‡ *Pharm. Centralblatt,* 1851, p. 175.

§§ *Zeitschrift für anal. Chemie,* vol. i., p. 151.

‖‖ *Jahresbericht für Chemie,* 1864, 444.

¶¶ *Annalen der Chemie und Pharmacie,* vol. cxxix., p. 15.

*** *Annalen der Chemie und Pharmacie,* vol. cxxxv., p. 333.

††† *Annalen der Chemie und Pharmacie,* vol. cxlvi., p. 357.

preferable to "β-quinine" since then a confusion between that alkaloid and quinine in commerce would not so readily occur, and besides it is a definite term that does not throw upon the nature of the substance the doubts which inevitably result from the use of the word "quinidine."

At the commencement of 1860 De Vrij, while examining a *C. Calisaya* bark from Java, found a peculiar alkaloid very easily soluble in alcohol and in ether, crystallizing from the latter in pretty cauliflower-like tufts and lævogyrous. That this bark contained considerable quantities of conchinine had already been pointed out by Winckler* and Jobst† in their treatise on Java barks; but it was in 1869 that De Vrij‡ first convinced himself of the existence of this alkaloid in cinchona barks, consequently it was not possible that he previously separated it by his analysis from other substances and especially from quinine, so that it is quite probable that his new crystallizable cinchona alkaloid was a mixture of quinine and conchinine. All the experiments that I have since made with calisaya bark from Java tend to confirm me in this opinion.

As to the yield of conchinine, I must point out that this alkaloid is found in considerable quantity in the bark of *C. Pitayensis*, such as is brought from Popayan. This species of cinchona has for some years been cultivated in India also, but as other climatic conditions have there an influence upon the increase of cinchona than in its native country, Howard and others consider that this acclimatization might produce different results. Among the other cinchonas which contain notable quantities of conchinine may be mentioned also *C. amygdalifolia* and *C. ovata*, as well as many hitherto so-called East Indian Calisaya barks.

With regard to the Pitayo barks which are collected in the forests of Pitayo, in the province of Popayan, from *C. pitayensis*, and, according to Karsten, from *C. lancifolia* also, Henry showed in 1830 that they contained very much quinine and especially cinchonine; but in 1837, Peretti, then in Mailand, found in a Pitayo bark a so-called new base which he called "pitoyine." In 1839 Guibourt again examined this bark but could find only quinine and conchinine. Henry as well as Guibourt overlooked the conchinine and probably took it for quinine. Formerly I was of the opinion that Peretti had been the first to prepare conchinine in a pure state, but further researches on this subject showed that this was an error, and that Peretti had not examined a true Pitayo bark, but one from "China bicolorata," collected, according to Karsten,§ at Atacamez, west of Ibarra. In 1835 the republic of Columbia presented to Pope Gregory XVI. some of this bark, which consequently acquired a great reputation in Italy, and fetched a high price. This bark, after repeated experiments, I find does not contain any alkaloid; there is therefore no reason for retaining the name of "pitoyine," which Wiggers‖ has proposed to change to "bicolorin" or "tecamin."

I still prepare conchinine by the process formerly indicated by me. When this alkaloid is precipitated by iodide of potassium from a solution containing at the same time a pretty considerable quantity of cinchonine, the precipitate contains, as pointed out also by De Vrij, a little hydriodate of cinchonine, but the two hydriodates may be easily separated by boiling water or alcohol, in which the hydriodate of cinchonine is easily but the other salt difficultly soluble.

De Vrij¶ has published a very simple process for preparing conchinine, based upon the equivalent of quinoidine being about double that of tartaric acid. He dissolves together the corresponding two parts of quinoidine, and one part of tartaric acid, and thus obtains principally tartrate of quinoidine, while he thinks that the solution deposits the tartrate of conchinine, which is less soluble. But by his method mostly a mixture of cinchona alkaloids is obtained, from which, however, it is easy to extract the conchinine, by crystallizing the crude product from boiling water, and neutralizing the solution with ammonia. Upon the cooling of the solution, neutral tartrate of cinchonidine separates, mixed sometimes with a little tartrate of quinine, whilst the conchinine remains in the mother liquor, from which it can be precipitated, after heating, by iodide of potassium.

Conchinine turns to the right the plane of polarized light, as stated by Pasteur. According to him, $a\,r = +250{\cdot}75°$ at 13° C., which gives for the yellow ray, $a\,j = +327°$. My own experiments with this alkaloid have given a different result. I have dissolved the base in alcohol, after having estimated the water of crystallization by a special experiment.

(1) For $p = 3{\cdot}7787$ (anhydrous), and $l = 200$, $a = +21{\cdot}71°$.

(2) For $p = 3{\cdot}640$ (anhydrous), and $l = 200$, $a = +18{\cdot}94°$.

The rotatory power of conchine in alcoholic solution appeared to be, therefore—

	Experiment I.	Experiment II.	Mean.
$a\,j =$	$+260{\cdot}16°$	$+261{\cdot}14°$ . . .	$+260{\cdot}65°$.

With the neutral sulphate of conchinine I have obtained the following results :—

For $p = 2{\cdot}1400$ (anhydrous and in alcoholic solution), and $l = 200$, $a = +9{\cdot}71$, or—

For $2\,C_{20}H_{24}N_2O_2\,H_2SO_4 + 2\,H_2O$.	$a\,j = +216{\cdot}70°$.
For the anhydrous salt	$a\,j = +226{\cdot}87°$.
For conchinine	$a\,j = +261{\cdot}18°$.

This salt was afterwards dissolved in sulphuric acid, diluted to different degrees, and gave :—

(I.) For $p = 2{\cdot}4332$ (anhydrous), $SO_3 = 1$ molecule, and $l = 200$; $a = +13{\cdot}65°$.

(II.) For $p = 2{\cdot}4014$ (anhydrous), $SO_3 = 6$ molecules, and $l = 200$; $a = +13{\cdot}54°$.

Which would be for the anhydrous salt—

	Experiment I.	Experiment II.
$a\,j =$	$+280{\cdot}49°$	$+281{\cdot}91°$
For conchinine $a\,j =$	$+323{\cdot}06°$	$+324{\cdot}54°$

Finally, a test of the rotatory powers of the hydrochlorate of conchinine gave—

(I.) For $p = 2{\cdot}5362$ (anhydrous and in alcoholic solution), and $l = 200$; $a = +12{\cdot}31°$.

(II.) For $p = 1{\cdot}6910$ (anhydrous and dissolved in dilute HCl), and $l = 220$; $a = +10{\cdot}41°$.

(III.) For $p = 1{\cdot}6030$ (anhydrous and dissolved in concentrated fuming HCl), and $l = 200$; $a = +7{\cdot}42°$.

We have thus—

	Experiment I.	Experiment II.	Experiment III.
For anhydrous hydrochlorate of conchinine :— $a\,j =$	$+242{\cdot}68°$	$+279{\cdot}82°$	$+231{\cdot}44°$
For conchinine $a\,j =$	$+270{\cdot}03°$	$+312{\cdot}47°$	$+257{\cdot}52°$

From these results I draw the following conclusions :—When conchinine is combined with sulphuric acid, as a neutral salt, the rotatory power of conchinine is scarcely modified, but this is significantly augmented when this sulphate is converted into the sulphate with one molecule of acid; it then remains nearly constant, even in presence of a large proportion of sulphuric acid. In the state of hydrochlorate, however, conchinine possesses a rotatory power entirely different; as, for instance, when combined with that acid as a neutral hydrochlorate. With a

* *Neues Repertorium für Pharmacie*, vol. xv., p. 437.
† *Neues Repertorium*, vol. xix., p. 341.
‡ *Jahresbericht für Chemie*, 1869, p. 940.
§ 'Die medicinischen Chinarinden Neu-Granadas,' p. 28.
‖ Wiggers' 'Pharmakognosie,' 5th edit., p. 429.
¶ *Chemisches Centralblatt*, 1872, p. 152.

greater admixture of acid its rotatory power is augmented, as it is also by the addition of dilute acid, and the addition of concentrated acid so greatly increases it that the rotatory power surpasses that of free conchinine. It is probable, therefore, that Pasteur, in his estimation of [a], did not use pure alcohol to obtain a solution of the alkaloids for his researches, but a moderately dilute acid.

III. Quinidine.

Under this name I would designate provisionally an alkaloid which Kerner* formerly (before 1862) frequently met with in the sulphate of quinidine of commerce. This alkaloid, according to Kerner, appears under the form of large, short, usually truncate prisms, which effloresce but slowly. Its salts present a remarkable dissimilarity to the corresponding salts of quinine, both in their form and in their degree of solubility. The sulphate dissolves in from 180 to 300 parts of cold water. This difference of solubility appears to indicate that this alkaloid which Kerner named first "α-quinidine," and afterwards "quinidine"—is but a mixture. Should this conjecture not be confirmed, and should it be established that this body is a definite compound, I would propose to give it another name to avoid the confusion resulting from the employment of the word "quinidine."

Experiments made by me last year with the object of obtaining this alkaloid from commercial cinchona barks remained without result, but I intend to make further experiments in this direction, unless Kerner should make known his labours upon the subject.

(To be continued.)

A CHEMIST IN THE BUSH.

BY W. M. ROGERS.

The idea has lately occurred to me that a brief sketch detailing the every-day life of a chemist in the "wilds" of Tasmania, might not prove unpalatable to your readers or unsuited to your pages.

If you will take the trouble to refer to one of Stanford's maps of Tasmania, and run your eye along the northern shores of that island, abutting on to Bass's Straits, you are well nigh sure to encounter Port Frederick, the entrance to the River Mersey.

Taking this as a starting point and drawing your finger in a line almost due south until you arrive at a spot where the river suddenly contracts within a comparatively narrow margin, you will perceive marked, no doubt, a township under the name of Latrobe. Of quite a recent origin, in fact, barely twenty years old, this township, owing its existence almost entirely to agriculture, possesses within itself all the elements of prosperity, and in spite of changes of a feeble ministry, exhibits all the tokens of progression.

The inhabitants of the township proper do not exceed, probably, 400, but the surrounding district has a wide area, dotted over with numerous homesteads, whose occupiers have encountered and still encounter hardships which to an English farmer, if related in all their startling truth, would be regarded as inventions of the fictionist. The majority of the smaller proprietors hail from the Emerald Isle, with a sprinkling of a better class from the northern and midland counties of England, whilst a few of the more refined descendants of "good families" still reside in the immediate neighbourhood. Further westward, again, dwelling in habitations at intervals, on what is known as the north-west coast, may be found a few retired officers, who have served under the East India Company, and as members of the British Army, in virtue of which they receive annual pensions of from £200 to £600. There is no such thing as individual wealth amongst the members of this mixed community, and with the exception of the latter-named class, each one is struggling for existence on well-nigh equal terms. Salaries and wages, although higher than in England, are reduced to a similar footing by the increased prices for articles of necessity, one article of food, that is meat, only, can be excepted. With regard to the charges for physic more will be said anon. I can picture the astonishment, nay, even disgust, which a dapper young assistant from one of your West End establishments would of a surety display were he suddenly to be transported (not as a convict, of course), but for the purpose of taking charge of a *bonâ fide* business in the bush of Tasmania.

It requires a schooling, I assure you, O reader! whoever you may be, whether proprietor of one of those splendid West End establishments, or a young man contemplating emigration in search of improved fortunes, novelty, or merely change.

Yes, it requires a schooling, and more than this, a mind moulded perchance to adapt itself to circumstances, and capable of resisting the enervating influence of the many hours during which it is next to impossible to find active employment. Yes, the absence of this latter is the one thing which a young man fresh from the turmoil and excitement of a busy European city would mostly miss, and no doubt regret.

But, on the other hand, to the intellectual mind, and to one able to overcome the first feelings of depression consequent on the sudden change, there is a glorious sensation of liberty. And to one who goes forth with a determination to rightly make use of this glorious acquisition, there ensues a wide field for giving scope to the intellectual powers, which soon begin to soar above the mere humdrum of business, to be regarded only as means to an end, and not allowed to engross the whole of one's worldly existence. Yes, without in any way despising this means of gaining a livelihood, or neglecting the so-called drudgery of a pharmacist's occupation, the aspirant may gradually but effectively penetrate into those regions of philosophy, however humble may be his footsteps, which he had hitherto seen but dimly and from afar.

Yet must he anticipate difficulties, for the probability of meeting with one bent on a similar task, or having access to one who has already reached the goal are extremely faint and rare. But, though he may not all at once meet with human sympathy, what lacks he when surrounded by all glorious Nature, who patiently awaits but his signal to open to him her "holy of holies?"

After all the artificial excitement of a city life how dull and unattractive to the mere outward observer would doubtless appear our natural surroundings, tempered as yet with but little of architectural addition; but to you, gentle reader, perchance a humble worshipper of Nature, something of interest may be reflected from her magic mirror. Look to the southward and see tier after tier of ranges, rising gradually, until at length in the far distance may be distinguished one fellow towering above his neighbours—that is Mount Roland, visible far out to sea and attaining a height of over 4000 feet. To the north you perceive another range, at the foot of which lies the little township, surrounded, in fact, on every side by hills except an opening to the westward, the valley along whose base flows with swift current the noble river. Up this valley come the prevailing west and north-westerly winds, at times soft and gentle as a zephyr, at others with the force of a hurricane. Very healthy are these westerly breezes, coming fresh from the South Atlantic Ocean, and laden with the life-restoring ozone. Indeed, during my sojourn here upwards of four years no epidemics beyond attacks of influenza have occurred, and these, too, limited to a few mild cases. Now let us observe a peculiarity in the surface soil taken from various localities throughout this broad valley or depression, which is the prevalence of water-worn shingle and marine and fresh-water shells, an evident indication that the disturbances which caused the waters to retire have been of comparatively late occurrence. These marine deposits may be found too on the summit of the highest range hereabouts, with occasional

* Zeitschrift für Analytische Chemie, vol. i., p. 150; Archiv für Physiologie, vol. ii., p. 200.

patches extending to a considerable depth on the hill slopes, as though arrested half way down by some intervening cavity. Coal has been known to exist in the neighbourhood for some years, and in various places, half a mile or so from the river's course, may be discovered abandoned shafts, the old workings of some company now in a state of collapse. At the time I write, owing to increased demand for this fuel, the search is being renewed and speculation is becoming rife both in this and neighbouring colony of Victoria. One individual, comparatively a poor man, bids fair to accomplish what hitherto wealthy companies have failed to do, that is, discover a payable coal mine. He commenced boring some six months ago, and after various testings, hit upon a spot at the junction of two lines of range, running at oblique angles, where at the depth of some forty feet from the surface, he came upon a seam of the mineral from twenty to twenty-two inches in thickness. Some six feet above this was a layer of lignite a few inches thick, containing a large quantity of iron pyrites, with earthy and alkaline salts. For steam purposes this coal answers admirably, and several of the residents who have tried it on their open hearths speak highly of its heat producing qualities. The sulphur which it contains must however somewhat limit its use, but even in this respect it seems preferable to the coal hitherto found in this part of Tasmania. Of the more precious metals we cannot make much boast. Gold has been found in very minute particles in the creeks and tributaries within a few miles of us, but the result has not been of a nature to induce any organized search. About three years ago, however, myself with a few others cast in our lots, and having raised some £40 by subscription, sent forth an experienced miner into the "wilds" to prospect for gold. Whatever might have been the experience of this individual in the colony of Victoria he did not prove equal to the emergency of Tasmanian bush exploration, for the lad who accompanied him, a shrewd native youth, and accustomed to "rough it," told us that his mate quite broke down on the fourth day out, scared at the difficulties of making headway through the dense foliage and scrub which bordered the river and creeks. Fearful doubtless of becoming totally lost, he "made tracks" for the haunts of civilization with only a few specimens of iron and copper pyrites glistening in the crystal quartz, and to the uninitiated bearing strongly the appearance of the more precious metal.

About 100 miles to the westward, at Mount Bischoff, there has lately been discovered a tin-bearing locality. The lucky finder, after years of travel through the very heart of the bush, upheld by his unbounded faith in the mineral wealth of the country, is now in a position to take his ease, if he so chose, for the remainder of his life, his interest in the affair, at the lowest computation, being worth £20,000.

No gems of any great value have as yet, so far as I am aware, been found in this locality; but examine the bed of the river, and you will find many a bright-tinted stone, but none, unfortunately, worthy to rank with the jasper or emerald. Small specimens of the ruby may here and there be selected from the masses of water-worn quartz at the bottom of the creeks, which take their rise in the lofty ranges to the south-west. The diamond, so-called hereabouts, is nothing but a well-defined quartz-crystal.

I have seen from Flinder's Island some magnificent specimens; and it is not so long since that an amusing incident occurred. An unusually large crystal was enclosed in a chamois leather bag, and despatched to a well-known Melbourne firm, celebrated for its dealings in the more precious stones and minerals. On the strength merely of its weight and size—for only a privileged few were permitted to behold the stone devoid of its covering—a company was actually inaugurated to purchase this so-termed diamond. One would-be shareholder, however, more wise or suspicious than the rest, proposed that it should be passed under the observation of a noted mineralogist, and his opinion obtained thereon. Consequently, Mr. Clark, of Sydney, was sent for (the stone was too precious to intrust to the tender mercies of any single individual), and his arrival in Melbourne and examination of the false diamond, soon put a stop to the hubbub.

A friend of mine tells me that lately while superintending the cuttings for a tramway some eight miles from here, he came across some very pretty crystals embedded in a kind of amygdaloid rock, each almond-shaped cavity or spot containing them in numbers, specimens of which he has promised to bring me.

Now let us look on the surface, and see what claims our attention, for surely:—

"It is pleasant to note all things from the rush to the spreading cedar,
From the giant king of palms, to the lichen that staineth its stem."

Note first of all as most conspicuous the towering Eucalypti with their leaves—as it is now spring-time—of a more vivid green, and getting new coats to their backh or in other words renewing their supply of bark, of whics they have been stripped during the winter months. Very ghostly do these trees appear amidst a full forest with their trunks bare as they glisten white on moonlight nights. You will hear them designated popularly as white and red gum, peppermint, etc., etc. The blue gum (*Eucalyptus globulus*), of which you have heard through its late introduction as a febrifuge, does not thrive in this northern part of the island, but further south it is tolerably abundant. On the alkaloid extracted from the leaves principally, Mr. Bosisto, of Richmond, Victoria, has bestowed the name "Eucalyptene."* The volatile oils from *E. melaleuca* also furnish a very fair substitute for cajeput, which likewise belongs to the extensive family of Myrtaceæ. Just now you will perceive the air laden with the delightful wattle perfume; the *Acacia mimosa*, the blossoms of which you have doubtless seen in your greenhouses at home, but which thrive here most luxuriantly. On the river bank, and in moist places, you will find the "Dogwood Piscidia," the ash of which yields potash; as yet we have failed in procuring the alkali to any extent from other trees. A friend of mine having plenty of iodine, but no potash, lately went to some trouble to prepare the iodide, of which he found himself in immediate want, and it being a long distance to send to the northern metropolis (Launceston). I must not omit to say that it was from the dogwood he obtained his supply of potassa.

Manna from *Eucalyptus dumosa* is not found here in quantity, but further south is picked up in large fragments and eaten with gusto by the juveniles. I am not aware that it possesses laxative properties like its namesake from Egypt.

Although this is not the season for seeing a fern in all its quiet beauty, more especially those called the tree ferns, still there are numerous specimens of the smaller species worthy our examination. The Maidenhair (*Adiantum Ethiopium*) to wit, under the flowering box and wild raspberry (which latter is very common hereabouts) may be met with almost throughout the entire year. The Spleenworts (*Asplenium*) are a widely diffused genus, one especially (the *A. flabellifolium*) we find running. about everywhere. The *Polypodii* too are numerous The true *Aspidium* I have not yet met with.

And now to close this imperfect sketch with a bit of in-door gossip. Amongst a comparatively rude population (although some very intelligent men may be here and there met with) any elaborate display on our part is found to be both impracticable and superfluous. We go in for the purely practical, and our notoriety is to be founded on results only. We must needs combine the physician, the apothecary, the surgeon, and the chemist. Through this your humble servant was "once on a time" nearly

* Our correspondent does not seem to have heard of Mr. Broughton's unsuccessful search for this supposed alkaloid. —Ed. P. J.

getting into trouble with a black-visaged "Medico" who made a brief sojourn in the neighbourhood. That is to say he contested my right to give advice gratis, as the advertisements say, and to avoid difficulties I deemed it prudent to yield to the whim of the "legally qualified." Our patients or customers, by whichever title it may be thought proper to distinguish them, do not as a rule display any nicety as to the kind of bottle from which we may obtain their particular remedy or remedies, whether with gilt label and stopper, or simply a plain written strip and cork. What they require mostly is for you to minister to and alleviate the ailment from which they may be suffering. Do this and they will proclaim trumpet-tongued in your favour. During my bush experience I have ever observed a disposition on the part of the public to overlook little deficiencies in the way of appliances, and to be content with a plain exterior. They frequently express their gratification that a knight of the pestle and mortar has deigned to settle amongst them. Our charges, of a necessity, are much higher than those of your country, for instance, ℥i. to ℥iv. mixtures, 2*s.* 6*d.*; ℥vj and ℥viij, 3*s.* 6*d.* to 4*s.* 6*d.*; pills, per dozen, 1*s.* 6*d.* to 2*s.* 6*d.*; powders 1*s.* each, and so on in proportion. These charges, however, as a rule include advice, for, as before remarked, there is no resident medical gentleman, and consequently written prescriptions may be likened to angel's visits—few and far between.

INFLUENCE OF PRESSURE UPON FERMENTATION.*

BY HORACE T. BROWN, F.C.S.

In an investigation undertaken for the purpose of determining accurately the composition of the gas evolved during the vinous fermentation, the author noticed the fact that other gases, besides carbonic anhydride are evolved when glucose splits up under the action of the alcoholic ferment. He also found that the amount of atmospheric pressure materially affected the relative quantity and also the composition of the evolved gases unabsorbed by potash, and that these variations were accompanied by corresponding alterations in the liquid undergoing fermentation.

When the gas evolved after several hours' fermentation at 14°C. of malt worts previously freed from air was collected over strong solution of caustic potash the proportion of unabsorbed gas to the total amount liberated was about 1 : 3,000, and a rise in the temperature was generally accompanied by a slightly increased evolution of unabsorbed gas. The unabsorbed gas was found to be a mixture of nitrogen, hydrogen, a hydrocarbon, and in some cases nitric oxide; the following represents its percentage composition :—

Nitrogen	92·15
Hydrogen	4·85
C_nH_{2n+2}	1·67
Nitric Oxide	1·33
	100·00

The occasional evolution of nitric oxide was attributed to the "nitrous fermentation" of nitrates present in the water employed, since when the water was free from nitrates no nitric oxide was detected. The hydrocarbon did not occur in sufficient quantity to admit of an accurate determination of its nature, but as it was not absorbed by fuming sulphuric acid it was presumed to belong to the paraffin group. The hydrogen was not, as might have been supposed, indicative of the simultaneous occurrence of the butyric fermentation. Under a reduced atmospheric pressure the amount of gases unabsorbed by potash was found to increase, and this increase was mainly due to the more abundant evolution of hydrogen under these conditions; but no butyric acid was found. The increase of hydrogen was invariably accompanied by an increased quantity of acetic acid and aldehyd in the fermenting liquid, but no butyric acid was formed. The author thinks that hydrogen must be looked upon as a normal product of the alcoholic fermentation, and for various reasons he considers that water is decomposed during vinous fermentation, the dissociation of the water molecule being favoured by a reduction of external pressure. Nitrogen was evolved from solutions containing albuminoids but no nitrates; on the other hand none was observed during the fermentation of solutions containing abundance of ammonia salts, but no albuminoids. The author therefore infers that the nitrogen proceeds from the decomposition of albuminoids. The evolution of nitrogen, contrary to that of hydrogen, appears to decrease with decrease of pressure.

The results of numerous experiments pointed to the conclusion that diminished atmospheric pressure tends to retard in a remarkable manner the progress of the alcoholic fermentation; but the amount of this retardation did not appear to be directly proportional to the diminution of pressure, nor yet related to it in any simple way. The author, however, thinks it probable that by conducting a series of experiments upon exactly similar liquids, at the same temperature, some correlation would be found between the actual pressure and the alcohol formed. Still it is a fact that under diminished pressure there is always less sugar decomposed than during an equal interval of time at the ordinary pressure of the atmosphere.

The amount of carbonic anhydride produced from fermentations at ordinary pressures, as compared with the alcohol formed, was found to be subject to a variation of about 2 per cent. Moreover, the interesting fact was revealed that diminished pressure tends to increase the relative amount of carbonic anhydride, this increase varying, in the experiments made, from ·5 to 2·5 per cent. of the alcohol formed. If the equation of Guy-Lussac, $C_6H_{12}O_6 = 2\,C_2H_6O + 2\,CO_2$, were rigidly correct, every 100 parts of alcohol ought to correspond with 95·65 parts of carbonic anhydride. Pasteur found that during the fermentation of about 10 grams of sugar, alcohol and carbonic anhydride were produced in the ratio of 100 : 96·09. The difference between this last number and that indicated by the equation of Guy-Lussac he attributed to the simultaneous production of glycerine and succinic acid, according to the equation :—

$$49\,C_{12}H_{22}O_{11} + 109\,H_2O = 24\,C_4H_6O_4 + 144\,C_3H_8O_3 + 60\,CO_2$$

Succinic Acid. Glycerine.

If it be true that the excess of carbonic anhydride which is always found is entirely due to the production of glycerine and succinic acid, it appears evident that a reduction of atmospheric pressure favours this particular reaction.

In seeking for a sufficient cause to account for the comparatively slow progress of the alcoholic fermentation in a more or less perfect vacuum, it was thought not improbable that it might be found in the partial destruction of the torula cells constituting the parent yeast, through the carbonic anhydride held in solution by the protoplasmic contents of the cells being liberated, when pressure was reduced, with such violence as to rupture the cell-wall and arrest the vitality of the organism. But some portions of yeast having been placed under the receiver of an air-pump, and the air exhausted with considerable rapidity, no difference could be detected in the appearance of the cells when carefully examined under the microscope, neither was their fermentative action found to be materially modified. The only other reasonable explanation of the retarding influence of reduced pressure upon the alcoholic fermentation, the author considers to be that the organized ferment experiences greater difficulty in re-arranging the atoms of the sugar molecule, owing to the changed physical conditions of its environment; that, in fact, the sugar molecule is more stable under conditions of

*Abstract of two papers read before the Chemical Society (*Journ. Chem. Soc.*, vol. x. p. 570 and vol. xi. p. 973.)

low external pressure. It therefore became interesting to consider how this conjecture agreed with the conclusion of Sorby, that it is highly probable "that pressure weakens or strengthens chemical affinity, according as it acts against or in favour of the change of volume." In other words, that when the re-arrangement of atoms due to any reaction taking place slowly results in an increase of volume, pressure retards the chemical change, whilst the reverse holds good in those cases where there is an actual decrease in volume. Theoretically and experimentally it was found that a contraction in volume takes place during the alcoholic fermentation of a sugar solution, and the retardation of the fermentation under diminished pressure therefore affords evidence in favour of the correctness of Sorby's proposition.

With respect to the acetic acid formed, the proportion of which increased with diminution of pressure, the author for various reasons felt driven to the conclusion that acetic acid is sometimes produced directly from the sugar, and not by oxidation of the alcohol. Whether the splitting up of the sugar molecule under peculiar circumstances, according to the equation $C_6H_{12}O_6 = 3C_2H_4O_2$, is correlative with the functions of the ordinary yeast cells he is not prepared to say, but the fermentation appeared to be quite normal, and the microscope revealed no indications of the presence of the *Mycoderma aceti*. It is interesting however to note that the decomposition of the sugar molecule in this manner is just such a reaction as should, according to Sorby's law, be intensified by a decrease of pressure, because during the change there would be a large increase in the volume of the liquid.

GIGARTINA ACICULARIS AS AN ADULTERANT OF CARRAGEEN MOSS.*

BY J. DALMON.

The author has for some time frequently observed in French commerce the mixture of *Gigartina acicularis* with carrageen moss (*Fucus crispus*, L.; *Chondrus polymorphus*, Lam.), and he states that he has received specimens of moss containing as much as 40 per cent. of it. The mixture is readily discovered upon a moderately careful examination.

The *Gigartina acicularis*, Lam., belongs, like the *Fucus crispus*, to the order of Algæ, sub-order Choristosporeæ. It is distinguished from the latter by its cylindrical, cartilaginous, subdichotomous, flexuous fronds, with acuminate most frequently bifurcated branches, sending out lateral horizontal spiniform branchlets. The conceptacles are spherical, sessile, and thin. The mixture is also manifested by the light brown tint retained by the pedicels, which gives to the mass an appearance of a less uniform colour than that presented ordinarily by carrageen.

Placed in contact with cold water, the *Gigartina acicularis* absorbs it rapidly and in great quantity, and swells considerably. Treated with boiling water it dissolves, but in much less proportion than *Fucus crispus;* the jelly which it yields upon cooling is opaque, whitish, and without consistence. 100 parts of this alga leaves upon calcination 16 parts of a residue which retains the form of the plant. This ash dissolves partly in water. The solution is neutral; it is precipitated slightly by nitrate of silver, and abundantly by nitrate of baryta and oxalate of ammonia. The solution evaporated, and redissolved in alcohol and water gives, with phosphate of ammonia, a crystalline precipitate. The insoluble part of the residue consists of carbonate of lime and silica. Operating as above the following results were obtained:—

Chlorides of Sodium and Magnesium	0·60
Sulphate of Magnesia	1·20
Sulphate of Lime	6·60
Carbonate of Lime	5·40
Silica	2·20
	16·00

Calcination with potash and testing with an acid and starch showed no trace of the presence of iodine.

Practically the mixture of *Gigartina acicularis* with carrageen moss presents no advantage to the pharmacist, who would not obtain with this product a jelly presenting the consistence sought for in the preparation of jellies from carrageen. But the author considers that the remarkable quantity of lime salts which the *Gigartina* contains would render it a fairly active medicament in many cases, and especially in phlegmasies of the intestinal canal.

* *Répertoire de Pharmacie*, new series, vol. i., p. 696.

THE LESSER CENTAURY.

According to the *Journal Officiel d'Algérie*, an extraordinary quantity of the lesser centaury, *Erythrea Centaurium*, Pers., was sent from Algeria into France during the year that has just closed. Its Arab name is *Meurr el haneeh* ("the serpent's bitter"); Spanish, *El feld de tierra;* German, *Das gemeintausend Gatdenkraut.*

The plant is common in three provinces of Algeria. Europeans and natives collect it for their own use and for exportation; the tops being employed for making an infusion, 10 to 30 grams in 500 grams of water. It flowers from March to May, as also does its yellow flowered congener *Erythrea maritima*, Fries.; *E. ramosissima*, Pers.,* or *E. pulchella*, Fries., flowers from May to July, and *E. Spicata*, Pers., which grows in marshy lands, from June to August. In France the *E. Centaurium* enters into the composition of "banme vulneraire," "esprit carminatif de Sylvius," "thériaque," etc. It belongs to the Gentianaceæ and presents two varieties, which are considered by some botanists to be two species, the *E. major*, Link., and *E. latifolia*, Smith. It is called the lesser centaury because it is bitter, tonic and febrifuge, like the great centaury (*Centaurea Centaurium*, Linn.), which belongs to the Compositæ, and of which the root is used.

Two other gentians are found in Algeria, the *Chlora grandiflora*, Viv., considered by many botanists to be merely a variety of *C. perfoliata*, Linn., and the tiny *Exœum filiforme*, Wild, found in the marshes in the spring time. The *Chlora* is worthy of being cultivated in gardens because of its large yellow flowers, the same flower opens in the morning and closes in the evening, during at least a fortnight. Its Arab name is *tadger*.

ESTIMATION OF ACONITINE IN DIFFERENT ACONITES.†

BY O. ZINOFFSKY.

The estimation was effected by means of a solution of iodide of mercury in iodide of potassium:—

From 100 parts of	A. stoerkeanum.	A. napellus.	A. variegatum.
Fresh leaves, before the opening of the flowers	0·1699	0·1776	0·1670
Fresh stalks, before the opening of the flowers	0·1166	0·1236	0·1009
Fresh flowers, before expanding	0·3418	0·4350	0·4350
Fresh leaves, when the flowers are fully expanded	0·2710		
Fresh stalks, when the flowers are fully expanded	0·2770		
Fresh flowers, expanded	0·7294		

These numbers show that the flowers are always richer in alkaloids than the leaves and stalks.

* The "Muli Ali's Flower" mentioned by Dr. Leared in his list of Morocco Drugs (PHARM. JOURN. [3] iii. 622), as being used in dyspepsia belongs to the species.—ED. PH. J.

† *Journ. de Pharm. et de Chemie*, Jan. 1874, p. 82, from Wittstein's 'Vierteljahresschrift.'

The Pharmaceutical Journal.

SATURDAY, JANUARY 31, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

OUR EVENING MEETINGS.

QUITE in the infancy of the Pharmaceutical Society, almost before it had even gained sufficient coherence strictly to entitle it to such a name, it was contemplated, as one of the means by which sound pharmaceutical information could be diffused throughout the country, to hold periodical meetings, when papers recording the results of original research in the sciences related to pharmacy might be read and discussed. With the men who then were working so heartily for the good of pharmacists the conception of a plan was rapidly followed by an attempt to put it into execution. Thus it was that although through the "incomplete state of the infant Society, and in "the absence of the requisite accommodation, these "scientific meetings could not be established on a "scale which would be creditable to a public institu-"tion," a pharmaceutical meeting was held at 338, Oxford Street, on the 11th May, 1841, at which a paper was read, and to which medical men, as well as chemists and druggists, were invited. Other meetings were then announced, and a hope was expressed that in process of time meetings of this description would be officially instituted by the Pharmaceutical Society, and that papers would be furnished containing materials for a Journal of Pharmacy. The hope was fulfilled, and on the 12th of January of the following year the first pharmaceutical meeting was held in the new premises just then taken by the Society in Bloomsbury Square, when, after an address from the President, Mr. ALLEN, papers were read by Mr. SQUIRE, and Mr. (now Dr.) REDWOOD. How the Society has developed since that time is well-known; but the Pharmaceutical Meetings have not grown with its growth and strengthened with its strength. In early days, when papers bearing the names of such men as THOMSON, MORSON, DEANE, BELL, SQUIRE, REDWOOD, GARROD, GUIBOURT, PEREIRA, FOWNES, and many others, were forthcoming, it was thought necessary on one occasion to point out that these meetings were not the primary attraction which the Society offered to the pharmacist; but we fear that such a remark would be sadly out of place now.

It is in the remembrance of what has been, and the knowledge of the fact that up to the time of writing no paper has been received for the Pharmaceutical Meeting next Wednesday, that we find an excuse for calling attention to this subject; should the result be that steps are taken towards raising these meetings to the position that we conceive they ought to occupy, our object will have been accomplished.

What then are the causes that have led to such a result as that,—for the second time this session, and this time, after an interval of two months,—there is a difficulty in announcing the subjects for discussion before the time of meeting? Some of these appear to be unavoidable, but others we think might be controlled. There is the fact that a constant gleaning is going on for supplying the columns of this and similar journals; there are also now the competing claims of numerous provincial associations for papers that might otherwise have found their way to Bloomsbury Square; and further there is the holocaust of pharmaceutical research offered annually at the meeting of the Conference. All this must be admitted, but should not be deplored, since there must be ample material left to occupy the five evenings a year allotted to these meetings, and material, too, that probably would not be utilized in any other way.

With regard to the question as to the best means of increasing the interest of these meetings, since we write rather in ignorance of what has been done by those to whom this business is entrusted, anything we say must take the form of suggestions. And first, could not more assistance be obtained from the members of the medical profession, whose interest in the progress of scientific pharmacy nearly if not quite equals that of the pharmacist, and who must frequently have questions pertaining to the preparation of medicines pressed upon their notice, which they would like to refer to pharmacists to consider? If it were more generally understood that the Pharmaceutical Society would welcome such communications at these evening meetings, would papers like that of Dr. DYCE DUCKWORTH be such *rare aves in terra?*

Again, as respects internal assistance, passing by the question whether there might not be more frequent contributions from the representative men of the Society—the members of Council, professors, and examiners—might not the subject-matter for a very profitable evening be sometimes provided in the report of a committee appointed to consider a particular subject? The Paris Society frequently refers in this manner a subject brought forward by one of its members; the report on commercial "propylamine" was a valuable contribution towards clearing up the confusion which existed respecting that article, and another committee is now engaged in preparing a report on the various methods of estimating the alkaloidal value of cinchona barks.

Lastly, we would ask the question, how often the bye-law is complied with which states that "all communications intended to be made at such meetings shall be submitted to the President, or, in his absence, to the Vice-President, or to the Chairman of the meeting, for his sanction, and without

such sanction no subject shall be introduced ?" From an apparent neglect of this bye-law on various occasions, the earlier part of the time of the meeting has been occupied by the introduction of unexpected subjects, and the reading of announced papers has either been deferred or taken place at so late an hour as to preclude their proper consideration, to the disappointment of the authors and of those who came to take part in the discussion. Here, again, the example of our *confrères* across the Channel might be profitably copied. A few days since, a discussion having arisen in the Paris Society upon the education of apprentices, MM. Bussy and Bourgoin made a vigorous protest, and succeeded in maintaining the priority of scientific papers of which notice had been given.

We have thus thrown out a few hints upon the subject, but many others might suggest themselves if the matter were fully considered; our main object now is to attract the necessary attention to secure that, even if too late this session, another shall not commence without an effort to put our Evening Meetings upon a more satisfactory footing.

Since the foregoing was written we have received an intimation that at the Evening Meeting on Wednesday next a "Note on Iodide of Iron," by Mr. W. Murton Holmes, will be read. We hope that other papers will also be forthcoming, but this detracts in no degree from the opinion we have expressed above. The chair will be taken at half-past eight o'clock precisely.

PUBLIC ANALYSTS.

In commenting on a recent case (see p. 626) of prosecution under the Adulteration Act which resulted in a dismissal of the summons, and even induced the magistrate to abstain from inflicting penalties in some other similar cases, the *Medical Press and Circular* offers the following remarks:—

"Such instances are not, unfortunately, rare, and the question naturally arises why are persons appointed to such posts who are either incapable of detecting adulteration, or so careless in the discharge of their duty as to substitute mere guess-work for careful investigation. With the utmost charity let us allow possible excuses for mistakes from over anxiety to carry out the strict letter of the law, etc.; but when gentlemen become candidates and are appointed to positions of such public trust and confidence, armed with powers for the protection of the masses, second in importance, perhaps, to none in the State, and these in their individual capacities state upon oath that the milk examined in one case had been largely adulterated with water, which afterwards was proved to contain no added water, and another vouches that the loaf he examined contained 45 grains of alum, which in reality contained not a trace—when, we say, such things happen, we have no capacity for excuses, but feel that we must face the matter boldly for the sake of our profession, and in defence of an Act which is capable of so vast an amount of good, but which is in danger of being held up to public contempt by its faulty administration. We should consider ourselves as betraying our trust, and culpable of a gross dereliction of duty, did we, from interested motives, or from fear of giving offence, hesitate to draw attention to such an anomaly. It comes to this, the appointment of public analysts will have to be confided to the Government, or to some duly qualified corporate body competent to examine candidates so as to ensure the proper working of the Act, and the protection of the public against unfounded charges. Let us not be misunderstood in advocating a change in the system of appointments; we do not for an instant mean to infer that any looseness or irregularity in the present mode of election has resulted in the return of incompetent or negligent persons; on the contrary, we fully believe that local authorities have impartially and disinterestedly elected those whom in their opinion were best qualified to fill the office. Still, local boards are not expected to understand chemistry, and the result has also gone far to prove that medical men are not all chemists—not all qualified to occupy the posts obtained. Another question also presents itself as to how far the subjects embraced in the medical curriculum are calculated to fit members of the profession for the post of medical officer of health. Does State medicine receive that amount of attention its importance demands? This part of the subject, however, we must defer to a more suitable opportunity, our present purpose being simply to draw the attention of the proper authorities to anomalies which must be at once seen to. If we succeed in this both the profession and the public will be gainers."

The opinions here expressed are very much in accord with those we have at various times put forward in regard to the subject, and we are glad to find that a medical journal has not only recognized the fact that medical officers of health are not as a rule qualified to perform the duties of public analyst but has also had the courage to make this view of the matter public. We trust that something will ere long be done to save the working of the Adulteration Act from the disgrace into which it appears to be rapidly falling.

EVASION OF THE ADULTERATION ACT.

We learn from a local paper that Dr. Barclay, of Chelsea, in alluding to some of the difficulties that are met with in carrying out the Adulteration Act, mentions the case of a milkman, who, when asked for some milk by the inspector, deliberately emptied the contents of his can into the gutter.

SMUGGLED LEECHES.

Morocco furnishes a curious instance of smuggling in the article of leeches, which are shipped from Tangiers principally to Cadiz, and thence to South America and Havana. Although the trade returns would apparently indicate a considerable diminution in this industry—the numbers quoted as exported having fallen from 4,960,000 in 1867, to 335,000 in 1872—yet it is asserted that in reality as much business is done now in leeches as in former years, but there is much reason to suspect that great numbers are shipped in contraband.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

January 21st, 22nd, and 23rd, 1874.

Present (21st and 22nd)—Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

23rd.—Messrs. Allchin, Benger, Carteighe, Corder, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

Dr. Greenhow was present on the 21st, on behalf of the Privy Council.

MAJOR EXAMINATION.

Six candidates presented themselves. *Two* failed. The following *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists :—

*Druce, George Claridge.....Northampton.
Edwards, Charles .....London.
Fox, Charles Edward .....London.
Williams, William Francis .....London.

MINOR EXAMINATION.

Fifty-six candidates presented themselves. *Forty-one* failed. The following *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists :—

*Wood, Alfred .....Sheffield.
Equal. Gresswell, Arthur.....Spalding.
Equal. Rippon, Edwin .....Stamford.
Cheetham, George Richard.....Bradford.
Equal. Polley, John .....Chester.
Equal. Warren, Francis William .....Weston-super-Mare.
Equal. Owen, Samuel .....Leominster.
Equal. Twemlow, Francis Ernest .....London.
Stephan, William Henry.....Chipping Norton.
Hoyles, George .....Lincoln.
Pritchard, Owen .....Bangor.
Barlow, Frederick.....Birmingham.
Roberts, Richard Pritchard.....Bangor.
Colley, Walter ....Birmingham.
Gooseman, John Brocklesby ...Grimsby.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

The undermentioned certificate was received in lieu of this examination :—

Certificate of the University of Cambridge.

Mawson, Thomas Oliver .....Sheffield.

* Passed with Honours.

Provincial Transactions.

LIVERPOOL CHEMISTS ASSOCIATION.

The seventh general meeting of the Liverpool Chemists' Association was held at the Royal Institution, on Thursday evening, January 15th. There was a very large attendance.

The Honorary Secretary announced the following donations :—The current numbers of the PHARMACEUTICAL JOURNAL ; 'Catalogue of the Library of the Pharmaceutical Society, 1873' ; the 'American Chemist' ; the 'Chemists' and Druggists' Diary, 1874,' per Mr. Mason ; a new powder-folder, from Messrs. Lynch and Co., London, per Mr. C. W. Bannister.

The President, Dr. Symes, said that he was glad to see so many present ; he thought it fully showed that they intended to make the second half of the session as profitable a one as the first had been.

Mr. Edward Davies, F.C.S., gave a lecture on "The New Gas," which was listened to with a great deal of interest.

Messrs. Poths and Semple, of London, exhibited some pharmaceutical utensils and certain chemists' sundries, among which were a fine analytical and dispensing balance ; hand-balances, with sliding-weights and dividing-beam, to weigh without weights ; various kinds of hydrometers and thermometers ; and a great variety of horn utensils and card-board boxes, etc.

A vote of thanks to Mr. Davies for his very able lecture, and to Messrs. Poths and Semple, for sending so many new and valuable articles for exhibition, brought the meeting to a close.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

On Monday evening, January 19th, the third annual *soirée* of this Association was held at the Assembly Rooms of the Royal Hotel.

A large room adjoining the ball-room was devoted to an exhibition of scientific objects, and the thanks of the Association are due to the President and members of the Council who laboured so successfully in its preparation.

A fine collection of microscopes, with many new and choice objects, under the superintendence of Mr. Jones, was shown by some members of the Microscopical Society, aided by members of the Association.

Messrs. Southalls exhibited a rotatory pill machine, in action, and a large case of very fine chemicals and rare drugs ; while a fine electrical display was made by Messrs. Harris and Co.

Mr. C. Woodward, B.Sc , kindly lent a very ingenious apparatus for effecting the condensation of gaseous ammonia.

The London Stereoscopic Company showed their Jewel Kaleidoscopes ; and an Arithmometer or calculating-machine, of French construction, was kindly lent by Mr. Gilbee, of London ; while the large stereoscopes and graphoscopes lent by Miss Bailey served to entertain the fairer portion of the company.

The rooms were adorned with some very fine photographs lent by the President (Mr. Stirling Grieves), and by Mr. A. Day and Mr. Sunderland.

Early in the evening Mr. A. Cresswell, of the Midland Institute, delivered a semi-scientific lecture, abounding with humour, and exhibiting several chemical experiments from a new point of view.

The ball, which commenced shortly after eight, was kept up with much spirit until two.

The company numbered more than 200, and the Association is again to be congratulated on the success of the annual *soirée*, which we believe will be repeated on a still larger scale next year.

GLASGOW CHEMISTS' AND DRUGGISTS' ASSOCIATION.

The fifth General Meeting of the Glasgow Chemists' and Druggists' Association was held in Anderson's University, on Wednesday 21st January, at 9 p.m. Mr. John Currie, President, in the Chair ; there was a good attendance.

The secretary having read the minutes of previous meeting Mr. Kinninmont said that he had an objection to make against them in so far as they make him say that "every Chemist in the kingdom should do his utmost to get the Adulteration Act repealed ;" what he said, or what he intended to have said was that every one should do his utmost to have the act amended. He by no means objected to the act itself ; what he condemned was the manner in which it was being carried out.

Dr. Thorpe, professor of chemistry Andersonian University, Glasgow, then delivered an able and extemely interesting lecture on "The Life and Works of Thomas Graham." The lecturer gave a brief sketch of the life of Graham, and then explained some of his more interesting and valuable investigations.

The second part of the lecture was profusely illustrated by experiments. On the motion of the chairman a most hearty vote of thanks, was accorded the lecturer.

SHEFFIELD PHARMACEUTICAL STUDENTS' ASSOCIATION.

The first annual meeting of this association was held on Thursday Jan. 22nd, in the Music Hall, Tudor Place, when the president M. E. R. Learoyd addressed the meeting. He spoke of the want which had so long been felt in Sheffield of an association of this kind, of the examinations it was now compulsory for chemists' assistants to undergo, and hoped that members of the association would prove the truth of the old adage "Unitate Fortis" by helping each other to climb, round by round, the ladder of pharmaceutical learning and establish for themselves a status in society. He congratulated the association on the progress it had made during the past year and was very sanguine that the present year would be one of still greater success; two very learned gentlemen having promised to conduct a pharmacopœia class, which it was intended to organize, one of them taking the materia medica, and pharmacy, while the other superintends the practical chemistry.

After a few more remarks from the President and a vote of thanks to him had been passed, the annual report was read and adopted.

A vote of thanks was passed to the Sheffield Pharmaceutical and Chemical Association for their kindness in lending their room, museum, library, microscope, etc., etc.

A vote of thanks was also passed to Messrs. Ellinor and Harrison for their valuable assistance during the past year.

A member moved that the employers of the town should be solicited for shorter hours, as no time was allowed for study. The motion was reserved for future consideration.

The following officers were then elected for 1874:—President—Mr. E. R. Learoyd (re-elected). Committee—Messrs. Harrison, Atkinson, Husbands, and Wright. Librarian and Curator—Mr. G. M. Jones. Treasurer—Mr. W. G. Lancaster (re-elected). Honorary Secretary—Mr. G. B. Owen, junr. (re-elected).

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

Meeting of the Executive Committee.

January 22, 1874.

Present—Messrs. Groves (Chairman), Williams, Ekin, Carteighe, Benger, Umney, Martindale, Hills, Greenish, and Attfield.

The minutes of the previous meeting were read and confirmed.

Date of Meeting, 1874.—Mr. M. Carteighe, Local Secretary of the Conference for the current year, said that after communicating with several influential members residing in London, he had come to the conclusion that it would be desirable to hold the annual meeting of the Conference in May, in the same week as that in which the annual meetings of the Pharmaceutical Society of Great Britain were held. He therefore proposed a motion to that effect, which was seconded by Mr. Williams.

Mr. Martindale thought that the last week in September would be a more convenient time for London members of the Conference.

The Chairman considered that a May meeting would not give sufficient time for the preparation of papers.

Mr. Ekin thought that members not residing in London would prefer that the voice of the metropolitan members should prevail in deciding the question; at the same time he believed that country members would be more likely to attend a meeting at the end of July or the beginning of August.

Professor Attfield said that if the meeting were late in September there would not be time to get the 'Year Book' published in December; while if fixed for so early a date as May, they would scarcely have time to prepare for such an exhibition of pharmaceutical novelties and objects of interest as he hoped would be held this year. The last weeks of July were so occupied by examinations that he feared the rooms kindly offered to the Conference by the Pharmaceutical Society would not then be at disposal. There remained June, which was too near May, and the first week in August.

Mr. Hills had hoped that the meetings of the Pharmaceutical Society and Pharmaceutical Conference would have been held in one week in May. He could see objections to that as well as to other times, and could only again remind the Committee that the Council over which he presided was most anxious to afford every facility for promoting the success of the Conference meetings, whenever held.

Mr. Williams was quite sure that the Council of the Pharmaceutical Society would be especially glad to have such an exhibition as had been mentioned held in their rooms, under the auspices of the Conference. As to the time of meeting, the first week in July was a busy one for London commercial men. He thought that perhaps, circumstances would oblige the Committee to fall back upon the first week in August.

The resolution relating to May was then withdrawn.

Professor Attfield said that as there was but one opinion respecting the desirability of holding a pharmaceutical exhibition at the forthcoming meeting, an opinion so strongly in favour of the project as to materially influence decision as to the time of meeting, he thought that a resolution in favour of holding the exhibition would perhaps produce unanimity on the other question.

It was then proposed by Mr. Benger, seconded by Professor Attfield, "That it is desirable to hold an exhibition of objects of interest to pharmacists in connection with the next annual meeting of the Conference." Carried unanimously.

It was next proposed by Mr. Ekin, seconded by Professor Attfield, "That the Annual Meeting for 1874 be held on Thursday and Friday, August 5th and 6th." Carried unanimously.

Appointment of Editor of the Year Book.—Professor Attfield read applications from eight candidates, also letters from Messrs. Brady, Clayton, Parkinson, Reynolds, Schacht and Sutton, who were unable to be present at the committee, but had sent communications relating to the editorship and the merits of the candidates. After considerable discussion and careful deliberation, the election fell on Mr. Louis Siebold, Lecturer at the School of Pharmacy of the Manchester Chemists' Association.

Bell and Hills Research and Library Fund.—Mr. M. Carteighe proposed and Mr. Umney seconded, a motion authorizing the Treasurer to sell one bond of £50, and to expend the proceeds in aid of research or otherwise, according to the instructions of the Committee. Carried.

Professor Attfield proposed and Mr. Martindale seconded a motion "That £5 be placed at the disposal of Mr. Gerrard, to defray the cost of materials to be employed in a research on the official and other plasters." Carried.

Professor Attfield's Report of Work done since previous meeting.—Grant of Books to Bradford. As a result of instruction from Committee and correspondence with Mr. Rimmington, ten guineas' worth of books had been purchased, bound in calf, and stamped with the Bell and Hill device and duly forwarded to Bradford. In acknowledgment Mr. Rimmington wrote, "At a special meeting of the Chemists' Association of Bradford, it was unanimously resolved that the best thanks of the meeting be given to the Committee of the Pharmaceutical Conference for the very handsome present of books that has been forwarded to the Association."—*Research Fund.* £10 had been forwarded to Mr. Groves to defray expenses incurrred in further researches upon the Aconitines, and £10, voted to Dr. Wright at a previous meeting, would be sent at once to that gentleman now that the sale of a bond had been ordered.—*Assistant Secretary.* Mr. Robert Higgins Davies had been

appointed.—*The Year Book of Pharmacy.* The late date of the last annual meeting, and the sudden departure of the Editor for India, had caused, ten days' delay in the publication of the 'Year Book.' The volume had however been issued on the 6th of January and, before the 22nd, a copy sent to every member who had paid the annual subscription. The steps taken for the printing of the Editor's manuscript in his absence were also described.—*Circular respecting Unusual Doses.* Professor Attfield had communicated with the officers of the Conference and with Mr. Hampson on this subject, and the resolutions of the Conference, preceded by an introductory letter, had been printed in the form of a circular, nearly five hundred copies of which had been posted to the leading physicians of England, Scotland, and Ireland. Although no answer to the circular was requested, several letters commendatory of the course adopted by the Conference had been received. The medical and pharmaceutical press generally had also given favourable notices of the matter. Further, written copies of the circular-letter, signed by the President of the Conference, had been sent to the Presidents of the General Medical Council and Colleges of Physicians of London, Edinburgh, and Ireland, accompanied in each case by a short private note from the President of the Conference. From the English College the following reply has been received:—

"December, 11th, 1873.

"Sir,—I am directed by the president to acknowledge the receipt of your letter in reference to the recommendations passed at the Pharmaceutical Conference, and to inform you that the subject will be brought before the College at the earliest convenient opportunity.

"I have the honour to be, Sir,

"Your obedient Servant,

"HENRY N. PITMAN,

"*Registrar.*

"The President of the Pharmaceutical Conference."

—*Receipt of Subscriptions.* Up to the date of the last committee meeting (Sept. 17th), 700 subscriptions had come to hand as then reported; between that date and December 1st, 260 had reached the Professor. In reply to a request for the subscription, sent to nearly 1,000 members, 340 money orders had been received. Altogether, about 1,300 subscriptions had been paid, leaving more than 600 still due. In the course of a month or six weeks another application for the amount would be issued, accompanied by the statement that on receipt of the sum the volume would be forwarded by return of post.

Some discussion ensued on the question of filling up the vacancy on the Committee caused by the appointment of Mr. Siebold as Editor of the Year Book. It was recommended that no action on the subject should be taken until the next Annual Meeting.

The following gentlemen were unanimously elected members of the Conference:—Archer, Albert (Ridgeway), Ainslie, W. (Edinburgh), Biddiscombe, C. (London), Binnie, R. (Dumbarton), David, James (Bath), Davies, R. H. (London), Flower, J. J. (London), Galwey, R. J. (Dublin), Haslett, John (Belfast), Linay, Thos. (London), Jackson, Dr. H. W. (Sydney), Jones, John (Llanwrst), Skirrow, W. E. (Bingley), Thibon, Denis (Nice), Williams, W. J. (London), Wyley, J. (Coventry).

MEDICAL SOCIETY OF THE COLLEGE OF PHYSICIANS, DUBLIN.

At the meeting of the above Society on Wednesday, December 10, 1873, Sir Dominic Corrigan, Bart, M.P., M.D., in the chair, the following paper was read:—

THERAPEUTICAL REMEDIES RECENTLY INTRODUCED.*

BY WALTER GEORGE SMITH, M.D.

Of the new drugs which have been introduced into medical practice within the last few years, it is remarkable how large a share has been contributed by organic chemistry, and it is worthy of note that several of them, although well known to professional chemists, remained for years objects of purely technical interest before there was any thought of investigating their physiological or therapeutical qualities. Having this origin, and carrying with them into medicine their strictly chemical titles, it is not surprising that the nomenclature of some of them, although really simple, should appear perplexing to those who have not kept abreast with modern chemistry. Some of them, moreover, are rare and of difficult production, and hence are so costly that, for the present, however valuable they promise to be, they scarcely come within the pale of general practice.

In the hope, therefore, that the exhibition of the more important of the new remedies and physiologically active agents might prove of interest to the members of this Society, I have ventured to bring them down this evening; and, without any pretensions to reading a paper, I will pass them briefly in review, and will point out their salient properties in a necessarily cursory way.

On glancing over the list of names, I find that they can be arranged appropriately under three heads:—

I. *Alkaloids and active principles;* guarana, methyl-strychnia, emetia, apomorphia, ergotin.

II. *Hydrocarbides and their derivatives:* xylol, bromoform, iodoform.

III. *Alcoholic compounds:* nitrite of amyl, bromal, chloral, croton-chloral, propylamine (so-called).

I.—*Guarana.*—This drug is an example of an old remedy re-introduced, for it was first noticed as far back as 1817. In connection with its medicinal action, it is worth remembering that its active principle, the so-called *guarania*, is identical with the well-known caffeine or theine, a base which occurs also in Paraguay tea (Maté) and in the kola-nut of West Central Africa. Guarana is practically nothing but a convenient channel for the administration of impure caffeine. Curiously, the five genera in which caffeine is known to exist belong each to a different natural order.

Methyl Strychnia.—This remarkable body, $C_{21}H_{22}N_2O_2$ CH_3, HO is not only interesting in itself, and as a specimen of a now numerous class of organic substances, but is more especially noticeable as an illustration of a recent and novel method of inquiry, which can scarcely fail to bear important fruit. I refer to the study of the connection between chemical *constitution* and physiological action—a subject which has been so successfully prosecuted by various observers, notably by Crum Brown and Fraser, in Scotland; and by Pelissard, Jolyet, and Cahours, in France.

Brown and Fraser have shown that the *addition* of various organic radicals, *e.g.*, methyl and ethyl, to the molecule of some highly active bodies, such as the alkaloids, without destroying or altering the chemical integrity of the body, effects most extensive and unexpected changes in their physiological action. Iodide of methyl is inert in itself. For example, this very body, the hydrate of methyl-strychnium, produces a condition exactly the reverse of that produced by strychnia, and, in fact, instead of causing muscular spasms, due to increase of reflex excitability of the cord, it actually paralyses the peripheral terminations of the motor nerves, and it has accordingly been suggested as an antidote to strychnia poisoning. 0·1 gr. of hydrochlorate of strychnia caused death in a rabbit in half an hour, while 30 grs. of iodide of methyl-strychnium (containing 21·1 grs. of strychnia), previously administered to the same rabbit, produced no effect whatever. In other words, more than 200 times the amount of strychnia can be administered with impunity in the form of the ammonium base than as any of the ordinary salts of this alkaloid. The ammonium bases of brucia, thebaia, codeia, morphia, nicotia, and atropia, have also been examined with the like startling results.

In the case of atropia, the poisonous activity of the

* From the *Dublin Journal of Medical Science* for January, 1874.

base, instead of being so enormously diminished, is considerably increased, so that we cannot formulate any law as to quantitative alteration of toxic energy. Interesting as these researches are, too extreme importance should not be attached to them, and they throw little light upon the question of the respective actions of the different alkaloids.

Emetia.—This substance is noticed in conjunction with the next, apomorphia, because they are the only two bodies which can be fitly employed subcutaneously as emetics. As in the case of ergot, we should distinguish pure emetia, *i.e.*, the alkaloid, 15*s.* per ℥j., from the preparation sold in France under the name of "coloured emetin," which is nothing but a brown extract, and is 12*s.* per ounce. Pure emetia is at least three times as strong as the impure, and is recommended as a safe, rapid, easy, convenient, and agreeable form of emetic. The dose by the mouth is from $\frac{1}{18}$–$\frac{1}{6}$ gr., and subcutaneously, about $\frac{1}{30}$ gr. (1 in 30 water, with a little sulphuric acid). Its solubility in water is 1 in 1,000. Its salts are uncrystallizable, and are very soluble in water.

Apomorphia.—The alkaloids are steadily and deservedly gaining confidence every day, and atropia, morphia, strychnia, quinia, etc., are counted our most trusty remedies. But hitherto we have been restricted to bases derived directly from the plant, and apomorphia is the first example of an alkaloid introduced into medicine which has been derived by decomposition from a pre-existing and well-known alkaloid, *i.e.*, it is a product, and not an educt.

The ordinary emetics are usually bulky in dose, uncertain in action, and are apt to produce depressing nausea and prostration, and apomorphia opportunely presents itself as a convenient and unirritating emetic, the one of all others which acts most speedily, and with least trouble to the patient. It is prepared by heating morphia for two or three hours with excess of hydrochloric acid; or, similarly from codeia, which is methyl-morphia. The free base is unstable, and, originally white, turns green immediately on exposure to air. The hydrochlorate is more permanent, but even its watery solution begins to alter in a few minutes, and rapidly passes from an aquamarine tint to an emerald green colour, and ultimately becomes opaque. The physiological effects of the coloured solution are said to be similar to those of the recent solution, but it is less powerful, and is more irritating to the skin. $\frac{1}{30}$–$\frac{1}{20}$ gr. is a suitable dose for hypodermic injection. A solution of 1 gr. in 200 minims of water is a convenient formula. Occasionally giddiness, cerebral oppression, and præcordial anxiety have followed its use.

Apomorphia offers special advantages in dealing with refractory children, insane people, or with adults in some kinds of poisoning, when coma or delirium hinder oral administration. The only drawback is its costliness, and at present ℥i. costs £1, *i.e.*, 4d. a grain.

In illustration of its effects I will mention two cases in which I have employed it. Some time since I injected $\frac{1}{30}$ gr. of apomorphia from a green solution into the arm of a woman at the Adelaide Hospital. In 10 minutes the stomach turned without causing her pain or distress. On December 6th I injected $\frac{1}{20}$ gr. of apomorphia from a fresh solution into the arm of a patient suffering from spasm of the œsophagus, an affection to which he has been occasionally liable since an attack of cholera in 1867. He was of a peculiarly placid and unexcitable temperament. Five minutes after the injection the pulse had risen from 70 to 104, and he complained of a sensation of heat in the head and of nausea, which rapidly increased. In 10 minutes he was inclined to be sick, but could eject nothing, and there was a sudden call to stool. The bowels were moved a second time in 5 minutes more; motions thin, copious, and very offensive. After the expiration of 20 minutes the pulse had fallen to 56; he was sleepy, pale, and felt and looked much prostrated. Within 2 hours he had completely recovered. No effect was produced on the œsophageal spasm, which was absolute and complete for a period of 122 hours, when the "stomach opened" after a long continuance of retching, and he was able to swallow some food.

Apomorphia is a striking instance of the assistance which scientific chemistry may, and does, lend to therapeutics, and it establishes another link between chemistry and medicine. Moreover, it evinces the radical alteration produced in the physiological action of a substance by instituting an *apparently* slight change in its molecular constitution. In this particular case, the withdrawal of a molecule of water causes such a rearrangement of the atoms that we obtain new and unlooked for results, for apomorphia, $C_{17}H_{17}NO_2$=morphia, $C_{17}H_{19}NO_3$, minus water, H_2O.

Ergotin.—No better example than this can be brought forward of the confusion which results from the same name being applied to several distinct substances, or from a definite term being affixed to a body of unknown or uncertain composition. There are no less than 3 totally distinct substances included under the common designation *ergotin*, viz.: Wiggers' ergotin (1831), Bonjean's ergotin (1840), and Wenzell's ergotin (1864).

1. *Wiggers' ergotin* is prepared by acting upon the spirituous extract of ergot, previously freed from fat with water, whereby the reddish-brown powder is left behind. It has a bitter taste, and is insoluble in water and ether, and difficultly soluble in spirit. Like Bonjean's preparation, it is an impure substance. In doses of from 3-7 grs. it gives rise to a nauseous bitter taste, followed by a confused feeling in the head, running on to headache, dilatation of the pupils, fall in the pulse, and abdominal pain; 7 grs. caused further a sensation of dryness in the throat, lasting for several hours. It costs 5*s.* per drachm.

2. *Bonjean's ergotin.*—Prepared by exhausting the watery extract of ergot with spirit of wine, and evaporating the spirituous solution. It is a brownish-red extract, with a peculiar odour of roast meat, and a sharply bitter taste. It is completely soluble in water and spirit, and is evidently a complex product. Its action appears to be similar to that of Wiggers' ergotin. Cost, 1*s.* 6*d.* per ounce.

3. *Wenzell's ergotin.*—According to Wenzell, ergot contains two alkaloids, ecboline and ergotine, which can each be obtained as an amorphous, brown, feebly bitter powder, easily soluble in water and spirit, insoluble in ether and chloroform. The property of exciting contraction of the uterus is stated to reside in the ecboline, but this statement needs confirmation. These bases seem to rest upon a slender foundation, their relations to Wiggers' and Bonjean's ergotins is not determined, and, in short, as matters stand at present, it is impossible to give a satisfactory answer to the question—what is the active principle of ergot?

II.—Of the second group little need be said—further than to point to the specimens on the table.

Xylol.—Had a very short-lived run in the treatment of small-pox, in which it was administered in capsules, in doses of 10–15 m. It belongs to the small but important group of bodies known in chemistry as the aromatic hydrocarbides, from the agreeable odour of some of their compounds, *e.g.*, essence of bitter almonds. The first term of this homologous series is the familiar benzine or benzol, C_6H_6, and above this are five higher terms, the third of which is xylene or xylol, C_8H_{10}.

Its name is derived from ξύλον—wood, because it was first found among the oils which are separated from crude wood spirit by the action of water.

When we consider the importance of the group of hydrocarbides to organic chemistry, and call to mind that they are hundreds in number, exist in every variety of form, and with every variety of properties, thus constituting in themselves a compact and symmetrical range of series, mutually connected by simple laws, it seems strange how little medicine has borrowed from them, for, with the exception of the terebene series, including oil of turpen-

tine, and its numerous isomers, oil of juniper, oil of lemon, etc., it has not yielded much to the stores of therapeutics.

Chloroform, $CHCl_3$.—*Bromoform*, $CHBr_3$.—*Iodoform*, CHI_3.

These three bodies afford additional confirmation, were that needed, of the remarkable gradation of properties which exists between their halogen parents, Cl, Br, and I, and which extends throughout the majority of their combinations.

Thus Cl is a greenish-yellow gas.
Br is a red liquid.
I is a dark solid.

So we have—

$CHCl_3$—a colourless liquid.
$CHBr_3$—a reddish liquid.
CHI_3—a sulphur-yellow solid.

Bromoform is less volatile than chloroform, more easily decomposed by alkalies, and appears to enjoy much the same properties as iodoform, but it is irritant, and does not appear likely to fulfil any useful indications in practice.

They are all prepared in an analogous manner. *Iodoform* contains 90 per cent. of iodine, and yet its taste is mild and non-corrosive. It is not new, for it was discovered in 1823, and has been long in use on the Continent. There is much evidence in its favour, and from its non-irritating action, ready absorption, and peculiar anæsthetic effect locally, it seems surprising that it has not come into more general use. Dose, ½-1 gr.

III.—*Alcoholic compounds—Nitrite of Amyl.*—This liquid is the second example only of an organic nitrite being utilized in medicine, the other being nitrite of ethyl—the essential constituent of the old and well-known "sweet spirit of nitre." *Nitrate* of ethyl or *nitric* ether proper, is a heavier liquid than nitrite of ethyl, and does not appear well-adapted for practice on account of its irritating tendency.

This amylic nitrous ether was discovered by Balard in 1844, more fully investigated by Guthrie, in 1859, and again more thoroughly still by B. W. Richardson in 1863-64. We cannot doubt that we have here an agent of at least very remarkable and energetic powers, while it is noticeable that the morbid conditions in which the drug has been found serviceable were pointed out before it was used in practice. As a powerful and rapid modifier of the action of the heart, and as an extraordinarily active means of relaxing arterial tension, it stands alone; and with too scanty experience to pronounce positively on its precise powers for good or evil, we cannot mistake the prompt and effectual relief which it has in several cases given to the agony of angina pectoris and the paroxysms of spasmodic asthma. No doubt some serious consequences, such as troublesome headache and alarming prostration, have occurred after its use, but we should remember that much of the amyl nitrite, as sold, is very impure, and, in addition to not inconsiderable quantities of prussic acid, is liable to contain other organic compounds, *e.g.*, aldehyd and ethyl-amylic ether, which must interfere with its proper action. Unlike nitrite of ethyl, it does not appear to suffer decomposition by keeping.

Bromal, Chloral, Croton-Chloral.—Of these three bodies I may say, in brief, that ordinary or ethylic-chloral has secured for itself a firm position in medical practice; bromal offers little promise of utility; and croton-chloral is just entering upon its trial. They are all strictly analogous bodies, and are respectively the bromine or chlorine derivatives of aldehyds. Bromal is brominated ethylic (common) aldehyd; chloral is chlorinated aldehyd; and croton-chloral is a chlorinated derivative of crotonic aldehyd, *i.e.*, of the aldehyd, of crotonic acid, a constituent of croton-oil.

Bromal is prepared in a manner similar to that used for chloral, viz., by the action of bromine on alcohol. It is a colourless, oily liquid, sp. gr. 3·34, boiling above 212°, and, like chloral, forming with water a solid definite hydrate. It was discovered by Löwig in 1832. The hydrate $=C_2HBr_3O, 2H_2O$ (Watts). When administered to the lower animals (frogs, rabbits, and guinea-pigs) in doses of from 2–15 grs., the principal symptoms produced are irritation of the air passages, restlessness followed by imperfect sleep, and anæsthesia, and finally dyspnœa and death, either with or without convulsions. It has been given to man in a few cases of disease, viz., epilepsy, tabes dorsalis, and aortic valve disease, in doses of ½–1½ gr. and upwards. It is soluble in 6 parts of water. It is evidently possessed of considerable activity, for 1 gr. has, in the human subject, produced unpleasant results, and 4 grs. have caused great depression and severe pains in the stomach. It seems unlikely to prove useful either as a hypnotic or as an anæsthetic. It is too irritant, and does not appear to offer any advantages as a therapeutic means over other safer and speedier remedies. It is stated to be barely supportable in an emulsion containing 1 in 300.

Chloral.—Of this now so familiar drug I would only say that it, as well as bromal, supplies us with a fresh warning to take heed not to push chemical analogies too far when dealing with the phenomena of life, and we shall only be led astray by regarding the stomach as a warm test-tube, in which the chemist can work out his problems as unerringly as in the laboratory. Because chloral is decomposed by strong alkalies, or their carbonates, in accordance with a well-known reaction, into chloroform and formiate of the base, the specious theory was promulgated that the action of chloral was thus simply explained, and that it, in fact, was nothing else than the action of nascent chloroform gradually evolved within the system.

Although this theory has met with, and still finds, general favour, it has, in my opinion, no valid support, and cogent chemical and physiological arguments can be arrayed against it. I think it should be held that chloral exercises a specific action of its own upon the organism, which is not to be reasoned out from an exclusively chemical basis.

It is interesting to recall that the discovery of chloral preceded that of chloroform, for it was in 1832, while studying chloral, which he had just discovered, that Liebig for the first time met with chloroform.

Other varieties of chloral, *e.g.*, amylic and propionic, are known to chemists, and probably an indefinite number of chlorals could be obtained by suitable means. Liebreich, the introducer of ordinary chloral, has suggested a new chloral, which is possessed of some remarkable properties. To distinguish it from its predecessor, it is termed *croton*-chloral, *i.e.*, the chloral of the crotonic series. Dr. Hofmann found that some of the German chloral contained more or less of crotonic chloral, and its origin is accounted for in this way:—

The alcohol from which ordinary chloral is made in Berlin, by the action of dry chlorine on absolute alcohol, is purified by passing it over charcoal. Hence, by oxidation, some ethylic aldehyd is formed. This, when acted upon by the hydrochloric acid liberated in the reaction, suffers dehydration, and yields crotonic aldehyd $-2C_2H_4O - H_2O = C_4H_6O$; and this new aldehyd, acted upon by the chlorine gas, furnishes the new chloral, $C_4H_3Cl_3O$.

Most agents which act upon the nervous system affect it generally, or at least, engage in their sphere of action several important tracts. At the same time we possess some active drugs, which exhibit a remarkable determination to particular areas, *e.g.*, conium, curare, etc., and in this new compound, croton-chloral, we meet with a body which exerts a specialized and singular action upon a very limited nervous region.

When administered to animals it produces, first, anæsthesia of the head, then loss of reflex movements throughout the body, and finally death by paralysis of the medulla oblongata. In man, however, when given in small doses it produces anæsthesia of the fifth nerve, and of that alone, while the sensibility of the body generally, and the pulse and respiration remain unaffected. This singling out of an individual nerve will, if confirmed, stand alone, and is a curious and suggestive phenomenon.

Hydrate of croton-chloral closely resembles in appearance the ordinary chloral. It may be prepared by passing chlorine gas into allylene, or by acting upon dichlorallyl and formic acid with alkalies.

Propylamine (so-called).—This, the last subject upon which I will offer any remarks, has given rise to some discussion and to much confusion in the medical journals, but it may be disposed of in a few words. The principal points which I would urge are the importance of precise nomenclature, especially in organic chemistry, and the necessity of discriminating clearly between isomeric compounds, or, in other words, not to mistake identity of *composition* for similarity of *constitution*. So far back as 1817 it was announced that the fœtid odour of *Chenopodium vulvaria*, a British plant, commonly known as stinking goosefoot, was due to the presence of a volatile ammoniacal compound ready formed—the first example of a free alkali in the vegetable kingdom. More than thirty years subsequently (1851) it was shown that the same volatile base existed in many other plants, and in various animals (maybug), its most abundant source being herring brine, and it was at first identified with the chemical compound propylamine, *i.e.*, propyl-ammonia. For years this was generally accepted, and the drug was introduced into medicine under that name by Dr. Awenarius, of St. Petersburg, in the treatment of rheumatism more especially. Even in the last edition (1865) of Guibert's excellent History of "New Remedies," this substance is treated of under the erroneous title of propylamine. But it has been known for some years (1862) that true propylamine has a different origin, and exhibits widely different properties, and it has been proved that the so-called propylamine of commerce, obtained from cod-liver oil, herring brine, ergot, etc., is in reality trimethylamine, with which it is isomeric.

The ultimate composition of these bodies is C_3H_9N, but, of course, this formula in itself teaches us little, and we now know that there are at least three different bodies which own this empirical formula, and yet are totally distinct from each other. These bodies are—

$$\left.\begin{matrix} C_3H_7' \\ H \\ H \end{matrix}\right\} N\text{—A primary amine} = \text{true propylamine.}^*$$

$$\left.\begin{matrix} CH_3' \\ C_2H_5' \\ H \end{matrix}\right\} N\text{—A secondary amine} = \text{methyl-ethyl-amine, and,}$$

$$\left.\begin{matrix} CH_3' \\ CH_3' \\ CH_3' \end{matrix}\right\} N\text{—A tertiary amine} = \text{trimethylamine.}$$

We should remember, then, that as yet there is no such thing as real propylamine used in medicine, and what is styled so is undoubtedly trimethylamine.

The boiling-point alone will distinguish trimethylamine from propylamine, for the former boils at 40° F., and the latter at 121°. The dose of trimethylamine is 20 m. and upwards. It may be said what is the use of this dissection of formulæ, this contention about names—let chemists fight their own battles. To this I would answer, not only is the confusion of names mischievous, but the properties of these bodies are different one from another, and plainly all accurate knowledge is at an end unless names be used in their true signification. It is only because of their comparative novelty, and of the partial resemblance between propylamine and trimethylamine, that these two liquids have been confounded. Morphia and piperia are isomeric—their empirical formulæ are identical—yet no one dreams of confusing these two bases, for they are too widely apart in their origin and properties. In reference to the class of bodies to which trimethylamine belongs, viz., the amines (*i.e.*, organic ammonias), it may be observed that, as all the natural alkaloids are probably either secondary or tertiary amines, it is only rational that we should look for active agents among such as can be artificially prepared.

If we now take a glance over the history of *organic* chemistry, *i.e.*, the chemistry of the hydrocarbons and their derivatives, from its birth, half a century back, we shall see that the principal services rendered by chemistry to therapeutics distribute themselves through several epochs. First, chemical analysis came to our aid, and revealed the existence of distinct active principles in drugs, and explained their composition. To this study we owe the whole group of alkaloids, and the knowledge of such facts, for example, that the properties of cherry laurel water, or of emulsion of bitter almonds, are entirely due to the production of prussic acid. The poisonous qualities of bitter almonds had been indicated from antiquity, and those of cherry laurel from the beginning of the eighteenth century.

Then, advancing beyond the mere separation of immediate principles, chemists submitted animal and vegetable matters to the action of the most varied and powerful re-agents, and thus, through the study of chemical metamorphoses, whole groups of new compounds were opened up, and novel, simple, and less costly processes for the preparation of bodies previously known were disclosed. In proof of this may be cited the present commercial manufacture of benzoic acid from hippuric acid, and of glycerin by the aqueous saponification of fats.

In pursuing these intricate studies chemists were naturally led, not only to the consideration of known substances in varied aspects, but also to the discovery of entirely new compounds.

How pregnant with value this line of research has been to medicine will be manifest when I mention among its offspring creosote, carbolic acid, collodion, chloroform, chloral, apomorphia, &c.; while in the arts we have from coal, benzine, aniline, with its splendid colour-derivatives, and anthracene, from which the colouring principle of madder is artificially obtained. In more recent times still physiologists and therapeutists, not content with passively accepting information from scientific chemists, assume, in their turn, the position of teachers, and by the happy combination of their joint labours we may justly look forward to an array of discoveries, of which nitrite of amyl, chloral, and chloroform are the heralds.

In conclusion, I wish to say that my object in demonstrating these various drugs this evening was mainly on account of their possible novelty to some of the members, and to give them an opportunity of examining them at leisure. Some of the remedies were referred to chiefly from a chemical point of view, but I would not be understood as desirous of claiming too arrogant a position for chemistry in its relation to therapeutics, nor can therapeutics ever be built upon any one science, or be successfully studied without the co-operation of clinical observation.

But while I do not believe in the visions of those who see in the chemistry, and in the chemistry alone, of the future, a complete and harmonious system of therapeutics, the close and legitimate alliance which subsists between scientific chemistry and practical therapeutics cannot be too strongly upheld.

* There is also iso-propylamine known,

$$\left.\begin{matrix} CH(CH_3)_2 \\ H_2 \end{matrix}\right\} N.$$

SOCIETY OF ARTS.

On the Energies of the Imponderables, with especial reference to the Measurement and Utilization of them.

BY THE REV. ARTHUR RIGG, M.A.

Lecture VII.

*On the Energy of Heat, with especial reference to the Measurement and Utilization of it.**

(*Concluded from* p. 604.)

We will now pass on to a series of experiments, the object of which is to show the effect of heat in relation

* Cantor Lecture, delivered March 17, 1873; reprinted from the *Journal of the Society of Arts*.

to solids and liquids, and converting them into vapour. Mr. Wills, to whom we were indebted for assistance on the evening of the lecture on the energy of affinity, has kindly undertaken to exhibit some striking and instructive experiments. In this iron bottle there is condensed carbonic acid gas, which under ordinary circumstances is a gas, but when it is brought under a pressure of 700 lbs. to the square inch it becomes a liquid. To reconvert it from liquid into gas requires a large amount of heat. The conseqnence is, one part takes heat from the other, whilst a portion of it is sent forward in the form of vapour at the expense of the heat of the remainder. That remainder, therefore, becomes colder and colder, and appears in the form of ice and snow, as you see on turning the tap, and letting it escape into the room. The white substance which now is falling in the atmosphere of the room is carbonic acid snow. There is an apparatus for enabling the vapour to pass round and round in a copper vessel, and then escape at the handles; in so doing it absorbs a large quantity of heat, and therefore that which remains in the vessel freezes. We shall collect in this way a large amount of snow, which can afterwards be used for other purposes. Nearly a pound weight of this carbonic snow is now deposited in the copper vessel, and so cold is it, that on wrapping a piece of wet flannel round the vessel it freezes immediately. This snow can be held lightly in the hand without inconvenience, but if pressed a blister will at once be raised. Mr. Wills has taken a small portion upon his tongue, and breathing out the vapour as it melts, a candle is immediately extinguished. In the same way some of it may be put in a beaker, and the gas collected as the snow melts, when it will be found that a light cannot live in it. Again, here is a bottle of water, by putting some carbonic snow into it, and corking it up, we immediately get excellent soda-water. By pouring some ether upon it, the degree of cold is greatly increased by the rapid evaporation, so that the vessel becomes frozen to the stool upon which it stands, and a pound or two of mercury will soon be frozen into a solid body. Its temperature is about 130° below the freezing point. On placing the frozen mercury at the top of a tall jar of water, beautiful icicles are immediately formed in consequence of the intense cold.

Before closing, attention may be directed to the sources whence our supplies of heat are derived. The classification of these, and the character of the heat derived from them, may be studied in the tabular form.

SOURCES.

A	Inherent Affinities.
B	Solar Radiation.
C	Earth's Rotation.
D	Earth's Internal Heat.

STORES.

Potential.	Whence Derived.
Fuel	B and A.
Food	B.
Reservoir Water	B.
Tidal Water	C.
Kinetic.	**Whence Derived.**
Winds.	B.
Ocean Currents	B.
Hot springs	D.
Volcanoes	D.

There is one other matter to which the subject of last week's lecture bears a very extraordinary relation. Science investigations have established that a process of what is called dissipation of energy is going on. In the lecture on the energy of light, attention was directed to a remarkable testimony which, through modern science views, is thus given to Scripture. Let me add a few words on an equally remarkable one in reference to the energy of heat. In the case of light, reference was made to the beginning of the Bible; in this case of heat it is to the end of it. St. John (Rev. vii., 16), speaking of the new heavens, writes, "neither shall the sun light on them, nor any heat." How singularly in accord with this is the declaration (Rev. xxi., i), "There shall be no more sea, neither shall they thirst any more." Clearly, if the heat be not, there can be no water nor sea. Now, science testifies to the dissipation of heat, and thus unconsciously testifies to a gradual progress to that state which prophecy so plainly declares.

In closing this course of Cantor lectures on the energies of the imponderables, the thought re-presents itself, which was not an unfrequent visitor in the preparation of them, and which gained utterance in the first lecture in these words:—"It may be said, and with some show of reason, when the comprehensive title of these lectures is considered, a little well or completely done is better than much ill or very partially done. As a principle in education this is a truism. These Cantor lectures are not to be scholastic lessons; they may teach, but the primary object of them is rather to be suggestive of thought, to give food for reflection, material for development, to arouse inquiry, to provoke investigation, to leave, in fact, an unsatisfied impression that there is more than the lecturer has expressed, and that there is much for hearers and readers to consider. Such an unsatisfied feeling in relation to the energies named and the measurement and utilization of them it is the object of this course to create. If this result be attained, then, in those future years when by individual labour light shines where darkness now overspreads, there will be cause for thanks where perhaps, when these lectures end, an unsatisfied longing may alone be found."

Experience in the delivery confirmed the anticipation in my mind, and probably to your minds has suggested the question, why was so much undertaken with so little time in which to do it? Let the answer now given satisfy those who were not present on the first occasion, that however imprudent or unwise the judgment may have been, there, nevertheless, were method and object in it.

Probably the illustrative apparatus and diagrams which the room contained, but of which no use was made, may have assured some how much remains to give the zest of freshness to an extended research. Should any pursue this course they will find an interest at every turn which probably other pursuits cannot supply—an enjoyment with no after-reproaches, a provocation to cheerful thought and pleasant meditations, for:—

> "To him, who in the love of nature holds
> Communion with her visible forms,
> She speaks a various language."

They will further find an employment for leisure hours which soothes care by for a while removing it. They will find their eyes opened to sights of beauty and brightness to which the eyes of many are closed; they will be induced to permit their children, and their children's children, to acquire along with other knowledge that which surpasses, both in interest and in educative power, the writings of men in other days. Solomon and Pope, in this matter, have each given advice—one encouraging, the other discouraging, those studies these Cantor lectures suggest. Solomon wrote, more than two thousand years ago:—

"I was King, and gave my heart to seek and search out by wisdom concerning all things that are done under heaven."

He illustrates this and shows his knowledge of physical science by writing in the same chapter (Eccles. iv., 6-7) the following, which are clearly suggestive of what we call trade-winds, evaporation, condensation, etc., etc.:—

"The wind goeth toward the south, and turneth about unto the north; it whirleth about continually, and the wind returneth again according to his circuits. All the rivers run into the sea, yet the sea is not full; unto the place from whence the rivers come, thither they return again."

Pope wrote, more than one hundred years ago :—

"Know, then, thyself—presume not God to scan—
The proper study of mankind is man."

To follow Solomon is to find peace and pleasure ; to follow Pope is to find contentions and wars. Cunning craft and over-reaching are not in those pursuits with which we have been dealing, for you may rely upon it that—

"Nature never did betray the heart that loved her.
'Tis her privilege through all the years of this our life
To lead from joy to joy."

CHEMICAL SOCIETY.

Thursday, January 15th, 1874. Professor Odling, F.R.S. president in the chair. After the customary business of the society had been transacted, Mr. W. C. Roberts handed in a table supplementary to his paper read at the last meeting and containing complete analyses of all the standard trial plates still extant, dating from A.D. 1477, namely 17 gold plates and 14 silver ones. The first paper was "On the Action of Trichloracetyl Chloride on Amines:—I. Action on Aniline," by Dr. D. Tommasi and Mr. R. Meldola. This reaction gives rise to a substance called *phenyl-triacetamide* which crystallizes in lustrous plates. It is acted on by nitric acid, with production of *dinitrophenyl-triacetamide*, crystallizing in yellow needles. The next paper, by Dr. H. E. Armstrong, was entitled, "Note on the Action of Sodic Ethylate on Ethylic Oxalate and other Ethereal Salts," and the last, "On the Products of Decomposition of Castor Oil : I. Sebacic Acid," by Mr. E. Neison, giving an account of the preparation and properties of pure sebacic acid and of many of its salts.

The meeting finally adjourned until Thursday, 5th February, when there will be a paper "On the Action of Benzyl Chloride upon Camphor" by Dr. Donato Tommasi.

Parliamentary and Law Proceedings.

Death from Excessive Drinking and Overdoses of Chlorodyne.

On Wednesday, Jan. 21st, an inquest was held at Manchester by Mr. E. Herford, the city coroner, relative to the death of Thomas Hartley, aged 47 years.

Mary Hartley said the deceased was her husband. He had suffered from bronchitis and the liver complaint for six or seven years, but had not been under any doctor for 12 months. He had taken chlorodyne for his cough. Not feeling well on Monday he did not go to work, and he purchased a bottle of chlorodyne from Mr. Bowker's druggist shop, Deansgate. About seven o'clock on Tuesday morning he took a "mouthful" of the chlorodyne, and during the morning he said to witness, "I got threepennyworth of the stuff on Monday, and filled the bottle up with water." Deceased had taken a mouthful three or four times. At ten o'clock in the evening the deceased said he was very ill, and at his request witness went for his brother. On her return the man was found dead in bed. Deceased had been a heavy drinker. On Monday he had three half noggins and a two pennyworth of whiskey from 6 a.m. to 9.30. a.m. The rest of the medicine was taken during Tuesday night. He had taken two three pennyworths before. The last bottle was finished in three days.

Richard Methuen, druggist, Deansgate, said the medicine was served by his assistant. The quantity for threepence would be half an ounce, and half the quantity would poison a person. The deceased was understood to be a regular customer, and in that case the "regular dose," being mentioned was not necessary.

The jury returned a verdict of "Death from natural causes, accelerated by excessive drinking, and the overdoses of chlorodyne, and expressed the opinion that the label of the bottle ought to have contained proper directions as to doses."—*Manchester Courier.*

Alleged Adulteration of Food.

Mr. Martin, baker, of Mason-street, New-cross, appeared on Thursday, Jan. 22nd, at the Greenwich Police Court, to an adjourned summons for selling bread adulterated with alum. In this case there had been two analyses. The first, made by the local analyst, showed that there were 45 grains of alum to the 4lb. loaf. The second analysis was by Dr. Stevenson, of Guy's Hospital, who could not find any alum, though he made special search. Mr. Patteson dismissed the summons, and ordered the Greenwich district board of works to pay five guineas, the cost of the second analysis, reserving till a future day the question as to general costs. Mr. Pook, who had been engaged in the cases in which convictions had taken place, but the fines postponed, asked that the summonses might also be dismissed, on the ground that such convictions had taken place on the evidence of the local analyst, whose correctness of analysis had that day been disproved by the certificate of Dr. Stevenson. Mr. Patteson said that an error in one analysis was to be taken as an error in the others, and these summonses, as also two others not gone into, were dismissed, with the same conditions as to allowance of costs.—*Standard.*

Review.

A Course of Analytical Chemistry. By W. W. Pink and G. E. Webster. London: Lockwood and Co. 1874.

A short time ago the educational department of chemistry was in great need of a really good small elementary handbook of chemistry. Now, a few such have been written, and their well deserved success has stimulated so many men to write, that we are being overwhelmed with works of all sizes, each professing to supply an urgent want, and as a natural consequence many of them are crude, inaccurate, and, in a word, deplorable.

The one now before us constitutes a new volume of 'Weale's Educational Series,' but we fear we cannot say that we think it will add greatly to the reputation of the series, for it has never before been our misfortune to read a book containing so large a number of blunders both as to matter, arrangement, and language. This may appear to be very severe criticism, but a few extracts will amply justify it. Let us take in the first place some of the definitions we meet with. As a specimen of looseness of definition: "For fixed solids which do not vapourize, the atomic weights are referred to the element lithium, the atomic weight being determined by the amount of heat which any body contains when it is at the same temperature as lithium, both being the same weight, lithium being considered as seven." "All precipitates are solids in a state of powder." "Effervescence is the disengagement of gases from any liquid or solid." We might readily multiply such instances, but space will only permit the mention of one which completely baffles us. "Deflagration is the re-arrangement of the crystals of a substance, and is, in ordinary terms, the crackling of a body when exposed to heat" (p. 26). We thought at first that the authors meant *decrepitation*, but on p. 115 we are told that "upon heating chlorates a very violent deflagration ensues," and "if KCy be added, the deflagration is still more violent."

The atomic hypothesis is adopted with the most unhesitating readiness. It is true that we are told that "all bodies are *supposed* to be built up of an infinite number of small particles called *atoms*," and that "it is *assumed* that the different atoms possess power, lines of force, or *points of attraction* called *bonds* ;" but beyond the use of these words "supposed" and "assumed," the subject is treated as if the existence of atoms had been proved by the strictest logical process. It is to be imagined, however, that the authors did not fully appreciate the force of the term "infinite" in the above sentence. The mysteries of *gra-*

phic and *glyptic* formulæ are elaborately expounded, but here again the ideas of the authors seem to be very confused, for they speak of *four* systems; the *glyptic*, the *graphic*, the *empirical*, and the *constitutional*, whilst most people would consider the two former as merely modes of representing the latter. While on this point we may mention that it is stated that "this (graphic) form of formula has been adopted by Professor Frankland, and *generally throughout the kingdom*," which latter assertion we think will hardly be admitted by any one who has the slightest acquaintance with chemical literature. A subsequent assertion that empirical formulæ are "now not recognized by many colleges, or allowed in many examinations" will also, we feel assured, be repudiated by any one familiar with such matters.

A still more serious class of mistakes must now be hastily glanced at, namely, errors in statement of chemical facts. We are told that "platinum combines easily with silica and carbon"; that a platinum vessel must not be used in which to dissolve with hydrochloric acid "*any* substance containing manganese," because chlorine would be evolved which would attack the platinum, and a subsequent sentence implies that *all* green or black mineral substances contain manganic oxide. It is also said that "lead is present to a much greater extent in dilute sulphuric acid, as Pb is scarcely soluble in concentrated acid," the exact contrary being the case. Speaking of the purity of sodic hydrate, we are told that "sodic hydrate *should cause no effervescence*," but as no other substance is spoken of in connection with it, we can only suppose that it is not to effervesce spontaneously. Again, it is said that "*sodic carbonate* must completely volatilise"; "ferric chloride must be neutral to test paper"; "$COAmo_2$ is *sesqui*-carbonate of ammonia"; "chlorine is prepared by heating a mixture of sodic chloride, hydrochloric acid, and manganic oxide, but the last, MnO_2, *has no chemical reaction*," and the use of manganic oxide or ferric oxide, when preparing oxygen from potassic chlorate, is liable to contaminate the gas with traces of Fe or Mn. A dialyser is described as "a species of sieve, having sides and *top* of gutta-percha, and bottom of parchment. Sodic or potassic *oxide* (ONa_2, or OK_2), is constantly prescribed as a precipitant. We are told to keep hydrofluosilicic acid in india-rubber bottles, etc.

In the analytical tables we are directed to look for sodium in a solution to which sodic phosphate has been added, and for ammonium after the residue has, by express directions, been heated to drive off all ammonium salts. In testing for acids, $BaCl_2$ is said to evolve HF, or to cause effervescence by expulsion of CO_2, and these assertions are repeated on the next page.

These illustrations could be multiplied almost indefinitely, but we think that enough have been given to show that the authors have not succeeded in their endeavour "to prevent the confusion occasioned by many works on this subject," and we can only recommend them to take to themselves the advice they give on page 2 to "speedily endeavour to obtain a complete knowledge of the compositions of bodies," and (we would venture to add) of the English language.

It is the worst book we have seen; may it be the last of its kind!

BOOKS RECEIVED.

ELEMENTS OF CHEMISTRY: THEORETICAL AND PRACTICAL. By William Allen Miller, M.D., LL.D. Revised by HERBERT MCLEOD, F.C.S. Part II., Inorganic Chemistry. Fifth Edition, with Additions. London: Longmans. 1874. From the Publishers.

A PHARMACOPŒIA INCLUDING THE OUTLINES OF MATERIA MEDICA AND THERAPEUTICS FOR THE USE OF PRACTITIONERS AND STUDENTS OF VETERINARY MEDICINE. By RICHARD V. TUSON, F.C.S. Second Edition. London: J. and A. Churchill. 1874. From the Publishers.

Obituary.

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

On the 17th January, 1874, Mr. Thomas William Cox Andrews, Pharmaceutical Chemist, of Norwich. Mr. Andrews had been a Member of the Pharmaceutical Society since 1853.

On the 10th January, 1874, Mr. William Barber, Chemist and Druggist, of Lavenham, Suffolk.

Notes and Queries.

[383]. CHILLI PASTE:—

SMEDLEY'S CHILLI PASTE.

℞.	Ol. Olivæ Pur.	2 lbs.
	Capsici Contus.	½ lbs.
	Cetacei	6 ozs.
	Ol. Lavand.	q. s.

Boil the chillies in the olive oil for seventy-two hours, then add the spermaceti previously melted, let stand until nearly cold, adding the oil of lavender to scent sufficiently. —S. J. COLEY.

[384]. COLOURS FOR CARBOYS:—

ROYAL BLUE.

℞.	Cupri Sulph.	℥ viij.
	Aquae ad	Coug. j.

Dissolve and add—

	Liq. Ammon. Fort.	q. s.
	Aquae ad	Cong. ij.

GREEN.

℞.	Cupri Sulph.	℥ ij.
	Liq. Ferri Perch. Fort. . . .	q. s.
	Aquae	Cong. ij.

Having used the above I can recommend them to J. R. H. Cold water that has been boiled in an open vessel is best.—W. THIRLBY, *Leicester*.

[385]. BROWN HAIR DYE.—I should be much obliged to any reader who would give me a good formula for a Dark Brown Hair Dye, several having been tried without effect.—G. N. FOWLER.

[386]. DR. JELLING'S OINTMENT.—J. N. F. asks for the true formula of Dr. Jelling's Ointment.

ELIXIR OF WILD-CHERRY BARK:—

(1.) Take	Wild-Cherry Bark, bruised .	4 ounces.
	Alcohol	5 fl. ounces.
	Simple Syrup	8 „
	Cold Water, sufficient.	

Macerate the bark for twelve hours in enough cold water to cover it; transfer to a percolator, add water gradually until the percolate measures 19 fluid ounces, and mix with the other ingredients. Colour according to taste, and filter.

(2.) Take	Fluid Extract of Wild-Cherry Bark . . .	4 fluid ounces.
	Water.	15½ „
	Simple Syrup. . . .	8 „
	Alcohol	4½ „

Mix and filter.

COPAL VARNISH WITH OIL:—

Take	Pale Hard Copal	2 pounds.
	Boiled Linseed Oil	1 pint.
	Spirits of Turpentine (about) . .	3 pints.

Fuse the copal, add the oil hot, with constant stirring;

then withdraw from the fire, and add gradually the turpentine, previously warmed.

COPAL VARNISH WITH ALCOHOL.

Take Gum Copal	1 ounce.
White Shellac	½ „
Alcohol	1 quart.

Powder the resins and put them in a jar with the alcohol; cork tight, and keep in a warm place, shaking occasionally, until all is completely dissolved.

REMEDIES FOR CHILBLAINS :—

(1).	Soap Liniment	2 ounces.
	Tincture of Cantharides	1 ounce.
	Oil of Cajeput	1½ drachm.

Mix together. Useful for unbroken chilblains. To be applied twice a day, with friction.

(2).	Nutgalls, finely powdered	1 drachm.
	Simple Cerate	7 drachms.
	Glycerine	2 „

Mix and rub into a uniform mass. A good dressing for broken chilblains.

CEMENT TO MEND INDIA-RUBBER SHOES :—

Take Virgin Caoutchouc	2 pounds.
Sulphide of Carbon	12 to 14 „

Cut the caoutchouc into thin slices, put it into a close vessel of tinned sheet iron, pour over it the sulphide of carbon, and, by means of a water bath, bring the temperature to about 86° F. The solution will take place promptly, but the liquid will thicken very soon, rendering the application difficult, if not impossible. In order to prevent this thickening the following solution must be added in a quantity sufficient to bring the mixture to the consistency of a thin paste :—

Take Virgin Caoutchouc	1 pound.
Powdered Resin	½ „
Spirits of Turpentine	3 to 4 „

Cut the rubber in pieces, heat in a suitable vessel over a moderate fire, until the gum becomes fluid ; then add the resin, and allow it to dissolve. When these materials are perfectly fluid, add the turpentine gradually, by small portions at a time.

The cement thus obtained is said to fully answer the purpose of gluing together rubber surfaces, as well as leather, or rubber and leather.—*Druggists' Circular.*

PRESERVATION OF OIL OF LEMON. — The addition of two ounces of water to each pound of fresh oil of lemon is said (*Pharmacist*, vi., 332) to make it possible to keep it unchanged and of fine odour for years. The water sinks to the bottom and carries down with it the mucilaginous matter which hastens the change to the terebinthate state.

CACAO CREAM.—The following formula for a "very elegant mixture for dressing the hair" is given by T. S. Glenn, of St. Louis (*American Journal of Pharmacy*, [4] iv. 9). In cold weather it is said to become quite hard, but a little heat soon renders it fluid.

℞	Ol. Theobromæ	℥xvi.
	„ Ricini	℥xcvi.
	„ Bergamii	℥vi.
	„ Limonis	℥iss.
	„ Citronellæ	℥iss.
	„ Lavandulæ	℥iv.
	Sp. Coloniensis, 95 per cent.	℥lxiv.

Melt the oil of theobroma, warm the castor oil and mix. Dissolve the essential oils in the cologne spirit. Fill the bottles two-thirds full with the first mixture, and then complete the other third with the perfumed spirit.

Correspondence.

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

THE REMUNERATION OF ASSISTANTS.

Sir,—The question of the remuneration of assistants is one of the utmost importance, and deserving of the greatest consideration ; and though it will be conceded by almost every one that the salaries of our young men are not so large as could be desired, it must be borne in mind that they have improved very materially of late years, and advanced in a greater proportion than the emoluments of their employers.

I am sure every one with true knowledge of the trade will corroborate me in this statement,—and though I should like to see an Association of Assistants formed, and wish it every success, I am sure that no advantage would be gained by assistants approaching their employers in an angry or hostile spirit, and that no combination or strike could possibly force up salaries to an unnatural height.

The truth simply is, that, under the present system of conducting business, both employers and employed are underpaid, and the remedy is by no means very apparent,—but with your permission I will touch upon this subject in another letter.

HYDE PARK.

S. W.—See Mr. Pocklington's paper on "Starches Microscopically and Polariscopically Considered," at p. 352 of the present volume of this Journal.

H. J.—(1) Some particulars respecting the use of hydrate of chloral in sea-sickness were given in the first volume of the present series of this Journal, pp. 465 and 500. (2) The formula of "Aitken's Syrup" will be found on p. 610 of the present number. (3) An index has been published at the completion of each volume.

"*Semper Viridis.*"—About 40 to 50 grams of melted yellow wax, added to the other ingredients previously mixed in a warm mortar and the whole allowed to become quite cold, will form a suitable mass. The oil of theobroma would probably answer, but more of it would be required.

J. D. M.—Phillips's Translation of the London Pharmacopœia of 1851 was published by Messrs. Highley and Son, 32, Fleet Street, and possibly might still be obtained from their successors, Messrs. G. Philip and Co.

W. E. S.—(1) Probably crystals of an oxygenated camphor or stearoptene, which occur together with a liquid hydrocarbon, cedrene, in the volatile oil obtained from cedar wood. (2) See vol. iii. of present series of this Journal, p. 604.

T. Perkin.—At present there is no restriction as to age ; but a new bye-law has recently received the sanction of the Privy Council (section 10, clause 16) which says that "after the 31st day of December, 1874, no person shall be admitted to the Major or Minor Examinations who shall not have attained the full age of twenty-one years."

"*Smoker.*"—We are unable to suggest any other plan.

W. J. S.—The question in its present form is too vague to allow of our giving an answer.

G. Neville.—We must refer you to our advertising columns, as the only part of this Journal in which currency could be given to your announcement, and we are rather doubtful as to the amount of credit it would reflect on them.

Mr. W. Wilkinson is thanked for his inclosure.

S. W. is referred to the rule respecting anonymous communications.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Bolton, Mr. J. Knowles, Mr. Harper, Mr. Bennett, Mr. G. Fowler, Mr. Greensell, Mr. Haslett, Mr. F. W. White, "West," J. E. M.

The following journals have been received :—The 'British Medical Journal,' Jan. 24; the 'Medical Times and Gazette,' Jan. 24; the 'Lancet,' Jan. 24 ; the 'London Medical Record,' Jan. 24 ; 'Medical Press and Circular,' Jan. 24 ; 'Nature,' Jan. 24 ; 'Chemical News,' Jan. 24 ; 'Gardeners' Chronicle,' Jan. 24 ; the 'Grocer,' Jan. 24 ; 'Journal of the Society of Arts,' Jan. 24 ; 'Grocery News,' Jan. 24.

NOTE ON IODIDE OF IRON.*

BY W. MURTON HOLMES.

Having recently had occasion to make a mixture containing iodide of iron, and not being perfectly satisfied with its appearance, I was induced to make a few experiments, and I thought the results might be interesting to others. The prescription was as follows:—

℞.

Potass. Iodid.	℈j.
Ferri Iodid.	℈ss.
Syrup. Tolut.	℥ij.
Aq. Destill. ad	℥iv.

M. ft. mist.

In my first experiment the Pharmacopœia iodide of iron was used, being rubbed with a little reduced iron, and the solution filtered; the iodide of potassium was then added, and lastly the syrup. After it had been standing a few minutes, I noticed a flocculent precipitate, which soon collected and sank to the bottom.

A similar mixture was afterwards made by a friend; a clear solution being the result.

I was at a loss to understand the reason of this difference, and attributed it to various causes, the iodide of potassium among the number, which, however, answered the Pharmacopœia tests.

After two or three experiments it occurred to me that the syrup was, perhaps, the cause of the difference; I therefore made a solution of iodide of iron, to one-half of which I added the syrup (two drachms in four ounces), and afterwards the iodide of potassium. To the other half I added the iodide of potassium first, and then the syrup. In this case a precipitate of hydrated oxide of iron was formed almost immediately, whilst in the former the mixture remained perfectly clear, and no change took place for some hours.

This is curious, as showing the action of sugar in retarding the decomposition of the iodide.

I would suggest here, that when there is occasion to dispense iodide of iron in solution, that it is just as easy to weigh an equivalent quantity of iodine and mix it with a small quantity of reduced iron and a little water, whilst the result is more satisfactory, the Pharmacopœia preparation being so unstable and liable to deliquesce.

Since writing the foregoing, I have found that by adding to the iodide of potassium, dissolved in a little water, enough citric acid to neutralize the small quantity of free alkali it nearly always contains, a permanently clear mixture is obtained.

338, *Oxford Street, Jan. 28th*, 1874.

[*The discussion on this paper is printed at p.* 643.]

PHOSPHATE OF IRON AND ITS COMBINATIONS.†

BY CHARLES GEISSE POLK, M.D., OF PHILADELPHIA.

(*Concluded from page* 611.)

PHOSPHATE OF IRON WITH AMMONIO-CITRATE.

The phosphate of iron with ammonio-citrate is a very valuable preparation, and possesses several advantages over the bibasic phosphate with ammonio-citrate. The profession is indebted to Mr. Creuse, of the *Physician and Pharmaceutist*, for the proper method of preparing it in scales, and to Mr. R. Rother for the syrup form. For several years past I have been accustomed to prepare a syrup of this form of iron thus, using however the potassic citrate instead of the ammonic citrate:—

SYRUP PHOSPHATE OF IRON WITH POTASSIC CITRATE.

℞.	Liq. ferri tersulphatis	℥viij.
	Sodii phosph.	℥ix.
	Acidi citrici	℥xiv.
	Potassii bicarb.	q.s.
	Sacchar. alb.	℥xiv.
	Aquæ	q.s.

Dissolve the phosphate of sodium in one pint of boiling water, and slowly add to the solution the tersulphate of iron, stirring slowly until the phosphate of iron is completely precipitated. Then wash it in a funnel, on a muslin filter, until the washings are tasteless. Saturate the citric acid dissolved in one ounce of boiling water with the bicarbonate of potassium, add to the iron and apply gentle heat on a sand-bath until the iron phosphate is dissolved. If it is not dissolved readily a small amount of citric acid may be added, which very promptly secures a perfect solution. Evaporate to ten ounces, add the sugar, and continue a gentle heat until the sugar is dissolved. Each drachm represents fifteen grains of the citro-potassic ferro-phosphate.

This syrup can be very readily used as the ferric base of an elixir with quinia, cinchona or gentian. Or the sugar may be omitted and the process of scaled ferric salts followed, by which very perfect olive green scales may be obtained. It will be observed that the process is almost precisely like that followed for the pyrophosphate of iron, only the tribasic phosphate of soda is used instead of the bibasic phosphate.

SYRUP OF THE SUPERPHOSPHATE OF IRON.

Dissolve four ounces of glacial phosphoric acid in six ounces of water, raise the temperature to the boiling point, and add sufficient freshly precipitated phosphate of iron to saturate the solution, then introduce sufficient syrup to make thirty-two fluid ounces. If it be desired to unite quinia alone, or with strychnia, add the freshly precipitated alkaloids in the proportion of one grain of quinia and one-twenty-eighth of strychnia to each drachm, or two hundred and fifty-six grains of the former and eight grains of the latter to an ounce of water, and rub them up with nine drachms of syrupy phosphoric acid. Add sufficient syrup to the iron to form sixteen ounces, and sufficient syrup to the alkaloids to measure sixteen ounces, and add the two syrups together. This forms a powerful tonic, seldom disagrees with the stomach, is entirely void of the slightest inky taste, and proves a very effective preparation. Unfortunately, it is very unstable and deteriorates rapidly. This fault can be remedied by adding two ounces, instead of nine drachms of syrupy phosphoric acid, but then it will have the faults of the concentrated ferrous syrups without their tonic power, in relative doses.

In conclusion I may here remark that the syrup of the hypophosphite of iron, quinia and strychnia exceeds in its therapeutical value every other preparation here given. Pharmaceutically, however, it is not perfect, and I would be very thankful for an economical and practical mode of preparing it. To me this preparation is yet an unsettled problem. The expense of the syrup is also an obstacle to its general use.

The syrup of the phosphates of iron, quinia, and strychnia prepared by my formula is an article of great value, and will seldom disappoint those who trust it as a general tonic.

The phosphate of iron with ammonium-citrate is a mild chalybeate, very soluble, readily incorporated into compounds, either as elixirs, syrups, or pills, and thus fills a very important desideratum. It is therapeutically and pharmaceutically superior to the bibasic phosphate, which it is destined to supersede in many preparations where the latter is now employed. I do not believe bibasic phosphoric acid possesses any remedial powers. The phos-

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, February 4, 1873.

† From the *Druggists' Circular and Chemical Gazette*, January, 1874.

phate of iron with ammonium phosphate is worthy of further investigation. The more I have used it the more I have been impressed with its great importance, the wider its range of application, and greater my confidence in its remedial power. In chronic engorgement of the uterus, attended with aching pain in the left iliac region, with tenderness on pressure, morbid sensibility along the course of the spine, deranged digestion, attended with constipation, head-ache, nervous derangement of the heart, attended with marked anæmia, I have found this combination to give better results than anything else in the manner of constitutional treatment. In fact, in nearly every case unattended with ulceration or organic disease this syrup, assisted by enemas of cold water (one pint being injected into the bowels upon arising from the bed every morning), and an occasional blister over the region of the uterus, gave very prompt relief, and produced a radical cure.

In certain forms of neuralgia it seems to exceed in its prompt and permanent relief every other known remedy. A few months ago I was consulted by a lady who had been for two years a victim of sciatica. Aconite, belladonna, bromide of potassium, iodide of potassium, colchicum, blisters, moxas, arsenic, morphia, quinia, and iron (the subcarbonate) had been freely used without any permanent benefit. I prescribed for her this preparation, to be taken in teaspoonful doses three times a day, increasing the amount of quinia however to two grains in each dose, twenty grains of hydrate of chloral, twenty grains of the bromide of potassium, and one drachm of the valerianate of ammonium, to be taken in a wineglassful of port-wine at bed-time, and a liniment composed of equal parts of saturated tincture of aconite (18 ozs. to the pint), chloroform, and sufficient camphor to saturate them. Within a week the suffering was much mitigated, and in six weeks after the cure seemed perfect.

In neuralgia of the face and head, the result has been extremely gratifying. Cases that had defied every other treatment often obtained relief from this syrup. About four months ago a gentleman about fifty years of age placed himself under my treatment. He was suffering intensely with neuralgia on the left side of the head, his eyesight very much impaired, and his intellectual faculties reduced almost to the condition of a puling babe. I placed him on this preparation. The improvement was remarkable. In one week the acute pain had subsided to a slight soreness; the eyesight was very much improved; the change in his physiognomy was very marked; the pale, haggard, woe-begone expression, so marked on his countenance at the beginning of my treatment, was replaced by a bright, cheerful face. He used twelve ounces of the preparation, and then, not being able to procure it, was persuaded to use Easton's syrup—that it was just as good. It seemed for a couple of weeks to do a slight benefit. The physician then placed him on bromide of potassium, and all the good he had received from the iron treatment was speedily undone.

In those cases of subacute rheumatism associated with anæmia, nervous debility, and slight cardiac trouble, in fact, the very numerous class of rheumatics found in low, damp, malarial situations, I esteem the syrup of the phosphates of iron and ammonia, with quinia and strychnia, very highly. I, however, use it in alternation with the following:—

℞.	Tinct. guaiac. amm.	℥ ij.
	Fluid. ext. colchici rad.	℥ ss.
	Potassii iodidi	℥ iss.
	Fluid. ext. cardamomi	℥ iij.
	Syrupus aurant. cort.	℥ iij.
	Aquæ ad	℥ viij.

Tablespoonful every four or six hours.

This treatment has been generally very satisfactory in my hands, and holds my confidence in a higher degree than any other.

Although one might, *a priori*, infer that the main good resulted in such cases from the last receipe, I do not think so. The phosphate of ammonia is one of the most valuable remedies in rheumatism. Quinia is well known as an anti-rheumatic, especially in the class of cases above referred to. In disease of the urinary and genito-urinary organs this combination does much good. While a medical officer in the Federal army, I had very rare chances of using this remedy, and watching the effect, as it only can be watched in an army hospital, during the late civil war; and, taking my own experience as a datum, I am very positive in my conclusion that it often did more good than I obtained from other remedies. In chronic diarrhœa, complicated as it very often was with Bright's kidney disease, this preparation often stayed the progress of this very obstinate malady, although I am sure not a single cure was permanent, except those sent to Northern hospitals, in which cases the removal from concurring and exciting causes did more advantage than could have possibly accrued from the entire paraphernalia of the materia medica.

In imperfectly cured pneumonia, where there has been extensive extravasation into the parenchyma of the lungs, the air-cells obstructed by the albuminous exudation, and a low state of inflammation still continuing, this preparation has given very good results, especially by adding about twenty grains of phosphate of ammonium to each dose. Such cases are generally diagnosed phthisis, dosed with cod-liver oil, and buried. A correct diagnosis and judicious treatment will cure nearly all of them. The diagnosis between phthisis and chronic pneumonia is too seldom, I fear, definitely determined. The rapid destruction of the lungs after acute pneumonia is too often erroneously attributed to tubercles, and the true pathological lesion overlooked. In such cases the syrup of the phosphate of iron and ammonia, with quinia and strychnia, is entitled to favourable consideration, and I have no doubt that very many would recover under judicious treatment who die from the sequelæ of pneumonia. In recommending the syrup of the phosphate of iron and ammonium, with quinia and strychnia, as a very valuable agent in the sequelæ of this disease, I need hardly remind the profession that the presence of inflammatory symptoms contra-indicate the preparation; the iron is very prejudical to the already irritable air-cells. Phosphate of ammonium and phosphate of sodium seem to have a marked influence. Ten grains each, given in an ounce of camphor-water, and repeated four or five times a day, very often modifies the condition materially, if it does not dissipate every inflammatory symptom. Inflammatory symptoms being removed, the iron combination can be used with marked benefit. Phosphorus certainly exerts a marked influence over pulmonary troubles. I have seen several cases of acute pneumonia treated by phosphorus in $\frac{1}{200}$ of a grain doses, and repeated every two or three hours. They did very well. The improvement was marked and rapid, and the cure effectual. I have however, never ventured to trust a patient of my own to such treatment.

The hypophosphites are unquestionably the best medium by which phosphorus can be introduced into the system, by which the curative impression can be transmitted. The hypophosphites of iron, ammonium, quinia, and strychnia seem to equal, if not surpass, the phosphates of the same salts in nerve trouble, surpass that combination in pulmonary diseases, but prove very much inferior in rheumatism, gout, uterine and kidney derangements. As a tonic, no combination yet devised, of iron and alkaloids, equals the syrup of the ferrous phosphate, with quinia and strychnia, made according to my formula.

GHAZEEPORE ROSE-WATER.

The following interesting information on the cultivation of roses and the preparation of rose-water at Ghazeepore has been taken from the Catalogue of the Indian Department at the Vienna Universal Exhibition, for which it was written by Mr. R. Saunders.

"The roses from which the celebrated Ghazeepore rose-

water is distilled came originally from Bussorah. These roses were first transplanted from Persia, and brought to the ancient, but now ruinous, Hindu city of Kanauj on the Ganges, and thence to Ghazeepore.

Somewhere about a century ago, Shaikh Abdullah (the father of the last Nawab Fuzl Alee Khan) made the first trial of a rose plantation in the vicinity of the city of Ghazeepore. Having experimented on a very limited scale in his own garden, he discovered that the soil of the environs of Ghazeepore was admirably adapted for rose-cultivation, and since that period it has by degrees been extended.

The celebrity of the Ghazeepore perfumes prepared from these roses very soon spread throughout India, and to other countries, while to this day they have been held in the highest possible esteem on account of the permanence of the odour, and the peculiar delicate fragrance of the scent for which they are specially appreciated in the mercantile world. Year after year traders come from immense distances to work temporary distilleries, for the season only, in order to replenish their stock of these delicious and precious rose-scents.

Culture of the Roses, and Plantation of Rose Gardens.—Unlike the propagation of the specimen roses of England, which depend chiefly on grafting, these rose trees are raised from cuttings which are planted out from nurseries after one year's growth at an expense of Rs. 25 per beegah. These slips are watered every five or six days till the setting in of the rains, and when once they have taken root they are finally transplanted to the field intended for the rose-garden. Here each rose tree is planted three feet apart from the other, and on an average 1000 shrubs are allowed to grow in each beegah of land.

Rose fields are kept scrupulously clean by constant weeding, and loosening of the soil around the roots. This operation takes place about three times a year. Leaf-mould, which is the best sort of manure for roses, is sprinkled all over the fields once a year, and twice a year the fields are irrigated by flooding them with well water. Priming takes place annually in the month of January. The flowering season is in February and March, when the blossoms are picked and collected each day before sunrise.

The average yield of flowers per beegah is from 30 to 60,000. These are sold to the distillers at a rate varying from 100 to 125 rupees per lakh (hundred thousand) of flowers. The total area under rose cultivation in Ghazeepore is estimated at about 200 acres, bearing an average rental of Rs. 4 per beegah.

Process of Manufacturing the Pure Attar of Roses.—A gallon, or half a gallon, of the best rose-water is kept in a large copper vessel in the cool night air, with a thin cotton covering over it. Before day-break the oily extract floating over the surface of the water is carefully collected with a pigeon's feather and placed in a phial.

The next day fresh flowers are added to the water, and it is again distilled, and the same process is continued for several days successively, till as much pure attar of roses is collected as is required. The whole quantity thus collected is kept in a phial and exposed to the sun for a few days, and as soon as the watery particles have evaporated pure oil, or attar of roses, is left in the phial, which sells by weight at Rs. 100 to Rs. 125 per tolah. This sort of attar being costly is generally made only to order, and the ordinary quantity produced each year rarely exceeds 5 or 6 tolahs. The rose-water left after eight or nine distillations again comes into use, and is sold in the market as the best of its kind. It is, in fact, a clear profit to the manufacturer, who is already amply repaid by the attar itself. The prime cost of a tolah of attar is fairly estimated at Rs. 72, viz. :—

Cost of labour	Rs.	12	0 0
Value of 50,000 rose flowers at Rs. 120 per lakh	Rs.	60	0 0
Total . .	Rs.	72	0 0

The margin left to the manufacturer after covering the cost of interest on outlay does not fall far short of 40 or 50 rupees per tolah, which it must be admitted is not at all a bad profit on the transaction.

Manufacture of the Alloyed or Ordinary Bazar-Sold Attar.—Sandal wood is well pounded and mixed with water, and then subjected to the usual process of distillation with roses. This gives a greater quantity of oily substance than could be expected from roses only. The same water is distilled over and over again with an additional quantity of fresh flowers as many times as suits the fancy of the manufacturer.

The value of this attar rises in proportion to the number of distillations, and the best of the kind sells at Rs. 10 per tolah down to the lowest rate of Rs. 2 for the inferior sorts. The process of collection of this attar is the same as that of the other, the only difference between the two being in the admixture or not of sandal wood oil.

It is difficult to estimate with any degree of accuracy the quantity of alloyed attar annually produced in Ghazeepore, for a large number of outsiders come every year, stop for the season only, and then carry off what they produce. Probably a maund would be near the mark, but the value cannot be accurately computed, owing to the great variety of rates for the different qualities manufactured.

Manufacture of Plain Rose-Water.—The process is simple, but the varieties are great according to the number of flowers allowed to each distillation. The ordinary rose-water is sold in huge spherical glass receptacles called "karábás," each containing 14 quart bottles. The average selling price of ordinary rose-water varies from Rs. 2 to 12 per karábá, and English quart bottles from 8 annas to 8 rupees each.

The usual cost of labour for each distillation yielding 24 bottles is one rupee. During the season numerous temporary rose-stills are worked by traders from different parts of India. Consequently it is very difficult to make even an approximate estimation of the actual quantity produced, but it is supposed to be somewhere between two and three hundred maunds.

GRANULES PERLÉS OR GOUTTES PERLÉES.*

BY M. SARMANT.

Ordinarily the granules are prepared by the process which consists in coating a certain quantity of nonpareil with a concentrated medicated solution. This mode of preparation offers no guarantee for the exact distribution of the active principle; hence the editors of the Codex rightly ordered that they should be prepared in the same manner as pills, by mixing the active substance with sugar of milk, gum and honey.

M. Sarmant thinks that this latter method, although preferable to the former, does not allow of a certainty that the granules so obtained all contain the same quantity of the active principle. He therefore proposes to prepare them in the following manner. Dissolve in water, by the aid of heat, the medicament it is desired to administer mixed with a certain quantity of gum and sugar, then introduce this mixture into a special apparatus, consisting of a cylinder formed of long articulated divisions, which are of an equal calibre from top to bottom, and subjected always to the same pressure, in such a manner that the drops which fall from these tubes all weigh 5 centigrams. Exposed to the air, these drops solidify and take a slightly flattened globular form, which they retain indefinitely.

The following is an illustration of the modification which, in various formulæ, allow of their adaptation to M. Sarmant's method of preparation :—

Fowlers's Solution (Codex).

Arsenious Acid	5	grams.
Carbonate of Potash	5	„
Distilled Water	500	„
Tincture of Melissa	15	„
	525	„

* *Journ. Pharm. et de Chimie* [4] xviii. 481.

Reduce by heat to 500 grams, and the solution will then contain one per cent. by weight of arsenious acid.

Sarmant's Formula.

Arsenious Acid	5	grams.
Carbonate of Potash	5	,,
Distilled Water	250	,,
Gum and Sugar	250	,,
Tincture of Melissa	15	,,
	525	,,

Reduce by heat to 500 grams, and the solution will then contain one per cent. by weight of arsenious acid.

By this method a large number of active principles employed in medicines may be accurately divided into doses.

FIRE.

To the readers of this journal the inquiry will be interesting how far chemists and druggists and the many trades connected therewith suffer from fire, and in order to gain information upon this point the annual report of Captain Shaw, the chief officer of the Metropolitan Fire Brigade, is of essential service. The report issued by this officer as to the occurrence of fire in London during the past year is more than usually interesting; and we may shortly examine it with the view of seeing how far our readers, or rather the trade in which they are engaged, has suffered of late in consequence of what the reporters term "alarming conflagrations." In Captain Shaw's report the trades are given alphabetically, and the first in the list are "apothecaries and dealers in drugs, but no chemical works carried on." During the past year no less than thirteen fires occurred at premises included in the above category, but fortunately none of these fires were seriously destructive. Notwithstanding that they were thus comparatively harmless in their effects, it is interesting to note the causes which led to their occurrence. Thus, three were caused by "light thrown down"; while one was attributable to each of the following causes:—escape of gas, seeking for an escape of gas with light, lime-slaking, phosphorus, defect in flue, spontaneous ignition, and lucifers. We next get to the chemists, who, we are pleased to find, have been very fortunate during the past year with regard to exemption from fire. Only three fires occurred at chemical works, and while one of these was the means of doing serious damage, two only resulted in slight damage. The origin of these fires is thus explained officially:—"overheat of drying-stove, 1; spark from fire, 1; and tar boiling over, 1." Passing through the list we come next to the wholesale druggists, who have been even more fortunate than the chemists in regard to the small number of fires which happened at their premises during the past year. The number is only two, and neither of these did much damage. The cause of one is said to be chemicals boiling over, and the other boiling acids. The drysalters in London last year only suffered from one fire, which was a very slight affair, and which was caused by the unfortunate breaking of a bottle of chemicals. During the past twelve months only four fires occurred at the premises of lucifer-match manufacturers, and only one of these caused serious destruction. The origin of two is explained by the over-heat of drying-stove, while one is attributed to spontaneous ignition, and one to "lucifers." Medical fixture dealers only suffered from one fire, which is ascribed to the somewhat curious cause of "light thrown from street"—a fact which indicates how easily fire is spread, and how careful we should be in regard to it. Generally speaking there is no doubt that, considering the list of London fires for the year just past, there is cause for satisfaction that the chemists and druggists, together with the other trades which are more or less connected with them, have been so singularly exempt from any serious conflagrations, and have suffered from such a remarkably small number of these occasionally disastrous and always unpleasant calamities. Comparing the chemists and druggists with other London trades in this respect, the comparison is most favourable to our readers, and doubtless the reason why they show so well in this list is to be found in the fact that they exercise a little care and precaution in the prevention of fires at their establishments. A little care, as a rule, is all that is required, but a little neglect is pretty certain to lead to some such result as that which necessitates the calling in of the services of the Brigade over which Captain Shaw so efficiently presides.

A most interesting subject of inquiry is the cause of fires, and some of the London fires are certainly to be attributed to very peculiar causes. Thus the origin of no less a number than 187 is thus concisely explained—"candle"! By this we are enabled to see how mischievously so useful an article as a candle may be used, and how occasionally it gives a little more illumination than is bargained for. Outsiders might be disposed to think that in a trade such as the manufacture of chemicals, where the materials are of so apparently dangerous a character, the liability of fire would be greatly increased; and yet these returns show quite the reverse. Thus, during the past year, the explosions of chemicals only caused one fire in London, while it must be remembered that nearly 200 were caused by "candle." Indeed, carefully examining the list of causes of fires, we are astonished to find how few are caused by chemicals or the business therein, and, on the contrary, how many are attributed to causes easily preventible, and which can only be traced to the grossest neglect. No less than 115 London fires were last year caused by what Captain Shaw describes as "light thrown down"—that is by people when they have done with a light pitching it anywhere, utterly regardless of the consequences, and caring not what evil results may ensue. The origin of twenty-nine fires is directly traceable to children playing with lucifers; escapes of gas caused 45; spirit lamp upset, 41; children playing with fire, 21; intoxication, 6; and smoking tobacco, 36. Without in any way endorsing the doctrines of the Anti-Tobacco Society, we would respectfully direct their attention to the last fact, as furnishing a new argument for their diatribes against the use of the "divine weed."

BISHOP TEMPLE ON EXAMINATIONS.

On Wednesday, the 28th January, the public distribution of prizes and certificates, awarded to pupils at the Christmas Examination of the College of Preceptors, took place in the theatre of the University of London, under the presidency of the Right Rev. the Lord Bishop of Exeter. In opening the proceedings his lordship delivered a valuable address upon the subject of examinations, which is here reproduced from the *Educational Times*.

"I have been asked to distribute the prizes to-day, and I hope I may be allowed to make a few remarks as an old schoolmaster, and to give a few words of advice to examiners, teachers, and scholars; to tell what is the use they can make of such examinations as this College is engaged in conducting, and the dangers that constantly attend them. The use to be made of them, although it is very clear to those who have studied the matter, is yet very often not so clear to the learners, who sometimes are not aware why it is that they should be subjected to these examinations, and what is to be gained from them. Generally speaking, it would be better if they would take the trouble to understand exactly what is the purpose of putting their knowledge to such tests, because by that means they would be most likely to make good use of the examinations. Their real purpose, then, is to secure both teachers and learners against the delusion, that is exceedingly natural and almost inevitable, of fancying that we know things that we do not know, and that we have taught things when we really have not done so. The worst of this delusion is, that the best teachers and the cleverest scholars are, perhaps more than any others, liable to be ensnared by it. When a very good teacher has put before

a scholar a perfectly lucid account of what he is teaching, he naturally believes that it has been carried away by the pupil; and again, in proportion to the clearness with which it has been understood by the learner, so does he believe that he has really mastered it; but it very often happens that, simply because the teacher has stated his knowledge so clearly, he has contributed to deceive the learner into the belief that he has learnt more than he really has; and very often clever boys, or quick-witted girls, who see what is said to them instantaneously, are most likely to go away with the belief that a thorough mastery has been obtained, whereas experience often shows that that would be a mistake. The old adage that "knowledge is power" is so true, that you may very fairly take power as a test of knowledge. Now when you come to apply the test, you constantly find this—the teacher has taught a particular subject, which he feels he has expressed quite clearly, and the learner has appreciated it and learnt it; and yet, when the learner is set down to utilize it, he finds he can make no use of it at all; that he cannot reproduce it or apply it. He finds, in fact, that his mind during the process has been entirely passive; and it is quite certain, unless there has been a spontaneous activity in the mind of the learner, and he has not really made what he has learnt part of the substance of his own mind, he has a great deal more to do before he can really be said to possess his knowledge. It is for the purpose of preventing this mistake that these examinations are held. We often find that when teachers fancy their pupils have obtained a thorough mastery of a subject, they are deceived, because they have not noticed that in almost imperceptible ways they have been doing for the pupil what he ought to be doing for himself. I have repeatedly gone into a school, and on examining it, say in arithmetic, have been told by the master, "It is very strange that the boys do not know it; I thought they knew it thoroughly." I have always asked them this, "When you have examined them, have you made them answer for themselves?" And the reply has been, "Yes; I have left them with themselves except just the very slightest possible help occasionally; just enough to prevent them from wandering about." That is the whole thing. That very little help is the thing which vitiated the examination altogether; and the test of real mastery is that the knowledge shall be produced without any help at all. When a man or woman in after-life come to use their knowledge, they will find that the knowledge is really of no use unless they are able to apply it absolutely without assistance, and without the slightest guidance to prevent them falling into the most grievous mistakes. For this reason these examinations should be used to guard us against this sort of mistake. I have said these words rather for the sake of the scholars than the teachers, because teachers are almost driven to find it out for themselves. I know, however, it is not by any means familiar to the learner, and I want, if I can, to get them to see the absolute necessity of using these examinations for the purpose to which I have been speaking, to test what they can do absolutely unaided. But now I wish to add what is, perhaps, still more important to all, as to the danger which always attends such examinations. There is a perpetual danger that they shall crush the study, as it were, into a mould; that the learner should learn, not with a view to knowledge, but with a view to being examined; that instead of the knowledge growing in the mind in the healthy and natural way, developing, as it were, from within, that the learner should be always looking forward to the black day when, perhaps, he may fail in his examination; that he shall always be asking himself, What sort of questions shall I be asked? and that he shall be endeavouring, if possible, to fit everything that he learns to what he anticipates will be in the paper that is put before him. In the same way there is a danger that the teacher, instead of studying the subject, shall study the examination papers; that these papers for one year shall be the guide for the teaching of the next, and that the teacher shall have constantly present to his mind the probability or improbability of particular questions being asked. In all these cases it is quite certain that examinations damage teaching. Learning, if it is to be worth anything, must have a spontaneous character, and must have a growth within the mind peculiar and proper to itself. It must be adapted to the mind of the learner. And, moreover, the teacher must adapt as he gives it to his own mode of teaching, and all this is liable to be set aside by the thought of the examination for which the teacher and learner are to prepare. Moreover, these examinations are intended to secure that there shall be such an absolute mastery of the knowledge as will be required in after life to be applied to practical purposes, and in all examinations there is an almost inevitable tendency not to make the examination at all like the sort of trial that will be found in life afterwards. Both in the examiner and in the examinee there is a natural tendency to have the answers neat, clear, and precise, and to frame the questions accordingly. But when the learner goes out into the world, he will never by any chance get precisely such questions as these to which to apply his knowledge. Thus, for instance, if he has studied physics or mechanics, and has answered a great many examination questions, all this will have been framed with a view to neat and precise answers; but when he comes into actual life he will find the presence of that awkward element, friction, which disturbs all calculations, and will never allow anything to come out neat and accurate at all. So, again, to take a different illustration. A learner has studied chemistry, and in doing so he has been dealing always in the laboratory with carefully prepared ingredients, as pure as they can be obtained; and this is the proper way, for you cannot study well unless you make your study as simple as you can. But when you go out into life, and have to apply that chemical knowledge, you never get the ingredients precisely such as you find them in the laboratory, but all sorts of foreign elements come in and disturb your calculations. So, again, to take an illustration from a different source. A learner has learned, with great pains, to write themes and essays, taking great care in the composition and arrangement of his sentences, and this is an admirable preparation for a great deal that he will afterwards have to do; but, nevertheless, in after-life he will inevitably find that he is often called upon to use this power under circumstances where he is no longer able to sit down and frame his sentences just as he would wish; perhaps he may be called upon to speak without any previous preparation; or to write without any time for thinking, or even, perhaps, without those means of information which he has been accustomed to use. Thus in many ways a man finds that there are difficulties in applying that knowledge which he carefully acquired in the process of education. For this reason it is that all through the process of acquiring knowledge it is essential that the mind should be fresh and vigorous, and maintain its own spontaneity; and in proportion as it loses that spontaneity, and gets to work by rule and according to routine, in that proportion will it be found that the knowledge acquired is not suited for the purposes of after-life. Hence, therefore, the danger that these examinations may have the effect of making knowledge more precise and more reducible, but less living; with less of the man's mind in it, and consequently with much less elasticity, and much less adaptability to the purposes for which it will afterwards be wanted. There is one rule which it has always appeared to me should be followed in these matters, viz., to make the examination follow the school rather than making the school follow the examination. We should, as far as possible, endeavour that the school should share in as free a course and as unfettered a choice as possible. Instead of putting before them a rigid course of examination, and saying, "Mould your teaching to that," we should rather say, "Let us know how you teach and we will endeavour to accommodate our examinations to that." And it is because I believe the College of Pre-

ceptors has endeavoured to follow this principle that its work has been so good. Nevertheless, what I have said may not be altogether out of place, because even if this principle be adopted, it is as well that it should be consciously expressed and held out as the end at which the College is aiming. It is as well, in a matter of this sort, that we should all know what we are doing, and see clearly the reasons for it. Although I may claim to have some knowledge of the matter, from long experience and the devotion of a life, I have no doubt there are many listening to me who are much better able than I am to say all this; but still I do not think it is at all unfitting that on such an occasion I should say it. I rejoice, therefore, to see the work that the College of Preceptors is doing. I rejoice to observe, from the report your Dean has sent to me, that the number of candidates has steadily increased from 1517 in 1870, to 2313 in 1873—an increase of over 50 per cent. And not only so, but the number of those who have passed the examinations has increased in a corresponding ratio, from 1070 in 1870 to 1584 in 1873—an increase also of more than 50 per cent. Meanwhile I have no doubt that both schools and examinations are improving step by step; that as time goes on the teachers are better able to put before their pupils knowledge in such a way that they can receive and reproduce it. At first it is often very difficult to do this. When these examinations were commenced it was exceedingly difficult to do anything of the kind; but in all schools, if they are doing their work well, there grows up a body of tradition of learning and of teaching; I do not mean rules whereby they bind themselves, but a kind of spirit whereby each successive generation of scholars and teachers is affected by what has been done by those who preceded them; and as time goes on the boys learn more and more from each other, and they see better what it is that their teachers are aiming at. And in schools of some standing it will always be found that the school itself, almost independent of the teacher, adds a great deal to what he teaches, simply by the way in which the school acts upon all who enter it. The consequence is that as time goes on these examinations are more and more put to their proper use, and more and more test the reality of the knowledge which is imparted. The pupils know how to, and do, use them better, to a great extent unconsciously, simply because they catch from one another the power of doing so; and the same with regard to the teachers. But at the same time it is necessary that I should warn you that as the advantage of these examinations increase, so also do their dangers. The danger of which I spoke just now is an existing and real one, and one which, as long as teaching goes on, we have perpetually to be watching against; for, depend upon it, nothing is so dangerous to real knowledge as to have it dried up, as it were, at the heart by the want of the true scientific aim and purpose both in teachers and learners. There is nothing which in the end will tell against the real efficiency of any teaching so much as to find that both teachers and learners are unconsciously—for I do not believe that any teachers would so far forget their duty as to do it consciously—drifting towards what has been so often and so properly condemned, the system of cramming for examinations. This danger is very real. The learner must still hold for his aim, not the passing of the examination, but the mastery of the knowledge; and if he observe that his teacher is teaching him something which, as far as he can see, will be of no use to him in the examination, he must still trust that the teacher is doing the wisest thing that can be done, giving him knowledge for its own sake; and he will inevitably find that in the end he will have gained far more than he may appear to have lost for the time. It is quite possible that in such a case the learner may not do quite so well at one particular examination, but he may be sure that if the teacher knows his business at all he is doing the right thing, and he ought to give his mind to it, and so follow the course marked out; learn to learn for learning's sake, and for the sake of really knowing that which he wishes to know; not merely for the sake of exhibiting his knowledge to his fellows, and perhaps winning a prize. It is excellent to do well in an examination, and it is excellent to win prizes; but it will not be an excellent thing, but a positive hurt, to any one who has made the passing of the examination, and the winning a prize, the real purpose with which he has studied. Therefore I beg you all, teachers and learners, to never let that temptation lay hold of your souls; for if you do, you will surely find that the true and real thing at which you all are aiming will escape you altogether."

THE PROPOSED PHARMACY BILL FOR IRELAND.

On the evening of Friday, 23rd January, 1874, a meeting of members of the Association of Licentiate Apothecaries of Ireland was held in Thompson's Dining Rooms, Donegall Place, Belfast.

On the motion of Mr. Pring, seconded by Mr. Grattan, Professor Hodges took the chair.

The Hon. Secretary (Mr. R. Bolton) stated that in reply to the circulars he had sent to Licentiates throughout Ireland, he had received replies from about one hundred and twenty gentlemen, up to the present, signifying their desire to become members of the Association.

A general discussion then followed, wherein it was agreed that it was a matter of surprise as well as regret that the body which was bound to protect their interests should now meditate the legalizing of a measure which would be most injurious to the Licentiates as well as to the public at large. It was also admitted that the diploma of the Apothecaries' Hall in Ireland should exist as a qualification in Pharmacy only, and not to enable to practise as a physician; and that the curriculum of study should be modified accordingly in the future.

The following resolutions were passed unanimously:—

Proposed by Dr. Stewart, seconded by Alderman Whitaker—

1. "That this meeting expresses the regret and indignation with which it has heard of the changes proposed to be effected by the Pharmacy Bill, about to be introduced by the Apothecaries' Hall of Ireland; and, in the interests of the public, earnestly deprecates and seriously resists any change by which the standard of pharmaceutical education would be lowered in this country."

Proposed by Mr. Grattan, seconded by Dr. Aickin—

2. "That a copy of these resolutions be sent to the Chief Secretary for Ireland, the different Medical Corporations, and all others interested in scientific and pharmaceutical education in Ireland."

Proposed by Dr. Wheeler, seconded by Dr. Gribbin—

3. "That a deputation, consisting of Mr. Pring, Dr. Ball and Alderman Whitaker, with power to add to their number, proceed to Dublin during the coming week to confer with the members of the Association there, and with them to carry out the objects for which the Association was formed, especially by opposition to the Pharmacy Bill."

On the motion of Mr. Pring, seconded by Dr. Aickin, Dr. Ball was requested to act as treasurer, and, he having consented, a subscription list was at once opened.

[Subscriptions, therefore, will be received by the treasurer at 21, Donegall Place, Belfast.]

Dr. Stewart having been moved to the second chair, the best thanks of the meeting were tendered to Professor Hodges for presiding. Proposed by Mr. Pring, seconded by Dr. Bolton.

Dr. Hodges then replied, expressing the pleasure it afforded him to act as chairman, and suggesting the desirability of promoting scientific and pharmaceutical knowledge by means of the Association.

The meeting then separated.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 7, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

EXAMINATIONS AND THE REGISTRAR'S ANNUAL ANALYSIS.

EXAMINATIONS may be, and doubtless are, in the opinion of many who have to undergo them, of the tribe of "evils that the flesh is heir to," and are often as little appreciated as is the infliction of a cold douche upon one yet ignorant of the experience of the after-glow. But the increasingly important position they are taking in our national life is illustrated by the frequency with which they now become the subject matter of the utterances of our public men. Within a moderate space of time the words of, amongst others, the Archbishop of CANTERBURY, Bishop WILBERFORCE, Lord DERBY and Lord GRANVILLE, have furnished food for thought on this subject, and this week our pages record the ripe experience of Bishop TEMPLE. Nor have they been absent from election oratory, for on Tuesday the HOME SECRETARY, in his address to his constituents of the University of London, was able to face with comparative calmness the terrible catastrophe of a Liberal defeat, but he begged that those who heard him would never allow the boon of competitive examinations to be withdawn.

Another indication of the growth of public opinion upon this question is found in the fact that it is thought the time has come when a simplification of the variety of preliminary examinations now required by different public bodies can be profitably advocated, and the amalgamation of the local examinations of the Oxford and Cambridge Universities under a common board is suggested as the best method of effecting the object desired. Such are the recommendations adopted at a Conference of Head Masters of Schools held recently in London, and they are now in course of circulation, accompanied by explanatory remarks, and an appeal to private employers of labour and Joint Stock Companies that they would "confer a boon upon education" by requiring some educational guarantee from youths entering their service.

Fortunately the principle laid down in the latter part of this advice is now generally acted upon by pharmacists, and the practice already adopted by the Board of Examiners of the Pharmaceutical Society, of accepting in lieu of their own preliminary examination the certificates of any approved legally constituted examining body—provided Latin and arithmetic have been included in the subjects of examination—is in accord with the principles laid down in the former part. Such an examination is intended to mark the close of general, and the commencement of special, education. To meet the difficulty of different degrees of proficiency being required by different learned bodies or intending employers, three grades of examinations are proposed—a "Senior," "Junior," and "Preliminary," and it would of course be a mere matter of detail to decide which of these three would best satisfy the requirements of the Pharmaceutical Examining Board. The project is one that is, we think, much to be commended; the principle that a preliminary examination should be a test of general education is a sound one; and it is to be hoped that every year there will be a greater disposition on the part of parents to have this work performed whilst lads are yet at school, and by a scholastic body, instead of throwing it upon an examining board appointed rather with a view to its technical skill. Incidentally, it is instructive to note how wide-spread and varying in degree is the evil now generally known as "cram;" for one of the causes of the Conference above referred to has been the inconvenience occurring in schools through the variation of studies thought requisite in preparing scholars to pass different examinations.

Whilst discussing the subject of examinations, the opportunity may be taken of comparing, by the aid of the statistics given in the Bishop of EXETER'S speech, and the analysis of examinations presented to the Pharmaceutical Council this week by the Registrar, the results of the examinations by the Board of the College of Preceptors and by that of the Pharmaceutical Society. Some idea may thus be formed as to whether the number of failures is due to the Society's standard being unnecessarily high, or to the inferior education of the class of youths who are unsuccessful. It will be noted that as during last year 1584 out of 2313 candidates passed the College Board, the number of rejections could have been only about 31·5 per cent. But although certificates of having passed this examination are received in lieu of the Pharmaceutical Preliminary Examination—and therefore the latter cannot be considered a more difficult one—the number of rejections by the Society's Board in Scotland amounted to 41·35 per cent., and in England to as much as 48·14 per cent. of the whole.

The Major and Minor Examinations, according to the Registrar's analysis, approach rather more nearly what may be deemed a normal average, the rejections in the Minor being, in Scotland, 38·66; in England, 44·96 per cent.; and in the Major in England only 32·87 per cent., the total number in Scotland being, perhaps, too small to allow of the average being important. The results of last month's examination, however, when 41 out of 56, or 73 per cent., failed in the Minor, promise to spoil the average for the present year; and as the time approaches when the new regulations come into force, it is probable that a large number of candidates will enter the examination-room prematurely. We have no further

to seek than our own advertising columns to find one cause of failures, in the promises therein made to impart in a few weeks the information which is to do duty for the accretions of years. Whatever may be said of the number who pass under these conditions, it is evident that many more must and ought to fail. Mr. SCHACHT well remarked on Wednesday that Pharmacy is an art based upon science. Upon the breadth and solidity of the foundation laid depends much of the value of the superstructure, and this superstructure is best reared, not so much by the communication of the knowledge possessed by the teacher as by guidance into proper opportunities for the pupil's acquisition of it by personal experience. In the subjects of so practical an examination as the Minor is intended to be, "knowing, in relation to "the training of the mind, is the result of learning; "and learning is the process by which a child teaches "himself—by personal experience." The advantage of starting with some systematic knowledge, however small, of the sciences upon which Pharmacy is based —physics, chemistry and botany—cannot be overrated.

It would be presumption on our part to criticize the address of so famous a teacher as the late Master of Rugby; we have nothing but admiration for Bishop TEMPLE'S address. In it the danger of crushing study, as it were, into a mould, that the learner should learn, not with a view to knowledge, but with a view to being examined, and the danger that the teacher, instead of studying the subject should study the examination papers, have beacons of warning set upon them. Examinations, by the stimulus they impart, may be the channel of much good; but it is also undoubtedly true that the learner should "hold for his aim, not the passing of the examination, but the mastery of the knowledge." Where this object ceases to be striven for, "education" is no longer a fit term to apply to the work: it is degraded to a struggle on the part of the examinee anyhow to pass the examiner, and if under such conditions he fail—as fail he often does—he has no claim upon our sympathy.

A CORRESPONDENT of the *Pharmacist* calls attention to the abundance, in the United States' markets, of a substance known as "American Dandelion," but which is simply pure chicory root. Notwithstanding this, he says it is largely used by manufacturers in the preparation of liquid and solid extracts, which are afterwards labelled as preparations of *Taraxacum Dens Leonis*. This is an adulteration that, when met with in this country, is generally looked upon as accidental, occurring through the ignorance of collectors. But the reason now given for the substitution of one root for the other is that the chicory root yields fully twice as much solid extract as the true root, and consequently a denser fluid extract.

MR. F. M. RIMMINGTON, F.C.S., Pharmaceutical Chemist, has been appointed Public Analyst for the Borough of Bradford.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, February 4, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present — Messrs. Baynes, Betty, Frazer, Greenish, Hampson, Mackay, Radley, Robbins, Sandford, Schacht, Shaw, Stoddart, Urwick, and Williams.

The minutes of the previous meeting were read and confirmed.

APPOINTMENT OF EXAMINERS.

The SECRETARY read a letter from the Privy Council approving the appointment of the Examiners recently chosen by the Council.

PRELIMINARY EXAMINATION REGULATIONS.

Mr. MACKAY drew attention to the last paragraph in the Instructions to Superintendents of Preliminary Examinations, directing that all the papers when sealed up shall be sent to the "Secretary." Unless some further intimation were sent to the Scotch Superintendents, the papers would be sent to the Secretary in London, instead of to the Secretary of the North British Branch in Edinburgh, as heretofore.

Mr. WILLIAMS thought it was the intention of the Council that all the papers should come to London. It seemed very absurd that examination papers should not come to be valued by those who had set the questions; and indeed the practice had been to send down to Edinburgh the answers to the questions and their values in marks, in order that the Board there might attach the same value to the answers as was done to those of English candidates. He hoped, therefore, that the matter being so entirely one of form, the Scotch Board would not think they were in any way treated with disrespect if the whole of the papers now came direct to London.

Mr. MACKAY said the Board in Edinburgh had their own powers and prerogatives, and he was sure they would not give them up. The value put upon the answers was always exactly the same as in England.

Mr. WILLIAMS hoped that if the Northern Board continued to conduct these examinations they would set the questions and value the answers themselves. He had not the slightest objection to this being done, if the examinations were held simultaneously with those in England.

Mr. HAMPSON quite agreed with the suggestion of Mr. Williams. He thought they ought not to interfere with the action of the Board of Examiners in Scotland, who were a distinct and responsible body.

Mr. SANDFORD also approved of this suggestion.

After some further conversation it was suggested that the question of examinations in Scotland would come up again later, when the matter could be disposed of.

RETIRING MEMBERS OF COUNCIL.

The lot being taken in the usual manner for the seven members of Council who should retire in May next, the following names were drawn :—

Bottle	Mackay	Sandford
Hampson	Robbins	Williams
Hills		

The following seven, who remained in by lot last year, now retire by rotation :—

Frazer	Shaw	Sutton
Owen	Stoddart	Urwick
Schacht		

The following seven will remain in office for the ensuing year :—

Atherton	Brown	Radley
Baynes	Greenish	Savage
Betty		

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

Druce, George Claridge
Edwards, Charles
Fox, Charles Edward
Thresh, John Clough
Williams, William Francis

Elections.

PHARMACEUTICAL CHEMISTS.

The following Pharmaceutical Chemists were elected Members of the Society :—

Druce, George Claridge .....Northampton.
Edwards, Charles .....London.
Farries, Thomas.....London.
Fox, Charles Edward .....London.
Thresh, John Clough .....Dukinfield.
Walton, Major Foulds ... .Sowerby Bridge.
Wood, Alexander .....New Brentford.
Woods, Joseph Henry .....Warrington.

CHEMISTS AND DRUGGISTS.

The following registered Chemists and Druggists were elected Members of the Society :—

Bellamy, Robert .....Hull.
Holmes, John Thomas .....Dublin.
MacRitchie, David .....Inverness.
Mercer, Allan ....Prestwich.
Mildren, William Williams .....Hayle.
Twaddle, Robert .....Glasgow.
Watson, Robert William.....Sheffield.

ASSOCIATES.

The following, having passed their respective examinations, and being in business on their own account, were elected "Associates in Business" of the Society.

Minor.

Bond, Charles Radcliffe .....Kingston, Surrey.
Bradshaw, John.....Adlington.
Brown, Richard Fearon .....Cockermouth.
Casely, Thomas..... .....London.
Chambers, Pearson .....Liverpool.
Cossey, James Davis..... .....Yarmouth.
Herbert, Samuel .....Keynsham.
Lucas, Joseph Michael Mark ...Gravesend.
Mellor, John Gilbert.....St. Neots.
Sangster, William.....Dufftown, N.B.
Scott, Thomas Alexander .....Chertsey.
Swinbank, John.....Bedale.

Modified.

Betts, William Maydwell .....Towcester.
Jones, Enoch Henry.....Bristol.
Lloyd, John .....Croydon.
Oakey, Joseph .....Rusholme.
Palmer, Henry Bridges .....Wingham.
Rowell, John Childs.....Reading.
Scott, John Gladstone.....Dumfries.
Scott, Joseph.....Preston.
Snook, Joseph John .....London.
Stones, William.....Manchester.
Trick, William Borrow .....Stoke Newington.

The following having passed their respective examinations were elected "Associates" of the Society :—

Minor.

Alderslade, William .....Southwark.
Barlow, Frederick.....Birmingham.
Chamberlain, Arthur Garratt...Leicester.
Cheetham, George Richard .....Bradford.
Colley, Walter .....Birmingham.
Corder, Sheppard Ransome .....Norwich.
Flint, Charles Bruce.....Glasgow.
Forewell, Henry .....Edinburgh.
Gresswell, Arthur.....Spalding.
Harrold, Charles Jesser .....Frome.
Hayton, John William.....Wigton.
Hearne, Frederick.....Strood.
Higginson, Alfred.....Manchester.
Hobbs, Thomas Henry Hurle...Wells.
Holden, William Henry .....Staithes.
Jarvis, Abraham .....Kingsbridge.
Jeans, Thomas Robert .....Mansfield.
Kemble, James .....St. Austell.
Purse, Alfred Dodds.....Sunderland.
Rhodes, Samuel.....Oldham.
Rippon, Edwin .....Stamford.
Spencer, James Hampson .....Manchester.
Strongitharm, William George..Birmingham.
Sturdy, Thomas Metcalfe.....Leeds.
Taylor, John .....Carlisle.
Thomas, Thomas Francis.....London.
Twemlow, Francis Ernest .....London.
Umpleby, Samuel Sayer .....Harrogate.
Vince, James.....Lancaster.
Willson, Alfred.....Landport.
Wood, Alfred.....Sheffield.

The following, having passed the Modified Examination, was elected an "Associate" of the Society :—

Modified.

Howson, Joseph Frankish .....Islington.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary Examination, were elected "Apprentices or Students" of the Society :—

Allen, Henry.....London.
Barker, Alfred William .....Saffron Walden.
Bennison, Richard.....Stokesley.
Bird, William.....York.
Blagg, Eli .....Hanley.
Borman, William Alan.....Lincoln.
Boucher, Edward Grove .....Birkenhead.
Boyfield, John Richard.....Boston.
Brend, Kenneth Benjamin .....Swansea.
Briggs, William Henry.....Wakefield.
Catcheside, Matthew Henry ...Hexham.
Chapman, Joseph George.....Binfield.
Clarke, Willoughby .....London.
Cornwell, Thomas Chinsura.....Penzance.
Davey, John Trimble .....Exeter.
Davidson, Alexander .....Insch.
Duckett, George .....Preston.
Elliot, Joseph .....York.
Ellis, James .....Southsea.
Elmslie, J. Alexander Robson...Aberdeen.
Esam, Richard .....Stamford.
Galloway, James Barker .....Liverpool.
Golding, John Frederick .....London.
Greatorex, Edward John.....Stapleton.
Greenwood, William.....Settle.
Gudgeon, Harry Atkins .....Northampton.
Heaver, Arthur William.....Norwich.
Holl, Edmund .....Scarborough.
Humphreys, Arthur .....Nottingham.
James, Isaac Rowland .....Aberystwith.
Jarvis, Clarence Frank .....Handsworth.
Jelley, George William .....Coventry.
Jevons, Wallis Byron .....Market Rasen.
Jones, Llewellyn .....Chester.
Kiloh, James .....London.
Langdon, Frank Bowers .....Plymouth.
Laurie, John .....Ipswich.
Laverty, Joshua .....Jersey.
Lister, Amos .....Bradford.
McDonald, Donald Frazer .....Edinburgh.
Mackay, J. Bunyan Lillie .....Inverness.
Mawson, Thomas Oliver .....Sheffield.
Midgley, James Herbert .....Edinburgh.
Owen, Rowland.....Holyhead.
Paull, John .....Brecknock Road.
Pentelow, Harry .....Oundle.
Plant, Charles Plantagenet.....Leicester.
Portway, Arthur Cyril.....London.
Pumphrey, John Henry .....Evesham.
Read, John Henry .....London.
Ridley, Edward Henry.....Manchester.
Richardson, William Henry ...Boston Spa.

Roberts, George Constable .....London.
Robertson, William .....Peebles.
Shum, Arthur George .....Edinburgh.
Simpson, Charles Alfred .....Fenton.
Sproson, Thomas Frederick.....Wolverhampton.
Taylor, James Henry .....Darrington.
Temple, Frederick Staveley.....Hull.
Toon, Frederick.....Eccleshall.
Wild, John.....Bury.
Williams, Charles Edward .. ...Bayswater.

A member who had neglected to pay his subscription within the proper time was restored to his former status upon payment of a fine equal to one year's subscription.

Report of Examinations.

January, 1874.

England and Wales.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	6	4	2
Minor	56	15	41
Preliminary	232	115	117
	294	134	160

Certificate received in lieu of the Preliminary Examination :—

University of Cambridge 1

Scotland.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	1	1	0
Minor	23	12	11
Modified	6	3	3
Preliminary	27	14	13
	57	30	27

Certificate received in lieu of the Preliminary Examination :—

University of Edinburgh 1

The Examinations.

Mr. Hampson said he had understood that when candidates came into the building they were asked if they had been students of the Society. He wished to know if this was the case.

The Secretary said the Board of Examiners were in perfect ignorance as to where candidates came from, or where they had received their education.

Mr. Hampson said he believed it was some one in the office, not the examiners who asked the question.

Mr. Urwick had also heard statements to the same effect, and he had been told that it was desirable for the Examiners to know where the candidate had received his education in order that they might frame their questions accordingly in order to prevent the success of cramming. He had not understood, however, that the question was put by the Examiners themselves, but by some one in the office. If a young man failed, who had not been educated at Bloomsbury Square, he might perhaps fancy he had not been treated so favourably as others who had enjoyed that advantage.

Mr. Williams thought it much better that such questions should not be asked, but at the same time some of the Examiners had told him they could often distinguish without much difficulty where young men had received their education ; and of course they could not prevent the Examiners forming their own opinion in this way.

Mr. Baynes said he knew the question had been put to candidates, had they been educated at Bloomsbury Square ; at the same time he was quite certain that it was done with no improper purpose, and that the Board of Examiners were quite above the least suspicion of partiality in any way.

The President said he might state from his experience at the examinations that no such questions were ever put to candidates by the Examiners.

After some further conversation.

The Secretary stated that for the last 16 or 17 years he had been in the habit of requiring candidates for the respective examinations to fill up a form, stating their name, age, residence, and whether they had attended the Society's Laboratory or lectures. This was done merely for the sake of obtaining useful statistical information for respective Laboratory or reference, but the Examiners had not the least opportunity of becoming acquainted with the particulars thus furnished.

Mr. Greenish suggested that the candidates should be called up into the room by number, and not by name.

The President said he would submit the suggestion to the Examiners.

Mr. Williams suggested that the Council should give some opinion as to whether the practice referred to by Mr. Hampson should be continued or not.

Mr. Hampson thought it unnecessary, as the same information could be collected in another way.

Mr. Betty thought the statistics thus obtained were valuable, and they could not be prepared otherwise without a considerable deal of trouble.

Mr. Schacht thought it very undesirable that any restriction whatever should be placed on the freedom of action of the Examiners in the performance of their duties ; and he, though not an Examiner, could conceive it quite probable that it might be a great assistance to know the name of a candidate and where he had obtained his education. He happened to know that some of the highest authorities, such as Dr. Michael Foster, made a distinct point to always find out the antecedents of the candidates.

The discussion then dropped without any resolution being passed.

The President said he had just received a telegram from Mr. Atherton, saying that he was detained at home by election business, and asking for the loan of some specimens from the Society's museum, for the chemists' conversazione at Nottingham, a fortnight hence.

It was unanimously resolved that the request be acceded to.

A letter to the Council from the Board of Examiners in Scotland was read by the Secretary, containing various suggestions as to some of the details of the Examinations.

Mr. Mackay suggested that the letter be referred to a Committee, which should be attended by a deputation from the Board of Examiners in Scotland, and by the London Board of Examiners. He also added that Dr. Maclagan, the Government Assessor in Scotland, had taken great interest in the Examinations, and would be very happy to attend the deliberations of the Committee. He would therefore move—

"That the letter of the Edinburgh Board of Examiners be remitted to a Committee of the Council to consider and report upon, and that a deputation from the London and Scotch Boards be invited to meet the Committee to discuss the whole matter previous to the said report being drawn up. The Council Committee to consist of the President, Vice-President, Messrs. Brown, Sandford, Schacht, and Williams."

Mr. Schacht seconded the motion. He thought it of the greatest importance that the Examinations in Edinburgh and in London should be as nearly as possible absolutely *identical*.

After some conversation the motion was adopted unanimously. It was also decided that the question of the Preliminary Examinations in Scotland, as previously referred to by Mr. Mackay, should be referred to the Special Committee by whom the new regulations for conducting the Preliminary Examinations were prepared.

The Registrar's report for the year 1873 (see page 637, opposite) was laid on the table, and ordered to be entered on the minutes.

REGISTRAR'S REPORT.

ANALYSIS OF EXAMINATIONS FOR THE YEAR 1873.

ENGLAND AND WALES.

Number of Meetings for Major, Minor, and Modified Examinations 36
Average attendance of the Board of Examiners ... ... 11·83

Examinations.	Number of Candidates during the Year.	Number of successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	73	49	24	11	6·63	2·18	32·87
Minor	745	410	335	33	22·57	10·15	44·96
Modified	95	60	35	3	31·6	11·6	36·84
Preliminary	1292	670	622	4	323·00	155·50	48·14

SCOTLAND.

Number of Meetings for Major, Minor, and Modified Examinations 8
Average attendance of the Board of Examiners ... ... 6·25

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	10	5	5	4	2·5	1·25	50·00
Minor	75	46	29	8	9·37	3·62	38·66
Modified	21	15	6	5	4·20	1·20	28·57
Preliminary	162	95	67	4	40·5	16·75	41·35

THE REGISTER, 1873.

Additions during the year :—

Number of persons who have passed the Modified Examination	75	
Minor „	456	
Major „	54*	
Number of persons registered on payment of the Registration Fee, having been in business before August 1, 1868.	27	
Number of persons restored to the Register on payment of a fine of One Guinea	3	
		561

Erasures during the year :—

Deaths :—		
Notices from Registrars.....	86	
„ „ other sources	6	
Erased by order of the Council.....	3	
Erased at the request of registered persons themselves	7	
		102
Increase of numbers on the Register	459	
		561

* These having already been included in the number who passed the Minor, do not increase the numbers on the Register.

Number of Pharmaceutical Chemists on the Register, 31st December, 1873 2,392
Number of Chemists and Druggists 10,896
———13,288

REGISTRAR'S REPORT AS TO MEMBERS, ASSOCIATES, AND APPRENTICES OF THE SOCIETY FOR THE YEAR 1873.

MEMBERS AND ASSOCIATES IN BUSINESS.

	Members.		Associate in Business.
	Pharmaceutical Chemists.	Chemists and Druggists.	
Number of Subscribers, 1872	1766	749	247
„ restored, 1873	8	2	—
„ elected, 1873	143	54	141
	1917	805	388
Deaths, secessions, etc.	69	27	17
Total number of Subscribers, 1873	1848	778	371
Summary :—			
1872	1766	749	247
1873	1848	778	371
Increase	82	29	124

ASSOCIATES AND APPRENTICES.

	Associates.	Apprentices.
Number of Subscribers, 1872	630	644
„ „ „ 1873	681	727
Increase	51	83

Preliminary Examination in April.

It was resolved—

"That the Preliminary Examination in April next be held on the second Monday in the month of April next instead of the first, the first Monday being Easter Monday, a Bank holiday."

Finance.

The report of this Committee was received and adopted. It recommended the payment of sundry amounts, amongst others the sum of £100 to the North British Branch, on account of current expenses.

Mr. Mackay said the Council of the North British Branch had for some time past felt that they were paying too high a rent for the accommodation they had, which was not sufficient for their purposes. They had now a prospect of something like eight cases of specimens coming from Singapore to the Society's Museum in Edinburgh, but there was really not room for their accommodation. They felt that they should get more room and pay less money; and as they had the power of breaking the lease in May next, he had taken the liberty of giving notice that they would take advantage of that power. They were, therefore, now on the look out for more suitable premises, as to which he would again communicate with the Council. He might add that since the rooms had been opened something like 1100 young men had taken advantage of the library, reading-room, and museum. He was happy to say that they had a very good museum, containing nearly everything in the Pharmacopœia, which was at all times open to students, whilst there was a separate cabinet, kept under lock and key, reserved for the use of the Examiners.

Mr. Hampson asked if the Society's Museum in Bloomsbury Square was open in the evenings, as well as the library.

Mr. Greenish said the museum was only open from nine to five o'clock.

Mr. Hampson thought it very desirable that the museum should be open in the evenings, and said he would take an early opportunity of moving a resolution on the subject.

Benevolent Fund.

The report of the Benevolent Fund Committee was read, recommending that the name of Mr. H. J. Bellingham, of Peckham, should be placed on the list of approved candidates for an annuity at the next election; also that the widow of a chemist and druggist, registered in October last, should receive from the Benevolent Fund the sum of £5 5*s*., the fee recently paid by her late husband. These recommendations were adopted.

Special Report on the Benevolent Fund.

A report was read from the Special Committee, appointed in November last, to consider what steps it is desirable to take to increase both the amount of subscriptions and the usefulness of the Benevolent Fund. It recommended that subscribers to the fund should have a larger proportionate influence in its distribution. It was proposed to effect this by giving to subscribers of half-a-guinea *two votes* at each election of annuitants, instead of one as heretofore; to subscribers of one guinea, four votes instead of one, and so on in proportion. It was also proposed that subscribers of five shillings should have one vote. It further recommended that the regulation that "No pension shall exceed the value of £45 yearly," should read, "Each pension shall be of the value of £30 yearly," the latter being the amount hitherto granted.

The report and recommendations were received and adopted, and a circular containing the proposed alterations in the regulations, and setting forth the claims of the fund, was ordered to be sent to each person whose name appears on the register.

Mr. Sandford said that the proposition made by Mr. Robbins was very meagrely set forth in the report of the Committee. Mr. Robbins had submitted to the Committee a proposition to increase the number of annuitants believing that the amount of annual subscriptions during the last three or four years would justify the Council in relying to some extent on the subscriptions for the future, instead of depending entirely upon the interest arising from the invested capital. The question was fully discussed, but the Committee did not submit any recommendation upon it, because they ascertained that there was no by-law or regulation binding the Council in any way, and that it was quite open to them at their meeting in June to decide upon recommending the election of as many annuitants in the ensuing October as they thought proper.

Mr. Robbins said he had intended on the previous evening to have proposed a recommendation that they should for the future cease to maintain the difference between the income derived from one source and that derived from another, viz., the funded property and the subscriptions; but, as Mr. Sandford had pointed out, there was nothing now to limit the action of the Council, and he was, therefore, quite satisfied to leave the matter as it was. He was very glad the Special Committee had been appointed, and that this subject had been ventilated so much, because he was quite sure that many members of the Council now saw the matter in a different light to what they did when it was first introduced, and he was also convinced that at the June meeting if there were five deserving candidates they would not agree to elect only one. He had gone into the figures at some length, and had shown pretty clearly that the Benevolent Fund was in a satisfactory state, so much so that for some years past the subscriptions had always been on the increase; at the same time they knew that the demands on the funds had increased also, but as it appeared they could depend to a certain extent on the annual subscriptions, and as it certainly appeared to be the case that the more they gave away the more subscriptions came in, he had no doubt the policy he advocated would be adopted. It was now found that the income from the invested capital was the smallest part of the annual income, and therefore it was desirable to elect a larger number of annuitants, especially as the amount received from subscriptions was greater than could be spent simply by giving small grants from time to time, as was the practice at present. For some years past they had had an annual income of £1200, and if they could calculate on that for the future, they would be able to elect 20 annuitants, and still leave £600 for casualties and investment. He was glad to find that several gentlemen who had looked into these figures had arrived at the same conclusion as himself, and he had no doubt that the subscriptions would come in even more freely and more largely when it was understood that the money would be distributed instead of being invested.

The Vice-President said he had hitherto been of opinion that they could not safely give annuities out of annual subscriptions. On looking into the matter, it appeared that the subscriptions were really as permanent a source of income as their invested capital and therefore he saw no reason why the change now proposed should not be adopted. He was also very sanguine that the alterations just made in giving a vote to each subscriber would introduce a large number of subscribers, and if he had the honour of sitting on the next Council he should be happy to support Mr. Robbins at the June meeting, in moving that a considerable addition be made to the number of annuitants in future.

It was then resolved unanimously that the Treasurer be requested to purchase £256 10s. 5d. consols, on account of the Benevolent Fund, making the total invested capital, £14,000.

Library, Museum, and Laboratory.

The report of this Committee was read, recommending the purchase of the following books:—

'Throat Hospital Pharmacopœia,' second edition; Bloxam's 'Laboratory Teaching,' second edition; Griffith's 'Chemistry of the Four Seasons,' second edition; Kay-Shuttleworth's 'Modern Chemistry,' second edition

Beasley's 'Book of Prescriptions,' fourth edition; Lescher's 'Elements of Pharmacy,' fourth edition; Carpenter's 'Microscope and its Revelations,' fifth edition; Rodwell's 'Notes on Natural Philosophy'; Muter's 'Key to Organic Materia Medica'; Wood's 'Year-book of Therapeutics, etc.,' 1872; Squire's 'Companion,' ninth edition (two copies).

Also that the following duplicates of books in the Library be purchased :—

Bentley's 'Botany'; Bloxam's 'Chemistry'; Cooley's 'Receipts'; Fownes's 'Chemistry'; Gmelin's 'Chemistry'; Garrod's 'Materia Medica'; Hofmann's 'Chemistry'; 'French Pharmacopœia'; 'German Pharmacopœia'; Proctor's 'Pharmacy'; Redwood's 'Supplement'; Royle's 'Materia Medica'; Ure's 'Dictionary'; Supplement to Watts' 'Dictionary.'

The Committee also gave a list of books to which they proposed an asterisk should be affixed in the catalogue, as indicating that they were not to be sent out from the library without special leave from the Committee.

The Committee reported that 500 copies of the new catalogue had been already circulated, and recommended that an additional 1000 be printed. They also recommended certain additions to the salaries of the officers on whom extra duties were thrown by the keeping open of the library in the evening.

The report and recommendations were received and adopted.

House.

The report of this Committee was read and adopted.

Parliamentary.

The report of this Committee was read and adopted. A letter from the solicitor was read, stating that he had not yet received the opinion of counsel on the points which had been referred to them.

Pharmaceutical Congress at St. Petersburg.

Mr. Greenish said the Secretary had just handed to him for translation a communication from the Secretary of the International Pharmaceutical Congress. In 1869 two gentlemen were deputed by the Society to attend the International Pharmaceutical Congress held in that year at Vienna, when it was determined that the next should take place at St. Petersburg in 1872. The letter now received stated that in consequence of the Franco-German war the meeting of the Congress had been deferred until August, 1874, and to assist in making arrangements for it, replies were requested to four questions on pharmaceutical subjects, one of which he did not quite understand without a more careful translation than he had yet been able to make. The replies were asked for before the 27th March next. He suggested that the subject be referred to a committee, when he would be prepared with a proper translation of the document. He was of opinion that it was most desirable that British pharmacy should be represented at the approaching Conference in St. Petersburg.

Mr. Williams thought this was hardly necessary, especially considering the length of the journey.

Mr. Greenish said the journey was not very difficult, and persons attending such conferences were able to travel on the Continent at half the usual railway fare.

Mr. Hampson quite agreed in the desirability of Great Britain being represented at the Congress. He had no doubt the gentlemen selected would be able to bring back some valuable information, and at any rate they would promote kind feeling and amicable relations, which were always desirable.

Mr. Urwick said he should rejoice to see any friendly ties established between British and continental pharmacists.

It was then resolved unanimously that the matter be referred to a committee, as suggested.

The Classified Register.

Mr. Shaw drew attention to the Register classified alphabetically according to places which was placed on the table last month by the Registrar, and said the question now arose what was to be done with it—whether it should be printed, or remain for reference. His own opinion was that it should be simply kept for reference, and that any local secretary who wished to have a copy of that part of the Register that referred to his own district should be supplied with a written copy from the office.

Mr. Hampson thought it was a question whether the Register should not be printed.

The Registrar said it would have to be altered all through before it could be printed, in consequence of the constant change of addresses going on.

Mr. Betty said this was a matter in which Mr. Atherton took a great deal of interest, and probably it would be better to let it stand over till next month, when most likely that gentleman would be present.

Mr. Radley said local secretaries had often felt the want of something of this kind, and he thought the information would be very useful to them; still, they were the only parties to whom it would be valuable, and therefore there seemed no necessity to go to the expense of printing it. It would be better to keep it in the office, and let each local secretary be furnished with such portion of the list as he required.

Mr. Mackay and Mr. Baynes also thought that a manuscript list would serve every necessary purpose.

The History of Pharmacy.

The Vice-President said, on referring to the minutes of the Council under date March 6th, 1872, he found a resolution to the effect that the historical sketch of the progress of pharmacy, by Mr. Jacob Bell, be reprinted, and that the then President, Professor Redwood, and Mr. Sandford be invited to undertake the continuation of the same to the present time. Unfortunately nothing had been done in this matter, but he thought the Council of 1872 were quite right in the view that, as thirty years had elapsed since the history of pharmacy had been published, it would be very desirable to have it completed and brought down to 1868, and it appeared to him that unless some steps were now taken to have this work completed it could never be done, because if they waited until the actors who had taken part in the proceedings of the Society during the last thirty years had passed away, the opportunity would be lost of getting information which never afterwards would be recovered. If they completed the history up to the time of the passing of the Act of 1868, they might then fairly look to the Year Book of the Pharmaceutical Conference to continue the work for the future. No one could be better fitted than the three gentlemen appointed in 1872 to complete this work, but he thought it would be expecting too much time and labour from any one of them to do it as a matter of independent work. It had therefore occurred to him and some others that if they wished to have it efficiently done they could not do better than apply to Dr. Redwood, the gentleman who was associated with Mr. Jacob Bell at the commencement of the Society, and with the Society ever since, and who, perhaps, had better means of getting assistance from outside than almost any other individual. He would, therefore, propose—

> "That Professor Redwood be invited to undertake the completion of the 'Historical Sketch of Pharmacy' up to the year ending 1869, and that a sum not exceeding one hundred guineas be paid to him for the work."

Mr. Baynes seconded the motion, which, after some conversation, was unanimously agreed to.

Additional Scholarships.

Mr. Schacht, in pursuance of a notice he had given, moved :—

> "That ten Scholarships be instituted, and be competed for at the same time and by the same process as the Jacob Bell Scholarships."

He said it must be taken for granted that it was a tolerably well-recognized duty of the Society to promote

the development of scientific pharmacy. This view had been specially adopted some time ago when an endeavour was made to arrange something like a system for more efficient education in the provinces. Certain suggestions had been made by which the funds of the Society could be utilized to that end, but from various causes they had practically fallen through, and very little as yet had been accomplished. The scheme which he had at one time ventured to suggest, from the discussion which it elicited, appeared rather to indicate that a feeling existed amongst those who took most interest in these matters that the operations of the Society should be directed rather to the encouragement of very high-class education in a few than to the cultivation and general development of it in many. That was a point which he should like to have fully discussed in order that something like a conclusion should be arrived at whether they should, as a Society, limit the assistance which they gave to the development of a high scientific standard amongst the few, or to enable the average mass to raise themselves to the standard required by law. The question appeared to him to run somewhat parallel to that which might be raised in connection with richer educational societies, of fellowships on the one hand and scholarships on the other; and, for himself, whilst one of the last to discourage fellowships, he still thought that in the present condition of scientific education amongst pharmacists such a system in their case would be like beginning at the wrong end. He had always had this idea present in his mind, that pharmacy was essentially an art, founded upon science undoubtedly, but still an art; and as it would seem to be a mistake for anybody anxious to acquire the perfect training of a seaman that he should devote all his energies to learning astronomy, while practical seamanship was the thing wanted—though of course that depended on the science of astronomy—so he thought, though it might be desirable that the two sciences of chemistry and botany should be cultivated, still pharmacy was a practical art rather than a science of pure chemistry or botany. This was the ground of his preference for the institution of scholarships which would enable young men, not so well placed as others for obtaining education, to enter the school, rather than having obtained men and passed them through the Examinations to give them bonuses to pursue their studies in the higher flights of science. This question perhaps would present itself somewhat differently if the students presenting themselves at the Examinations showed that they passed these tests very easily. But the facts were just the reverse—the statistics prepared by the Registrar showed that during the last year only 44 per cent. of the Minors were able to pass at all, and when it was remembered that only a moderate percentage of marks were required in order to enable a candidate to pass, this showed that only a very small percentage of those who come up were at all completely prepared for the ordeal. He had also taken some trouble to ascertain the proportion of those who passed in honours, and during the last year he found that they did not exceed 9 per cent. Now even this was not a very tremendous achievement, because a candidate who obtained only 65 per cent. of the possible marks would gain that distinction. It was therefore clear that the average candidates could not be looked upon as being placed upon a very high platform of cultivation. It was with the object of stimulating this class that he should propose the institution of some scholarships similar to those now existing, not simply because ten scholarships more would enable ten men to do something essentially good for themselves, but because these rewards would stimulate industry throughout the length and breadth of the land, and many might be encouraged to exert themselves more than at present, for every one person who would succeed there would be probably some 50 trying for it, which of course would result in very great gain to the individuals and consequently to the community. He had originally intended to propose that six additional scholarships should be instituted. It occurred to him that that number was scarcely sufficient, and he would therefore propose that ten should be the number. Of course the pecuniary point of view must not be lost sight of, but looking to the fact that they were now saving about £200 per annum on the educational portion of their establishment in that building, he thought they might even venture to establish ten scholarships, though he understood the expense would exceed £60 a year each; still he did not insist upon the particular number, and was willing to leave that blank, or to have the details modified or discussed in committee if desired.

Mr. STODDART seconded the motion. He said that although there might be only ten or twelve individuals directly benefited, still they would represent 1200 or 2000, all over the country, and he thought gentlemen in London had very little conception of how much many young men required coaxing in order to get them to apply themselves thoroughly to their studies. There were a certain number who would work well of their own accord, but the others required encouragement, such as these scholarships would afford. He had much pleasure, therefore, in supporting the proposition.

Mr. WILLIAMS said the expense of each scholarship was £62 12s. per annum. He viewed the proposal with a great deal of favour; but, at the same time, he thought it required consideration, particularly as to what would be the probable effect on the laboratory. The question occurred to him whether it would not prevent the entry of paying students by inducing men to compete for these scholarships who would otherwise attend as independent students. It would not be very desirable that they should give a better education to those who could not afford to pay anything than to those who could and did pay something for their own education. There was plenty of time yet to consider this matter, as it could not come into operation before next session; and he therefore suggested that it should be referred to a committee before a final decision was arrived at.

Mr. URWICK thought this suggestion a very good one, that it would tend to stimulate education throughout the country, and could not possibly injure the school; on the contrary, he thought it would benefit it.

Mr. MACKAY was very much pleased to find that the feeling of the Council seemed in favour of giving full consideration to this question. He understood that in establishing these scholarships a sum of money equal in each case to about £62 10*s.* would be required, rather more than half of which would go in fees to the professors, and the remainder be paid in cash to the student. But suppose that there were three successful candidates, one in the extreme part of England, another in the extreme part of Wales, and another in the extreme part of Scotland, it would be impossible for them to come to London and subsist on the £30 while they were taking the benefit of the lectures and classes. It therefore seemed quite possible that there might be many young men very deserving who would not be able to take advantage of the scholarship in that form. He thought, therefore, that the matter would require most deliberate and full consideration before it was finally decided upon.

Mr. SANDFORD suggested that the proposal should be referred to the Committee, saying he did so with the full desire to support the proposition.

Mr. URWICK suggested that the principle should be affirmed and the details left to the Committee.

Mr. MACKAY thought it better that it should go to the Committee first.

Mr. SCHACHT said he had omitted to draw a plain distinction, as he had intended, between this proposal and any which had formerly emanated from the Provincial Education Committee. He wished this to be regarded as a perfectly open question, neither metropolitan nor provincial.

The VICE-PRESIDENT said he quite went with Mr. Schacht, and to some extent farther, and he should like the Council to affirm the principle generally that it was

desirable that scholarships, similar in amount and character, be instituted, leaving it for the discussion of the Committee as to what should be the number of scholarships.

Mr. HAMPSON said there appeared a tolerably unanimous feeling in favour of the principle, and he thought they might decide upon that at once. He was sorry to say he was not very sanguine as to the great rush of successful students which would come upon their funds, and therefore he thought that even if ten scholarships were offered for competition they need be under no fear with regard to finding the necessary funds.

Mr. FRAZER said he felt some difficulty as to the words "similar in amount and character," as he was rather doubtful whether the examination was not at present rather too high, and whether it did not repel students.

It was then unanimously agreed to pass the resolution as follows, omitting the number of scholarships :—

"That scholarships be instituted and be competed for at the same time and by the same process as the Jacob Bell Scholarships."

It was then moved by Mr. SANDFORD, seconded by Mr. MACKAY, and resolved—

"That this Council refer the proposal to offer scholarships in addition to the Jacob Bell Memorial Scholarships to a committee, consisting of Messrs. Atherton, Betty, Hampson, Mackay, Sandford, Schacht, Shaw, Stoddart, and Williams."

Mr. SCHACHT said he should also be quite content to leave the second resolution, of which he had given notice, to the decision of the Committee, viz., "That in the conditions of eligibility for the Jacob Bell Scholarships the limit of age be altered from 21 years to 22."

THE CONVERSAZIONE.

It was resolved that the annual Conversazione be held on Wednesday, May 20th, and the Secretary was requested to write to the Lords of Committee of Council on Education, asking permission to use the South Kensington Museum on the evening of that day for such purpose.

PHARMACEUTICAL MEETING.

Wednesday, February 4, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting having been read, the following donations to the Library were announced, and the thanks of the Society were awarded to the donors :—

'Classified and Descriptive Catalogue of the Indian Department of the Vienna Universal Exhibition, 1873,' from the India Office, per Dr. Forbes Watson ; 'Year-Book of Pharmacy and Transactions of the British Pharmaceutical Conference, 1873,' from the Conference ; another copy, from Mr. Richard Bremridge ; 'Praxis Medica Boerhaaveana,' from Mr. L. J. Thompson.

NOTE ON IODIDE OF IRON.

The President then called upon Mr. W. Murton Holmes to read a "Note on Iodide of Iron." The paper is printed at p. 629, and gave rise to the following discussion :—

The PRESIDENT said this paper, though not very long, was important, for differences occasionally arose in making up prescriptions, and these little notes were very useful. He should be glad to see more such papers brought forward, because it was very important that mixtures and other preparations should be as nearly as possible uniform in their consistence and appearance.

Mr. WILLIAMS asked if he rightly understood Mr. Holmes that he found it advantageous to use an equivalent each of iron and iodine in making the solution.

Mr. HOLMES said he used an equivalent of iodine ; it did not much matter how much excess of iron you had.

The PRESIDENT remarked that even these little alterations ought not to be made unless with the knowledge of the medical man, but probably if these kind of papers were copied into medical journals physicians would see them, and very probably express their approval.

Mr. WILLIAMS said he had misunderstood Mr. Holmes' remark with regard to the equivalent of reduced iron. The reduced iron of the Pharmacopœia sometimes contained 50 per cent. of magnetic oxide, and therefore the equivalent of that would not answer the purpose intended. He did not quite see the advantage of using reduced iron over any other form of the metal.

Mr. HOLMES said it was more convenient.

Mr. RIMMINGTON asked if the precipitate would occur, supposing the iodide of iron and the iodide of potassium were perfectly neutral.

Professor ATTFIELD said in such a case he did not suppose it would. It seemed to him that the object of Mr. Holmes' paper was to suggest what could be done when the substance was not quite neutral. The paper was interesting in itself, and also suggested two important points—first, as to how far a dispenser was justified in departing from a prescription, and introducing something else to prevent some unpleasant appearance or effect. With regard to that point it should be understood, that in prescribing such a solution as iodide of potassium the prescriber probably believed he was prescribing iodide of potassium only, and not that salt containing free alkali. If the iodide of potassium contained alkaline matter, then it seemed to him that the chemist, in virtue of his knowledge of chemistry, was justified in producing a neutral article such as was intended, and in doing so to the best of his ability. The remarks of Mr. Holmes illustrated, secondly, a matter which was one of general principle, and as such was recognized in Chemistry, viz., that it was much easier to prevent the deposition of precipitates by the addition in the first place of the substances in which they were soluble than to redissolve the precipitate after it had been precipitated. This was a principle which often applied in Pharmacy. Hydrate of iron was only one of a multitude of inorganic substances which were soluble in solutions of such organic substances as sugar and in solutions of inorganic salts.

Mr. RIMMINGTON remarked that on the subject of the legitimacy of adding anything to a prescription, it appeared to him that chemists might be justified in correcting an error. By way of an illustration, this iodide of potassium and iodide of iron could not be perfectly correct, the precipitate being the result of an error ; therefore the correcting of the error fell within the domain of the chemist, and he would be justified in correcting it, as he would thus be carrying out rather than altering the intention of the physician. It was his intention, no doubt, that the thing should be all right, but as the ingredients might be slightly wrong the dispenser should correct them.

Professor REDWOOD remarked that with reference to this question they should consider not abstractedly what iodide of potassium was chemically, but what it was as ordered by medical men; and the Pharmacopœia recognized that iodide of potassium in practice might contain, what as a rule it did, with very rare exceptions contain, a little excess of alkali; therefore, the case should be treated as a practical one. If there were means of producing readily iodide of potassium perfectly free from the presence of alkali, without incurring too great a cost, the case would be different, and the formation of a precipitate would indicate a defect in one of the ingredients used. Mr. Williams would be able probably to enlighten them as to whether it were possible to rely on obtaining iodide of potassium perfectly neutral. Methods had been suggested from time to time for so making it, but it was not generally met with in commerce, nor would the process given in the Pharmacopœia insure its perfect purity. It therefore appeared to him that there could be no error in using it as recognized, and that they might naturally expect on the addition of iodide of iron that there should be a slight precipitate. The question as to whether that might be prevented by the addition

of some ingredient other than that prescribed was a more serious and important question. He did not think it would be safe to recognize the use of any substance of that description, although it might be very well to suggest such an addition to medical men, so that they might, if they thought fit, order the iodide of potassium to be first neutralized with a little acid.

Mr. WILLIAMS said it was perfectly true that the iodide of potassium of commerce was alkaline. It was possible to make it neutral, but the difficulty and expense of doing so practically prevented it. It seemed to him that a medical man who ordered iodide of potassium and iodide of iron supposed he was ordering a neutralized iodide of potassium, and not that he was ordering an incompatible. The question really was whether it was right to add some little ingredient by which that which was theoretically compatible, but practically was not, might be rendered compatible. He could not see any objection to the addition of a little mild acid, to bring the iodide of potassium into that neutral condition in which it would no longer precipitate the iodide of iron. He did not believe that any medical man in ordering that prescription intended that there should be a precipitate of iron or basic iodide of iron, and that really pharmacists might be excused, and even praised, for going out of their way a little and remedying such slight defects as must occur with ordinary commercial and medicinal iodide of potassium. This salt very frequently contained sulphate of potassium, or even chloride of potassium, which was still more injurious. Carbonate must also almost of necessity exist in it.

Professor REDWOOD said one thing must be borne in mind, namely, that there might be some very conscientious pharmacist who would not like to make any addition to the prescription, and accordingly there would be a slight precipitate; then the same prescription might be taken to another dispenser who by a little modification might prevent this, and thus the first man, simply on account of his conscientious action, would be blamed for having used something improper.

The PRESIDENT said that was why, in his opinion, chemists should go to the prescriber and get his approval of the modification.

Mr. RIMMINGTON asked whether anyone had tried the formula given in the PHARMACEUTICAL JOURNAL a month or two ago for tasteless syrup of iodide of iron; if not, he should recommend it to their notice: it was very nearly tasteless, and made an excellent and permanent syrup.

Mr. WILLIAMS said he had tried it, and liked it very much, but he understood it was patented, and this of course prevented its general use. It was very remarkable to find that iodide of iron and chloride of iron when combined with citrate of potassium formed a double salt that was almost tasteless; it was a beautiful compound, and ought really to become a recognized compound in Pharmacy. He believed it would be found as efficacious medicinally as any other, and it quite got rid of the nauseous qualities of the original compound. He did not think the qualities of citrate of potash and citrate of soda were yet appreciated, or the power of that wonderful acid, the citric, in disguising nauseous medicines. The new compound, citrate of bismuth, was, he believed, very valuable, and there were many other salts in which citric acid would play an important part. He understood, however, that with regard to the compound of citrate of potassium with iodide of iron and chloride of iron, the compound was patented, and therefore he could say no more about it.

The PRESIDENT suggested that if this compound were not patented, Professor Redwood might succeed in including it in the proposed additions to the Pharmacopœia.

Professor ATTFIELD, referring to the remark of Professor Redwood about a conscientious dispenser who would not depart from his prescription, drew attention to the Pharmacopœia, in which the conscientious reader would find after the words "Potassii Iodidi," KI. If this formula were regarded as the definition of iodide of potassium, the salt should contain nothing but potassium and iodine; but if it had "a feeble alkaline reaction," that property would show that it contained something beyond K and I, and the intelligent dispenser would consider what he should add to rectify alkalinity. He might hesitate between hydriodic acid, citric acid, or other acid; but if he had a conscientious desire to make the compound neutral, he would add an acid of some kind. The speaker thought that what should guide them in discussing this point was that most medical practitioners regarded iodide of potassium as a neutral salt, and he therefore considered that a chemist would be right in making its solution neutral whenever, from his knowledge of chemistry, he foresaw that alkalinity would be objectionable.

Professor REDWOOD thought that any one who attempted to interpret the Pharmacopœia in that way would very soon get into serious difficulties.

Mr. MARTINDALE asked if it would be competent to a dispenser to neutralize the spirit of nitrous ether when prescribed with iodide of potassium by correcting the acidity. It occurred to him that in case discoloration took place one would be fully justified in correcting the acidity of spirit of nitrous ether by a small quantity of liquor potassæ. Iodide of potassium varied a great deal in the quantity of free alkali it contained, but he thought it would be found practically, that if one drachm could be neutralized with one drop of dilute nitric acid, it was pure enough for practical dispensing, but when the alkali existed in a larger quantity than that it should be considered an impurity. He would suggest to Professor Redwood that the quantity of alkali allowable should be indicated in the Pharmacopœia, in order to prevent the use of that which sometimes came into the market, and which contained a considerable excess of free alkali.

Mr. BLAND said he had observed that commercial iodide of potassium was invariably alkaline; but neither Professor Redwood nor Mr. Williams had given the reason why that was the case. He did not think it depended so much on the difficulty of making a neutral salt as upon this fact, that when perfectly pure it could not be kept for any length of time. An immediate decomposition took place; iodine was set free, and some portion of iodate of potash was also formed. Another reason why pure iodide of potassium was not sent out was the difficulty of getting it in large and well-defined crystals. In the presence of an eminent manufacturer he spoke with diffidence; but he believed there was difficulty in getting large-sized crystals when the salt was perfectly neutral. Not only was this the case with iodide of potassium, but with many other salts which, when perfectly pure, did not readily form large, well-defined crystals. He believed the presence of a small amount of carbonate of potassium assisted in the formation of perfect cubes, and also tended to preserve it from that spontaneous decomposition which took place with the perfectly pure salt.

Mr. WILLIAMS said it was quite true that if the solution were perfectly pure you, as a rule, got bad and ill-formed crystals, which the public would not have. In fact, it seemed to be the rule that the more impure the solution the better the crystals. Probably the presence of impurities prevented the particles coming together so rapidly, and so made them arrange themselves more regularly when they did come together. It often happened that if some residual liquor were put aside as worthless, perhaps for some months, it would be found on examination to have deposited magnificent crystals. Pure bromide of potassium seemed always to crystallize badly.

Mr. RIMMINGTON, though not disputing the truth of what had been said, mentioned as a fact that some years ago Messrs. Southall of Birmingham used to make pure iodide of potassium almost transparent, and with beautiful crystals, the largest he had ever seen. It always seemed moist also. There might be great difficulty in the process, and he believed the manufacture had been almost given up; they certainly charged 3*s.* or 4*s.* a lb. extra for it.

Professor REDWOOD said they had formerly had some specimens of iodide of potassium in the state just described, very transparent and beautiful, but all he had ever seen of that description were alkaline; indeed, according to his experience, the more transparent the crystals the more strongly alkaline were they. Some years ago the Rev. Mr. Read took great pains to indicate a method of producing perfectly neutral iodide of potassium, but he always found that when in that state it rapidly acquired a slight yellow colour. The presence of a little free alkali appeared to prevent the decomposition. He could quite confirm what had been said as to the difficulty of forming large crystals from pure solutions. He had taken great pains for some years to get large crystals of pure carbonate of soda, but without success. Some years ago there was a specimen in the museum, which was unfortunately thrown away, ignorantly, and because it was rather unsightly, which had been very carefully prepared by Messrs. Howard, of Stratford, and was absolutely pure, to illustrate the fact that this salt could not be obtained in well-formed crystals from a pure solution. The presence of a little sulphate of soda appeared to greatly facilitate the crystallization of the carbonate, and probably other salts present in a solution of iodide of potassium produced a similar effect.

The PRESIDENT said it was very important that preparations of a definite character should always have the same appearance and strength, but he considered it also of importance that in such cases as the one they had been discussing the dispenser should see the physician and obtain his approval of the modification which was proposed to be made; and this would probably lead to the prescription being differently written in future. He was sorry to say that no other papers had been prepared for that evening, and ventured to hope that all members would take to heart the admonition which had recently appeared in the *Journal*, and use a little more diligence in this direction. To those persons, however, who did not come to the meetings, because they did not see papers advertised, he would say that during the last 33 years he had not missed more than six meetings, and had never failed to gain some useful information by coming.

THE ADDENDUM TO THE PHARMACOPŒIA.—LARCH BARK AND ARECA NUT.

Professor BENTLEY wished to ask a question of his colleague, Dr. Redwood, in his official capacity as Editor of the 'British Pharmacopœia,' as to the forthcoming 'Additions,' as he understood they were to be called, of that volume, and he hoped that Dr. Redwood would feel himself at liberty to answer it. He had heard on good authority that two new substances were to be added; and, if this were so, it seemed desirable that pharmacists should be made aware of it, in order that they might be prepared to introduce them when called for. Seeing the high position and reputation of the members of the Medical Council engaged in bringing out the 'Pharmacopœia,' he was quite prepared to believe that they had made repeated trials of these substances before recommending their introduction into the national 'Pharmacopœia.' They were *Larch bark* and *Areca nut*. The former had long been used as a tanning material, but he did not remember that it had been specially recommended for use in medicine until about ten years ago, when a paper by Dr. Greenhow appeared in the *British Medical Journal* on the value of tincture of larch bark in checking profuse perspiration and in certain bronchial affections; and he believed it had been used for some time in Ireland in similar cases. He should be glad to know if pharmacists had known it prescribed, and to what extent. On the table were samples both of the fresh bark and also of some which had been sent from Ireland, where it was often used, and was described as the inner bark. He should rather describe it, however, as the bark divested of its outer layer. With regard to the areca or betel-nut, it had been well known in this country for some time, particularly in the form of betel nut charcoal, and it was largely used in the preparation of the kind of catechu known as Ceylon catechu, which was formerly official in the 'Edinburgh Pharmacopœia.' He understood it was going to be introduced for its anthelmintic properties. Areca nut, had been used as a vermifuge from the earliest times, and was a popular remedy in India. It was rather remarkable, if it possessed well marked anthelmintic properties, that it had not received special notice to that effect in the Pharmacopœia of India, but in this volume it was slightingly spoken of. He understood, however, that some members of the Medical Committee had tried it, and found it to be one of the most useful remedies for tapeworm. He should be glad, therefore, to know if it were true that these two substances which he had named were coming into the 'Pharmacopœia.'

Professor REDWOOD said he saw no reason why he should not state that it had been suggested that these articles should be added to the Materia Medica. The supplement or addendum had been in type for some time, and it would be remembered he had brought the subject generally under the notice of the Society, in order to obtain their advice with reference to several articles which were proposed to be introduced. It had been in circulation amongst the members of the Medical Council for some time past, and they had been seeking information among their friends, pharmaceutical and otherwise, in different parts of the country. Certain modifications had been made, and certain substances which had been suggested were now put into form, and amongst others those which had been mentioned by Professor Bentley. It was to be hoped that the work would soon now be circulated. There had been much more delay than had been at first anticipated, but this had arisen from the fact that the members of the Medical Council wished to have the proposals in their hand, in order that they might judge for themselves, and obtain such information as they could before giving their sanction to them. He understood that the larch bark had been in somewhat extensive use in Ireland for some time, and had been found very efficacious in cases such as those mentioned when administered as a tincture, the formula being one part of bark to eight of rectified spirit, and the dose from 20 to 40 minims. The areca nut was administered in the form of a powder, as an anthelmintic, and there were some eminent members of the Medical Council who considered it the most valuable yet known at the present time for the expulsion of tape-worm. It was administered in somewhat large doses, viz., four to six drachms of powder mixed in milk.

Mr. MACKAY said that as far back as 30 years ago he was applied to by an eminent medical man in Edinburgh to prepare tincture of larch bark, which was used by him entirely as an astringent, and, according to him, with great success. It so happened that he had used the very proportions just mentioned by Dr. Redwood, viz., 2 ozs. of the bark to a pint of rectified spirit. At that time the bark was not to be got as an ordinary drug in the London market, and he had to cast about to see where he could get it. It so happened that he was acquainted with an extensive landed proprietor in Ayrshire, to whom he applied, and he accordingly gave instructions to his head forester to strip the bark at the proper time. The time came, and so did the bark; and had it been stripped properly it would have been enough probably to have supplied the whole of Great Britain for a very considerable time, but unfortunately there was a large proportion of woody fibre mixed with it, and a kind of excrescence on the outer bark, so that it was found nearly useless However, after stripping the woody fibre and the outside, he was about to make use of the middle bark, and since then, as the demand for the tincture still continued, he had been able to get excellent supplies in the neighbourhood of Edinburgh. As far as he knew, no other preparation but the tincture was made use of, but he found that other pharmacists besides himself were in the habit of preparing in Edinburgh, and therefore he was not at all surprised

to hear that it was likely to take its place in the next Pharmacopœia. As to the areca nut he could not say very much, and did not know that it had been used in medical practice in Edinburgh, though for many years it had been considered perhaps the best of all anthelmintics for greyhounds and other valuable dogs. Consequently he should not be surprised if it were found a valuable addition to the Pharmacopœia.

Professor ATTFIELD asked if there were likely to be any directions given as to the degree of fineness of the areca nut powder. It was well known that pharmacists in America were directed in the United States Pharmacopœia to sift their powders through special sieves, the size of which were mentioned. He asked this question because he believed that some persons considered that the activity of areca nut powder was partially mechanical, depending, in short, in some degree upon the size of the particles.

Professor REDWOOD was not aware of any intention to indicate the fineness of the areca nut powder, any more than that of rhubarb or jalap. It was well known that the preparation of medicinal powders was carried out much more systematically now than formerly, when most retail establishments prepared their own powders, and at a comparatively recent period he had known some London druggists make and sell powdered rhubarb in a state which any pharmacist now would consider quite unfit for use in medicine. Some pharmacists, particularly in Paris, laid great stress on the very minute division of substances administered as powders, and now-a-days, as a rule, they were reduced to the finest state of division. To this was owing the smooth, glossy appearance of powdered rhubarb. Although he was open to conviction upon this point, he did not think they could with advantage indicate the degree of fineness to which powders should be reduced, though such a thing might be useful where substances were directed to be reduced for the purpose of making tinctures, or anything of that kind.

Mr. URWICK said he had tried the areca nut powder on pointer dogs, and had found it of no effect when in very fine powder, but when administered in a coarse powder it proved effectual. It therefore appeared to depend for its effect partly on its mechanical action.

Mr. UMNEY said the powder of areca nut, as generally put up by grinders, would pass through a sieve having about 140 meshes per lineal inch, whereas powdered rhubarb would pass through a sieve of about 180 or 190 divisions, being the finest sieve made. Powders varied very much in their state of division ; thus, powdered caraway would scarcely pass through a sieve much finer than 60 meshes per inch, whereas jalap and rhubarb easily passed through one of double the fineness.

Mr. HASELDEN said he remembered an article which appeared in the Journal some years ago on larch bark, in which a form was given for preparing the tincture. It came, he believed, from Ireland, and for some time past he had been in the habit of making a tincture of larch bark for an Irish gentleman who came to England every year, and to whom it was prescribed, he believed, for dysentery. He had not experienced any difficulty in getting the bark. Areca nut he had known used for some time in several ways—in the first place as a tooth-powder, either pure or mixed with other powders ; and also in the shape of charcoal, though he could not undertake to say whether all the charcoal sold under that name was really made from the areca nut. He had also known it used for some years past as one of the best vermifuges for dogs, but had never known it prescribed for human patients ; probably the action would depend to some extent on the state of the powder. The adulteration of ipecacuanha powder had recently been noticed in the Journal, and he thought that the whole subject of powders and their adulterations might well be treated in a paper at another meeting, and hoped some one would take it up. He was not prepared to say that every druggist ought to grind his own powders, but he should certainly advise them to do so when practicable.

Mr. GREENISH said on reading the article to which reference had been made, on ipecacuanha powder, he had immediately sent for a sample, and had been examining it for the last two or three weeks ; he hoped to have a paper on the subject for the next meeting.

Mr. COLLINS thought it was open to considerable doubt whether the so-called extract of areca catechu was really produced from that plant at all. He did not mean that the plant did not produce any catechu ; but that which was known under that name to chemists always had rice husks about it, and did not seem to be produced from the areca. Dr. de Vrij had lately asked him this very question, and said he was not at all certain about it himself. He should therefore like to know whether any one had seen what might be termed a critical specimen, for these commercial samples certainly appeared very doubtful. He thought probably it was ordinary acacia catechu.

Professor BENTLEY, in answer to a question, said there would be no difficulty in getting larch bark ; but it was important that the British Pharmacopœia should clearly define what portion of the bark was to be used. With regard to the areca nut, he believed it was noticed in 'Braithwaite's Retrospect,' of 1864, and also in some papers in the *British Medical Journal* 10 or 11 years ago, where its anthelmintic properties were especially referred to. With reference to Mr. Collins' question, he had never examined the areca nut catechu minutely, but judging from casual observation he should say the probability was that it was the extract of areca nut. It had not the character of acacia catechu, for the fracture of this latter always presented a shining appearance, whilst the former had an opaque, rough appearance.

Mr. CANDY said larch bark appeared to be intended for employment on account of its astringent properties in checking perspiration or discharge, bronchial ailments, or dysentery. Presumably its stringency was due to the presence of tannin, and this therefore seemed to be a step in the opposite direction to what had been sometimes advanced, namely, the employment of active principles instead of crude substances. It seemed that the active principles were not always so useful as the crude substances, or there would be no necessity for introducing this article.

Provincial Transactions.

GLASGOW CHEMISTS' ASSOCIATION.

The Annual Festival of the Glasgow Chemists and Druggists, held under the auspices of the above association, was held in the Crown Hall, on Thursday evening, 29th January. Mr. John Currie, President, in the Chair.

The Chairman was supported on the platform by the following gentlemen :—Drs. A. M. Robertson, R. C. Moffat, and J. S. Nairne ; Messrs. Young, Gilmore, Mackay, Ainslie and Taite (Edin.), Kinninmont, Davison, (Ex Pres.) Clarke (Sec.), J. L. Hatrich, Fairlie, Galbraith, etc.

After tea the Chairman gave an address in which he alluded to the work that had been done during the session that was drawing to a close. He also referred to the "Assistants Branch" and stated that several excellent papers had been given by some of its members in competition for a prize offered by a gentleman connected with the drug trade.

A Concert followed, at the conclusion of which Mr. Alex. Kinninmont, in an admirable short speech, moved a vote of thanks to the strangers from Edinburgh.

Mr. Young (President of the North British Branch of the Pharmaceutical Society) responded. Dr. R. C. Moffat then proposed a vote of thanks to those who had taken part in the concert, which was carried.

A vote of thanks was then proposed to the Committee who had got up the evening's Entertainment by Mr. Gilmore, (Edin.) replied to by Mr. Clarke (Sec.), after which Mr. Taite (Edin.) moved a vote of thanks to the Chairman,

which was carried by acclamation. The Chairman suitably replied. At the conclusion of a short speech by Mr. Mackay the company parted, after singing "Auld Lang Syne."

An assembly afterwards took place.

LEICESTER CHEMISTS' ASSISTANTS' AND APPRENTICES' ASSOCIATION.

The half-yearly meeting of the members of the above Association, was held at the rooms, Halford Street, on Tuesday the 3rd inst. Mr. Wright, President in the chair. There was a large attendance. In opening the meeting, the President reviewed the work of the past session and congratulated the members upon the success that has attended the association, which has now reached its tenth session. The Hon. Sec. then read the following report. During the past half-year the attendance of the members at the meetings of the Socicty has been satisfactory. Fifty-five classes have been held, and three Lectures on scientific subjects have been delivered, by Messrs. W. J. Harrison, J. E. Weatherhead, and F. T. Mott, and the committee desired to express their thanks to those gentlemen for their kind services.

The arrangement of the specimens in the Materia Medica and Chemical Cabinet is now nearly complete, and the committee feel greatly indebted to the following firms for their liberal gifts towards furnishing it. Messrs. Barron, Squire and Co.; Cox, Gould and Co.; Maw, Son, and Thompson; Howard and Sons; and Wright, Sellers and Layman, (London); Messrs. Southall, Son and Dymond; (Birmingham); and Messrs. Richardson and Co. (Leicester).

Very extensive improvements have been effected in the Laboratory, a substantial working bench having been erected, and a most suitable set of bottles having been presented to the association by Messrs. Kilner Brothers of London. Ordinary experimental and analytical work can now be carried on. The Library has been increased during the past session by the purchase of Proctor's Practical Pharmacy, and by the presentation of a valuable series of the Pharmaceutical Journals, extending over a period of twenty-two years. Three members have passed the Minor and Modified examinations, during the last session. The total number of members has been thirty-four. Votes of thanks were then passed to the class teachers, Messrs. W. B. Clark, P.C.; T. Wright, P.C.; S. H. Cadoux, A.P.S.; C. B. Lomas, A.P.S., and P. Princep, A.P.S., to Mr. Cadoux who had undertaken the arrangement of the specimens in the materia medica and chemical cabinet, and to Messrs. Bishop and Shakespeare, who had superintended the fitting up of the laboratory.

A ballot was then taken for the new committee and officers which were elected as follows: T. Wright, P.C., President; S. H. Cadoux, A.P.S., Vice-President; Miller, A.P.S., Treasurer; E. J. Bishop, Hon. Secretary; E. H. Butler, A.P.S.; A. Shakespeare, and T. H. Lomas.

The meeting was then adjourned until Tuesday the 10th, inst., when the Treasurer's report will be laid before the meeting, and an inaugural address delivered hy the President.

Review.

VIENNA UNIVERSAL EXHIBITION 1873: A CLASSIFIED AND DESCRIPTIVE CATALOGUE OF THE INDIAN DEPARTMENT. By J. FORBES WATSON, M.A., M.D., etc., etc. London: W. H. Allen and Co.

Catalogues of the several departments of the Great International Exhibitions, it is well known, are of two classes; some of them are really worth a place in every reference library, while others are scarcely worth the paper upon which they are printed. Anyone acquainted with the London Exhibitions of 1851 and 1862, or of the Paris Exhibitions of 1855 and 1867, must be perfectly cognizant of this fact. Some of the catalogues and reports of these Exhibitions were very carefully prepared by competent writers, and so will stand as authoritative books on the several subjects. The catalogue, the title of which stands at the head of this notice, is one of the best we have ever seen. It treats in one volume of 246 pages of the resources and manufactures of our great Eastern Empire. The contents of the book are classified under the respective heads of mineral, vegetable, and animal substances, chemical and pharmaceutical preparations, food substances, textile materials, etc. In a long list of specimens illustrating the mineral wealth of the Empire, under the head of coal we read that "The coal trade in India is becoming of greater importance. The amount raised had increased between the years 1858 and 1868 from 220,082 tons to 484,642 tons, or considerably more than doubled. The mines are gradually being extended, and worked in a better manner than formerly, and the coal is sent to market in a better state." As an example of the care bestowed in the production of this catalogue, we may mention that to each kind of coal enumerated is appended a careful analysis, made in the laboratory of the Geological Survey.

Of salt, it seems that two varieties are produced and used in India, "One is produced by evaporation of the water of brine springs, salt lakes, and of the sea, and so artificially crystallized; the other, native rock salt, which is worked in several places, but most largely in the Salt Range, Punjab, and across the River Indus in the Kohat district. There is also a large amount of salt imported from Great Britain, and used chiefly in the neighbourhood of the port towns."

Food-grains, and pulse come in for a good share of attention. Wheat, of course, figures first, the extreme limit of which is stated to be at an altitude of between 13,000 and 15,000 feet. The natives themselves do not use the grain to any great extent, the bulk being disposed of by sale. The flour is mixed with that of some kind of pulse, and in this form is used for cakes or bread. The seeds of *Coix lachryma*, known as Job's tears, are used as food in China and Malacca, under the name of Eejin or Ee-yin. "It is," we are told, "the most remarkable among food grains for its chemical composition. Dr. Smith writes that 'it is larger and coarser than pearl barley, but it is equally good for making gruel. As it is sold for fivepence per Chinese pound, it makes an excellent diet-drink for hospital patients in China.' Dr. Hooker observes that 'a great deal of *Coix* is cultivated in the Khasia hills; the shell of the cultivated sort is soft and the kernel is sweet, whereas the wild *Coix* is so hard that it cannot be broken by the teeth; each plant branches two or three times from the base, and from seven to nine plants grow in each square yard of soil; the produce is small, not above 30 or 40 fold.' In Mason's Burmah it is stated that a species of *Coix*, with large esculent seeds, which are parched like Indian corn, are often for sale in the bazaars, and are cultivated very extensively by the Red Karens." Here is also an interesting note on the chickling vetch (*Lathyrus sativus*), which is used as food in many parts of India. "It will be remembered that Duvernoy ascribed such pernicious qualities to this pulse, as causing rigidity of the limbs, delirium, and other dreadful effects to such an extent that the Duke of Wurtemberg in 1671 prohibited its use by edict, which was confirmed by his successors. In the recent Pharmacopœia of India, attention was called to this plant in a special note, because 'the continued use of its seeds as an article of diet is apt, under certain circumstances to induce paralysis of the lower extremities. In one district in Bengal nearly 4 per cent. of the population were sufferers from it.'"

Under the somewhat lengthy head of "Pharmaceutical Preparations, Ethereal Oils, Perfumeries, Drugs, and other raw products for pharmacy and chemical industry," we have much valuable information on these points. The notes on the culture of the rose at Ghazeepore and of the

manufacture of attar and rose-water is so interesting that we reprint it entire in another column.

A lengthy list of indigenous drugs of India attracts our attention as we find in parallel columns the scientific name of the product, the provincial name, officinal part, physiological action, and finally the retail price of the article in the Calcutta bazaar.

We take for instance as example *Agathotes chirayta*, provincial name, Chireta; officinal part, whole plant; physiological action, bitter tonic. Price at place of production 8 annas per pound. Space will not allow us to notice these products at greater length, nor can we but direct attention to the sections including vegetable and animal oils and fats, dye stuffs and food substances. We have preferred to give a general view of the contents of the volume rather than to dwell entirely on that part with which we as pharmacists are most interested. The book throughout is well printed and we cannot say more in recommendation of it than to advise our readers to obtain a copy.

Obituary.

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

On the 20th December, 1873, Mr. Edward Gould, Chemist and Druggist, of Moorgate Street, London.

On the 8th January, 1874, Mr. William Palmer Barrow, Chemist and Druggist, of Ipswich.

On the 26th January, 1874, Mr. Thomas Wilson Wigglesworth, Chemist and Druggist, of Sleaford. Mr. Wigglesworth had been a Member of the Pharmaceutical Society since 1869.

On the 28th January, 1874, Mrs. Mary Buckley, Chemist and Druggist, of Lees, near Manchester.

On the 29th January, 1874, at 2, Ockendon Road, Kingsland, Mr. James Mason, aged 34; for some years Manager in the Laboratory of Davy, Yates and Routledge, by whom he was much respected. Mr. Mason was formerly assistant to Dr. Redwood, of the Pharmaceutical Society.

Correspondence.

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

Chemists' Assistants.

Sir,—Little as I wish to trespass on your valuable space, I still cannot allow "Hyde Park's" letter to pass without protesting against any such construction as he puts upon my letter, or those of the gentlemen who have preceded me. He is going far too much ahead of us or any of our declarations. I do not think any of us (assistants) ever advocated such views as "Hyde Park" imputes to us; we have been always the first to disclaim them.

"Hyde Park" evidently thinks we are going in for "trades-unionism," "coercion," "intimidation," etc.

The question raised is not entirely one of money, but also of time. How many hours do we spend behind the counter fishing for catchpennies, after respectable tradesmen and their assistants of other denominations have finished business, and thrown "dull care" to the winds.

As a rule, employers do not feel these extra hours; it is the poor assistant who has to answer the call of everyone that has a penny to spend.

As a class, we have been duly lectured and somewhat abused for not taking advantage of our opportunities (?) and spending our evenings (?) in study. But it must be remembered that ours is an occupation calling not only for bodily labour, but also for the continued exercise of the mental faculties. It is a labour of both body and mind, both of which at the end (?) of the day's business need rest rather than increased exertion; it therefore cannot be much wondered at that, at the first moment of freedom, the tendency is to get into the fresh air, and as far as possible from the smell of the physic.

I think it behoves us assistants to join together and ask our employers as a body, whether they will do anything towards shortening our hours of labour, and give us that opportunity for acquiring knowledge, the loss of which we deplore more than themselves. I am sorry to say that some of the best (historical) houses, who should be a bright example to their weaker brethren, are going backward and lengthening shop hours.

Should a Chemists' Assistants' Association be formed, and be successful in moderating these excessive hours, one of its first objects would be the establishment of a course of evening lectures, which would enable assistants to utilize their extra time and pass the necessary examinations; and which would, moreover, tend to repress those systems of "cramming" so much abroad, and to which this Journal so fully testifies.

"Hyde Park" says that assistants' salaries have materially improved, while the corresponding improvement has not taken place in employers' emoluments. I, however, venture to say (from my own and the experience of others, older and more fully acquainted with business than myself), that this is not a matter quite beyond dispute. However, admitting it for the nonce, I think it is in great measure due to the want of better relations, and the great estrangement which has all along existed between employers.

If "Hyde Park" can suggest any means for bettering the condition of assistants, he will earn the gratitude of the whole body, and they will be only too willing to aid him in carrying out any plans for the benefit of their employers.

PHARMACIST.

London, Feb. 4th, 1874.

The Society's Museum.

Sir,—As the Council have been kind enough to allow the library to be opened in the evening, might not the experiment also be tried with the museum. I have no doubt there are several men in the same position as myself—occupied all day—who would gladly avail themselves of the opportunity of using the museum after business hours. Leaving this in the hands of those who are better able to judge than myself, I am, etc.,

AN ARDENT STUDENT

T. T. C.—The preparation you inquire about is advertised as a proprietary article.

S. C.—The statement you refer to was quoted from the by-law which you will find on p. 943 of the present volume of this Journal.

H. McCallum.—Your communication respecting the addressing of your Journal has been handed to the Secretary.

E. B. Starkey.—Your wish shall be complied with.

N.—Such an addition would be a departure from the instructions of the Pharmacopœia.

"West."—We have never while making the preparation observed the formation of such a precipitate as you describe.

"Hydrocarbon."—(1) The liquids could be separated by fractional distillation, but the result would not be worth the trouble. (2) There would be no difference in the subscription; simply communicate your wish to the Secretary.

W. K. F.—The powder is rather darker than we should have expected it would be, but it is difficult to pronounce without careful examination. We should recommend you to submit it to a practical microscopist.

J. E. M.—The effervescence will be due to the carbonic acid evolved from the bicarbonate of potash, by the acidity of the subnitrate of bismuth. It is not possible to free the subnitrate from this acidity entirely without decomposing it, but in your case there seems to have been more present in it than there ought to have been. We advise you to test it.

COMMUNICATIONS, LETTERS, etc., have been received from T. W. White, J. E. Howard, Bolton, W. Smith, "Inquirer," A. L.

NOTE ON ARECA NUT.

BY CHARLES ANDREWS, M.P.S.

A question having arisen at the last Evening Meeting of the Pharmaceutical Society respecting the anthelmintic virtues of areca nut, and the degree of fineness to which it should be powdered, I am induced to state my experience as to the method of using the nut in India, acquired during a residence in the Bombay Presidency, where I have frequently known it to be used by the natives with very good effect as an anthelmintic.

The natives pick it off the tree, and *grate* it on an ordinary nutmeg grater. About a teaspoonful is administered, after the patient has fasted twelve to fourteen hours, either made up into a bolus with ghee (clarified butter) or floating on milk, the latter being the favourite method. It generally acts (without any other medicine being given) in about an hour after administration, and is efficacious for round as well as tape worms. It is used both for the human subject and dogs in the same manner and dose.

My opinion is that it is much more useful given *grated* than in a *fine* powder.

A celebrated "dog powder," which is largely sold, I believe to consist of nothing but this areca-nut powder.

CONTRIBUTIONS TO OUR KNOWLEDGE OF THE CINCHONA ALKALOIDS.*

BY O. HESSE.

Hager states in his commentary on the German Pharmacopœia that sulphate of quinine usually contains appreciable traces of sulphate of cinchonine, which the manufacturer does not attempt to remove. This statement is, however, contrary to my experience, according to which the sulphate of quinine produced under my superintendence in the manufactory of Messrs. Jobst, in Stuttgart, as well as that from some other German manufactories, which I tested in consequence of Hager's statement, is absolutely free from cinchonine sulphate.

Hager affirms that he detected the so-called cinchonine sulphate by means of pure chloroform. As I doubted the accuracy of this observation, on the forementioned grounds, I believed that I should be able to throw light on the matter by examining chloroform with reference to its power of dissolving the principal cinchona alkaloids. In this way I have ascertained that pure chloroform is an excellent separatant of the sulphates of these alkaloids, some being easily soluble in it, whereas others are difficultly soluble.

According to my experiments, the following are the quantities of chloroform (1·492) required to dissolve 1 part of anhydrous sulphates of

	Quinine.	Cinchonidine.	Conchinine.	Cinchonine.
At 61-62° C.	196	300	9	22·4 parts.
At 15° C.	about 1000	about 1000	19·5	60 „

On evaporation of the chloroform solution of these salts at a gentle heat, the quinine and cinchonidine sulphates remain behind in crystals, whilst the conchinine and cinchonine sulphates are obtained as a transparent amorphous mass.

If, therefore, quinine sulphate (one gramme) when agitated with pure chloroform (15 c. c.) gives a solution which on evaporation leaves a transparent amorphous residue, it follows that conchinine or cinchonine sulphate is present. If these salts are not present the residue of the evaporation is crystalline. When pure quinine sulphate is thus treated, 10 c.c. of the chloroform solution pass easily through a small plaited filter, and on evaporation (at 30-40°) the filtrate yields not more than 35 mgr. of crystalline residue. With cinchonidine sulphate, or a quinine sulphate containing a considerable quantity of this salt, it is impossible to obtain 10 c.c. of filtrate from the mixture, on account of the swelling up of the cinchonidine sulphate. The latter is converted into extremely fine needles, which soak up the chloroform solution like a sponge, and do not yield it again without pressure.

If the residue is crystalline, and does not amount to more than 35 mgr. from 10 c.c. of solution, the absence of conchinine and cinchonine sulphates may be determined by heating this residue with about 5 c.c. of water, adding 0·5 gramme of potassium-sodium tartrate, removing the precipitated quinine or cinchonidine tartrate by filtration after cooling, and mixing the filtrate with an equal volume of officinal solution of ammonia. If no conchinine or cinchonine salt is present the solution remains clear, but in the other case a precipitate is formed.

On treatment with pure chloroform, cinchonidine sulphate is quickly deposited in extremely delicate prisms, and on this account is bulky. Only traces of it are taken into solution, the greater part remaining in the undissolved residue. The salt is easily detected in this residue, after removal of the adhering chloroform solution, by pressing between folds of bibulous paper, by means of Kerner's test, *i.e.*, 5 c.c. of the watery solution mixed with 7 c.c. of officinal liquor ammoniæ will cause more or less turbidity, which eventually resolves itself into a crystalline yet flocculent precipitate.

In pure chloroform, then, we have an excellent means of rapidly deciding in a given case whether "quinidine sulphate" (as cinchonidine sulphate containing quinine is generally termed) contains conchinine or cinchonine sulphate, or is perhaps the conchinine salt only. The latter would be the case if, for example, 0·5 gramme of the salt dissolved with ease in 7 c.c. of pure chloroform. Since, then, the "quinidine salt," called conchinine sulphate by Hager, dissolves only slightly in pure chloroform, it certainly contained no conchinine sulphate.

According to Cullen and others, cinchonidine sulphate is an excellent febrifuge, but is excelled in this respect by quinine sulphate. On account of its low price it might be more extensively prescribed for the poor, and generally where, on other grounds, great expense is not advisable. On this account I regret the omission of it from the German Pharmacopœia.

Chloroform usually contains a small proportion of alcohol, which, as is well known, renders it more stable. A trifling difference in the amount of alcohol makes itself apparent in the proportion of quinine or cinchonidine sulphate dissolved, and on this account is allowed a residue of 55 mgr. for 10 c.c. of solution, which more than corresponds to the solubility of both salts. This number is not arbitrarily chosen, but has been ascertained by experiments with quinine sulphate which answered the tests of the Pharmacopœia.

A chloroform which contains more alcohol than is generally the case, dissolves a correspondingly larger proportion of quinine and cinchonidine sulphates. Six parts of a mixture of 2 vols. chloroform and 1 vol. absolute alcohol dissolves as much as one

* *Neues Jahrbuch für Pharm.*, Sept., 1873, p. 130.

part of quinine sulphate, $2C_{20}H_{24}N_2O_2,H_2SO_4+7\frac{1}{2}H_2O$ at 18°C. Cinchonidine sulphate also dissolves very readily in this mixture, which I use in examining quinine sulphate for the sulphates of sodium, magnesium, and calcium and other inorganic substances, salts of ammonium, mannite, cane sugar, milk sugar, and starch, since these do not dissolve in the mixture. Salicine itself is separated by it, if present in greater quantity than 1 per cent. One gramme of sulphate is introduced into a test-tube and 7 c.c. of the mixture are added. (Only 5 c.c. are requisite for solution, but 7 c.c. are ordered to compensate for unavoidable loss of solvent). The contents of the tube are shaken once round, the tube is corked and allowed to stand aside for about ten minutes; at the end of this time, if the salt is pure, it is entirely dissolved, leaving only a few fibres of paper introduced in the drying of the salt to trouble the clearness of the solution; these finally settle to the bottom, and are of course disregarded. But if the salt contain an admixture of any of the above-cited substances, these also subside to the bottom of the glass, and may then be known, in part, by their form. To determine them quantitatively it is only necessary to throw the mass upon a small filter, and afterwards to wash them with a little of the pure mixture.

This operation may be supplemented by the ignition test, which, since the carbon of quinine burns away with great difficulty, is an exceedingly protracted operation, and not unfrequently has led to misapprehension. A case recently came under my own notice, in which absolutely pure sulphate of quinine was said to contain sugar, or other difficultly combustible substance, because the operator could not succeed in burning away the carbonaceous residue of the quinine.

Of the remaining salts of these alkaloids, I will cite only the neutral hydrochlorates, which, without exception, dissolve very readily in pure chloroform, giving up to it their water of crystallization. On this latter account these salts should be previously dried at 100°C. At 15°C. anhydrous hydrochlorate of quinine dissolves in about an equal weight of chloroform.

The hydrochlorates of cinchonine and cinchonidine present this curious phenomenon—these salts dissolve indeed instantly in the chloroform, but the solution, after a short time, and at the original temperature, becomes thick and crystalline, owing to the formation of difficultly soluble compounds of the salts with the solvent. In such compounds, 1 part of cinchonidine hydrochlorate requires 13 parts of pure chloroform at 20°, and 1 part of cinchonine hydrochlorate requires 22·2 parts of pure chloroform at 15°C., for solution. On evaporation of the solution the cinchonine hydrochlorate remains behind as an amorphous resinous mass, which, without increase of weight, gradually changes into radiating crystals. It is the anhydrous substance $C_{20}H_{24}N_2O,HCl$. The different behaviour of quinine sulphate and cinchonine hydrochlorate with pure chloroform furnishes a ready and convenient method of detecting the latter salt when mixed with the former.

Finally, most cinchona barks, when treated with pure chloroform, yield a small quantity of alkaloids to it. The method devised by Bernatzik* for the discovery of a falsification of cinchona bark with quinoidine is therefore useful only under certain limitations.

* See before, p. 569.

FERRIC PHOSPHATE.*

BY R. ROTHER.

Ferric phosphate is usually considered to be a very definite chemical, susceptible of exact determination, and capable of entering into definite and soluble combinations with acids and various salts, particularly those of organic acids with a monad base. However, the resulting body as obtained by different methods of manipulation is not always identical, nor even chemically similar in the predominant points. Usually when a normal ferric sulphate in concentrated solution is poured into an excess of disodic orthophosphate, also in hot saturated solution, or if a basic ferric sulphate be similarly treated, the precipitated normal ferric orthophosphate will always be more or less contaminated with basic salts.

The solution of ferric orthophosphate in ammonium citrate is nevertheless a more stable and convenient preparation than the U.S. officinal ferric pyrophosphate. The latter salt is less soluble, and therefore more easily and elegantly scaled; but since the secompoundsare properly administered only in a liquid form, it is therefore an advantage to employ a salt of greater solubility, which especially is permanent in solution. The pyrophosphate when dry and exposed to light is rapidly discoloured and decomposed, and when in solution it is speedily converted into orthophosphate. The pyrophosphate is prepared by an exceedingly circumstantial process which ordinarily is impracticable, consequently the dispensing pharmacist will have to procure his supply from the wholesale manufacturer. But the ferric orthophosphate when dissolved in ammonium citrate, even if in the utmost concentrated state, will rapidly decompose, particularly in warm weather; however, in this respect the citro-ammoniacal pyrophosphate is precisely similarly disposed. The disruption is usually indicated by the formation of mould which invariably accompanies the destruction of the salt. Many soluble citrates are perfectly proof against spontaneous decay, yet when ammonia is present in the combination, the dissociation is not so easily counteracted, but if the compound in addition contains phosphoric acid, the climax of instability is insured. Ammonia is a fertile base for mouldy formations, but phosphoric acid will generate organic growths if only a trace of available material is present.

The citro-ammoniacal ferric orthophosphate, in concentrated solution, can be well protected by means of sugar; if this is added in sufficient quantity to form a dense syrup, the green colour of the solution is perfectly retained; but recently the writer has observed that a sample several years old, which during the hot weather had been stored away in a partially filled bottle in a dark place, had generated mould on the surface and become dark brown in colour. It was also noticed that a specimen three years old preserved with glycerin was perfect.

With the aid of sugar a solution can be prepared which is just half as strong in iron as the U.S. officinal solution of ferric citrate. However, when glycerin is employed the strength of the solution can be doubled; that is, made identical in iron strength with the solution of ferric citrate.

The writer has now adopted this latter strength, adding glycerin in the proportion of 4 fluid ounces in the pint of finished product.

When ferric sulphate in moderately dilute solution is treated with disodic phosphate, also in dilute solution, but only in equivalent proportion, then the liquid filtered off the precipitate will be acid, and it can be assumed that the acidity is derived from the presence of acid sodium sulphate (SO_4NaH).

But usually it is accepted that free sulphuric acid results, thus:—

$$(SO_4)_3Fe_2''' + 2(PO_4Na_2H.12OH_2) = 2(PO_4Fe'''4OH_2) + 2(SO_4Na_2) + SO_4H_2 + 16OH_2.$$

In medium concentration the free sulphuric acid will

* From the *Pharmacist*.

retain much of the ferric phosphate in solution, but if comparatively much water is present the affinity of the acid is weakened and most of the ferric salt will precipitate. Nevertheless, all methods for the complete precipitation of the ferric phosphate are based upon the use of sodium phosphate in excess on supposition that the decomposition leads to the formation of acid sodium sulphate and acid sodium phospate (PO_4NaH_2) in the solution. However, upon this premise it is fair to surmise that since acid sodium sulphate in the first instance dissolved the ferric phosphate largely, it would naturally exert the same action here; consequently the theory is erroneous, and we are justified in taking for granted that free phosphoric acid, in which the ferric salt is insoluble, is alone generated according to the equation :—

$$(SO_4)_3Fe_2''' + 3(PO_4Na_2H.12OH_2) = 2(PO_4Fe'''4OH_2) + 3(SO_4Na_2) + PO_4H_3 + 28OH_2.$$

The ferric phosphate when thrown down from dilute solutions is excessively bulky and gelatinous, and the latter condition renders the washing by filtration tedious and unsatisfactory, whilst the bulkiness and lightness seriously interferes with washing by decantation. Therefore, the writer has always endeavoured to precipitate it in the most compact and least gelatinous form. Concentrated hot solutions are very serviceable, in fact the only recourse to meet this end. The writer found an advantage was gained by pouring the strong solution of the ferric sulphate into the hot saturated solution of the sodium phosphate.

But lately the writer has reversed the method, and pours the sodium phosphate solution into the iron liquid. With this procedure, and the employment of hot concentrated solutions, the precipitate of ferric phosphate is again dissolved after each addition of the sodium salt, until over two-thirds of this has been added, when the precipitate will remain insoluble as formed, and rapidly augment upon each addition. The result of this manipulation was a more compact and granular precipitate, in which the presence of basic phosphate was totally prevented; in fact it was undoubtedly contaminated largely with the acid phosphate.

$$(Fe'''_2(PO_4H)_3).$$

The only objection to these precipitates was the slowness of their washing process, which was almost equal in tediousness to that of the gelatinous precipitates, owing to the fact that the water permeated them very gradually although more evenly than the former. Yet if after complete separation the precipitate was mixed with a great volume of water, the method of washing it through decantation applied admirably, because deposition occurred speedily and rather compactly.

The writer, therefore, has now abandoned either method entirely, and, with a view to save the large waste of phosphoric acid, resorted to an altogether new manipulation and modification of the general process, which, though not producing exactly normal phosphate, results in the complete precipitation of the iron and utmost utilization of the sodium phosphate ; so that practically no loss is experienced, since the precipitate contains all the iron and phosphoric acid, but not as one homogeneous compound, but rather as a mixture of acid and basic salt.

Two important advantages become prominently conspicuous, namely, the economy of the process, which saves one-third of the sodium phosphate ; and secondly, the production of a dense precipitate, which can be expeditiously washed by decantation, and finally pressed between muslin to separate most of the adhering water, without waste to the precipitate ; thirdly, the usual large excess of water adhering to the other precipitate is not present here, and therefore the necessary evaporation is avoided.

When sodium phosphate and ferric sulphate are employed in equivalent proportions, and a hot concentrated solution of the former gradually poured into a hot concentrated solution of the latter, the precipitate at first formed is again re-dissolved, until nearly all the sodium salt has been introduced ; but ultimately, after complete mixture, only a comparatively small portion of the iron will have been precipitated, probably as acid phosphate. If now, however, a moderately concentrated solution of disodic carbonate in equivalent proportion is gradually added to the hot mixture, the iron will be perfectly thrown out of solution as a heavy granular precipitate together with all of the phosphoric acid. Each addition of the carbonate is attended with copious effervescence, and the preliminary formation of a red precipitate, which the excess of hot acid rapidly converts into the light-coloured phosphate. An excess of carbonate added all at once, however, permanently discolours the precipitate, because basic phosphate, ferric hydrate, and sodium sulphate are produced, leaving the original sodium phosphate in a great measure untouched, but the manipulation, when carefully conducted, yields so little of the basic salt that only a faint yellowish colour distinguished this precipitate from the whiter and purer normal orthophosphate. The final phase of the reaction may be thus expressed :

$$(SO_4)_3Fe_2''' + 2(PO_4Na_2H.12OH_2) + CO_3Na_2\,10OH_2 = 2(Fe'''PO_4\,4OH_2) + 3(SO_4Na_2) + CO_2 + 27OH_2.$$

In practice it is necessary to add a slight excess of sodium phosphate and a small deficiency of carbonate to insure a mild acid reaction, which will prevent undesirable basic tendency in the ferric phosphate which finally remains.

This precipitate, after solution in the usual proportion of ammonium citrate, yields a greenish solution with a brownish cast ; the reddish tint results from the basic phosphate, but if an excess of ammonium citrate be used, the deep green colour is developed, since the ammonium citrate extinguishes the brown tint of the basic salts, converting them into the normal green, consequently more citrate is needed to produce the citro-ammoniacal compound with this phosphate than with the use of normal or acid ferric phosphate.

From these observations the writer has constructed the following elegant and expeditious process for the production of concentrated and absolutely permanent solution of the citro-ammouiacal ferric phosphate :—

Take of—

Ferrous sulphate in coarse powder	8 troy ounces.
Sulphuric acid . . .	1 troy ounce and 200 grains.
Potassium chlorate in crystals .	283 „
Disodic orthophosphate, cryst. .	11 troy ounces.
Disodic carbonate, cryst. . . .	4 „ „
Citric acid, cryst.	4 „ „
Ammonium carbonate	sufficient.
Glycerin	4 fluid ounces.
Water sufficient.	

Mix the sulphuric acid with 12 fluid ounces of water add the ferrous sulphate, and apply heat until complete solution results, then add the potassium chlorate, and stir until dissolved ; now dissolve the sodic phosphate in 20 fluid ounces of water with heat, and pour this, by gradual addition and with constant stirring, into the iron solution ; then dissolve the sodium carbonate in 4 fluid ounces of water, with heat, and pour this very gradually into the other mixture, stirring this well for a few moments after each addition until the bright red precipitate at first formed has again disappeared ; after the final addition, continue the heat a few minutes, and then dilute the mixture with water to the measure of 8 pints ; when the precipitate has perfectly subsided, draw the supernatant liquid off by means of a syphon, and pour on a fresh portion of water in similar volume to the first. After having thus washed the precipitate three or four times, remove all the water possible by means of the syphon, pour the precipitate upon a muslin strainer, and press it thoroughly.

Upon the citric acid pour 4 fluid ounces of water, and add ammonium carbonate in small fragments until the acid is perfectly neutralized.

Place the washed and pressed precipitate of ferric phosphate in a porcelain capsule, add to it the solution of

ammonium citrate, together with the glycerin, and apply a gentle heat until solution is complete; if necessary, mix this with water to the measure of a pint, and strain through muslin while warm.

If the solution of ammonium citrate contained acid salt, or if, during the solution of the phosphate, the heat upon the dense liquid had dissipated a part of the ammonia, then, after cooling, the solution may separate a crystalline deposit of acid ammonium citrate. Should this occur, the supernatant liquid is decanted, and a few drops of ammonia is added to the crystals at short intervals until perfect solution results in the formation of the exceedingly soluble and noncrystallizable normal ammonium citrate. An excess of free ammonia, however, colours the solution red; but if the excess that was added is not too great the reunion with the decanted portion will again restore the green colour throughout the whole solution. A most expeditious method for dissolving salts deposited in the bottom of bottles is to lean the receptacle at an angle of 45°, and change the position of it occasionally, so as to bring the liquid into the most advantageous contact with the mass for favouring its solution.

The ferric phosphate yielded by 8 troy ounces ferric sulphate approaches this in weight, but assuming that it is the phosphate, $Fe'''PO_4 . 4H_2O$, it should by theory only weigh 6 troy ounces and 3·34 drachms. However, the theoretical quantity of the phosphate, $Fe'''PO_4 . 5H_2O$, is 6 troy ounces and 7·48 drachms. Yet if we calculate upon the acid phosphate, $Fe'''_2\ 3(PO_4)H_3$, then only 5 troy ounces and 6·04 drachms should result.

From this comparison it is fair to conclude that the precipitate is the phosphate $Fe'''PO_4 . 5H_2O$, and hence one pint of the solution of ammonio-ferric citro-phosphate would represent about 7 troy ounces of the former compound, corresponding to about 12 troy ounces of the soluble double salt.

NOTES ON AROMATIC WATERS.*

BY JOSEPH P. REMINGTON.

This class of preparations has long found favour with physicians as a means of dissolving and administering such potent or disagreeable remedies as are readily soluble in water, and the increasing use of carbonate of magnesium in their manufacture (although probably not the best method) renders their preparation of easy accomplishment.

The first requisite is the selection of fresh essential oils. An aromatized water made from a stale and terebinthinous oil is the worst advertisement a pharmacist can have, whilst, if a fresh oil is at hand, even an aromatized orange water can be made which will serve many good purposes. The writer has used an orange water made in the usual manner with considerable satisfaction, and a very useful simple elixir resembling Curaçoa cordial may be made by taking of—

Aqua Aurantii (℥ij in a pint) . . .	f℥iss.
Simple Syrup	f℥iss.
Cologne Spirit	f℥j.
Spt. Vini Gallici (opt.)	f℥ss.

Mix.

Some formulas for simple elixirs direct the essential oils to be mixed with the spirit, and then a certain proportion of sugar and water added and filtered. The great objection to those made in this way is that when such are used in prescriptions with water in combination (and it is generally used in this way), a separation of the excess of oil takes place, which renders the preparation unsightly.

A delicately flavoured syrup of citric acid may be made which will be clear and bright, not disfigure the sides of the bottle, nor have the harshness that the officinal article possesses.

To make this, double the quantity of fresh oil of lemon prescribed by the U.S. officinal formula [4 minims] should be rubbed up with a small quantity of carbonate of magnesium, a little water added, thrown on a filter, then followed by more water, sufficient to form with the sugar and citric acid the syrup of officinal strength.

Compound aromatic waters are readily made, containing caraway, coriander, cinnamon, orange and orange-flower flavours, and form a means of preparing the host of elixirs that are now required:—

The mixed alkaloids to be dissolved in cologne spirit, syrup added, and the salt soluble in water, dissolved in the aromatic water.

* Read before the Philadelphia College of Pharmacy, Nov. 18, 1873 *(American Journal of Pharmacy)*.

CULTIVATION OF OPIUM IN INDIA.*

BY R. SAUNDERS, *Collector of Ghazeepore.*

The cultivation of poppy in India can be traced back as far as the sixteenth century. An allusion is made to the opium and saltpetre monopolies of the Emperor Akber in the reign of Queen Elizabeth, in the celebrated Ayeen Akber of Abul Fuzul, prepared during the latter part of the sixteenth century.

The poppy plant has been cultivated in Nepaul for many years, doubtless for as long or longer than in Bengal and the North-western provinces; and it may be that the opium from India was first introduced into China by the Nepaulese, and afterwards by the Dutch, who used to purchase the drug for export, long before the East India Company held possessions in this country.

The process of the manufacture in India at the present day is as follows:—

About the end of January the poppy plant commences to flower, and continues till March; the petals are watched, and are carefully collected in the following manner,—

The forefinger and thumb encircle the stem just beneath the pod, and, with the other fingers drawn inwards, a kind of tube is formed; this tube is then gently raised straight over the pod, and if the petals are matured they come off. They are never plucked off, as it would injure the pod. When a sufficient quantity has been collected in this manner, the cultivator proceeds to manufacture them into flat cakes, something like pancakes, or, as they are technically termed, flower-leaves, and the opium cakes are wrapped in these leaves.

The manufacture of the flower-leaf is simple and inexpensive. A circular-ridged earthen plate, about 12 inches in diameter, is placed over a slow fire, the required quantity of petals is then placed in it, and pressed with a damp cloth pad till they have adhered together; the flower-leaf is then removed and allowed to dry, when it is ready for use in the manufacture of opium.

In February the poppy plant is pretty well advanced, and the prospects of the season can then be fairly ascertained.

In some instances in January, but generally in February and March, the pods mature, and are lanced in the afternoon; the opium is allowed to exude and remain on the pod till the next morning, when it is scraped off gently with a small iron scraper, and the thumb or finger is then run over the incisions to close them. The number of incisions required to complete exudation of all the juice varies, and ranges from one to five and six, and occasionally to seven and eight in some isolated cases. The opium thus collected is placed in earthern or brass vessels slightly tilted to drain off the dew and any opium juice it may contain; and when the whole of the drug is collected and thus treated, it is carefully manipulated, put into a new earthen pot, and set aside in some ventilated and safe place. Should the opium be of low spissitude, it is exposed in some shady place (not in the sun), turned over occasionally and very carefully, so as not to injure the grain, and is so treated till it reaches the required consistency; and remains in the custody of the cultivators until it is weighed.

* From the Official Catalogue of the Indian Department at the Vienna Universal Exhibition.

After the opium has been extracted, the pods are allowed to dry and are then broken off and the seed collected. An ample quantity is kept by the cultivator for next season's sowings, and the remainder disposed of to traders.

The leaves of the plant are left on the podless stalks, and, when withered, are collected and delivered into the Government opium factory, and termed technically *trash*, for packing the opium balls in the chests, for which payment is made at the rate of 12 annas a maund.

The flower-leaves are weighed in March and April, and are sorted into classes. The first is of fine texture and colour, and from 8 to 10 inches in diameter; the second, slightly inferior in both texture and colour; and the third is of a roughish and thicker quality; as sorted they are weighed, and the weight of each quality is entered in the leaf weighment book, when the value of each quality is calculated at the rate of Rs. 10, Rs. 7, and Rs. 5 a maund.

The flower-leaves are despatched by country boats or carts to the factory at Ghazeepore, and on arrival are weighed, examined, and classified.

Before the opium weighments commence, the several books are prepared; new earthen jars and pots, with covers, are purchased and carefully weighed, coarse cloth, sealing wax, and twine for closing and sealing the jars, and baskets for holding the filled jars, are also purchased; every scale, beam, weight, pan, and reservoir is carefully examined and tested, and then the weighments take place.

After the opium has been brought in by the cultivators, it is tested, and samples of each consignment are taken for a careful chemical analysis, to the opium examiner's room, to detect adulteration. The opium is then stored in large wooden vats.

The pure opium, which is fit for the China provision, and the consumption of the local market, is stored in large wooden vats, each holding about 50 maunds (about 1½ ton weight); the opium derived both from the assameewar and chullan sources is not stored anyhow, but each parcel, according to its class, is emptied into a vat bearing the designation of that class; the light divisions are arranged in lines.

As much opium as can be removed from the vessels by light scraping is taken; that which adheres is afterwards removed by second scraping, and set aside for lewah; and that which persistently adheres is removed by water—this is called washings, and when evaporated is used in making lewah; the washings alone are valued at about Rs. 65,000 a season at the Ghazeepore Factory, and the opium thus recovered amounts to over one ton in weight.

When a vat is filled, the opium in it is stirred by long wooden poles daily until the drug is used for caking.

When there are about 2,000 maunds (about 75 tons) stored—we have accommodation for upwards of 6000 maunds—we can, if we possess the proper quantities of the various consistencies, commence caking. One may ask, but why have you not caked before you collected so much? The reply is, we are bound by order to cake at a consistence of 70°; that is, when the opium contains 70 per cent. of the pure dry drug and 30 per cent. water. We are allowed—as it is very difficult to hit off the consistence of 70° exactly when manipulating such a large quantity (nearly three tons) as we require daily for caking—to cake when the assay shows the opium to be above 69·50° and under 70·50°, so that we are allowed half a degree above and below the standard of 70°.

To prepare the opium for caking, a certain number of vats are marked of each class; a long iron instrument, something like a cheese-taster, is thrust from the top to the bottom of the vat (it forms half a hollow cylinder when open, and a complete cylinder when shut), and closed; the sample of opium is withdrawn, the contents of the sample drawn are thoroughly mixed up, and three specimens of 100 grains are assayed; the mean of the three results is taken as the correct consistence. By the same process the samples from all the vats, which have been marked, are taken and assayed; those which will give, when mixed together in certain proportions (by rule of alligation), opium at a consistence of 69·30 or 69·40° are exported to the alligation vats, and the contents of the selected vats are equally distributed over the seven alligation vats, so that the consistence of each may be uniform. The opium is then well mixed by rakes and by men walking about in it, and kneading it with their feet. At about 3 p.m. it is removed from these vats into the five caking vats; equal quantities being taken from each of seven alligation vats are distributed over the five caking vats. On the following morning the opium in each vat is again mixed by six men allotted to each, from 5 a.m. to 8 a.m. Four samples are drawn from each vat, and thoroughly incorporated together, and three specimens from this mass are taken for assay; this pertains to every caking vat. Should the whole of the assays of each caking vat come out above 69·50 and under 70·50, the agent of the Ghazeepore Factory gives the order to cake, or in his absence the principal assistant does so.

The cultivation of the poppy plant is rendered as far as possible both profitable and popular.

A large room, 944 feet long by 27 feet wide, accommodates the 250 cake-makers; each cake-maker has a number, and a place assigned for him to work at, the cake-maker's number being printed on the wall above his seat. Each man is provided with a wooden seat, and is furnished with a brass cake-mould, forming the half of a hollow sphere; he has also a tin vessel graduated so as to hold 4½ chittacks of lewah, the regulated quantity which is used in making the shell of each cake.

The opium produce per beegah ranges from one to fifteen seers, according to the quality of the soil, and the attention and care bestowed on the cultivation, and state of the weather. The profit varies, and ranges from Rs. 1 to Rs. 50 or upwards per beegah.

The following materials are used in making a cake, and as it is necessary that every cake should be of the same weight, viz., two seers, every precaution is taken to ensure the accurate determination by weight or measure (calculated for weight from actual experiments) of the articles which compose the cake. The proportion of each article is given in the table below:—

	Seers.	Chittacks.
Standard opium at 70	1	7·5
Lewah at 53	—	4·5
Flower-leaves	—	5·0
Water	—	·5
Trash	—	·25
Total weight of cake on the day of manufacture . .	2	1·75

The lewah now demands attention. Lewah is a paste made by breaking down opium in water which has been used for removing the traces of opium which adhere to the jars or vessels in which opium has been placed; this is called washings, or technically *dhoe*; the washings contain about 8 to 10 per cent. of opium; the opium is broken down in large vats containing about 800 cubic feet, and about 8 per cent. of pussewah is added to the lewah to render it smooth and glutinous.

When the lewah has a consistence of over 52·50 and under 53·50, it is called standard lewah; its consistence is determined every morning by assay, and, until it is of the proper degree caking cannot commence.

The lewah is delivered in bulk by weight, and the quantity to be used for each cake is measured by a brass cup, which delivers 4½ chittacks at 53°.

The poppy flower-leaves agglutinated by the lewah form the shell of the cake; five chittacks of dry leaves are required for each cake; but as the leaves vary in

weight according to the amount of moisture in the atmosphere, ten seers are steam-dried daily to ascertain how much moisture they contain; knowing this, an exact increase or decrease in the weight of leaves can be made, which is required to compensate for the moisture containcd. This control is necessary, since if five chittacks of leaves are used which contained much moisture, when the leaves parted with that moisture by evaporation in the dry months the cakes would be light.

The loss in weight which the leaves sustain by steam-dryings is determined on the day previous to their being required for use; the bulk required for the caking of the next day is weighed out and damped in the afternoon, so as to render the leaves supple and pliant; when dry they are crisp and break readily.

Having explained the preliminaries of caking, the method will now be described. Down the centre of the room the scales for weighing opium and the lewah vats are placed; there is a weighman for each scale and two assistants. The weighman weighs the opium on a very delicate scale, and one assistant searches the opium to ascertain finally that there are no extraneous matters in it; the second man arranges the movable tin pan, and places the opium on it.

When caking commences the caking-vat room doors are opened, and the opium is brought out in tinned sheet-iron vessels holding 20 lbs. each. One vessel is set before every scale, and a sufficient quantity for one cake having been searched is handed over to the weighman's second assistant, who adjusts the quantity in the pan. When the weighman declares it to be correct, the tin plate with the opium is taken away by a boy to his cake-maker, who has been supplied in the meantime with a tin cup filled with the requisite amount* of *lewah* for a single cake; he has also received the proper quantity† of leaves for one cake.

Having these by his side, the worker now rapidly forms in the brass mould the lower half of the shell of a cake, pasting by means of the lewah, leaf over leaf, until the thickness of about seven-sixteenths of an inch has been obtained. He allows in so doing the upper part of some of the leaves, which he tears in half and places vertically, to hang down outside the mould (with these he forms the upper half of the cake). The cake shell is principally made of half leaves vertically placed, other halves being inserted horizontally, so as to give equal strength in all directions. Having finished the lower half of the shell he takes the tin plate and accurately, to a grain, removes the opium into the half of the shell now ready for its reception; it is pressed upwards into the shape of a cone, some pieces of leaves are applied horizontally to it, then some lewah; now some of the parts of the leaves hanging down are pulled up and secured, more pieces are applied horizontally, and at last, having pulled up and properly arranged all the pieces of the leaves which were hanging around the cup, a whole leaf is applied to the top, and the cake is now finished.

It is a sphere of about the same size as a 24-lbs. spherical shot; it is removed from the mould and dusted with a little coarsely powdered poppy trash, so as to prevent its adhesion to the cup—made of burnt unglazed pottery—which is of the same shape as the mould in which the cake was made. It is now carefully placed in the cup while still soft, and it is carried out by the cake-maker's boy, who puts it in the sunshine on a little square of brick flooring, which has been allotted to the cake-maker whom he serves, and where a small board stands bearing his master's number.

Before removal, a paper ticket is pasted on the cake, bearing the cake-maker's number, and the date on which it was made; every cake has its ticket, so that we can at any time trace its history, and by this means we can hold every cake-maker responsible for the careful manufacture of his cakes; by means of these tickets, should anything be found wrong with any cake it can be brought home to the man who made it.

The caking begins generally at 10 a.m., and lasts till half-past one or two o'clock in the afternoon; usually 20,000 cakes are made daily.

The cakes are on the evening of the second day counted and sent to their destination in one of the cake godowns, where they and their cups are stored in racks.

The great object to be attained is to make the cake as carefully and compactly as possible by one operation, to have the shell even in thickness throughout, and to spread the lewah uniformly between the leaves. This can be attained by good cake-makers under strict supervision; cake-makers usually make sixty cakes a day; every good cake-maker gets twenty or more additional ones to make, for which they receive an extra allowance.

The flower-leaf forms an excellent covering; it is in every way suitable, but it has its drawbacks. It is affected by wet, and is liable to be attacked by mildew, borers, and white ants, while it will not resist hard pressure applied to any small area of its circumference; however, it certainly most effectually retains the moisture and aroma of the drug enveloped in it, and by its own fragrance adds to that which the opium *per se* contains.

The cake godowns are large and high brickwork buildings, with galvanized iron roofing, well ventilated by numerous windows and doorways. The windows have iron gratings fixed in the masonry outside, and skeleton doors are provided for the best godowns to admit of the entrance being closed while free circulation of air is not interfered with. All the doors and windows of the better-class godowns are further secured from thieves by galvanized wire netting, so that cakes cannot be cut up and passed out in large pieces.

Inside the godowns are wooden racks, extending nearly up to the roof; there are intervening rectangularly-placed passages traversing the frames to permit of ventilation. In these racks the cakes are stored in their cups.

Every third day the cakes, wherever placed, come down to the ground, are lightly hand-rubbed with a little trash, turned, replaced in their cups, and sent up again to be placed in the racks. The object of turning is to allow the shell of the cake to dry evenly.

The packing takes place only in dry weather, and after the morning dew has been dispersed.

Into a strong mango-wood chest, one yard long and two feet four inches wide, forty cakes are packed in two layers of twenty each; the balls are prevented from rolling about by each one being placed in a compartment; and in these chests, varying in number according to the year, the opium cakes find their way to Calcutta, whence they are shipped to China at the close of the annual Government sales, each chest realizing as much as £13, or, in other words, 1300 rupees, in an average good season.

* 5 chittacks. † 2 chittacks.

THE MOTIONS OF CAMPHOR AND OF CERTAIN LIQUIDS ON THE SURFACE OF WATER.

BY CHARLES TOMLINSON, F.R.S.

The author, who, as is well known, has studied the phenomena of the above subject for many years, in a paper recently published in the *Philosophical Magazine* refers to the additional light thrown upon it by the researches of Professor G. van der Mensbrugghe, of the University of Ghent, by means of the principle of surface tension of liquids, and then recapitulates as follows some of the principal observations made by former investigators.

Omitting mere guesses, such as that of San Martino, who, in 1793, attributed the motions of camphor to electrical action, we come to Sir H. Davy, who, in 1802, noticed that fragments of acetate of potash (then called acetite) move on the surface of water somewhat after the manner of camphor. The more irregular fragments rotate most quickly, whence it is concluded that the shifting of the centre of gravity had something to do with the phenomena, while the rectilinear movements were

attributed to currents descending from the salient points of each fragment, and so producing on it unequal pressures.

Carradori, in 1805, noticed that when a large drop of the milky juice of a euphorbiaceous plant is placed on the surface of water in a large vessel, a portion of the drop spreads, while another portion descends in threads, which accumulate at the bottom. If, then, the vessel be inclined so as to spill some of the water and so renew the surface, on returning the vessel to its first position the agitation will cause some of the milky filaments to rise to the surface, where they spread like the first portion.

These and a multitude of other phenomena, as noticed in my first 'Experimental Essay,' were attributed by Carradori to a "superficial attraction" (*attrazione di superficie*), which Dutrochet afterwards developed into the "epipolic force" (*force épipolique*).

In 1819 Barlocci covered fragments of camphor with gold leaf, and found that they did not move on the surface of water. The idea was that by preventing the formation of vapour, Venturi's theory, which attributed the motions to the escape of vapour, would be supported. It is further stated that perfect cubes of camphor do not move on the surface of water, on account of their perfect symmetry. This, however, is a mistake which several observers have fallen into; and we suspect that the cutting and shaping and handling of the camphor so as to confer upon it a geometrical form made it dirty, and that this was really the cause of its want of motion. I have frequently placed beautifully formed oblate spheroids of camphor on the surface of water, and these have continued to move about during some hours: but these figures were absolutely clean, for they were formed by dissolving camphor in strong sulphuric acid, and depositing a drop of the solution from the end of a clean glass rod upon the surface of clean water in a catharized glass 3½ inches in diameter. The acid dialyzes off and leaves the camphor in a compact, well-shaped button. Two or three drops may be deposited on the same surface; and the resulting buttons will sport about for a long time without interfering with each other's motions.

In 1824 a writer in Thomson's 'Annals' attributes the motions of camphor on water to the fact that the centre of gravity of each fragment and the centre of support are not in the same vertical. Another anonymous writer rejects this idea, on the ground that, if true, every irregular floating body ought to present the same phenomena as camphor.

I may here remark that during the many years in which the motions of camphor puzzled even the best observers, the idea was not seldom started that the shifting of the centre of gravity had something to do with the phenomenon. In 1863 Mr. Trachsel quotes an experiment by M. Gingembre (without reference), in which a cylinder of camphor, ballasted at one end with lead, was placed in water reaching halfway up the little pillar. After twelve hours' contact the camphor was cut half through at the level of the water, but not equally all round. This experiment (which really originated with Venturi) is quoted to show "the unequal power of solution in certain directions of the crystalline mass," and "this being one of the properties of camphor pointed out by Mr. Lightfoot, and from which he derives his well-written explanation of the cause of these motions when he says, 'the water upon which it floats, being capable of diffusing this vapour more readily in certain directions of the crystalline axis, thereby removes sufficient vapour-pressure at these points for the opposite side to drive about (by recoil) the nicely suspended particle.'"

In my reply to Mr. Trachsel, I state that nearly two years before I had pointed out the more rapid solution of camphor on a broken than on a natural surface, and also that the vapour theory was three-quarters of a century old. It was first started by Volta in 1787, adopted by Prevost in 1799 under the term *jet gazeux*, and is now being revived without any experimental basis being provided for it.

As to the disturbance of the centre of gravity being the cause of motion in a floating and partly soluble mass, we have only to secure a crystal of some soluble salt to a slice of cork by means of an india-rubber ring, so as to be a little lighter than water; and if this be set floating, the waste will be constantly disturbing the centre of gravity of the mass, so as to produce a rolling over and a slow progressive motion. But no explanation of this kind suffices to explain the gyrations of camphor, benzoic acid, citric acid, etc., which are so rapid under the most favourable conditions (namely, chemically clean glass and water, and a bright, warm, dry day) as to extinguish the form of the fragments and make them appear like a grey cloud on the water.

In 1825 the brothers Weber examined the subject of the camphor motions, and showed that a downy feather smeared with oil at the two ends will rotate on the surface of water. But other observers had already pointed out that an indifferent substance, such as sulphur, glass, earth, sugar, paper, etc. (as indicated by Carradori in 1808), smeared with a fixed oil, will rotate on the surface of water. But the first observation of this fact is older still. Franklin, in his celebrated letter to Brownrigg, on the action of oil in stilling the waves, dated November 7, 1773, states that while visiting Smeaton, near Leeds, he was about to show what he calls "the smoothing experiment" on a pond, when Mr. Jessop, one of Smeaton's pupils, spoke of an odd appearance on that same pond. "He was about to clean a little cup in which he kept oil, and he threw upon the water some flies that had been drowned in the oil. These flies presently began to move, and turned round on the water very rapidly, as if they were vigorously alive." The experiment was repeated before Dr. Franklin, who says, "To show that it was not any effect of life recovered by the flies, I imitated it by little bits of oiled chips and paper cut in the form of a comma of the size of a common fly, when the stream of repelling particles issuing from the point made the comma turn round the contrary way." The Doctor adds that "this is not a chamber experiment; for it cannot well be repeated in a bowl or dish of water on a table." The reason for this is want of chemical purity in the bowl or dish. The effect may be well shown in a clean glass five or six inches in diameter, by moulding small coracles of paper on the rounded end of a glass rod, pouring into one of these coracles a few drops of a volatile oil, and placing it on the surface of water. The paper-comma experiment is sometimes referred to as originating with the brothers Weber; but in truth their labours added nothing to the subject, nor does it appear that they intended to do more than glance at it. They do not settle anything, but, on the contrary, declare that the varied phenomena connected with the subject still remain unexplained. They are even inclined to fall back upon an electrical theory in order to explain the rapidity with which a drop of oil spreads on the surface of water.

In 1828 August described an experiment by Wirth, in which a metal ball is suspended at a short distance from the surface of water sprinkled over with powdered sealing-wax. On closing the hands over the metal ball the fragments of sealing-wax are set in motion, an effect attributed by Wirth to the magnetism of the human body, but by August to currents of air due to differences in temperature. He supports this view by showing that the effect can be produced by the action of a heated cylinder.

In 1836 Challis endeavoured to account for the spreading of a drop of oil on the surface of water by considering that the angle formed by the free surface of this drop and the common surface of the two liquids must be very small, and that consequently a thin film of oil must spread over the whole surface of the water, while a second drop would assume the lenticular form. I give Professor Challis's own words, since a similar theory was published by Du Bois-Reymond in 1858. He says:—"The angle of actual contact between two fluids is determined by the hydrostatical equilibrium resulting from the molecular attractions

of the two substances, the fluids being treated as incompressible. It thence appeared that this is an exceedingly small angle in cases in which the bodies in contact are not of very different specific gravities. Hence, in the instance before us, the angle of contact (that is, the angle which the surface of contact of the oil and water makes with the upper free surface of the oil) is very small. But since the drop is convex both at its upper and under surfaces, this is apparently an angle of considerable magnitude. In fact the theoretical angle of contact, or that which the upper surface of the oil makes with an imaginary surface drawn parallel to its under surface, and just beyond the sphere of the molecular action of the water, would be found by calculation to be of sensible magnitude. Consequently, that the angle of actual contact may be exceedingly small, the portion of the upper surface of the oil that lies within the sphere of the molecular action of the water must undergo a flexure near the visible periphery of the drop. Now in fulfilling this condition it seems probable that a very thin film of the oil spreads over the whole water surface (as there is no force to counteract), and gives rise at the same time to the visible spreading of the first drop. The film itself, being of less thickness than the radius of the sphere of the molecular action of the water, will not be perceptible to the senses. Such a circumstance having happened to the drop that first comes in contact with the water will prevent any that succeed from being similarly affected."

(*To be continued.*)

CINCHONA CULTIVATION IN JAVA.

The following letter from Herr Van Gorkom in Java, to Dr. Hasskarl, is published in the *Pharmaceutische Zeitung*, No. 85 :—

"*Bandong*, 15*th August*, 1873.

"I have already sent 188 chests of cinchona bark to Holland, and during this month 180 more will follow, so that the entire yield of 1873 (20,000 kilograms) will be in Amsterdam by November. Of the Ledger Calisaya bark, I export only 1200 kilograms ; this excellent bark contains always at least 5 per cent. of pure quinine, and will consequently be very much in request by the manufacturers. In the course of this year I shall collect a good quantity of seed, and then no other kind of Calisaya will be sown, so that after six or seven years all our barks will be superior barks for manufacturers. To this end they must content themselves with the kinds which are less rich, but which are of good value for pharmaceutical purposes.

"The plantations of 1865 to 1868 are at the present time somewhat thinned, whereby the remaining trees are placed in more favourable conditions, so that in a few years very thick bark will be obtained. Also the *C. officinalis* has proved to be a good manufacturer's bark, although the plantations are yet very young, and I intend to reserve extensive exportation until 1875, because then it can be regularly continued. As it is I should have been as well able to collect this year 100,000 as 20,000 kilograms ; but this yield demands much anxiety and oversight, and I am still too much wanting my skilled staff for the work of planting out, which by April, 1874—ten years after my undertaking the cultivation—will be completed to 2,000,000 plants ; after that the work will be more simple. The enterprise, therefore, only requires to be supported to become improved and reinvigorated.

"Moens continues his analyses ; all the barks which I export will be examined by him, and the trade may depend upon these analyses. I will take care that the results are published before the public sales.

"The cinchona powder, which I brought experimentally into the market, has not answered my expectations ; notwithstanding the low price it obtained, I am convinced that for pharmaceutical purposes, extracts, etc., it would be found equally suitable with the bark. I send at the present time a second sample of about 2000 kilograms, and hope that this will command a better price. It is an article requiring confidence, because the genuineness of such a powder cannot well be perceived exteriorly, and there is not the certainty that no adulteration has been permitted. Nevertheless, the dealers would well understand that I should not dabble in trade, and that the Government might even punish me by dismissal from office if I sought to lead them into error. The attention of private persons is turned more and more to cinchona culture. I receive fresh inquiries continually, and Herr Hofland, in Krawang, has already a splendid plantation of 100,000 trees, which he intends to raise to 1,000,000. I visited him last month, and was astonished at its fine condition. All this, however, does not prevent the lament raised a short time since by one of the Indian journals concerning the condition of our cultivation, which is already twenty years old, whilst the English have obtained such astonishing results in only ten years. But the editor of this Journal had not seen any of our cultivation, and he allowed himself to be guided by the light of English reports. Many of my friends wish that I should contradict this article ; but I rejoice that I can calmly leave such accusations unnoticed, and it is better that they should bluster to silence."

At the end of the above letter, in the *Zeitschrift des Allgemeinen österreichischen Apotheker-Vereines*—from which journal it is taken—is appended a report, prepared by Professors C. A. J. A. Oudemans and A. Stellingwerff, at the request of the Netherlands Trading Company, and published in the *Tydschr. der Nederl. maatsch. ter bevordering der nyverheide*, vol. xiv., p. 267. As this report deals very fully with the exterior appearance of the Java cinchona barks, it will probably not be unwelcome in this place.

"A. 107 chests of *C. Calisaya* bark distributed under five letters.

"(*a*). *Bark of Trees which were raised from Java seed* (23 chests containing 1825 kilograms).—The contents of the chests that were examined of this portion were not quite equal, but presented to some extent differences both in the form and appearance of the bark. These differences would be attributable to the varying age of the bark, since the old barks are more furrowed and wrinkled than the young. Compared with the American barks the superiority of these samples must be conceded, since, taken on the whole, the contents were very satisfactory, and the barks were not the inferior sort which was formerly brought from Java. This portion was sold at the average price of 121·8 cents (= 2*s*. 0¼*d*.*) per half kilogram.

"(*b*). *Bark from C. Calisaya trees, raised from Cuttings.* (23 chests, containing 1825 kilograms).—These were, so far as the exterior went, of excellent character, and were distinguished by their vigorous, healthy appearance. Some half quills taken at hazard from the bulk were ½ centimetre thick, and 2½ centimetres in diameter, proportions which are noteworthy. A whitish exterior surface with deep furrows having raised margins ; a beautiful uniform yellow-brown inner surface, and the bare places where the rubbing off of the bark scales had given rise to the so-called finger marks, stamped this bark at the first glance as a Calisaya. This portion was sold at the average price of 186·11 cents (= 3*s*. 0½*d*.) per kilogram.

"(*c*). *Bark in Irregular Pieces* (3 chests, containing 140 kilograms).—These pieces were irregular and short, but had a great similarity to both the before-mentioned lots. Having been taken from the under portion of the stouter branches, they were frequently ½ centimetre thick. Except in respect to form, the contents of these chests were judged equally favourable with the foregoing. They were sold at an average price of 116 cents (1*s* 11¼*d*.) per half-kilogram.

"(*d*). *Bark collected from Trees raised from Seeds from Madras* (5 chests, containing 346 kilograms).—According to the declaration of Van Gorkom, this kind yielded 5

* Calculated at the rate of 100 cents the florin = 1*s*, 8*d*. sterling.

per cent. of alkaloids, though least of quinine. As to the identity of this sort very great doubts are entertained. These chests contained quills of tolerable stoutness, some as thick as the middle finger, some even thicker; their exterior appearance was not so fine as that of the quills from (*b*), though in other respects satisfactory. With an equal diameter the bark itself was frequently thinner, splitting off in thin scales, so that not unfrequently the peculiar appearance arising from deep furrows with thickened edges would be absent. The doubt that exists as to the identity of this kind arises from the fact that the trees planted under the name of "*C. Calisaya* from Madras" do not agree in their botanical characteristics so entirely with those deemed to be typical in Java as that they can be considered certainly identical. This portion sold at the average price of 158·4 cents (= 2*s.* 7½*d.*) per kilogram.

"(*e*). *Bark from Trees raised from Seeds of C. Calisaya, obtained from America in* 1865 (4 chests, containing 261 kilograms).—According to the certificate of Van Gorkom these barks were characterized by their constantly high yield of alkaloids, of which generally more than three-fourths is pure quinine. These four chests were all examined by Messrs. Oudemans and Stellingwerff, and contained undoubtedly one of the most important cinchona products that have been yet supplied from Java. They contained quills of about 1½ to 2 centimetres in diameter, which resembled most those described above under (*b*), although not presenting so favourable an appearance. But on account of their large alkaloidal contents they deserve to be particularly recommended, and Messrs. Oudemans and Stellingwerff agree with Herr Van Gorkom that these trees provide a surer future for cinchona culture, and they approve in a high degree of his intention henceforward to plant only this one of the manifold varieties of *C. Calisaya*. The result of the sale has also vindicated this favourable opinion, since this portion was sold for the high average price of 4·56 florins (= 7*s.* 7¼*d.*) per half-kilogram.

"B. *Bark from C. Hasskarliana* (20 chests, containing about 1358 kilograms).—The quality of this bark was very good, and throughout was not of the inferior sort sent formerly. According to the statement of the quinine manufacturer Jobst, there was formerly obtained from this kind 3 to 5 per cent. of alkaloid, of which 1·7 per cent. was quinine. Likewise, the certificate now sent from Java fixes the amount of alkaloid at from 1 to 5 per cent., of which one-third to one-fourth is quinine. The *Hasskarliana* has consequently in respect to its chemical proportions remained stationary, or else on the whole improved. The average price for which it was sold was 141·2 cents (= 2*s.* 6¼*d.*) per half-kilogram.

"C. *Bark from C. succirubra; Red Bark* (5 chests, containing about 362 kilograms).—The alkaloidal contents were larger than in any of the other barks, and included comparatively little quinine, and much cinchonine and cinchonidine. Messrs. Oudemans and Stellingwerff on a former occasion recommended the company not to bring the *C. succirubra* bark from Java to public sale, since it possessed an unprepossessing exterior, and might produce an unfavourable impression at first sight. They further recommended that the Company should wait until a larger and probably better lot of this bark could be placed in the market. They are, therefore, the more pleased to be able to point out that a very marked progress has been made in the cultivation of this red bark. Upon an examination of that received it was thought not doubtful that a time will come when, at least as far as relates to external appearance, the Java red cinchona bark will stand on an equality with the American. But the commission does not place the fulfilment of this prediction in the immediate future, since the red bark from America comes into commerce in thick flat pieces, which are collected from old stems, whilst that from Java, on the contrary, would only be collected from young trees, and therefore appear in the form of quills. This parcel was sold at an average price of 114·8 cents (=1*s.* 11*d.*) per half-kilogram.

"D. *Bark from C. officinalis* (8 chests containing 407 kilograms).—This bark, judged according to its external appearance, the commission would rank with Loxa bark, although a cinchona bark, which, as is stated of this, contains 4 per cent. of alkaloids, half of which is quinine, must naturally be priced at a higher rate. It sold at 120 cents (=2*s.*) per half-kilogram.

"E. *Bark from C. coleoptera* (1 chest, containing 62 kilograms).—Amount of alkaloids 4 to 5 per cent., mostly cinchonine. This kind was now for the first time imported and offered for consideration. It includes quills which, in external appearance, stand between Loxa and Huanuco barks, and are generally overgrown with lichens. The impression of this new article was a favourable one. On account of its reported contents the commission was compelled to attribute to this bark a much higher commercial value than is awarded to Loxa and Huanuco barks. It was sold at 173 cents (=2*s.* 11*d.*) per half kilogram.

"F. *Bark of C. Pahudiana* (35 chests, containing about 2193 kilograms).—Amount of alkaloids 1·4 per cent., but little quinine. This *C. Pahudiana* bark also had a much better exterior than that formerly sent; it showed much more of the most esteemed characteristics of cinchona barks than formerly. In chemical value it stood about equally high with the American brown barks. It was sold for 128 cents (=2*s.* 1½*d.*) per kilogram.

"G. *Powder from Root Bark* (29 chests).—Amount of alkaloids, 2 to 3½ per cent.

"H. *Powder from Bark of C. Pahudiana* (2 chests).

"I. *Powder from C. Calisaya* (1 chest).

"Of the five chests opened for inspection, the contents of one appeared to be somewhat mouldy, probably because the powder was not sufficiently dry when packed; the contents of the remaining chests were perfectly dry, and possessed in a high degree the peculiar smell of cinchona bark. These three portions of cinchona bark powder fetched 15·6, 16, and 11 cents per kilogram."

"The entire produce of this second public sale of Java cinchona barks at Amsterdam amounted to quite 30,000 florins; at the first public sale there in March, 1872, 5937·25 kilograms were sold, which produced about 9000 florins. According to the opinion of Messrs. Oudemans and Stellingwerff the last importation shows a great improvement in this most important product of the East Indian colonies; a result the more surprising since the Java bark sold at the first public sales did not allow of very favourable expectations. It was then feared that the Java barks would not be able to compete with the barks from British India; this fear is no longer felt, since it is now justly considered that the result of the Java cinchona culture surpasses even that in India. Particularly noteworthy are the results from the plants which have been raised from the seed brought by Mr. Ledger from South America in 1865. It is remarkable that the portion of this seed purchased by the Dutch Government has succeeded much better than that which was sent to British India. This result is due principally to the zeal and good management of the Dutch cinchona planter, who, after this genuine sort had been once received, sought to increase it as much as possible by cuttings, since he mistrusted the uncertain results of sowing."

THE SIXTEENTH REPORT OF THE COMMISSIONERS OF INLAND REVENUE.

This report for the financial year ended 31st March, 1873, has only just come to hand, and as the reason for the delay in publication has not been given it is but fair to suppose there have been good grounds for it. We have only to turn to the first page in the report to find an evidence of the unparalleled prosperity of the country during the period to which the report relates; for we observe that the income from the excise alone increased from £23,386,000 in 1872 to £25,904,450 in 1873. And

although during that period the income tax was reduced from sixpence to fourpence in the pound, yet the income for the year from the inland revenue showed a net increase of £839,357. We are able to gather from the tabulated statements that the increase on spirit duty was £1,474,947; malt, £873,220; sugar, home made, £5862; and sugar used in brewing, £41,040. It is interesting to notice these increases, because they are gauges of the prosperity of the country. In times of depression of trade the artisan cannot afford to indulge to any extent in spirits, and sometimes it is even difficult for him to obtain his usual allowance of malt liquor, but from the fact that the consumption of spirits has increased $11\frac{2}{10}$ per cent., malt, $9\frac{2}{10}$, and sugar used in brewing 17,525,950 lbs., we are sure that the country was, during the financial year 1872, in a most prosperous condition. Taking the working classes in the aggregate, they obtain the necessaries of life as long as they can, and if out of the week's earnings there is a little to spare they then buy drink of some sort, so that, perhaps, of all the readings of our national prosperity there is none which gives such correct results as the malt and spirit duties.

Passing rapidly over the numerous items in this interesting report, we note that in the sister island the persons engaged in illicit distillation are rather higher in the social scale than formerly, for, instead of going to prison as heretofore, a larger number of them avail themselves of the privilege of paying the fine imposed by the magistrates.

The manufacture of sugar from beet does not appear to be greatly on the increase. In 1872 there was but one manufacturer, viz., Mr. Duncan, of Lavenham, and although he made a little more than in the previous year, the increase is trifling. There is one distiller also who manufactures spirits from beet, and he has considerably increased the quantity made in 1871, but we cannot say that these isolated cases look very hopeful towards the general establishment of these new branches of industry in England. It certainly seems surprising that both in France and Belgium the manufacture of sugar from beet should be carried on on a most extensive scale, and that the sugar so manufactured should have a ready sale to our English refiners, and yet no great efforts should be made here to compete with the foreigner in the production of an article in general demand in this country. The earthy taste of beetroot sugar, except of the finest kinds, will always unfit it for domestic use, but when we calculate the quantity used in the refineries in the United Kingdom it is a matter for surprise that one beet-root sugar manufacturer is the sole representative of this industry in Great Britain. The quantity of sugar made from starch for brewers is greatly on the increase, and we can only account for it by concluding that brewers do not very carefully estimate the extractive they obtain from this description of sugar. If they did we think they would think twice of the prudence of buying a sugar containing twenty per cent. of water at a high price, when ordinary raw sugar with four or five per cent. of moisture can be bought at a much lower rate. However, the chemical point of view is not always the one adopted by the public, and we can only dismiss the subject with the remark that if the brewers were a little more scientific this class of sugar would not be in great favour as a substitute for malt.

The obnoxious income-tax is referred to, and we are glad to see that the Commissioners have been restraining the zeal of some of their officers who have had to do with the assessment of this unpopular tax. The taxpayers of the metropolis have been made painfully aware of the power in the hands of the officials in making surcharges and increasing assessments. The extent to which this has been carried has lately been the theme at many recent political meetings, but we are glad to see the Inland Revenue Commissioners have taken their officials to task respecting their excessive and wrongly directed zeal.

From an increase in stamp duty received for patent medicines from £82,721 to £91,556, we may assume that pharmacists and others have had a fair share of prosperity, knowing as we do that after seasons of feasting medicine is required to get the system once again in tune.

In the appendix to the report we find as usual Mr. Phillips' report of the work done in the Inland Revenue Laboratory, and although it extends only over seven pages, it contains in a condensed form much interesting matter. Taking a general view of the report we are glad to see that there has been another increase in the permanent staff, and this appears to have been absolutely necessary in the interests of the department, from the large increase of work which had to be performed. We find that in 1872 no less than 14,031 samples were analyzed as against 12,128 in 1871, and that these samples were obtained, not only from the Inland Revenue, but also from the Board of Trade, Customs, and Admiralty. We also note that 4400 samples were examined by the chemical officers at the ten outports; so that the number of samples actually examined in London and the outports amounted to about 18,400.

We are shown that there was a steady increase in the consumption of tobacco, and that the quantity used amounted to 1 lb. $5\frac{3}{4}$ oz. per head of the population, or to put it more forcibly, 43,948,427 lbs. were cleared for home consumption. It would appear that adulteration was slightly on the decrease, as there were only found 212 samples adulterated in 1872, as against 404 in 1871. The samples of snuff examined passed through the ordeal in a satisfactory manner, for out of 26 only 1 was adulterated, the adulterant being rhubarb leaf.

Russian and Turkish cigarettes continue to be imported, but the English manufacturers appear to be successfully competing with the foreign manufacturers, as we find that the quantity of cigarettes exported increased from 8942 lbs. in 1870, to 21,784 lbs. in 1872.

At one time chicory was considered an adulteration of coffee, but now that the duties on each are equalized the substitution of one for the other is not a revenue fraud, although one of a gross kind on the consumer. The revenue has, however, been defrauded by the adulteration of chicory with dog biscuits and roasted rye, the percentage of adulteration varying from 2 to 10 per cent. Four samples were adulterated with oxide of iron. Grains of Paradise, liquorice, sugar, and caramel were used either as adulterants of beer, or of materials used in the brewing of beer.

Under the head of naphtha, we notice an interesting remark that one sample of alcohol to be used for methylation was found to contain wood naphtha, and that this detection led to the exposure of a great fraud on the revenue. We wonder whether these remarks apply to a methylated spirit maker who, about two years ago, undersold the other makers, and who has now left the country.

It is gratifying to observe that great care is still exercised in the examination of samples of lime and lemon-juice for the mercantile marine, and we hope to see the day when, by the adoption of proper diet and the use of good lemon-juice, scurvy will be banished from the Navy.

The report closes with reference to the work done under the Intoxicating Liquors Act, and we learn that it has been necessary to admit that when common salt is present in beer to the extent of not more than fifty grains in the gallon it cannot be considered an adulteration, on account of the variable quantities of common salt found in water used by brewers. We have for some time waited rather impatiently for this first report on the Intoxicating Liquors Act, because we have heard such dreadful reports on the adulteration of beer and spirits, that the public were led to expect the revenue authorities must make some startling discoveries. As, however, it is evident that the adulteration of beer and spirits is not general, we intend shortly to direct attention to some of the alarmist statements which have been recently and very improperly put in circulation respecting the adulteration of our national beverages.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 14, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE NEW REGULATIONS OF THE BENEVOLENT FUND.

The recent Report of the Special Committee, appointed last November to consider the management of the Benevolent Fund, ought to engage the special interest of every Chemist and Druggist on the Register. Much discussion has been caused, and many plausible explanations have been originated by the singular apathy with which the prosperity of this Fund has been regarded by many members of the trade, so far as it has been fair to judge by their abstention from contributing to it. The subject has more than once occupied the columns of this Journal, and it has been asserted that the want of sympathy has had its chief cause in the fact that the funds are not more liberally distributed, and that if it were found that instead of money being invested to meet future liabilities it was dispensed at once with greater reliance upon the future providing for itself, such a course would be speedily justified by a more extensive subscription list. The ground we have ventured to take in this matter has been that this would be no reason for withholding subscriptions, but rather for urging the views of the subscribers upon the Council of the Pharmaceutical Society, which has the administration of the Fund. We were confident that those gentlemen were ready and anxious to consider every suggestion for the improvement of this Fund.

Our confidence has been justified by the report adopted last week, which, although marked by considerable caution, virtually implies, we think, that the number of annuitants to be elected next October will probably depend upon the amount of money subscribed to the Fund between this time and next June. The proposition of Mr. ROBBINS, that the number of annuitants should be raised at once to twenty, was received with considerable favour; but, of course, the decision, according to the Bye-laws, will lie with the members of the next Council at their first meeting, and the present Council are unable to guarantee the action of their successors. Still, we believe that it may be inferred that gentlemen sitting on the present Council, who may also happen to be members of the next, will be prepared, should they think the amount received justifies them, to recommend an experiment in the direction of Mr. ROBBINS' scheme.

There are certain figures, however, that we may be sure will not be without their influence upon the decision. The amount required for twenty annuitants of £30 each will be £600; the interest received from the invested capital—now ordered to be increased to £14,000—will not be much more than two-thirds sufficient to meet this charge. The new Council therefore, should they authorize such an election, will not only be taking a large sum out of the current year's subscriptions, but also an equal sum from each future year during which the elected lives shall last. This will be a financial operation requiring a considerable margin of money, and such a margin should therefore be provided during the next three months by those who wish to see the operations of the Fund developed in this direction.

But although the Committee was not able to recommend present action upon this point it arrived at a most important conclusion upon another, namely, the proportionate influence in the distribution of the Fund to which subscriptions other than those to the Pharmaceutical Society shall entitle subscribers. In this respect the Council, acting on behalf of the Society and on the recommendation of the Committee, have decided in the most liberal manner. Hitherto the lowest subscription entitling to a vote has been half-a-guinea. But it has been thought that there might be a large class of persons who, not feeling able or willing to subscribe so much, would yet object to be shut out from all participation in the administration of the Fund. It has therefore been determined that in future a subscription of five shillings shall entitle to a single vote at each election of annuitants; that half-a-guinea shall entitle to two votes instead of one as heretofore; one guinea to four instead of two, and so on in proportion. It may appear to be a little inconsistent that the cost of a single vote should be a little less than half that of two; the object sought, however,—and we believe it will meet with general approval—is to widen the circle of subscribers as well as to increase the amount of subscriptions, and thus to make the contributors to the Fund as truly representative of the whole body of chemists and druggists as the recipients undoubtedly are. But the voting power of Members and Associates in virtue of their subscription to the Pharmaceutical Society remains unaltered, and it is hoped that the action of the Council in thus doubling the proportionate influence of subscribers to the Fund, will be accepted and acted on in the same liberal spirit.

The report has been made at a most opportune time; many of our readers will be remitting their annual payments to Bloomsbury Square, and we trust that if they have not already done so they will now make up their minds to accompany them with subscriptions to the Benevolent Fund. Moreover, the Secretary is about to send a circular containing an appeal on behalf of the Fund to every person on the Register of Chemists and Druggists. On former

occasions he has had to lament that *le jeu ne vaut pas la chandelle;* but surely a better response should be made to this fresh evidence of the desire to give catholicity to the Fund.

NEW WORK ON MATERIA MEDICA.

We learn from the *Journal of Botany* for February that Messrs. Macmillan are about to publish a work on Materia Medica by Dr. Flückiger and Mr. Daniel Hanbury, under the title of 'Pharmacographia Britannica,' a History of Drugs of Vegetable Origin used in Great Britain and British India.

PHARMACY AMONGST THE CANDLE MAKERS.

The fact that the vapours of balsams such as benzoin, storax, etc., often operate beneficially when inhaled by persons suffering from bronchial irritation and spasmodic asthma, has recently been applied in a novel manner by introducing these substances into candles, which, when burned, impregnate the atmosphere of a room sufficiently to produce the desired effect. It would be well if gas makers would turn their attention in the same direction, and supply gas which, if not medicinal, at least should not be poisonous.

In the Catalogue just issued from the India Office of the articles exhibited at the Vienna Exhibition some interesting information is quoted from the *Asiatic Journal* respecting the preparation of the celebrated "Wootz" steel in India. The ore from which it is made is one in which magnetic oxide of iron is combined with quartz in the proportions of about 48 per cent. of quartz and 52 per cent. of oxide of iron. The ore is found in considerable quantity in the form of low hills exposed above the surface of the surrounding country in many parts of the south of India. The processes of smelting and forging are conducted in a very primitive manner; but it is worthy of notice that the only fuel employed by the natives of India, throughout the various stages of iron and steel making, is wood charcoal.

The wood which is always selected to furnish carbon to the iron is that of the *Cassia auriculata*, and the leaf used to cover the iron and wood is that of the *Asclepias gigantea*, or where that is not to be had, of the *Convolvulus laurifolius*. The writer thinks it probable that the selection of particular kinds of vegetable matter to afford carbon to the iron may not be altogether a matter of fancy. The Indian steel maker of course knows nothing of the theory of his operations; he is satisfied with knowing that he can convert iron into steel by fusing it with what he calls "medicine;" and experience has taught him this medicine must be dried wood and green leaves. As different woods and leaves probably contain carburetted hydrogen in very different proportions, experience may also have taught the Hindoo that he can make iron pass into the state of steel more quickly and with a smaller bulk of particular kinds of vegetable matter than with others. The *Cassia auriculata* contains a large quantity of catechu, and the leaf of the *Asclepias* contains an acrid milky juice; but the leaf of the *Convolvulus* is in no respect remarkable.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN—NORTH BRITISH BRANCH.

The third meeting of the present session was held in the Society's Rooms, St. Giles Street, on Tuesday evening, January 27th, at half-past eight o'clock, Mr. J. R. Young, President, in the chair.

The following is an abstract of a lecture given:—

On the Use and Abuse of Food.

BY PROFESSOR ARCHER,

Of the Edinburgh Museum of Science and Art.

Professor Archer said the subject he had chosen that night for a single lecture was one which would certainly furnish ample materials for a very long course; and he hoped to live to see the day when in every university in Europe there would be a course of lectures delivered on this very important subject. Not only was that not the case at present, but in our English and Scotch universities there was no such chair as one for dietetics. That was the more surprising when they bore in mind that upon the simple question of whether we were to use food or abuse it depended our bodily happiness. By the abuse of food life was rendered miserable, and ample occupation for medical men trained in other branches of medicine was found. Now, it struck him, and it had always struck him, that this was beginning at the wrong end, and that they ought really to learn all about food, all about its application to the system, and by learning that be able to guard against a vast deal of the inconveniences they otherwise suffered.

He would inquire, in the first place, "What was food?" Food did not consist so much of all the materials which were put into the mouth, and passed from the mouth into the stomach, as all of that which if eaten could be rendered serviceable to the system after digestion. This food which was placed in the stomach was very much like the materials taken into the laboratory, for there it had to be worked up into a great variety of compounds, and distributed in a variety of ways into the system. Food was taken for two purposes—to restore the waste which was perpetually going on in the body, and to supply the fuel to what he might call the furnace of the laboratory, which did its work in furthering the process of assimilation of tissue-forming food. It was not generally borne in mind how constantly waste goes on in the body. No muscular action of any kind could take place in the body without some actual loss of weight. Food was required to restore this loss, and keep up a proper amount of matter in the body, and this food must be associated with some material which should keep up the vital heat in order that the body might assimilate the matter placed at its disposal.

There were various kinds of food. The first-class he should speak of was—absolutely necessary foods. In this class they had first, mineral foods. This mineral food consisted of water and salt, and what they might call the ashes of plants and animals—that was to say, the materials which were left after they were burned out either in the process of digestion or otherwise. After such burning there was a certain amount of mineral matter left behind in the bones and flesh of animals, and in the leaves and stalks of plants, which the human system required for supplying one of its wants. The second group consisted of carbonaceous, or heat giving matters. This second group included starch, sugar, fat, and acids. These consisted chiefly, in fact he might say altogether, of carbon, oxygen, and hydrogen. Their use was to serve as fuel by which the vital action of the body was kept up. The third group was the most important one, of nitrogenous or flesh forming substances—fibrine, albumen, and caseine—containing the absolute necessities of our existence.

The second class of foods consisted of what were called accessory foods, which were of use in alimentation but the exact function of which was not properly known. Such were the cellulose of plants, and the gelatine and gums of

plants and animals, which were certainly useful to the system, but the exact way in which they were assimilated and worked up was not clearly known.

The third class of foods, called auxiliary, was divided into two groups also. The first of these groups comprised the stimulants, such as alcohol and the volatile oils; the second contained the narcotics. In speaking of dietetics they placed things a little bit out of the way sometimes. For instance, they called tea, coffee, and cocoa narcotics, as well as tobacco and Indian hemp. These were none of them absolutely necessary, though some of them were really useful. In tea, coffee, and cocoa, besides the nutritious matter, there was another substance in each which was readily taken up by the system—theine. Unfortunately in the case of tea and coffee the theine was always associated with a very large quantity of astringent matter—tannic acid—and consequently these were often very injurious, and gave rise to dyspepsia in a very remarkable way. Of tobacco he was not going to say anything because he knew his opinion would be held to be perfectly useless by a large number. When in a healthy state the body was able to assimilate the various foods which it required, and a knowledge of these constituted the science of dietetics. His object in these remarks had been rather to point out to them how very much they were in want of information in this direction. There was not a single chair devoted to this science in any of our medical schools or universities, and, therefore, at present they had only to rely upon certain writers upon this subject who had stood forward for some time past as leaders. His object at present was rather to point out to them how very unreliable the very foremost of these writers was; because he considered it of the utmost necessity when they took up a subject for study that they should be exceedingly careful not to read books more likely to do harm than good. The only book which he knew professing to deal fully with the subject of dietetics was one which he now had before him, by a medical man who had the reputation of being the foremost in this subject for a long time—Dr. Edward Smith, of London, well known for his investigations into the action of theine. His present object was to point out some of the errors of this book; and if he showed them a few things which he had picked out of it in the most cursory way, and which were truly absurd, he was much afraid they would conclude that they should put down the bulk of the book as of the same kind. The author spoke of peas, beans, lentils, etc., as highly nutritious seeds, and went on to speak of them as of great value as food. As a matter of course, everything that was largely nutritious, if it were not associated with something else which counterbalanced that quality, ought to be classed with the very best kind of food. The author gave the scientific name of beans as *Phaseolus Hernandesi*, which was wide enough away from the proper name. He stated that they were "daily eaten in great quantities by the inhabitants of Mexico and Central America." He (Professor Archer) could not imagine why a man writing upon peas and beans should rush away to Mexico and Central America, as if these were plants known only in large botanical collections. Here we ate beans and peas just as they did in Mexico, and there was not one word said by the writer about the large production and consumption of them in Great Britain and Europe. The author spoke of the chick pea as largely grown in India and used there, and as being too delicate for this clime. The pods he described as hairy, and exuding an acid which was irritating to the hands, and injurious to the boots of those collecting the peas. Here he was evidently confounding two things, *Cicer arietinum* and *Mucuna urens*. In speaking of maize or Indian corn, Dr. Smith described it as "no doubt the product of sunny rather than of temperate climes." Now, everybody knew where maize came from, and that it was introduced in 1562 from America, and for a writer professing to give information about it to suggest that because it was raised in the tropical and sub-tropical climes of the world it must therefore be a native of sunny rather than of temperate climes was absurd. Dr. Smith gave millet as the heading for a series of things, and there were a large number of millets. The millet which he began with, was a small grain, as he said, scarcely larger than a pin-head. But then Dr. Smith had lost sight of the fact, if he ever knew it, that millet was a generic term applied to several different plants—in fact to plants of several different genera. They had this Chinese sort which Lord Elgin spoke of as plants growing five or six feet high; but then there were a large number of these plants having, not as Dr. Smith said, seeds of the size of a pin-head, but nearly as large as tares. The plant which Lord Elgin spoke of was really the sugar millet, *Sorghum sinensis*, a totally different plant which produced very little seed. Professor Archer then criticized some remarks of Dr. Smith on the subject of oatmeal porridge which he erroneously described as similar to the "hasty pudding" of the English, the fact being that the latter compound was made of fine wheaten flour instead of oatmeal. Then the author described maslin as "a mixed product grown in Yorkshire and other northern districts of England, and composed of two or three parts of wheat and one part of rye; but it is not very extensively used at the present time." He said nothing as to whether the plants were grown together or how they were mixed. Dr. Smith's remarks on the sweet potato (*Batatas edulis*), that it was rarely used in this country, although not unknown, but that it was in common use in Central America and other hot countries, "where the common potato does not grow or cannot be obtained," revealed great ignorance of the native country of the potato, which came from Peru, as did also the sweet potato. There was a most extraordinary mistake in a paragraph about the *Yucca*, which the author gave instead of *Jatropha*, the name adopted by botanists as the generic name of the plant which yielded tapioca and arrowroot; and he also stated that the same plant, the *Yucca*, yielded arrowroot. It seemed almost incredible, but there were hundreds of such mistakes. Then he went on to speak of the yam genus. In speaking of the plantain he said it was "cooked like other vegetables." Professor Archer said the only way in which he ever heard of plantains being cooked was their being fried. The author erroneously spoke of the horse-plantain as growing in India and on the Zanzibar coast. It grew in neither of these places, but in the extreme south of Africa and Ethiopia, and was the very plant which poor Bruce discovered and described as producing black seeds instead of the usual long fruit, which was set down as one of the aberrations of which he was said to be guilty, but which had since been all found to be truth. There was a rather rich little bit about the cabbage, which the author described as a most nutritious class of vegetables. In his remarks on the nettle the author spoke of the "medicinal virtues of its juices" as recommending it to use, while Professor Archer remarked, the real fact with regard to the nettle was that formerly, when green vegetables were fewer in number, the poorer classes cut off the young shoots just as they were appearing through the ground, and these were tied together and eaten like spinach. And they were very good too. But they did not drink the juice, which, like the juice of cabbage, was rather offensive in its own way. Then as to the fennel, Dr. Smith said, "Fennel (*Fœniculum vulgare*) was eaten in England many centuries ago, and is still used as an aromatic vegetable in the cooking of fish, but in various eastern countries the stem is eaten like rhubarb stalk, and offers an agreeable acidity." Most of them knew something of the fennel, but few of them he thought would find, as Dr. Smith stated, that it possessed any acidity, or an approach to it, in the stalks, which might tempt them to eat it as they would rhubarb. Dr. Smith spoke of the tomato being "boiled as a vegetable," but if they boiled tomatoes they would find very little left—they were very easily boiled away. The date Dr. Smith described as the "fruit of a palm,

growing extensively in the Sahara." He did not say in the oasis of the Sahara, but in the desert itself. That was a specimen of the way in which the book was written. Professor Archer also criticized Dr. Smith's remarks on the fig and the custard apple. He spoke of a hundred species of the former fruit while in fact we only used one species of edible fig. The guava was described as growing extensively throughout the east, and highly prized for the jelly obtained from it. Guava jelly, Professor Archer remarked, came from the West Indies, and the guava was certainly a West Indian plant, though it had been introduced into the east, simply because the fruit was a valuable one. But in Dr. Smith's book it was spoken of as belonging to the East only. The prickly pear was spoken of as growing in the island of Majorca, while the fact was that we never received any from Majorca, and the fruit grew more abundantly in other places in the Mediterranean, whilst its original country is South America. Yet in this book Majorca was given as the chief place to which we were to look for it. The banana and the plaintain were very closely allied, so much so that people who ate them could scarcely know one fruit from the other. But Dr. Smith said the banana was the delicious fruit of the palm (*Musa paradisiaca*). It was no more a palm than the palm was a cabbage. Then there were some remarks about strawberries which were rather more than any one could stomach. They were spoken of as abounding in the hotter countries, while the fact was that the further south you went the more difficult they were to grow. In the southern parts of North America, Dr. Smith said, they were "so abundant in the woods as to feed a large detachment of soldiers." "They were of delicious flavour, and growing upon bushes three or four feet high." Dr. Smith spoke of the pine-apple "*tree*" growing in every hedgerow in Zanzibar, the truth being that it was only a small plant. Of the quince, Dr. Smith remarked that it made "better marmalade than the orange." Now marmalade originally meant simply quince jelly, from the Portuguese name of quince—*marmar*. We had borrowed that name and applied it to the orange jam in use here, but for any one who knew anything of these things to say that the quince made better marmalade than the orange was a piece of very curious information. Professor Archer further criticized Dr. Smith's remarks on preserved ginger, and on almonds, pointing out that he spoke of the sweet and bitter varieties of the latter fruit as if they were two distinct species. After criticizing briefly some of Dr. Smith's remarks on the horse-chestnut and kola-nut, Professor Archer passed to the subject of condiments. He could not suppose that anyone would call either salt, vinegar, or pepper an element in cloves or in cinnamon, but Dr. Smith said that salt, vinegar and pepper were elements entering into the composition of all articles of the class of condiments. He might mean a little more than he said there. "Sago," Dr. Smith said was "the product of several palms, and principally of the *Cycas revoluta* and other trees in India, Ceylon, and many other Eastern countries." Sago, it was perfectly true, was the product of several palms, but the *Cycas revoluta*, put down as the principal one, did not happen to be a palm at all, and though something of the kind was said to be made from it by the natives, it certainly did not yield one single ounce of the sago of commerce. "Arrowroot," Dr. Smith said, was "a well-known food." Unfortunately, it did not seem to be very well known to Dr. E. Smith. He gave it as derived "chiefly from the palm tree (*Maranta arundinacea*), which had no right to be called a palm. After making some remarks on Dr. Smith's description of tapioca, cassava, and mandioca, Professor Archer referred to a statement by Dr. Smith to the effect that iron was one of the adulterants of sugar. Professor Archer said he certainly never detected iron in sugar, and he thought that if used in tea the iron, by darkening the tea, would be rather an advantage to some tea-makers. Manna was described by Dr. Smith as being the produce of Lebanon, Kurdistan, "and elsewhere, it is found on the leaves of various plants as the dwarf oak, tamarisk, and larch;" "it is also sometimes found on sand and stones, and is then whiter and purer than the tree-manna."

For this medical man, Professor Archer remarked, to say nothing of the manna ash of Europe, which yielded all the manna used in Europe, was very funny. For the tea plant Professor Archer pointed out that Dr. Smith gave four names—*Thea sinensis*, *Thea viridis*, *Thea bohea*, and *Thea assamensis*, without saying what was the proper name of tea. In conclusion, Professor Archer said he thought he had shown them enough to convince them that so far their chief guide in dietetics was not to be relied on, and therefore it was of the utmost importance that in reading they should study with great care to eliminate the few grains of truth in such a book as this from the very large quantity of very false chaff.

After some remarks on several of the points touched upon by Professor Archer, Mr. Tait begged to move a very special vote of thanks for the able and instructive lecture which had just been delivered. This was seconded by Mr. Ainslie and very cordially received.

Mr. Mackay thought that while the meeting conveyed thanks to Professor Archer they ought also to mention the high gratification felt by those present at the recognition bestowed upon Professor Archer by the Russian Government. Only yesterday a large and magnificent gold medal had been received by Professor Archer, accompanied by a diploma, explaining that the Emperor Alexander had bestowed the medal for the investigation of valuable matters instructive to the public, carried on for a long period as corresponding member of the Scientific Committee of the Ministry of the Domains of the Crown in Russia. The honour so conferred was one of which he felt assured both Professor Archer and his fellow citizens might well be proud.

The Secretary then stated that a slight misunderstanding had arisen in regard to the award of Mr. Hills' prize at the examinations in Scotland. When the money was handed over by the London President at the August meeting of Council the terms on which the books were to be awarded were distinctly stated. The successful candidate was to be the *highest in honours* connected with each Minor Examination held in Edinburgh. When it was announced here in December last that the first prize would be given in January, no allusion was made to the fact that no less number of marks than 650, being the pass number in honours, could be recognized as a success. The party gaining the highest number at their last examination did not reach 650, and was therefore not entitled to any prize under the conditions attached by the President to his kind and liberal donation. The party, however, appealed on the ground that this condition of gaining honours had not been made prominent enough, and the Board have therefore agreed to give the party a volume, but not as the "Hills' Prize," because it is desirable that the same rules should attach to the London and Edinburgh award. This arrangement is now very specially made known to prevent further confusion or future misunderstanding. No one, therefore, can obtain Mr. Hill's Prize of Books unless he has got at least the pass number in honours connected with his Minor Examination.

Specimens of quinoidine and sulphate of quinoidine, from Messrs. Howards and Sons, Stratford, London, were placed on the table as presentations to the museum of the Society.

Provincial Transactions.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

On January 2nd, 1874, the members of the above Association gave a series of readings and recitations, and a very enjoyable evening was spent.

On January 22nd a meeting was held for general busi-

ness, at which some letters from Mr. J. F. Evans, a corresponding member, now at Sinimberghi's Pharmacy, Rome, were read, and thanks passed to the Pharmaceutical Society for 'Catalogue of Library,' and PHARMACEUTICAL JOURNAL, and to Mr. Evans for some Italian prescriptions.

A meeting was also held on February 3rd.

The Honorary Secretary, Mr. G. C. Druce, having read the minutes of former meetings,

The President, Mr. Masters, said that he had a most pleasurable duty to perform, viz., that of congratulating their worthy and indefatigable Secretary, Mr. G. C. Druce, upon the honourable and praiseworthy manner in which he had just passed his Major Examination, being the only one out of the four that passed who succeeded in getting that characteristic stellate mark attached to his name. He told the members that it always had been a rigid ordeal, and that it was still more so now, and that any person who succeeded in passing it, even if he had been studying at Bloomsbury Square, under the Professors there, was entitled to much credit; but when any one, as their Secretary had done, passed that examination without any help whatever, except that of his own exertions, and without giving up his business occupations, he characterized him as one in a thousand, and said that he could scarcely find words strong enough to express the credit which in his opinion was due to him, and concluded by saying that he thought all the members ought to feel proud that they belonged to an Association with which he was connected.

Mr. O. Wallis then read a paper on "The Chemistry of Sugar and Starch," in which he described the proximate vegetable constituents of plants, dwelling for some time on the saccharine and amylaceous principles, explaining the manufacture of cane sugar, and the methods of distinguishing it from grape sugar. He then described starch, the method of procuring it, its occurrence in plants, its chemical constitution, its reputed structure and appearance; and then showed how starch might be converted into glucose, how cane sugar was converted into grape sugar, and that into alcohol. The theory of malting was then described, and Mr. Wallis concluded an excellent paper by stating that very often substances met with in every-day life are found, upon examination, to be teeming with interest, and to well repay any trouble that may be taken in investigating them.

The discussion was taken up with interest.

The attendance, despite political attraction, was a good one. After a vote of thanks to Mr. Wallis for his paper, the meeting terminated.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, February 5th, 1874, Professor Odling, F.R.S., President, in the Chair. After the ordinary business of the Society was completed, a "Preliminary Notice on the Action of Benzyl Chloride on the Camphor of the Lauraceæ" (*Laurus Camphora*), by Dr. T. Tommasi, paper was read by the Secretary. Dr. C. R. A. Wright had a on the "Isomeric Terpenes and their derivatives: Part III —On the Essential Oils of Wormwood and Citronelle," being a detailed account of his experiments on these substances, a preliminary notice of which was communicated to the Society some time since. The other communications were a "Preliminary Notice on the Perbromates" by M. M. Pattison Muir, F.R.S.E.; and "on the Coals from Cape Breton, their Cokes and Ashes, with some comparative Analyses," by Henry How, D.C.L.;—the latter paper giving the amount of coke produced by slow and quick coking, from the main seam coal of Sydney mine, Nova Scotia, and the Lingan Coal; also analyses of the ashes left by these coals.

The meeting was finally adjourned until Thursday, February 19th, when there will be a lecture "On the Detection and Estimation of Adulteration in Food and Drinks" by Mr. J. Bell, F.C.S. Lectures are also announced for March 19th, "On Dissociation" by Mr. J. Dewar, F.R.S.E.; and for May 21st. on "The Sewage Question, from a Chemical point of view" by Dr. W. H. Corfield, F.C.S.

MANCHESTER LITERARY AND PHILOSOPHICAL SOCIETY.

At the Ordinary Meeting of the above Society, on the 16th December, 1870, a paper was read entitled—

METHOD OF CONSTRUCTION OF A NEW BAROMETER.

BY J. P. JOULE, D.C.L., L.L.D., F.R.S., ETC.

The condition of the instrument placed on March 18 in the Society's Hall proves that it is possible to use sulphuric acid on the top of the mercurial column without chemical action taking place. I have therefore proceeded to prepare other tubes with a view to test, by practical work, the merits of the new contrivance.

A tube of about 3-16th inch bore is selected. It is first cleaned by drawing a knotted string through it. It is then bent to the siphon shape, and near the longer end it is drawn to a capillary tube. It is then washed with nitric acid; afterwards with sulphuric acid. The sulphuric acid is then drained off. Mercury is next poured into the short limb. The end of the longer limb is then attached to my mercurial exhauster. On working this the mercury rises in the tube, and, being replenished by pouring it into the short limb, soon arrives at the height due to the atmospheric pressure. It carries with it the acid left adhering to the sides, so that, after a few hours, half, or, what is better, one-third, of an inch of acid stands above the mercury. Small bubbles of air are seen to arise, but, by leaving the tube in connection with the exhauster for a day or two, these finally cease. Mercury is then poured into the short limb until that in the longer rises nearly to the capillary part of the tube. This is then sealed and detached from the exhauster. Mercury is then removed from the shorter limb until it stands in the long one at a convenient height. Sulphuric acid is then introduced into the short limb until it forms a column equal to that in the longer limb. A small tube is finally attached to the short limb, and dipping a little way into a small bottle containing a small quantity of sulphuric acid, prevents the access of moist air into the short limb.

The tube thus completed possesses the following advantages:—1. There is the utmost facility in the movement of the column, so that the most minute changes of pressure are at once registered without any dragging. 2. The depression produced by capillary action is reduced to one-half, so that the syphon arrangement can be satisfactorily used as affording an accurate neutralization of capillary action.

PARIS SOCIÉTÉ ET ÉCOLE DE PHARMACIE.

At the inaugural meeting of the Paris School of Pharmacy and the Society of Pharmacy for the present session, Professor Riche delivered a lecture, in which he called attention to the manufacture of soda and chlorine, and the application of the phosphates in agriculture; three great subjects which he considered the pharmacist of the present day could not afford to ignore.

A GLANCE AT SOME CHEMICAL INDUSTRIES.*

BY M. RICHE.

Professeur agréyé at the Paris School of Pharmacy.

In the first rank of chemical substances must be placed carbonate of soda, of which nearly 600,000 tons are manufactured annually, nearly one-third being produced in Great Britain and about 130,000 tons or rather less than one-fourth in France. The process followed is that originally proposed by a Frenchman, Leblanc, in 1793, and it is based

*Abstract of a lecture delivered at the Inaugural Meeting at the Paris School of Pharmacy, *Journ. de Pharm. et de Chim.* [4] vol. xix. p. 58.

on the reaction between sulphate of soda, carbon and chalk. The sole important modification that has taken place in it is a mechanical one, in which the trying work for a man of manipulating continually an enormous weight of pasty mass at a white heat is accomplished by a rotating cylinder driven by steam power. But if it has not yet been found practical to replace this process economically by any other, it has long been sought to utilize the residues of the manufacturer, and the importance of the problem is illustrated in the fact that the whole of the sulphur of the sulphate of sodium employed is present in the residues, and that this sulphur represents the greater part of the immense quantity used in the manufacture of sulphuric acid.

These residues in which the sulphur exists in the state of sulphide of calcium are heaped up in the neigbourhood of the works and form enormous mounds from which runs a yellowish sulphurous liquid that infiltrates to the wells and watercourses, and especially during the summer emits noxious vapours, giving rise to complaints because of the resulting injury. So that by the process of Leblanc not only is there loss of the sulphuric acid used as an intermediary in the manufacture, but the manufacturer has to bear the incessant complaints of his neighbours. Hence one of the greatest desiderata of modern industry have been to recover the sulphur from the soda residues. Numerous plans have been proposed with this object, seeking to assist the oxidation of the sulphide of calcium by heat, air, water, and other agents, and afterwards to heat with an acid the mixture of polysulphite and hyposulphite produced ; an operation having as an effect the reduction of the sulphur, which can then again be used in the manufacture of sulphuric acid. Among these processes hardly any except one, that of M. Mond, has been applied and that only in a few manufactories, since it requires considerable skill, and only yields a maximum of 20 per cent. of the sulphur contained in the mare. At Dieuze, a method invented by Messrs. Hoffmann and Buquet, the chemists of the establishment, is adopted. It is based upon the ingenious idea of utilizing for one another the residue of the manufacture of soda and that of chloride of lime. After having oxidized the soda marcs by the action of air, water, and the sulphide of iron produced with the residues of chlorine, the sulphur is precipitated from it, either in a free state by the hydrochloric acid of these residues, or in the state of sulphide by the chloride of manganese ; then this sulphur and sulphide are converted in the retorts into sulphuric acid. Although this process offers inducements to those manufacturers who produce both soda and chlorine—and these are the most numerous—it does not appear to have been adopted outside of the establishment in which it was originated, and this is probably due in great part to the fact that it requires several different operations, considerable room, and expensive labour.

Meanwhile it must not be supposed that the manufacture of soda has spoken its last word, and two important events give ground for the hope that in a not very distant future either we shall cease to employ the sulphate of soda or else cease to make that sulphate with sulphuric acid.

In 1855, two Frenchmen, Messrs. Rolland and Schloesing patented a process for manufacturing soda based upon the treatment of chloride of sodium with bicarbonate of ammonia. From the double decomposition, there results a deposit of bicarbonate of soda, which by a slight heat is transformed into neutral carbonate and a solution of hydrochlorate of ammonia, which is used to regenerate the ammonia. This process did not give rise to a regular manufacture ; but it has been taken up by a manufacturer named Solway, first in 1863 and recently in 1872, and the considerable modifications which he has introduced, both in the regeneration of the ammonia and in the saturation of the ammoniacal chloride of sodium by carbonic acid, permit a hope of the generalization of this process, which theoretically is of great simplicity, and presents an advantage over Leblanc's in recovering the soda from the chloride of sodium directly and at the ordinary temperature, *i.e.*, without the expense of sulphuric acid and a large consumption of fuel. The other method is to draw off the sulphate of soda already prepared in the immense reservoir which covers the greater part of the globe, namely, the sea. After having shown that it is possible to extract from the mother liquors of the salt marshes sulphate of soda, chloride of potassium, and sulphate of potash, M. Balard, sought to manufature these salts and M. Merles de Salindres attempted to introduce this great discovery of the laboratory into the manufactory. After considerable time, money and skill had been spent in the attempt a considerable industry was established at Camargues, and it commenced to send into the market the salts of soda and potash, when the discovery at Stassfurt of immense saline beds, deposited in regular layers by the evaporation of the seas of former ages, led to a sudden fall of 50 per cent. in the price of chloride of potassium. Many would have lost courage, but that of the founders of this industry seemed to increase, and justifying the proverb "le gênic est une longue patience," they now send out their salts at a remunerative price, to compete with those from Stassfurt.

The following is a sketch of this process. The sea water left to evaporate spontaneously yields at first "sea salt." The resulting mother liquor conducted into reservoirs is allowed to evaporate until it has a density of 35° B. ; it then deposits the "*sel mixte*," consists of sulphate of soda and chloride of sodium. This second mother liquor submitted to a second evaportion to 37° B. gives a third product called "*sel d'été*," in which predominate the double chloride of potassium and magnesium and the sulphate of those two metals. The "*sel mixte*," redissolved and submitted to an intense refrigeration by means of immense Carres apparatus, yields a crystallization of sulphate of soda and a solution of chloride of magnesium. Finally the last liquors remaining after these various treatments strongly charged with magnesian salts are utilized. The chloride is converted into hydrochloric acid and magnesia ; the sulphate is used in England in the cultivation of clover, in the manufacture of alum and sulphate of baryta, and in calico printing.

The soda manufacture is intimately connected with that of chloride of lime, because the hydrochloric acid which is the complementary product of the sulphate of soda is used principally in the preparation of chlorine. This body, the active principle of chloride of lime and other bleaching agents, is still prepared by the process of Scheele in causing hydrochloric acid to react upon binoxide of manganese, and this industry furnishes a second example of a method which has lasted during three quarters of a century without modification, but which is much unsettled at the present time. Here again the subject is attacked on two distinct sides ; it is proposed to utilize the residues in regenerating the binoxide of manganese, not only on economical but sanitary grounds, and it is also sought to dispense with this intermediary.

The regeneration of the binoxide of manganese is a problem solved by a skilful English manufacturer, Mr. Weldon. The chlorine residues are treated with two equivalents of lime ; there results a mixed protoxide of manganese and calcium, which heated in a current of air yields binoxide of manganese mixed with lime, which is used to react again upon the hydrochloric acid for the production of chlorine. This process allows of the realization of a considerable economy and leaves inoffensive residues, and it has been established for several years in numerous manufactories. Nevertheless, it has the inconvenience of wasting lime and the acid necessary for its saturation. Mr. Weldon has therefore recently proposed another process in which there is the consumption of only hydrochloric acid and fuel. The binoxide of manganese is mixed with an equal quantity of magnesia, then treated with hydrochloric acid, which produces, besides chlorine, a double chloride of manganese and magnesium. This,

heated in a current of air, regenerates the binoxide of manganese and the magnesia,—which are again used in the manufacture—and produces a gaseous mixture of hydrochloric acid, chlorine and air in excess, from which the hydrochloric acid is separated by water. The chlorine is thus produced from two sources ; first, from the action of the binoxide of manganese upon the hydrochloric acid, then from the decomposition of the double chloride by heat. The chlorine from this latter source is suspended in nitrogen and an excess of air, and this dilution does not allow of the production of chloride of lime of a high standard. In this case Mr. Weldon collects the gas in a milk of lime, which he afterwards treats with hydrochloric acid to obtain from it the pure chlorine. This process was introduced a year since, near Liverpool, with success, and appears to have been adopted in some manufactories in Scotland.

The second system, mentioned above, the manufacture of chlorine without the intervention of binoxide of manganese, is the invention of another Englishman, Mr. Deacon. His method is extremely ingenious, and offers the immense advantage of permitting the substitution of the previously diluted hydrochloric acid by the hydrochloric gas as it issues from the sulphate furnaces, and thus effecting a great economy. The gas, mixed with air, after passing through brick passages kept at a temperature as near as possible to 400° C., circulates in chambers maintained at the same temperature, in which are piled up balls of clay impregnated with sulphate of copper : chlorine and water are formed, and the sulphate of copper is left unaltered. Notwithstanding the costly apparatus and the necessity for maintaining the temperature within narrow limits, also of the transport of a certain quantity of the sulphate from the first towards the latter chambers, and the difficulties met with both in carrying off the gaseous hydrochloric acid, and in making chloride of lime of high strength with chlorine diluted with air, this process has worked regularly for some years in several English manufactories. However it has not yet been demonstrated that it can be applied to the very diluted hydrochloric gas which escapes from the sulphate of soda furnaces towards the end of the calcination. But it is extremely important to realize this condition, because these last vapours are extremely difficult of condensation, and when they spread in the neighbourhood of the works furnish a mine of ruinous disputation to the manufacturer.

The third industry which I propose to discuss is of recent origin. Less important than the two others, it increases day by day, and is destined to become a source of wealth to France : I mean the industry of the agricultural phosphates.

The labours of Payen, Berthier, Rivot, Boussingault, Barral, etc., have established that phosphorus occurs in all plants, and that of the various organs of plants, the seeds of cereals—our principal aliment—yield the ash richest in phosphates. The salts, aided by water charged with carbonic acid and various saline solutions, penetrate into their tissues, and it is from the vegetable kingdom that men and animals draw the phosphates met with in their organisms, and which constitute the major part of their osseous frames. Consequently phosphorus is an element indispensable to organized beings, and it is the soil that supplies it to them. This truth had not escaped Davy, for he did not hesitate to attribute the present sterility of Asia Minor and Sicily—those ancient granaries of Rome—to the exhaustion of the phosphates from the soil by the exportation of corn during whole centuries. This absolutely terrestrial origin is peculiar to phosphorus ; for carbon, hydrogen, oxygen, and nitrogen—that is to say, the other constituent elements of living bodies—are supplied especially from the atmosphere. Consequently it is necessary to restore to the soil the phosphorus which the harvests remove from it, and this necessity is the more urgent, because the proportion of phosphates contained in the best soils is very small. For a long period it has been known that bones constitute a valuable improvement to land, and in 1813 Payen called the attention of agriculturists to the efficacy of the black from sugar refineries.

The English were the first to enter this path, and about 1820 they manufactured a manure from bones which appeared to be of such value that their ships went afar to purchase this substance, and it is said that certain battle-fields have not been exempted from their explorations. In 1818 Berthier discovered the first bed of natural phosphated lime in France, at Wisant (Pas-de-Calais) ; but it was Professor Buckland who, in 1822, first called attention to the mineral phosphates. He explored the soil of England in all directions, and announced that in the carboniferous limestone, the greensand, and the chalk, and in different tertiary beds, he had met with abundance of coprolites, which were the excrements of various animals, and especially of huge saurians, the bones of which were found in those regions. He pointed out that these nodular masses, formed principally of powdered bones, were very rich in phosphates of lime and were widely distributed. In 1843 Messrs. Daubeny and Widdington were sent from England to explore the Estramadura beds, but it was not until 1851 that serious researches were undertaken in France. Messrs. Meugg and De la Noue discovered numerous coprolitic nodules in the lower cretaceous stratum, and in 1855, M. Elie de Beaumont published in the *Moniteur* some valuable articles pointing out the utility of phosphates in agriculture and the geological strata in which they were found.

The first attempts in France to realize the industrial application of this substance were made in 1856, and since then the manufacture of the phosphates assimilable by vegetables has acquired a certain importance in the Ardennes, the Meuse, the Pas-de-Calais, and the Tarn-et-Garonne. Beds of fossil phosphates have also been noticed in several other departments, and quite recently in the department of Lot, and near to Bellegarde. Doubtless they would be discovered in other countries, if the search were conducted according to the precise indications contained in the words of M. Elie de Beaumont :—"In the strata of the lower cretaceous formation the nodules of phosphate of lime are the constant companions of the green beads of ferrous silicate commonly called by geologists glauconite."

The coprolites appear as nodules of variable shapes, some have the form of oblong pebbles, others occur in uniform masses, others again resemble potatoes or fir cones. Their size varies from 2 to 8 centimetres in diameter. Their colour is sometimes blackish brown, sometimes greenish grey. Fragments of bones, teeth, and shells are found in them. According to M. Bobierre, who has made numerous analyses of them, they contain from 32 to 70 per cent. of phosphate of lime, the average being about 50 per cent. The remainder is formed of phosphate of iron in small quantity, carbonate of lime, silica and clay. The animal matter has not entirely disappeared, for if they be heated with an alkaline solution, ammonia is given off accompanied by a perceptible odour of animal matter. Coprolites are porous, and permeable to liquids and gases. Reduced they rapidly undergo modifications in the air. M. Dehérain has observed that nodules containing 2·5 to 6 per cent. of water lose only 0·25 per cent. of earthy phosphates when submitted to the action of acetic acid, whilst after being exposed during three months to the air they contain 17·5 per cent. of water and yield to acetic acid 5 to 6 per cent. of phosphates. This powder, agitated in corbonic acid water, is perceptibly attacked after some days, and this action is increased by its exposure to air. The assimilation of the fossil phosphates is therefore not doubtful, especially after some months' contact with the air. They are especially efficacious in schistous and granitic soils, and their association with sulphate of ammonia or animal matters produces a manure of the highest order. The rapidity of this assimilation is such that in many cases coprolites are employed without any

other preparation than a careful pulverization effected in the following manner. The nodules are cleansed from adhering matters by a prolonged agitation in a current of water; they are then crushed in an apparatus constructed on the principle of a coffee-mill, and afterwards reduced to a fine powder under millstones.

This easy assimilation by vegetables, which connects the fossil phosphates with bones, animal black and precipitated phosphate, distinguishes them clearly and advantageously from the mineral phosphates properly so called, such as apatite and phosphorite, the assimilation of which is so slow that it is necessary to heat them with an energetic acid before employing them in agriculture. This operation, which is also applied to the fossil phosphates, constitutes in England a flourishing industry, and is conducted in the following manner :—the matter, reduced to a fine powder, is introduced, a small portion at a time, by means of a hopper into a cylinder of brass, or of pine-wood tarred and banded with iron, 2 metres long and 1 metre in diameter; strong sulphuric acid is then added and the mixture is stirred for several minutes by a cylinder of brass having arms; the resulting fluid is poured out and one third of its weight of powdered phosphate added. At the end of an hour the sulphate of lime sets, the product becomes solid and it may be pulverized between the fingers. If a perfect manure be required a small quantity of sulphate of ammonia or nitrogenous matter is added or sometimes sulphate of potash.

The phosphate of lime so prepared is called super-phosphate. It consists of a mixture of phosphoric acid, and various lime phosphates, among which predominates the soluble phosphate, $CaO2HO, PO_5$, which is usually designated under the name of acid phosphate. It is not the solution of this salt which acts upon the plants, for its extreme acidity would produce a fatal effect upon their delicate organs; but it reacts upon the bases contained in the soil to produce various phosphates, and principally upon the carbonate of lime in producing a bibasic phosphate, $2CaOHO, PHO_5$, a gelatinous substance, which, being readily soluble in water, and especially in water charged with carbonic acid, is very easily assimilated.

The industry of fossil and mineral phosphates, and of the compound manures prepared by their aid, is yet in its infancy in France, and to Frenchmen it is sad to see the English carry off from their soil the natural phosphates to return them afterwards at a considerably increased value in an assimilable state.

It is the duty of all educated men to contribute in their sphere of action to the encouragement of these industries; but in order to do this more surely it is necessary to know the principal obstacle to their development. This is the numerous frauds of which these products are the object; frauds the more tempting to the seller from the inability of the agriculturist to detect them, and the more serious to the buyer in that he does not discover the cheat until long after, through the decreased value of his harvest. Thus, under the names of super-phosphate of lime, fossil phosphates, phospho-guano, and guano with soluble phosphates and fixed nitrogen are sold mixtures in which the smallest quantity of the useful principle is suspended in the inert body. I have had, for example, occasion to analyse pretended guano which were but earth mixed with a little guano to give it the tint and odour of that manure.

If this be the principal cause which injures the sale of artificial manures, and consequently paralyzes the development of their manufacture, it is necessary, in order to cut at the root of the evil, that transactions in manures should be based upon a faithful analysis, which should guarantee their strength in nitrogen and soluble and insoluble phosphate, and this plan has been adopted by respectable manufacturers in the large manure markets for some years; but it is far from being generally followed in the smaller towns and rural districts. It is therefore necessary to create throughout France centres for analysis, in order to facilitate the transactions between buyers and sellers, and to guarantee the interests of both. No person is better fitted than the pharmacist to fulfil this important misson for the development of agriculture and consequently of the national wealth. It might be said that he alone, in the majority of districts is able to do it, because he alone possesses the knowledge necessary for analyses of phosphatic manures, which if not difficult are at least delicate. For this reason I have for several years passed introduced this kind of analysis in my course. These analyses in unpractised hands have given widely divergent results; on the other hand, various methods have been extolled, wrongly I believe, which appear by their simplicity, more apparent than real, to allow of agriculturists themselves testing manures. From this double cause it results that confidence in analysis is lost, and the remedy appears worse than the evil.

This is the duty that I would desire to see the young pharmacists prepare to undertake upon leaving this school, animated by the ardour of their age and the natural desire to acquire an honourable position by their labours. Many among them would find an interesting occupation, which in the course of time might constitute an important addition to the produce of their pharmacies; but especially they would thus become arbitrators between their fellow citizens, and would then experience an increase in the consideration which should always surround the pharmacist—a consideration to which he his quite entitled by his education and his studies.

Parliamentary and Law Proceedings.

Condemnation of Unsound Coffee.

Mr. Baylis, the solicitor to the Commissioners of Sewers, applied, on Tuesday, Feb. 10th, to Mr. Alderman Carter, at the Guildhall Police Court, in the City of London, to condemn a quantity of coffee which one of the sanitary inspectors of the City had seized as being unfit for human food.

Dr. C. M. Tidy, Professor of Chemistry at the London Hospital, said he had been to the office of Mr. Syers, 44, Lime Street, and examined 31 bags of something that was called "coffee," and three boxes of coffee and dust. One sample had been taken from 15 bags of coffee on one floor, one from 16 bags in the passage, and one from three boxes in the office. Mr. Syers did not object to their taking away the three boxes of coffee and dust, but he protested against their taking the bags, as they had been sold to go to the Continent. He had tested the samples and they were undoubtedly unfit for human food.

Mr. Alderman Carter asked whether Mr. Syers was prepared to admit that it ought to be destroyed?

Mr. Syers said he was not, for it was all sold to go abroad, and more was wanted. He had drunk it himself.

Mr. Alderman Carter said he should not like to join him in a cup of such a decoction. If Mr. Syers wished to have legal assistance he would adjourn the case, otherwise he would proceed to adjudicate upon it at once.

Mr. Syers said the coffee was not unfit for food and was sold to go to the Continent. He had seen worse coffee sold in Mincing Lane.

Mr. Alderman Carter said that for the credit of Mincing Lane he hoped Mr. Syers was mistaken. What was the value of it now in its present condition?

Mr. Syers said 25*s*. per cwt.

The Broker to Mr. Syers said the coffee was going to the Continent, and he did not not know what they were going to do with it there. He and Mr. Syers would guarantee that it should go abroad.

After some further discussion, Mr. Alderman Carter condemned the coffee, and ordered it to be destroyed.—*Standard*.

Review.

THE TREASURY OF BOTANY: a Popular Dictionary of the Vegetable Kingdom, with which is incorporated a Glossary of Botanical Terms. Edited by JOHN LINDLEY, M.D., F.R.S., F.L.S., and THOMAS MOORE, F.L.S. New and revised edition, with Supplement. London: Longmans. 1874.

The object of this useful work, as set forth in the preface to the first edition, is "the bringing together into the form of a dictionary a concise account of all plants concerning which a general reader would be likely to seek information." It must be admitted that this object has been thoroughly accomplished, considering the immense number of genera and species from which a selection had to be made, and the small space which could be allotted to each; the amount of information conveyed, and the terse and lucid manner in which the descriptions are given, render the work quite a treasure to those interested in any branch of botany. The student, instead of puzzling over the scientific diagnosis of a natural order or genus in some advanced botanical hand-book, will here find the same characters explained in a clear and homely manner; the amateur gardener desirous of knowing what the botanical name of some plant may be, which is known to him only by its familiar English name, on referring to the latter in this dictionary will find out what he wants to know; the student of economic botany in the same way may learn the botanical source and history of the various vegetable products met with in commerce; and the student of physical geography will here find much information usually sought for in special works on that subject.

In addition to these advantages there will be found, dispersed throughout the work, a glossary of botanical terms, a series of French names of species and genera, and a large number of local names for plants and vegetable productions in various parts of the world. For this reason the 'Treasury' will be found useful to the dispenser of French and other foreign prescriptions, and also to the student of the materia medica of other countries. The names of the contributors to the 'Treasury of Botany' are alone a sufficient guarantee of the correctness of the information contained in it. Among these we notice those of Balfour, Berkeley, Carruthers, Dickie, Masters, and others well-known as occupying a high position in regard to botanical science. In the present revised edition the editor acknowledges additional assistance from the following gentlemen, Messrs. Britten, Thiselton Dyer, Halliday, and J. R. Jackson.

Numerous corrections have been made in accordance with the progress of botanical knowledge, and the views held with regard to the limits of natural orders, etc., by writers of the present day. These changes will be easily seen on turning over the leaves of the work, for on account of the work being printed from stereotype, the type presents a slightly different appearance where alterations have been made. For the same reason it has been impossible to insert in the body of the work much additional information, which consequently forms a supplement of 97 pages at the end of the work. This, together with the corrections made in the body of the work, brings it up to the present day with regard to the information contained in it.

In a book of this kind, which covers such an immense extent of ground, it is hardly possible that a few omissions or oversights should not occur; thus we notice that Turkey rhubarb, Pareira brava, and Artemisia Cina have been overlooked, the first being still attributed to *Rheum palmatum*, the second to *Cisampelos pareira*, and the third is omitted altogether. Instances of this kind are, however, rare, and we may congratulate the editors upon the success which has attended their efforts to render the work a really useful book of reference. It should find a place in the library of every intelligent observer of Nature.

BOOKS RECEIVED.

INTRODUCTION TO THE STUDY OF ORGANIC CHEMISTRY. THE CHEMISTRY OF CARBON AND ITS COMPOUNDS. By HENRY E. ARMSTRONG, Ph.D., F.C.S. (Text-Books of Science.) London: Longmans. 1874. From the Publishers.

PHARMACEUTICAL LEXICON: A DICTIONARY OF PHARMACEUTICAL SCIENCE, containing a Concise Explanation of the Various Subjects and Terms of Pharmacy, with Appropriate Selections from the Collateral Sciences, etc. By H. V. SWERINGEN. Philadelphia: Lindsay and Blakiston. 1873. From the Publishers.

Obituary.

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

On the 26th November, 1873, Mr. Henry Sprigg, Chemist and Druggist, of St. Neot's.

On the 16th January, 1874, Mrs. Elizabeth Adshead, Chemist and Druggist, of Dobcross, Saddleworth, Yorkshire.

Notes and Queries.

[386.] COCCULUS INDICUS.—Can any correspondent inform me what becomes of the "Cocculus Indicus" imported? I see that the stocks for the month ending January 31st, 1874, are 1066 bags, and the deliveries 47 bags. Is there any legitimate use for the same?—RICHARD STURTON.

FLUID EXTRACT OF SUMACH BERRIES.—Mr. J. P. Remington brought before the December meeting of the Philadelphia College of Pharmacy (*Amer. Journ. Pharm.* [4] iv. 7) the following formula for fluid extract of sumach berries (*Rhus glabrum*) which he stated was being largely prescribed in that city as an ingredient in mouth washes and gargles where the astringent and pleasantly acid properties of sumach berries were indicated:—

Sumach berries (in moderately fine powder)	16 troy ounces.
Glycerine	4 fluid ounces.
Alcohol,	
Water, of each a sufficient quantity.	

Mix half a pint of alcohol, three fluid-ounces glycerin, and five fluid ounces of water, and, having moistened the sumach with four fluid ounces of the mixture, pack in a suitable percolator, pour on the top the remaining portion of the sixteen fluid ounces of menstruum; close the percolator and allow the powder to macerate for four days; then open the percolator and continue the percolation until twenty-four fluid-ounces have been obtained. Of these, reserve the first fourteen fluid-ounces, and evaporate the remainder to two fluid ounces, mix with the reserved portion, and filter, if necessary.

A very good gargle and mouth wash may be made by taking—

Fluid ext. of Sumach berries	f℥iv.
Chlorate of potash	ʒij.
Glycerin, pure	ʒiv.
Water	℥vij.

Filter.

REMEDY FOR CATARRH.—The following mixture is said to have cured in about ten hours a very severe catarrh (*Neues Jahrb. für Pharm.*):—

Carbolic acid	10 drops.
Tincture of iodine	
Chloroform, of each	7·5 grams.

Some drops were placed in a test-tube, heated over a spirit lamp, and when evaporation commenced held under the nose. After two minutes the procedure was repeated, and it is stated that the troublesome symptoms soon disappeared.

Correspondence.

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

The Proposed Extra Scholarships.

Sir,—With the view of making the conditions for competition as easy as possible, I beg to offer the following suggestions for consideration and discussion. That a modification should be introduced to the effect that winners of scholarships, besides receiving a cash payment, should (if they desire) be allowed to attend the laboratory at half the fixed scale of fees, such reduction not to extend beyond ten months from the time of entrance.

To allow the student to enter the laboratory at any period convenient to him, within a stated time after gaining the scholarship, and to attend for as short a time as he might require, would, I think, be generally acceptable to country students, and make the competition more general. On a future occasion I may perhaps trouble you with a proposition for evening lectures at Bloomsbury Square at the same fees as the morning courses; supposing that under the present regulations the professors would be allowed to engage assistants to lecture in the evening.

My idea is that if young men have equal facilities given them for obtaining sound instruction at convenient times, many would avail themselves of the opportunity rather than adopt the rapid method of preparation for examination now in vogue.

AMICUS.

Sir.—Every student ought to feel indebted to Mr. Schacht for his untiring zeal in the cause of education, and I was very pleased to see in last week's Journal that there is some probability of additional scholarships being instituted. But I feel, as Mr. Frazer remarked, "some difficulty in the words, similar in amount and character," for there is no doubt "the examination is at present too high," and I would respectfully suggest for the consideration of the committee, that the proposed scholarships should not be competed for according to the conditions for the Jacob Bell Scholarships. My chief reason for this is very well expressed by our editor in his article on "Examinations and the Registrar's Annual Analysis," where in reference to the Preliminary he says:—"Such an examination is intended to mark the close of *general*, and the commencement of *special*, education." If these scholarships are to benefit the class of young men that Mr. Schacht intends, it would be those who are serving an apprenticeship of four or five years, and are engaged behind the counter for at least twelve hours daily, and it cannot be expected that the little time they have at their own disposal should be spent in keeping up their knowledge of Virgil and German or French, but rather in acquiring a knowledge of Chemistry, Pharmacy, Botany, &c., subjects of far greater importance to them. I would suggest then that the examination should, as Bishop Temple says, "follow the school," and therefore should be on such subjects as a young man ought to require during his apprenticeship. Applying this suggestion to the present conditions for the Jacob Bell Scholarships, Virgil and French or German as well as English Composition and parsing should be expunged. Arithmetic might remain, and to Chemistry, Pharmacy, and Botany might be added Materia Medica and questions on the dispensing of Prescriptions. I think the limit of age should be twenty-two. If these regulations were adopted, it would in my humble opinion tend to promote Mr. Schacht's idea, viz., "scientific pharmacy."

A COUNTRY APPRENTICE.

Feb. 9th, 1874.

The Proposed Pharmacy Bill for Ireland.

Sir,—Permit me to say a few words in connection with the meeting of apothecaries lately held in Belfast to oppose the new Pharmacy Bill for Ireland.

I, as one of their assistants, am of opinion that these gentlemen have very little right indeed to oppose such a measure, knowing very well that the whole dispensing business in all the leading houses is conducted by assistants possessing the qualification of the Pharmaceutical Society of Great Britain; and if such persons are fully competent to manage the compounding departments of such fine establishments, surely they are equally able to take charge of houses for themselves.

In a well-known firm the partner who represents the Apothecaries' Society, neither manages his dispensing nor does he compound a prescription from one year's end till another. This remark is applicable in nearly all houses in Ireland. The dispensing is done by one or two pharmaceutical associates and a staff of junior assistants who are both hard worked and poorly paid for their laborious services.

It is well known by all the apothecaries that this Act would do great good to Ireland, but less to their pocket, and that seems to be the No. 1 in this opposition association.

They propose for the future that their curriculum of study be modified; that is, that the medical subjects which are not required to make a pharmacist be erased from their subjects of examination; but this is unnecessary, as the curriculum for a member of the Pharmaceutical Society is now fully equal to that of the Apothecaries' Hall of Ireland in its branches of pharmaceutical education.

A. P. S.

Belfast, 10*th February*, 1874.

[*** Our correspondent appears to be in error in regard to the facts of the case. There is no curriculum required in order to become a Member of the Pharmaceutical Society, and unfortunately at present no curriculum is enforced before passing the qualifying examination. So far as relates to the establishment of a compulsory course of study we entirely sympathize with the opinion which we believe is held by the apothecaries of Ireland, who are really the educated pharmacists of that country.—ED. PHARM. JOURN.]

"*Associate*" and *T. P. H.* are referred to the rule respecting anonymous communications.

J. B.—A minim is a definite weight—according to the B. P. one-sixtieth part of a fluid drachm; the weight of a drop depends upon the physical properties of a liquid, such as its density.

"*A Hater of Injustice.*"—The discussion having embraced letters on both sides of the question, it must be considered closed for the present so far as this Journal is concerned. Dr. Johnson's paper possessed an interest to pharmacists as tending to show that powerful compounds are sometimes supplied to patients as "homœopathic medicines" under conditions for which a pharmacist would be blamed were he to act similarly. The plea used in this your second letter—that the printed label directed that the dose of the medicine should depend upon the urgency of the symptoms, when probably the only judge of their urgency would be the patient himself, who might reasonably be excused for thinking he was dealing with an "infinitesimal" dose, would, we think, have as little weight with a coroner's jury as the *tu quoque* argument you also adopt. Your denial of the use by orthodox homœopathic practitioners of medicines or labels as described by our correspondents does not disprove that what has been called "pseudo-homœopathy" has not been practised by others, although it may do away with the necessity for a defence of a body of gentlemen who were not accused. Anyhow, even if such a defence be necessary, we disclaim any belief in the peculiar fitness of pharmacists for arbitrating upon the rival claims of the two systems of medicine.

W. S. (Chester) is referred to the rule respecting anonymous correspondents.

"*Wales.*"—No person is eligible for the Modified examination who did not register for the same on or before the 31st December, 1869.

"*A.*"—All advertisements for the PHARMACEUTICAL JOURNAL, and communications respecting them, should be sent to the publishers, Messrs. J. and A. Churchill, 11, New Burlington Street, in accordance with the notice that appears twice in every number. Your inquiry has been forwarded, but doubtless the delay caused by sending the advertisement so late to the wrong office was the cause of its non-appearance.

"*Pharmaceutical*" is referred to the rule respecting anonymous correspondents, and to the back numbers of the Journal.

T. B. Allkins.—The question is a legal one upon which we are unable to give advice.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. J. J. Smith, T. B. Groves, J. M. Fairlie, Gordon, "Better Pay," K. T.

NOTE ON IODIDE OF POTASSIUM.

BY T. B. GROVES, F.C.S.

Colourless crystals of Iodide of Potassium being almost invariably alkaline, the difficulty described by Mr. Holmes is not unfrequently experienced by others of the fraternity.

In my opinion, the most convenient way of dispensing this salt in combination with, say, Syrupus ferri iodidi is to dissolve it in a small quantity of water and then add a minute portion (a few drops will generally suffice) of the syrup, in order to cause a precipitate of the greenish carbonate. A drop or more (according to the alkalinity of the specimen) of dilute acid (I use hydrochloric), added cautiously, dissolves the carbonate, the disappearance of which indicates arrival at neutrality. The rest of the syrup can then be added, the mixture remaining bright. This is far more expeditious than using test paper, and equally satisfactory.

In 1856 I made a number of experiments with the view of producing for a photographer's use an iodide of potassium quite devoid of alkalinity. My first idea was to obtain the salt by boiling recently precipitated iodide of lead (obtained by treating a solution of acetate of lead with iodide of iron) with a solution of sulphate of potassium. The salt was so made, but the trouble of removing the metallic and other impurities introduced by the sugar of lead rendered the process an unsatisfactory one.

The simplest way is to treat commercial iodide of potassium with just sufficient water to dissolve it, then to neutralize its alkalinity with dilute sulphuric acid, and finally add a small quantity of spirit to hasten the separation of the sulphate so formed. The clear liquid, evaporated quickly to crystallizing point, and then set aside in a covered vessel to cool, deposits colourless crystals of the neutral iodide. These are of small size, and will, unless carefully secluded from the air, speedily turn yellow.

The mother liquor, exposed for spontaneous evaporation, also acquires a yellow colour, which deepens up to a certain point, but goes no further. On the contrary, it then begins to grow pale, until after a few days the yellow tint has entirely disappeared, leaving the liquid pronouncedly alkaline, as are the crystals that are obtainable from it, and which are, I need scarcely say, not prone to become coloured. It seems, then, that neutral iodide of potassium is unable to resist the combined attack of ozone and carbonic acid; but as soon as these agents have, by removing iodine, established a certain degree of alkalinity, their power over the compound ceases. The iodine then gradually leaves the liquid by evaporation, rendering it colourless and not amenable to further change, unless it be first made neutral by further addition of acid.

[*** In reference to this subject we have received a note from Mr. Alfred Southall, in consequence of his having noticed Dr. Redwood's statement at the Evening Meeting, "that according to his experience the more transparent the crystals of iodide the more strongly alkaline they were." Mr. Southall says this is quite different from his own experience; in manufacturing this chemical he always finds it necessary to have the solution as nearly neutral as possible, in order to obtain semi-transparent crystals, for if there was an excess of acid he would get the opaque crystals that many have a liking for.—Ed. Ph. J.]

MUSTARD AND ITS ADULTERATIONS.*

BY ARTHUR HILL HASSALL, M.D.

The mustard of commerce, when pure and genuine, consists usually of a mixture in different proportions of the farina, with more or less of the husk of the seeds of brown and white mustard, *Sinapis nigra* and *S. alba*, plants belonging to the natural order *Cruciferæ*, which contains a number of other plants that furnish pungent seeds. Sometimes it is made wholly from the brown seed, and at others the farina of the white mustard seed is the principal constituent.

Of these seeds no very complete quantitative analyses have as yet been made, although many highly important particulars have been ascertained respecting their composition. Thus, black or brown mustard, as it is now generally named, consists for the most part of *fixed oil*, *myronic acid*, $C_{10}H_{19}NS_2O_{10}$, combined with potash, forming *myronate of potash*, *vegetable albumen*, a *bitter principle*, a little *gum* and *sugar*, a *peculiar green substance*, *cellulose* and *mineral matter*. The myronic acid is converted into the volatile oil of mustard, *sulphocyanate of allyl*, C_4H_5NS, or $\left.\begin{matrix}CN\\C_3H_5\end{matrix}\right\}S$, through the agency of the *myrosin*, another constituent of brown mustard, when the two are brought into contact through the medium of water.

White mustard differs essentially in its composition from brown; it contains *fixed oil*, but in lieu of myronic acid, convertible as described into the volatile oil of mustard, a non-volatile, bitter, and acrid salt, termed *sulphocyanate of sinapine* ($C_{17}H_{24}NSO_5$, or $C_{16}H_{23}NO_5$,CNHS), *myrosin*, *gum*, *cellulose*, and *mineral matter*.

Now, it is on the volatile oil and the acrid and somewhat bitter salt that the pungency and acridity of mustard depend, and this is a strong reason why in the mustards of commerce the farina of the two species should be blended together. Of the two active principles the volatile oil is by far the more important, and hence the seed of the brown mustard possesses the greatest commercial value. Messrs. Henry and Garot affirm that brown mustard, as well as the white, contains the acrid principle; this statement the author has been able to abundantly verify, especially by the action of nitric acid, caustic potash, and ferric chloride on the alcoholic extract.

The acrid principle of white mustard appears to possess but little stability, and although it is stated by v. Babo to bear a temperature of 130° C., Dr. Hassall finds that it is readily affected by heat, and that it is not safe to evaporate the alcoholic solution containing it at a higher temperature than about 90° F. If subjected to a much higher temperature it quickly loses its acridity, and acquires a bitter caramel-like taste.

Of neither brown nor white mustard has any percentage analysis been given; and in the few cases in which the quantities of any of the constituents are stated they vary greatly, according to different observers. Thus, according to Pereira, the *fixed oil* forms about 28 per cent. of the seeds of black mustard, while Watts puts the yield at 18 per cent. only, but white mustard-seed, he says, furnishes 36 per cent. The *volatile oil* amounts to 0·20 per cent. according to Boutron and Robiquet; 0·55 per cent. according to Aschoff; and 0·50 per cent. according to Wittstock;

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* Abstract of a paper in *Food, Water, and Air*, for February, 1874.

all which quantities are much below the mark. There is little or no difference in the amount of fixed oil furnished by the two descriptions of mustard,—that obtained by the author from the farina of brown mustard reaching 35·701 per cent., and that from the white mustard 35·768 per cent. Again, it is shown by the analyses given below that the volatile oil occurs in much larger quantities than those enumerated above, the amount which the author obtained from one sample being no less than 1·271 per cent.

The following are original percentage analyses of both brown and white mustard:—

Brown Mustard Farina.

Water	4·845
Fixed Oil	35·701
Myronic Acid	4·840
Myrosin and Albumen	29·536
Acrid Salt	3·588
Cellulose	16·765
Ash	4·725
	100·000
Volatile Oil	1·271
Nitrogen	5·068
Sulphur	1·413

The oil extracted by ether from the brown seed is of a bright and beautiful emerald green colour, owing to the presence of the peculiar green principle described as one of its constituents. So deep and remarkable is this colour of the oil that it would be very easy, by means of a graduated scale of tints, to determine with very tolerable certainty the percentage of brown mustard contained in any sample of mixed mustard. The small quantity of sugar found in mustard would, from the method of analysis pursued, be found with the bitter principle, and the gum with the cellulose.

White Mustard Farina.

Water	5·360
Fixed Oil	35·768
Acrid Salt	10·983
Myrosin and Albumen	27·484
Cellulose	16·295
Ash	4·110
	100·000
Nitrogen	5·285
Sulphur	1·224

These analyses, whether regarded from a scientific or practical point of view, are possessed of much interest. The fixed oil was obtained by exhaustion with ether, and it was found in all cases to be free from acridity or pungency. The volatile oil was determined by distillation into a strong solution of ammonia, after maceration of the mustard in water for some hours. The oil evolved was slowly acted upon by the ammonia, and after some hours was entirely dissolved, and from the solution by evaporation the volatile oil was recovered in the form of the crystalline sulphocyanate of allyl ammonium, $\left.\begin{matrix}CS\\C_3H_5\\H_3\end{matrix}\right\}N_2$; and lastly, from this the quantity of myronic acid present was calculated. The next steps in the analysis were to obtain the total amounts of nitrogen and sulphur in the mustard; the first was ascertained by combustion with soda lime in the usual manner; and the second by deflagration of the mustard and oxidation of its sulphur in a mixture of nitrate of potash and carbonate of soda. The acrid principle and the myrosin and albumen were then thus approximately ascertained:—As much sulphur and nitrogen were first deducted from the totals of these substances obtained as was necessary to the formation of the volatile oil actually found; next, the whole of the remaining sulphur, and as much of the nitrogen as was required, were then calculated into the acrid principle; lastly, the surplus nitrogen was calculated into myrosin, which has the same formula as vegetable albumen. But now having got approximately the amounts of acrid principle and myrosin, a further calculation had to be made. Myrosin contains about 1 per cent. of sulphur; this had to be deducted from the total acrid principle, thus liberating from that principle a small quantity of nitrogen, which in its turn was calculated into myrosin.

Both the brown and white mustard farina, after the removal of the fixed oil by ether, were successively treated with cold and boiling alcohol. In the case of the brown mustard the alcoholic extractive amounted to 13·36 per cent., and that of the white mustard to 12·11 per cent. The nitrogen and sulphur in both these extracts were determined, and, as might have been expected, since myronate of potash is to some extent soluble in rectified spirit, more sulphur was found in the case of the brown mustard than was required to combine with the quantity of nitrogen found, but it furnished by calculation 3·82 per cent. of acrid principle, while the white mustard yielded 5·41 per cent. of that principle only. It will be observed that in both cases the amount of total extractive obtained is much greater than can be accounted for by the amount of the acrid salt actually present, and the difference is probably in part due to a little sugar as well as other undetermined substances.

It will be noticed that no reduction of the sulphur existing in the form of sulphuric acid has been made in these calculations. The reason of this is that the quantity of sulphur met with in this form is so small as to be practically of no consequence. Thus, the sulphuric acid obtained from 100 parts of black mustard was only 0·0883 of a grain = 0·0353 of sulphur, while the same quantity of white mustard furnished 0·0560 grain of sulphuric acid = 0·0224 of sulphur.

In the original paper are given six analyses of farinas consisting of mixtures in different proportions of black and white mustard.

That all these samples were genuine was shown by the quantities of fixed oil, nitrogen, and sulphur obtained; and that they consisted of mixtures of the two mustards in different proportions—the higher qualities containing larger proportions of the brown mustard—was demonstrated by the different quantities of volatile oil obtained.

Analyses are also given of some mixed or adulterated mustards of different qualities. The analyses were conducted as in the case of the genuine mustards, the only difference being that an allowance was made for the nitrogen of the wheat flour.

From an examination of these analyses it is apparent that genuine brown mustard should contain about 36 per cent. of fixed oil, at least 1 per cent. of volatile oil of mustard, about 4 per cent. of acrid principle, and that it should furnish about 1·5 per cent. of sulphur, and 5 per cent. of nitrogen; that genuine white mustard should yield about the same amount of fixed oil, over 10 per cent. of acrid principle, and nearly the same amount of nitrogen and sulphur as

the black ; that the composition of genuine mustards, which are made up in various proportions of brown and white mustard seed, differs according to the quantities of each kind present, the relative proportions being determinable by analysis with considerable precision ; that in the mixed or adulterated mustards the proportions of fixed and volatile oil, of nitrogen and sulphur, are all much reduced, according to the extent of the admixtures, these consisting, in the mustards now reported upon, in all cases, of wheat flour and turmeric. Thus, the fixed oil was reduced in one of the samples from 36 per cent.—the normal amount—to about one-half, or 18 per cent. ; the volatile oil to 0·1 per cent. ; and the nitrogen to 3·32 per cent. ; while in another sample the sulphur was as low as 0·81 per cent. The amount of wheat flour and turmeric varied from 22·98 per cent. to 38·82 per cent., that is to say, from one fourth to one-third of the article.

It has already been pointed out that the turmeric is added to the mustard simply for the sake of its colour, and to cover and conceal the addition of the wheat flour. In favour of this addition Dr. Hassall believes that not a single reason can be adduced, except possibly that its use allows of the addition of a larger quantity of brown mustard seed than could otherwise be employed at a given price, and that thus the public gain an advantage, wheat flour being, of course, cheaper than white mustard, which, again, is less costly than brown mustard ; but this difference of the cost must really be very inconsiderable, and if obtained at the expense of the purity of the article, the practice should be abandoned. At all events, he thinks it is wrong and misleading to call these mixed articles by the name of mustard. By making mustard in all cases either entirely of the brown seed or of admixtures of the brown and white seed, a wide range in the qualities and prices of mustard can be obtained, and the mustard in which the white seed greatly predominates can be sold at a very low price. He trusts, therefore, that the time has now arrived for the abandonment of the use of wheat flour and turmeric in the manufacture of mustard, and that, if the sale of the mixtures still be allowed, the law will continue to render it compulsory that the mixed articles should be sold only as mixtures, and not under the name of mustard only. He even regards the manufacture of several varieties and qualities of the same article, as mustard, for example, a very great evil ; because the public suffers in pocket to a large extent thereby, the lowest qualities of these mixtures being constantly sold at the price of the higher, especially in poor neighbourhoods.

THE ALKALOIDS OF THE CINCHONA BARKS.*

BY O. HESSE.

(*Continued from p.* 613).

IV. Cinchonidine.

After becoming convinced that all the alkaloids that have been designated under the name of "cinchonidine" were identical with the cinchonidine of Pasteur, in the interests of the unity of chemical terminology, I had no hesitation in adopting Pasteur's name for this base, previously named by me "quinidine," although most of its properties incline more nearly to those of quinine than those of cinchonine. I consider also that upon another ground the name quinidine should not be used for it, namely, that under that designation other alkaloids are understood, and thereby great confusion would occur.

Amongst the salts of cinchonidine the neutral hydrochlorate requires notice, which crystallizes in monoclinic double pyramids, a form presented by no other combination of hydrochloric acid with a cinchona base. When an aqueous solution of this salt is concentrated at a gentle heat, as I on a former occasion stated, radiating crystals are obtained, which I then held to be the anhydrous salt. The hydrochlorate is very easily obtained in this latter form if the solution be a moderately supersaturated one. When these radiating silky-lustred crystals are allowed to remain a long time in the mother liquor, they are frequently observed to disappear, and are transformed into compact crystals with one molecule of water of crystallization. Estimation of the water in the radiating crystals gave the following results :—

1·7265 gram of air-dried matter lost at 100° C. 0·1585 gram H_2O.

0·8875 gram of air-dried matter lost at 100° C. 0·0825 gram H_2O ; it also gave 0·3415 gram AgCl.

These numbers lead to the formula $C_{20}H_{24}N_2O,HCl+2H_2O$, which :—

	Required.	Found.	
$2H_2O$	9·46	9·18	9·29
Cl	9·32	9·51	

When sulphate of cinchonidine is dissolved in boiling alcohol a salt containing $2H_2O$ crystallizes from the solution upon cooling in very slender white prisms. These gave :—

I. 0·605 gram of air-dried substance lost at 110° C. 0·030 gram H_2O.

II. 0·824 gram of air-dried substance lost at 110° C. 0·039 H_2O.

$2C_{20}H_{24}N_2O, H_2SO_4+2H_2O$

	Required.	Experiment. I.	II.
$2H_2O$	4·80	4·95	4·74.

This salt corresponds, therefore, with the sulphate of quinine crystallized from alcohol.

Like quinine, cinchonidine turns to the left the plane of polarized light. According to Pasteur $\alpha j = -141·61°$, according to Scheibler* $\alpha j = -113°$ (mean of eight observations). Having at my disposal an excellent polarimeter, I have checked these determinations, and in operating on a solution of the substance in absolute alcohol, obtained the following results :—

(I.) For $p = 3·1538$ and $l = 220$, $\alpha = -7·81°$.
(II.) For $p = 5·225$ and $l = 200$, $\alpha = -11·83°$.
(III.) For $p = 5·840$ and $l = 200$, $\alpha = -13·12°$.

From this is calculated—

	I.	II.	III.	Mean.
$\alpha j =$	−112·58°	−112·56°	−112·33°	−112·49°.

The supposed anhydrous neutral sulphate of cinchonidine gave in alcoholic solution—

(I.) For $p = 2·156$ and $l = 220$, $\alpha = -7·295°$.
(II.) For $p = 2·1175$ and $l = 220$, $\alpha = -7·18°$.

From which is calculated—

	I.	II.	Mean.
For $2C_{20}H_{24}N_2O, H_2SO_4$ $\alpha j =$	−153·79°	−154·12°	−153·95°
For Cinchonidine ... $\alpha j =$	—	—	−178·47°

Sulphate of cinchonidine in aqueous solution, with one molecule of SO_3 added, gave—

For $p = 2·388$ (anhydrous) and $l = 200$, $\alpha = -7·35°$.

And with six molecules of SO_3 added gave—

For $p = 2·3575$ (anhydrous) and $l = 200$, $\alpha = -7·08°$.

This gave, in the first case, $\alpha j = -153·8°$, or no material difference in the deviation ; for the second, $\alpha j = -150·15°$, or a slight decrease in the rotatory power of the alkaloid.

* Translated from the 'Vierteljahresschrift für praktische Pharmacie,' vol. xxii., p. 366.

* Berichte der deutschen chemischen Gesellschaft, vol. iv., p. 692.

Hydrochlorate of cinchonidine in alcoholic solution gave the following results :—

For $p = 5{\cdot}328$ (with H_2O as water of crystallization), and $l = 200$, $\alpha = -14{\cdot}67°$.

From which is deduced—

For the salt ... ... $\alpha j = -137{\cdot}66°$.

For the base as a neutral hydrochlorate $\alpha j = -162°$.

Dissolving afterwards this hydrochlorate in dilute hydrochloric acid, it gave—

For $p = 5{\cdot}328$ (with one molecule of H_2O) and $l = 200$, $\alpha = -15{\cdot}10°$, or $\alpha j = -141{\cdot}7°$.

In another experiment this substance was dissolved in hydrochloric acid diluted with an equal volume of water. This gave—

For $p = 4{\cdot}2376$ and $l = 200$, $\alpha = -12{\cdot}19°$, or $\alpha j = -143{\cdot}83°$, or for cinchonidine $\alpha j = -169{\cdot}29°$.

Here the value of $[\alpha]$ varies nearly indefinitely for the alkaloid dissolved in acid, according to the proportion of the acid and base ; but it is definite for the free base or one of its salts in aqueous or alcoholic solution.

I have thought it better to describe this examination of cinchonidine before occupying myself with the historical part of the question.

Cinchonidine was found in 1847 by Winckler* in "China Maracaibo," in the bark of *C. Tucujensis* (Karsten), as well as in an analogous bark of Huamilies cinchona, and was called quinidine. Afterwards, Von Leers† obtained it from Bogota or Caqueta bark, the bark of *C. lancifolia*, var. *vera*, called also, in New Grenada, "Tunita." This latter bark is still called in commerce "Carthagena bark," and at the present time shows variable quantities of this alkaloid. Climatic conditions and, perhaps, some other causes appears to exercise a great influence upon the structure of this bark, it becoming short fibred, and apparently rich in cinchonidine. Probably to this state is due a declaration of Koch,‡ that he once found in a Carthagena bark 1 per cent. of cinchonidine. But the difference which Koch sought to establish between this cinchonidine and his quinidine, an alkaloid contained, according to him, in a particular Carthagena bark, appears to me to be due simply to the fact that his quinidine was not completely free from quinine. This bark contains no peculiar alkaloid.

Although it was only in 1847 that Winckler first accurately described this alkaloid, it had been previously observed, in 1833, by Henry and Delondre, and named by them "quinidine." But this "quinidine" also contained a considerable quantity of quinine. Finally, in 1834, Henry declared that the "quinidine" he had studied with Delondre was identical with quinine, but that its greater purity was due to its capability of crystallization. An analysis made by Pelouze of this "quinidine" tended to confirm Henry in his opinion.

Henry and Delondre had not indicated in what species of *Cinchona* this alkaloid had been found. But when Pasteur had discovered the presence—rarely it is true—of an alkaloid, isomerous with quinine, in the sulphate of quinidine of commerce, and, without first proving it, had declared it to be identical with the quinidine described by Henry and Delondre,§ Delondre accepted the honour attributed to him, and described particularly the bark which contained this quinidine. This bark was also designated by Planchon, in 1864, under the name of "*quinquina à quinidine*," which, with other similar barks, appears to be employed in France in the preparation of quinidine.

In the meantime, Wittstein‖ received a cinchona bark which at first he called "China pseudoregia," but afterwards, following Wiggers, "China rubra granatensis." Wiggers compared this bark with the original barks which Delondre and Bouchardat had used for the illustrations in their work on Cinchona barks, and found it to be identical with the bark in which Henry and Delondre found their "quinidine." On the other hand, the chemical investigation which Wittstein carried out gave a different result, inasmuch as the alkaloid gave no green colouration with chlorine and subsequent addition of ammonia, and in composition it agreed with no other cinchona alkaloid. Wittstein, therefore, was of opinion that his alkaloid, which received the name of cinchonidine, was identical with Pasteur's cinchonidine, and that the nature of the quinidine of Henry and Delondre required yet to be cleared up.

Meanwhile, Dc Vrij examined a specimen of cinchonidine prepared by Wittstein, and found that it evidently consisted of a small quantity of sulphuric acid, but principally of cinchonine and Pasteur's cinchonidine. After a time however, Crawford* subjected this alkaloid to a further investigation, and showed that its hydrochlorate and sulphate were very easily soluble in ether. Consequently Wittstein's cinchonidine must be different from Von Leer's quinidine—corresponding to Pasteur's cinchonidine—since I have pointed out that both the neutral sulphate and hydrochlorate of that alkaloid are almost insoluble in ether.

In 1862, Kerner† described yet two other cinchonidines —an α-cinchonidine, and a β-cinchonidine. Of these the α-cinchonidine formed with hydrochloric acid a salt that crystallized constantly in rhomboidal octahedra.

When the cinchonidine was saturated with sulphuric acid and comparatively little water, after cooling and standing some time the solution usually became gelatinous. It turned the plane of polarized light to the right,‡ consequently differing from Pasteur's cinchonidine.

The β-cinchonidine, of which Kerner received a "sulphate" from France, formed with hydrochloric acid uniformly long hard rhombic prisms, but no rhomboidal octahedra. The pure β-cinchonine, crystallized in brilliant scales and needles. Later§ Kerner appears to have satisfied himself that his β-cinchonidine did not exist as a simple body ; at any rate, in his treatise on the cinchona alkaloids he has passed it over in silence as well as γ-quinidine.

That the hydrochlorate of cinchonidine sometimes crystallizes in prismatic crystals has been before stated, and it may be here generally remarked that there is no alkaloid yielded by cinchona the neutral hydrochlorate of which crystallizes in rhomboidal octahedra, and does not turn to the right the plane of polarized light. Obviously Kerner has been deceived in his observations upon the optical effects of his alkaloid, and that the α- and β-cinchonidine should be considered identical with Pasteur's cinchonidine, corresponding to Von Leer's quinidine.

(*To be continued.*)

* *Repertorium für Pharmacie,* vol. lxxxv., p. 392 ; vol. xcviii, p. 384.

† *Annalen für Chemie und Pharmacie,* vol. lxxxii., p. 147.

‡ *Jahresbricht für Chemie,* 1864, p. 444.

§ 'Quinologie,' by Delondre and Bouchardat.

‖ *Vierteljahresschrift f. Pharm.,* vol. v., p. 511.

* *Vierteljahresschrift,* vol. vii., 535.

† *Zeitschrift f. anal. Chemie,* vol. i., p. 151.

‡ *Achiv. f. Physiologie,* vol. ii., p. 200. § Ibid.

‖ From the *Philoeophical Magazinc,* xlvi.. p. 376.

THE MOTIONS OF CAMPHOR AND OF CERTAIN LIQUIDS ON THE SURFACE OF WATER.‖

BY CHARLES TOMLINSON, F.R.S.

(*Concluded from page* 656.)

It is remarkable that Professor Challis should have thought it theoretically probable that a thin [invisible] film of the oil spreads over the whole surface of the water and assists the visible [and slower] spreading of the first drop, because in some oils (such as oil of cinnamon) this thin film is visible. On depositing a drop of this oil on the surface of clean water in a clean glass $3\frac{1}{2}$ inches in diameter, an exceedingly thin but visible film is instantly drawn over the whole surface of the water, while the

denser film, which does not cover half the surface, spreads much more slowly. In the case of freshly distilled oil of coriander (the very remarkable cohesion-figures of which are given in one of my papers), the first thin film is accompanied by volleys of minute globules which extend to the edge of the water in radial lines. Other similar cases of essential oils might be cited; and even in the case of solid fats the evidence of a thin invisible film, covering the surface and arresting the camphor motions, seemed to be irresistible before the promulgation of the surface-tension theory. A stick of common mottled soap, or of tallow or lard, lowered into a large surface of water previously dusted over lightly with lycopodium powder, instantly clears away a large circular space (extending nearly to the edge of the glass). This effect is much more satisfactorily explained on the surface-tension theory than on the existence of a thin invisible film. But in the case of oils, whether volatile or fixed, it must be considered that a much greater tensile force is exerted in spreading some oils than others. When a film formed by a drop of a volatile oil nearly covers the surface of the water, there is still a sufficient residual amount of surface-tension to cause fragments of camphor to perform their evolutions; they skate through the film, cutting it up in all directions. But in the case of a film formed by so large a quantity as a drop of any fixed oil, the camphor fragments are motionless, whether on the film itself or on the adjacent water-surface. This was formerly supposed to prove the existence of a fatty film which, though invisible, destroyed contact between the water and the camphor; but now, in accordance with the new theory, the fatty-oil film so far reduces the tension as to leave no residual force sufficient to give motion to the fragments.

But if, as I have shown, a freshly distilled volatile oil does not prevent the motion of the camphor fragments, some deductions must be made from the statements of the earlier observers, which savour of the marvellous. Thus Volta, writing in 1787, says:—"If the water be defiled with any foreign substance, or its surface only slightly fouled with oily matter, if only the dust of the room or of one's clothes be upon it, the looked-for motions of camphor and of benzion will not take place, or will be so feeble as to be scarcely sensible. So also Prevost, writing in 1797, remarks that "if the surface of the water be touched with a pin previously dipped in oil, the motion of the camphor fragments instantly ceases, just as if they had been struck by lightning (*comme foudroyées*)." Venturi also, in 1797, says, "Touch the surface with oil, and an almost imperceptible film instantly advances over the whole surface, repels the fragments, and strikes them motionless as if by magic."

Now in all these cases I venture to say that the experiment was not performed under the most favourable conditions. It was known that the water must be free from grease; but I know of no reference on the part of these early inquirers to show that they took special means to make the vessel containing the water chemically clean, any more than the surface of the camphor or the knife with which it was cut or scraped. Hence, the initial tension of the water not being at a maximum, contact with a very slight portion of grease or oily matter would so far further lower it as to produce the sudden effects described. But if the experiment be repeated under the most favourable conditions, in which the surface-tension of the water is at its maximum, the water may be touched with a fixed oil, and the iridescent film resulting therefrom, though lowering the tension, will not do so to a sufficient amount to arrest the motions of the camphor fragments. For example, a shallow glass four inches in diameter was filled first with strong sulphuric acid and then rinsed out with tap-water and filled with the same. Fragments of camphor were extremely active on the surface, which was now touched with the point of a clean penknife that had been dipped into refined East India rape oil; a film of a splendid deep blue colour was produced, which instantly opened into a sort of lace pattern; but the fragments of camphor continued to rotate, not so vigorously as at first, but still with vigour. If the film of oil be first formed on the surface and the camphor fragments thrown upon it, they will also rotate. If instead of using the point of a knife to deposit the oil, a glass rod be employed and a drop be deposited, this, especially if the oil be heated, will flash out into a film, completely covering the surface of water in a vessel six inches in diameter. Under these conditions fragments of camphor do not rotate; but there is sufficient residual tensile force to give motion to creosote. A drop of this instantly repels the oil film, cuts it up in all directions, and moves over the surface with great vigour, the only sign of diminished tension being that the cohesion-figure does not open out into the usual brittle arc and so break up into a number of figures, but preserves one parent figure, from which volleys of small globules are discharged.

In the paper just referred to I give a number of cases in which a volatile oil film arrests the motions of creosote, and then evaporating, the water (according to the new theory) so far recovers its tension that the creosote suddenly starts into life and increases in vigour as evaporation proceeds.

Considering the mode in which surface-tension acts, it will naturally be supposed that the motions in question are not confined to camphor and a few other solids, nor to creosote and a few other liquids. In fact, fragments of any body that act by suddenly lowering the surface-tension at the spot on which they fall are liable to these camphor motions. Many salts act in this way, the last that I have observed being sulphate of aniline. The following solids also rotate:—Borneol, naphthol, thymol, nitro-toluol: this was inactive on water at 56° F., but very active on water at 90°, a crystalline needle sweeping over the surface at right angles to the length of the crystal. Binitrotoluol on water at 96°. Hydrochlorate of toluidin: a crystalline fragment darted to and fro in short jerks, as if surprised at the novelty of its situation, and then, accepting the conditions, moved rapidly over the surface in circular sweeps and quickly disappeared. Acetamid behaved in a similar manner. Lactid and oxamethan also rotate rapidly. Sulphaldehyd rotates rapidly in wide sweeps and soon becomes motionless. The same phenomena are exhibited by benzoic anhydride. Amidobenzoic acid also rotates rapidly, and quickly disappears; while the crystalline portion of nitrobenzoic ether sails round and round near the edge, and continues to do so for a long time.

Among liquids, a drop of toluidin on the surface of water, in a vessel 4 inches in diameter, affords an instructive illustration of surface-tension: the drop forms a figure for an instant something like that of creosote; it then bursts as with an explosion, dotting the whole surface with smaller figures, each of which also explodes; and the smaller particles resulting therefrom rapidly disappear amid lively agitations. A drop of phenyl-mustard oil quickly spreads into a large ragged film, which is torn into numerous fragments, covering the surface; and then each fragment gathers itself up into a well shaped lens. A second drop rests as a lens. A drop of monochloracetic ether spreads rapidly over the surface and rebounds to the centre, breaks up into numerous ovoid masses, with colour, which rapidly disappear with a remarkable opening out. When the whole has disappeared, the motes on the surface rush wildly to and fro. Formiate of ethyl produces a very pretty rose-engine figure with a central boss. Oxalate of ethyl forms a wide film with iridescent edges, and then, in waving figures, quickly disappears. Iodide of allyl gives a colourless film over the whole surface, then exhibits a magnificent display of iridescence, breaks up and instantly disappears. The following liquids also present interesting phenomena:—Nitrobenzol, nitrobenzoic ether, nitrotoluol, and cymol. It would be easy to extend the list both of solids and liquids that afford instructive illustrations of surface-tension, whether on the surface of water or on that of other liquids. A drop of

oil of lavender on the surface of liquid acetic acid forms a wonderfully active figure, which I have already noticed, together with the figures of various liquids on the surfaces of sulphuric acid, cocoa-nut oil, castor-oil, paraffin, spermaceti, white wax, olive-oil, lard, and sulphur, heated, where necessary, so as to render them sufficiently fluid.

In 1837 Dr. Pietro Savi had his attention directed to the following statements by De Candolle with reference to the contractile motions of plants :—"Si l'on place sur l'eau des folioles, ou des fragmens de folioles, du *Schinus Molle*, on voit l'huile volatile, contenue dans certaines cellules du tissu, s'echapper, non par un flux continu, mais par des saccades intermittentes, qu'on ne peut, ce me semble, rapporter à d'autres causes qu'à quelque contraction des cellules qui renferment ce suc." And again at page 287 of the same volume, with reference to the sudden and singular movements of the leafy fragments :—"Ces mouvemens sont dus à des jets intermittens d'huile essentielle, qui sortent des cellules, frappent l'eau, et determinent dans la foliole un mouvement de recul semblable à celui de l'éolipyle. On voit ici assez clairement un effet vital."

Dr. Savi shows, by a microscopical examination of the leaves in question, that no provision is made for the exertion of a contractile force, that fragments of the dried leaves move, that the motions are common to leaves of the *Terebinthaceæ*, *Euphorbiaceæ*, *Urticaceæ*, *Asclepiadaceæ*, and some others, and that the true explanation of these phenomena (which are physical, not physiological) is to be found in Carradori's attraction of surface, as explained in his memoirs.

In 1838 Morren showed that a leaf of the *Schinus Molle*, or American pear, placed on water had a jerking motion, while the surface became covered with a film of sweet-smelling oil. Another plant, the *Passiflora fœtida*, is furnished with hairs, one of which, plunged into water, discharges a small drop of oil, which, rising to the surface, expands and contracts several times, and then apparently bursts with violence, the smaller portions going through similar changes. These are well-known effects of surface-tension common to several oils and other liquids, as is also an experiment by Zantedeschi, in which a few drops of valerianic acid poured into water rise to the surface, go through a variety of contortions and evolutions, and excite the astonishment of the observer that dead matter should thus of itself become endowed with such active motion. A drop of isobutylic alcohol forms a similar figure, only more rapid in its action.

In 1838 I published a new method of producing Newton's rings. Referring to the facility with which oil spreads over the surface of water, it is stated that any oil, balsam, varnish, or essence not soluble in water will answer the purpose, or, if the oil or balsam, etc., be too viscid, it may be made sufficiently fluid by the action of heat. A single drop of oil, etc., may form a circular film from two to five inches in diameter with or without colour, depending on the thickness. Supposing the film to be without colour, the finger dipped in ether (or a piece of porous wood, or a camel's-hair pencil, or, as was afterwards adopted, a bit of sponge tied over the end of a glass rod) and held over the film, "we instantly see a repulsion or recession of particles ; a black spot is formed ; and round it the seven orders of rings appear in all their lustre and beauty. The rings remain just so long as the finger is wet with ether, which having evaporated, or the wet finger being removed, the rings contract in diameter and disappear altogether. These rings can be formed at any part of the surface of the film, and any number of times while the film endures."

Among the conditions enumerated are :—"The glass and the water must be perfectly clean and free from grease ; the surface of the water must be perfectly tranquil ; a clean glass rod must be dipped into the oil, and a single drop only be placed upon the surface of the water ; the ether must not touch the film, or it will destroy it, while if the ether be taken up by a body that has not a pointed or rounded termination the rings will not be formed, and there will only result a series of concentric figures, depending for form upon that of the end of the substance held over the film. Instead of ether we may employ solution of ammoniacal gas, pyroligneous ether, alcohol, or naptha. Strong ammonia sometimes breaks up the film and scatters it over the surface of the water."

A turpentine film, which is at first colourless, soon begins to display colour as the film becomes thinner by evaporation—a remark that does not apply to a film formed by a drop of the fixed oils of olive, rape, castor, nut, etc.

Films that exhibit some of the most splendid colours of thin plates may be formed from a drop of balsam of Peru or a turpentine varnish, such as copal varnish, carriage-varnish, gold-size, black japan, etc. If the ether be held over one of these coloured films, "we immediately get a series of rings as before, quite independent of the large rings which occupy the surface of the water. That part of the film subjected to the action of the ether no longer forms a portion of the original film, but is subject to the systematic arrangement which the ether produces. A film showing the colours of the 5th, 6th, and 7th orders only is, at that particular part which is subjected to the action of the ethereal vapour, made sufficiently thin to exhibit the rings of the 1st, 2nd, 3rd, and 4th orders, or of the 2nd and 3rd, or of the 3rd and 4th,—all depending on the quantity of ether taken up, the rate of evaporation, and the proximity of the ether to the film—in other words, on the comparative thinness of the film. Should the drop of oil, etc., form a lens instead of a film, the ether vapour will drive it with great energy over the surface of the water."

If the water be dusted over with a dry powder, the vapours of ether, etc., will powerfully repel the particles. "Turpentine and some of the volatile oils produce a similar effect upon powders ; and one volatile oil frequently repels a film formed by another."

The above details refer to the repulsion of films. "A strong and decided attraction may be exhibited by presenting to the film a drop of an acid of low boiling-point, such as nitric or pyroligneous acid. By such means an oil-film of the size of a crown piece may be reduced to the size of a sixpence ; and a film exhibiting colour will have all colour destroyed by the proximity of the acid, whose influence is to thicken the film. Sulphuret of carbon and an aqueous solution of chlorine produce a similar result." (pp. 545-549.)

In 1841 Sir David Brewster reproduced some of my results, probably without suspecting that he had been anticipated, although a full abstract of them was given in a then popular journal of wide circulation. Brewster formed a film of oil of laurel on water placed in a black vessel, or on the surface of diluted or real ink. He justly describes the rings produced as being splendid beyond description. He says :—"These thin plates of oil of laurel exhibit some curious phenomena which I believe have not been noticed. If we wet with water, alcohol, or the oil of laurel itself, the extremity of a short piece of wire, such as a large pin, and hold the pin in the hand so that its head may be above and almost touching the film, the film will recede in little waves of circular shape which form a new system of coloured rings ; and they become covered with the vapour from the fluid on the head of the pin in such small particles that they reflect no light, and the rings appear to be blackened. By withdrawing the pin the film is restored to its former state. The same effect is produced by heating the pin or the fluid upon it to promote evaporation." (p. 51, note.)

We now come to the time when Dutrochet published his elaborate essays on what he termed the epipolic force ; and as this forms a kind of middle term between the earlier and the more recent history of this wide subject, we may here conveniently pause for a time.

Highgate, N.

NOTES ON THE CHINESE OPIUM TRADE.

According to reports issued at various Chinese ports at the end of the year, the trade in opium does not show much fluctuation, and as regards imports remains about the same as in former years. The gross imports into Shanghai of Malwa opium amount annually to about 27,000,000 piculs, the description which is next in favour being Patna, and then Benares opium. The price of the native-grown article is much lower than for these sorts, and it is said that the increase in the cultivation of the poppy in China has had a most injurious effect on the consumption of the foreign drug, the import of which has remained perfectly stationary during the past five years, whilst the production of the native drug during the same period has more than quadrupled. Precise statistics of the growth of the poppy in China cannot be obtained, but according to the best authorities, there is no doubt that year by year it increases largely. It is reported by a gentleman who has lately made the overland journey from Peking to Chinkiang that the country between the Yellow River and the Yang-tzsé is covered with poppy-fields, where the drug is actively cultivated. The temptations, indeed, to its cultivation are very great, inasmuch as, according to the lowest estimate of the peasants themselves, it is twice as profitable as growing wheat; some even assert that it is six times as profitable, but that doubtless may be regarded as an exaggeration. So great has been the spread of poppy cultivation all over China that the subject has attracted—and not for the first time—the attention of the Imperial Government, and lately a decree appeared prohibiting its culture. It appears, however, that such decrees are not held in very great dread, and have not, in fact, the slightest effect, inasmuch as it would obviously not be to the interest of the officials to put down such a useful contribution to their exchequer, both public and private, and not insignificantly to the latter. Under these circumstances the opinion may confidently be expressed—and it is borne out by the principal opium merchants in Shanghai—that a gradual falling off in the demand for the foreign drug may be looked forward to; and, indeed, if the cultivation of the poppy continues to progress in China with the same rapidity in the future as in the past, the virtual extinction of the trade in Indian opium may be not unreasonably anticipated.

With regard to the opium trade in Tientsin, the diminution of the imports of Indian opium at that port is ascribed to the heavy inland tax upon the article, as well as to the competition of the native drug. The opium is now carried from the ports on the Yangtzse through districts where the tax is lighter, while the increased popularity of the native opium is shown by the recent re-exportation of all the Persian opium which had been previously imported with the idea that a trade might be done. Such, however, was not the case. It appears that in price the Persian drug competes with the native article much more successfully than Indian opium can do, but it is driven out of the market by the preference of consumers for the article of native production. We also learn from Foo-chow that the native product is increasing in popularity, while the demand for Persian opium decreases, and there is no business for what is imported. Some time since a stringent edict was issued at Pekin, prohibiting the cultivation of opium in all provinces, as being a contravention of the law; but, as we before remarked, while the wealth derived from its cultivation continues to be so much greater than can be derived from any other species of industry, there is little likelihood of the prohibition being carried into general effect. According to the statement of an opium cultivator, a mow of land planted with poppies yields five ounces of silver a-year, while ordinary crops of wheat would barely yield one ounce. There is little doubt that such a large source of profit must rather tend to increase than to decrease cultivation, especially if high prices be maintained. It is further important to note the statement that the native opium does not improve in quality, which would make it a still more formidable competitor of the foreign drug, but it appears that the Chinese product has this advantage—the habit of smoking it can be thrown off with comparative ease if the smoker desire it. Indeed, the Chinese consider that their own opium is less deleterious in its results than the foreign, hence we may see one cause of the increasing popularity of the former.

From reports from Neuchang, we learn that the authorities in the Province of Shinking have endeavoured to the best of their ability to carry out the edict for the suppression of the cultivation of the poppy, and have so far succeeded that the price of the native has risen to that of the foreign drug. No similar proceedings, however, are reported from any other districts. From most, in fact, an increase in the cultivation is reported. Thus Hankow feeds the large and fertile province of Szechuan, and when Baron Richtofen reported upon this province in 1872 he considered that the cultivation of the poppy there had reached its maximum, adding that, if the price of the article at Hankow were to increase, the cultivation of it would also progress. According to later authorities, this prediction as to increase in the cultivation has been realized, inasmuch as we learn from that district that opium is there produced to a very considerable extent, and that it is exceedingly improbable that its progress will be stayed by any efforts on the part of the officials.

ADDITIONAL NOTES ON PANCREATIN.*

BY RICHARD V. MATTISON.

Numerous inquiries regarding saccharated pancreatin, its doses, uses, etc., having been instituted since the publication of my last paper upon the subject, induces me to present a few further remarks upon this valuable and highly interesting substance. It is a fine white powder, almost tasteless, or with the slightly sweet taste of lactin. When mixed with water it is perfectly soluble, dissolving in between five and six parts of that liquid, and forming a perfect emulsion when mixed with liquid fats and a small quantity of water.

I would respectfully suggest the following formula for the proper exhibition of cod-liver oil in combination with pancreatin:—

℞.	Pancreatini Sacchar.	℥j.
	Aquæ	fℨiv.
	Sacchari Albi	℥vij.
	Olei Morrhuæ	Oiss.
	,, Gaultheriæ	gtt. xx.
	,, Amygd. Amar.	gtt. v.

M.

Rub the saccharated pancreatin with the sugar and water, in a mortar, until a thick syrup is formed; to this add the cod-liver oil, in which the essential oils have been dissolved. This forms a perfect emulsion, without difficulty. It separates, of course, upon standing, but can easily be shaken together again, forming an emulsion with slight agitation. This is certainly to be preferred to the thick mucilaginous emulsions made with gum arabic or tragacanth, which are usually so distasteful to patients, because of their being so thick.

By the above formula, a preparation can be furnished containing 75 per cent. of oil, in the condition in which the oil, as usually prescribed, enters the duodenum, thus rendering its absorption and assimilation by the lacteals comparatively easy, the molecular formation of the oil being completely broken up. To make the emulsion whiter a little lime water may be substituted, omitting an equivalent quantity of water, a partial saponification rendering the emulsion more permanent and more elegant in appearance.

The easy assimilation of this preparation having been

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* Paper in continuation of former paper by the author (see the present volume of PHARMACEUTICAL JOURNAL, p. 592), read before the Philadelphia College of Pharmacy (*Amer. Journ. Pharm.* [4] iv., 53).

experimentally demonstrated by several of our eminent medical practitioners, it stands unrivalled in a therapeutical point of view as a standard pharmaceutical preparation of cod-liver oil.

The action of pancreatin upon albumen having frequently been stated, experiments were instituted in order to more closely examine this action. Accordingly, ten grains saccharated pancreatin were dissolved in one fluid ounce of water, with the addition of six drops of hydrochloric acid. To this thirty grains of coagulated albumen were added, and the whole kept at a temperature of 100° F., being occasionally agitated. At the end of six hours about twenty-five grains were dissolved, thus showing the correctness of the usually received statement, and at the same time showing its great inferiority to saccharated pepsin, which under similar circumstances would have dissolved from 120 to 180 grains.

The action of pancreatin upon starch was next observed, and a drachm of Bermuda arrowroot was mixed with a solution of ten grains of saccharated pancreatin in one fluid ounce of water, and kept at the temperature of 100° F. for several hours. At the expiration of this time the mixture was filtered, and the filtrate tested for glucose, abundant evidence of the presence of this substance being afforded by Trommer's and Fehling's tests. That this glucose was the product of the action of pancreatin upon starch was demonstrated by testing the arrowroot, which gave a negative result, and by a comparative test with the solution of glucose obtained by the above action of the pancreatin upon the arrowroot. Fifty minims of this solution, containing less than one grain of lactin, reduced the cupric solution much more readily than a similar solution containing ten grains of lactin, the purity of both specimens of milk sugar having been ascertained before using.

Although the strength of saccharated pancreatin is given as "ten grains emulsify two fluid drachms of cod-liver oil," yet when ten grains were dissolved in one fluid drachm of water, and one fluid ounce of oil added, perfect emulsification was effected in a very few minutes.

The experiment of digesting the pancreas in cod-liver oil was tried.

In a bottle labelled No. 1 a pancreas was digested in cod-liver oil, with frequent agitation. The oil was much changed, acquiring the appearance and smell of a badly oxidized oil. This change was very rapid from the moment of the introduction of the pancreas.

In a bottle labelled No. 2, a pancreas was digested in the cod-liver oil, under precisely similar circumstances, with the exception of the addition of half a fluid ounce of hydrochloric acid to the mixture. This sample presented the appearance of a fine oil, free from any indication of rancidity. When to this pancreatized oil a portion of water was added, a perfect emulsion was formed, to which more oil could be readily added without disturbing the emulsion. It was, however, deemed inferior to the emulsion of oil prepared according to the directions given, in which such good evidence is afforded of the superiority of saccharated pancreatin.

Philadelphia, January, 1874.

GINGER.*

Zingiber Officinale.

Ginger, as is known, is the dried rhizome or underground stem of a plant which is cultivated for that purpose in the tropical regions of both hemispheres. Its quality and commercial value differs considerably in different localities, and is influenced very much by the method of collection and preparation.

The following account of the cultivation of ginger has been received from the Hill States adjoining the Ambàlah district. Ginger is principally produced in Mahúr Mássá, Patrá, Dárrá, Kothi, Kotahi, Bágal, and Jayál. The best pieces of the last year's harvest are selected and placed in the corner of a house in the month Phágan ; the heap is then smeared over and covered with cowdung to keep the roots from drying up in Hár month, when the first rain falls. The land is ploughed up two or three times, and then divided off into beds, with a little raised edge round each bed, care being taken to make openings to let superfluous water run off, for if water stands on the crop, the roots will rot. Little pieces of the roots are then buried three inches deep in the soil at intervals of nine inches, and the field is next covered over with the leaves of trees, which keeps the soil moist, and over the leaves manure is spread to a depth of half an inch ; when it rains, the water, impregnated with manure, filters readily through the leaves to the roots. Artificial irrigation is not employed while the rain lasts, but from Assúh to Poh it is necessary. In the month Poh the plants are about two feet high ; for every one shoot there are eight tubers or parts of the root ; these are dug out and buried in another place for a month ; then they are taken out, exposed to the sun for a day, and are then fit for use.

In the months of Sawán, Bhadon, and Assúh, three times the field is weeded. A begah of land requires eight maunds of ginger to plant it, and yields 32 maunds for a first-rate crop.

Ginger fit for planting again, sells at eight to ten seers per rupee ; that for use only, at 24 to 32 seers per rupee.

In order to dry ginger into "sonth," the fresh roots are put into a basket, which is suspended by a rope, and then two men, one on each side, pull it to and fro between them by a bit of rope attached, and thus shake the roots in the basket ; this process is carried on for two hours every day for three days. After this, the roots are dried in the sun for eight days, and again shaken in the basket. The object of the shaking together is to take off the outer scales and skin of the roots. A two days' further drying completes the process, and "sonth" sells at three to four seers per rupee.

Turmeric is cultivated in the same manner ; when ready it is dug up, steeped in hot water a day and a night, and then dried.

* From the Official Catalogue of the Indian Department at the Vienna Universal Exhibition.

CASTOR-OIL SEED.*

Ricinus Communis.

The castor-oil plant is extensively cultivated all over India. It is sown in June by almost all the villages ; not extensively, but principally for their own use. Its cultivation can be extended all over Oude. The oil is extracted by bruising the seed and then boiling it in water ; the oil is afterwards skimmed off. This is the only seed out of which the oil is extracted by boiling, as in this case it is found cheaper than the method used for other seeds, which is by pressure.

The cost of the seed is one rupee per maund, and the price of the oil is from two to five seers per rupee, according to the abundance of the crop in the season. The proportion of the oil yielded is about half the weight of the seeds boiled ; it is only used for burning.

In Cuttack, the plant is grown all over the province, a good deal in patches of newly cleared land in the jungles of the Tributary States and Sumbulpore. The oil is extracted in two ways. It is used for burning and culinary purposes, and medicinally also. The local market is now 11½ peculs of the seeds per rupee. Both the native methods of extracting oil are wasteful and tedious, and therefore expensive. European oil-presses, and a knowledge of some methods of clarifying the expressed oil, seem only to be required to render the oil-seed crops of this extensive division of great value.

The large seeds, *Ricinus communis major*, are employed for lamp oil, and the small seeds of the variety *Ricinus communis minor* yield the medicinal castor oil.

* From the Official Catalogue of the Indian Department at the Vienna Universal Exhibition.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 21, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ADULTERATION OF BEER AND SPIRITS.

ACCORDING to promise, we intend in this article to consider some of the extraordinary statements which have been recently made respecting the adulteration of beer and spirits, and what grounds there are for supposing that such adulteration is general.

At the outset it is necessary to define the term "adulteration" as applied to the sophistication of beer and spirits, and when this is understood there will be little difficulty in proving from facts which are beyond dispute that adulteration is not general, as alleged by those who make capital out of frightening the public, who try to make people believe that their ordinary food and drink are little better than poison. The General Licensing Act defines adulteration to consist of mixing with intoxicating liquor any ingredient deleterious to health, or any of the ingredients specified in the schedule of the Act. Now, it will be easily seen that beer when brewed in part or wholly from sugar, is not adulterated, and that a spirit vendor who mixes water with his spirits does not offend against the letter or spirit of the Act. We are aware that most people think beer is brewed wholly from malt and hops, and doubtless such persons will be horrified to know that in one year not less than twenty-one thousand tons of sugar are used by brewers in the United Kingdom. Yet this is the fact, and we are bold to say that the best judge cannot, from the taste alone, distinguish between a beer made from malt and one brewed from a mixture of malt and sugar. This is not surprising, when it is born in mind that brewing from malt consists in subjecting the malt to those conditions which are most favourable to the conversion of the maximum quantity of the starch it contains into grape sugar, by the action of the diastase which has been produced in the grain by the process of malting. When sugar is used it is generally cane sugar, but this is also converted into grape sugar in the mash-tun by the diastase in the malt. Whether grape sugar, therefore, is obtained from malt or from cane sugar is of little moment; and the brewer of the present day, who has to compete with his neighbours, finds that what he has to study is the cost of the grape sugar he requires, and consequently he increases or decreases the relative quantities of malt and sugar according to the fluctuation of prices in the market. A calculation has been made that in the United Kingdom nine hundred million gallons of beer are brewed annually; and yet we are told by the Commissioners of Inland Revenue, who take good care to protect Government interests, that their officials, who have to visit frequently all the breweries in the United Kingdom, only detected in the year 1872 six samples of beer, or of materials used in brewing beer, which were adulterated. Considering the enormous extent of our brewing industry, such a testimony as to the purity of the beer brewed is highly creditable to those engaged in the trade; and in the face of such facts we may rest contented, when taking our glass of Burton or of stout, that neither contains deleterious ingredients.

The first report of the Commissioners of Inland Revenue on the samples of spirits examined under the Intoxicating Liquors Act states "that none of the "samples sent up for analysis by the police or officers "of excise have been found to contain any of the "ingredients prohibited by the Act. Some of the "samples of whisky have been of a very inferior "quality. . . . It is probable that much of the "bad effect produced by drinking whisky, and which "is ascribed to adulteration, is due to the very dele-"terious fusel oil which is present in new whisky." A report like this is certainly not alarming, and especially when it is remembered that the 85 samples examined were obtained from Ireland and other places where complaints had been made of the bad quality of the spirits supplied, either in certain localities or by individuals. We may fairly assume therefore, that the whisky and other spirits examined were the worst of their kind, and if adulteration had been practised it would have been discovered. But the only deleterious ingredient detected was fusel oil, which is perhaps better known in the trade as "feints," or by chemists as amylic alcohol. This alcohol gives the character to Irish whisky, which has now become so popular. Its popularity has caused the whisky to increase in price on account of the increased demand, and this fact has induced many, who either cannot afford or are not inclined to keep their whisky two or three years to mature, to deceive the public by mixing new whisky with prune, muscatel, or low sherry wines, to impart to it a flavour and character which, without the aid of these artificial flavouring matters, can only be obtained by age. As the presence of these wines in Irish whisky is not deleterious to health, their addition is not prohibited by the Intoxicating Liquors Act. Scotch whisky, being made principally from malt, ripens much more rapidly than Irish, which is distilled chiefly from grain, and there is not that inducement in the former case to add flavouring materials as in the latter; much of the Scotch whisky of low quality, however, contains Hamburgh sherry in considerable quantity. This artificial mode of giving age to whisky will eventually be the means of decreasing the consumption; for the public, as a rule, cannot be deceived for any length of time by such devices.

The Report from which we have quoted contrasts very favourably with another to which we will briefly refer. It was printed in a Glasgow paper in 1872, giving the results of thirty so-called analyses of samples of whisky purchased from different tradesmen in Glasgow. Amongst the adulterants said to have been detected were wood-naphtha, shellac, turpentine, sulphate of copper, and sulphuric and hydrochloric acids. If thirty samples purchased promiscuously could produce such a fruitful crop of adulterants, we may fancy what dreadful stuff was sold as whisky in Glasgow, and we are almost surprised that many people who drank it were not poisoned. Luckily for the public, the results given were immediately questioned by several chemists of repute, and from the discussion that ensued in consequence sufficient evidence was given to throw an air of doubt on the accuracy of the analyses. Unfortunately it was not practicable to have the samples re-examined; if they had been, we feel sure very different results would have been obtained. The discussion had the immediate effect of allaying the excitement which had been caused by such startling reports; and since that time the subject of the adulteration of spirits has been carefully investigated by many chemists. We are glad to say we have since had no such results reported, and we may fairly conclude from our own experience, and that of our scientific friends, that the first Report of the Inland Revenue Commissioners gives a correct view of the condition of the spirit trade of the United Kingdom.

AMERICAN ELIXIRS.

The numerous formulæ for the class of preparations known as "elixirs" which have found their way to this country from the United States, have been highly suggestive of pharmaceutical bewilderment. The evil arising from their multiplication has for some time been the subject of complaint by our American brethren, who are sometimes not only compelled to keep for dispensing purposes elixirs bearing various names, but also a variety of preparations bearing the same name but concocted by different makers. A committee was appointed by the American Pharmaceutical Association to take into consideration the subject of elixirs and similar unofficinal preparations in all its bearings upon pharmacy, and if deemed proper, to report suitable formulæ for the guidance of the members. A report was consequently presented to the Association at its meeting last September at Richmond, Virginia, which was adopted, and ordered to be printed and circulated amongst the medical profession, with the suggestion that physicians, if prescribing elixirs at all, should prescribe only such formulæ as had been adopted by the Association. These formulæ were brought before the last meeting of the Philadelphia College of Pharmacy, a report of which will be found on p. 682.

Since, however, the abstract above referred to was prepared for publication, we have received (through the kindness of Professor Bedford, of New York, whom we take this opportunity of thanking), a copy of the entire report, as issued by Professor Maisch, the Permanent Secretary of the Association. In this the formulæ are accompanied by some prefatory remarks. The Committee state that the greatest commendation that can be bestowed on elixirs, as a class, is that they are too feeble to do much harm, even when containing strychnia. The Committee, however, have not been able to overtake some of the elixir manufacturers in the art of administering quinia, strychnia, and other bitter remedies in clear solution, without being accompanied by their characteristic bitter taste. This they confess might be due to a "want of a more profound understanding of the pharmaceutic art, in the domain of elegant pharmacy;" but they state that they have endeavoured to place the ingredients indicated by the formulæ in the vials, whilst those who have excelled them in the art of completely masking bitterness, may possibly have the active principles represented only by the labels.

We thoroughly sympathize with American pharmacists in their effort to make some head against this "pharmaceutical folly;" also we would heartily endorse the following *dictum* in this report, and commend it to the consideration of all prescribers and compounders of "philippic" preparations. "The "manufacture of preparations for, and the compound- "ing of, physicians' prescriptions should be an open "competition, entrusted only to thoroughly qualified "pharmacists. If this be granted, it is then unfair "for the physician to command the pharmacist of "one city to employ a pharmacist in a distant city "to prepare the remedies for his prescription, except "in remarkable cases."

The Council of the Society of Arts have arranged for an entirely new series of meetings for the discussion of the more recent applications of chemistry to Arts and Manufactures. They will be held on alternate Friday evenings, commencing on March 6th. The following are the subjects at present announced:—

March 6.—"On the Paraffin Industry." By Frederick Field, Esq., F.R.S.

March 20.—"On Anthracene and Alizarine." By Dr. Versmann.

April 10.—"On some Recent Processes for the Manufacture of Soda." By C. W. Vincent, Esq., F.C.S.

April 24.—"On Pyrites, as a source of Sulphur, Copper, and Iron." By Dr. C. R. A. Wright, F.C.S.

May 8.—"On Sugar Refining, with special reference to Finzel's Sugar Crystals." By Dr. Griffin.

May 22.—"On the Manufacture of Chlorine." By W. Weldon, Esq., F.C.S.

The second course of Cantor Lectures is now being delivered by Dr. Charles Graham, on the "Chemistry of Brewing," and this course will be followed by one on "Carbon and Certain Compounds of Carbon, treated in reference to Heating and Illuminating Purposes," by Professor Barff, M.A.

We learn from the *Brighton Herald* that the vacancy in the staff of Guy's Hospital caused by the sudden death of Dr. Dickson, the late Lecturer on Mental Diseases, has been filled up by the appointment of Dr. C. H. Savage, Junior Physician to Bethlehem Hospital. Dr. Savage is the youngest son of Mr. W. D. Savage, Pharmaceutical Chemist of Brighton, who has for many years been a member of the Council of the Pharmaceutical Society.

Transactions of the Pharmaceutical Society.

BENEVOLENT FUND.

Subscriptions Received During January, 1874.

London.

	£	s.	d.
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Bourdas, Isaiah, 7, Pont Street, S.W.	1	1	0
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Alnwick, Newbigin, Jas. L.	0	10	6
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Barking, Fitt and Son	0	10	6
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Queenstown, Rossiter, John, Haulbowline Hospital	1	1	0
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Shefford (Beds.), Baigent, W. H.	0	10	6
South Petherton, Wellington, F. G. N.	0	5	0
Stockport, Shaw, A. H., 13, Lower Hillgate	1	1	0
Stoke-on-Trent, Wilson, Clement F., 22, Liverpool Road	0	5	0
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Tunstall, Keightley, Joseph, High Street	0	10	6
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Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The fourth monthly meeting of this association was held in the library of the Philosophical Hall, on January 20, 1874, when a paper was read by Mr. E. Brown on "Water." Mr. Brown not intending to restrict himself to a purely scientific or pharmaceutical view of his subject, invitations were given to others than those connected with the Association; but, owing to the political excitement induced by the general elections taking place, the attendance was small. Subjoined is a brief review of Mr. Brown's paper :--

Those substances that are our constant servants, on which we most depend, and that respond the most readily to the varied demands of an ever advancing state of civilization, are naturally those that most claim our studious notice, and that will best repay investigation. Of such bodies 'water' takes a prominent place, as it contributes to the health, progress, and comfort of men of all ranks, occupations, and circumstances. Pure water is nearly colourless and inodorous, possesses great solvent power, and enters largely into chemical combinations. About 100 years since, the compound nature of water, and the proportion of the gases composing it, were determined. Those gases, oxygen and hydrogen, possess apart properties the opposite, as regards fire, to what they do in combination; the one being very ready to flame, and the other the most active promoter of combustion. One pint of water yields on decomposition about 4½ hhds. of gas, *i.e.*, 1238 pints of hydrogen and 619 pints of oxygen, so that the sudden severance, or combination, of these gases would induce violent concussions or explosions; water thus supplying materials in nature for the most formidable disruptions. Water may be regarded as the oxide of the metal, hydrogen, the lightest of all bodies bearing a metallic title. Water forms hydrates, or combinations of undecomposed solidified water, with the oxides of certain metallic bases, and it takes the solid form also in crystallization with many salts. Its elements in like proportions, as in water, constitute the greater part of glucose, cellulose, and some other substances, containing only the components of water with carbon. The most observable property of water is its very general solvent power, indeed, no other substance equals it in this respect; here it takes the opposite course to what it does in hydration and crystallization, not adapting itself to the condition of other bodies, but reducing other substances to its fluid state; and on this property of water depends all the great variety of kinds of water that we meet with, the hard and soft, the crystal spring, and the many kinds of mineral waters; by this property is caused the saltness of the sea, a condition of much value, preserving as it does the purity of the ocean's waters, rendering the sea more buoyant, less easily frozen, making it a more suitable abode for fish, supplying submarine vegetations with materials for their growth, and submarine creatures with materials for their structures, while it carries salt to every coast, where otherwise salt would not readily be obtained. The sea water permits light to penetrate its depth to nearly 1000 feet, while at less than half that distance from the surface there is but twilight.

The true colour of the sea is ultramarine; this however is modified by the state of the atmosphere, by depth, sun-

shine, clouds, wind, and other influences. The sea varies, too, in different regions, and sometimes the lines of change of colour are very marked. The phosphorescence of the sea is a grand spectacle, and is usually accompanied by a disturbed electrical state of the atmosphere. The presence of water in the air, deepens the blue of the sky, renders the atmosphere a better conductor of sound, regulates the character of our sunrise and sunset; it forms the cloud and paints the rainbow; it promotes the mirage of the desert, the ignis fatuus on the marsh, the remarkable refractions and reflections of the polar regions, the aurora-borealis in the sky, and is to all plants and animals an essential to their development, and a condition of their existence.

Mr. Brown explained the formation and suspension of clouds, the causes of rain, the precipitation of hail, the forms of snow-crystals, etc.; and he made some remarks on the distribution of water over the land, and its services to commerce and in civilization,—also on its mechanical agency—by its free mobility, comparative density, and the operations it thus conducts; the formation of deltas, the causes and services of the wandering of rivers, the elevations and extent of certain lakes; its sanatory uses, its socializing influence in gathering cities, etc.; and concluded by some comments on its various appearance, its historic associations, and the moral suggestions—such as the power of unity, the susceptibility of influence, and the recompense to activity and generosity that water may prompt.

The lecture was illustrated by drawings and diagrams.

A vote of thanks was given to Mr. E. Brown, on the motion of Mr. Yewdall, seconded by Mr. J. Abbott.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The annual general meeting of the above Society, for the election of officers, etc., was held in the rooms of the Society, at the Music Hall, Sheffield, on Thursday evening, January 29th. There was a moderate attendance.

The Council, in presenting their annual report, congratulated the members on the condition of the Association, several meetings having been held during the past year of a highly successful character, and though financially it had still to report a deficiency, yet this was not so great as might have been expected, and it was hoped that with careful management this might eventually be overcome. The Society having had several new members and associates added to it, derived therefrom renewed life. It was also gratefully noticed that a grant of chemical apparatus and books had been received from the Pharmaceutical Society for the use of the students, etc.

The report closed by an appeal to the members for their continued support and encouragement.

Upon the motion of Mr. W. Ward, F.C.S., the retiring President, Mr. G. A. Cubley was unanimously voted to the presidential chair for the coming year.

On taking possession of the chair, Mr. Cubley briefly addressed the meeting. In the course of his remarks he said that he hoped he might be enabled to follow in the footsteps of his predecessors, Messrs. Radley and Ward, and that if he could only maintain the status of the Society as they had done he should be amply satisfied. He referred to the necessity of continued united action on the part of all the members of the trade, and the importance of facilities being offered to the students while undergoing their professional education; and looked forward with hope to the time when they would have such an educational institute as should prevent any necessity for their youths having to visit London to receive a final polishing touch ere they went in for their examination. As the Pharmaceutical Society of Great Britain were now aiding them with grants, their own resources would be left more open to meet their annual claims. He further alluded to local trade matters, and concluded by proposing that the best thanks of the meeting be accorded to Mr. W. Ward, F.C.S., for the efficient manner in which he had occupied the position of President of the Association during the past year.

This being unanimously assented to, and Mr. Ward having duly replied, thanks were further tendered to the late Vice-Presidents, Council, Treasurer, Secretary, etc., severally, and having been acknowledged, the election of officers for the ensuing year was proceeded with, when the following gentlemen were found to have been appointed, viz.:—Vice-Presidents, Messrs. F. Hudson and W. H. Maleham; Council, Messrs. W. Ward, F.C.S., J. T. Dobb, Jervis, E. Wilson, Ellinor, J. H. D. Jenkinson, and R. T. Watson; Hon. Treasurer, Mr. W. V. Radley (re-elected); Hon. Secretary, Mr. E. R. Learoyd (re-elected).

The books and chemical apparatus presented to the Association by the Pharmaceutical Society were placed on the tables for the inspection of the meeting, and were much admired.

The following were unanimously elected:—As Members, Messrs. R. Thickett and Scott; as Associates, Messrs. Holmes, Atkinson, Reckless, and A. Hardwick.

This brought the meeting to a close.

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

The regular monthly meeting of the above College was held on Tuesday, January 20, 1874, under the presidency of Mr. Peter Williamson.

Mr. Richard Mattison read a paper on Saccharated Pancreatin and the Emulsion produced by the use of it and Cod Liver Oil, in continuation of his former note on the same subject (see before, p. 592). The paper is printed at p. 675 of the present number.

Mr. A. P. Brown, of Camden, stated that he had used saccharated pancreatin, and that physicians whom he had supplied with it had used it successfully. At the suggestion of one of his medical friends, he had treated the parotid gland by a process similar to that used for extracting pancreatin, and obtained a product which possessed in a degree the properties of pancreatin.

Pharmacognostical and Chemical Notes.

BY PROFESSOR MAISCH.

Professor Maisch presented specimens and read the following pharmacognostical notes on *Cortex Granati*, *Chiretta*, *Trompatilla* (a new remedy from Mexico, said to be successfully used in the treatment of hydrophobia), a new false Angustura, *Bouvardia triphylla*, and a report of an examination of a substance presented to him, which proved to be carbazotic acid.

It is desirable occasionally to call attention to drugs of handsome appearance and excellent qualities, if it be for no other purpose than to let the profession know how perfect by a drug may be preserved, even in commerce, so as to represent all its characteristics and show any admixture if such should be present. These considerations induce me to notice two drugs, Pomegranate Bark and Chiretta, which I recently obtained from Messrs. Cramer and Small, of this city.

Pomegranate Bark usually occurs in American commerce in small fragments of quills, which rarely attain the diameter of a finger. The bark in question is in single and double quills, varying in length from two and a half to seven inches, and from one-half to one inch in diameter. It has apparently been collected from the lower part of the trunk and the thicker roots, and agrees in all respects with the bark as usually seen in commerce, and which is evidently collected from the smaller branches of the tree and root. Those quills which are covered with a rather thick pale brownish-grey cork, more or less covered with irregular longitudinally cleft ridges, appear to me to belong to the root, while the trunk bark appears to have a thinner cork, with the fissured ridges in more regular longitudinal direction, and a colour more decidedly

grey, varied by patches of blackish brown. It will be remembered that Dr. C. Harz stated a few years ago that the commercial pomegranate bark is always the bark of the overground axis, but is sometimes mixed with the root bark in variable proportions. Both barks are said to be alike active as anthelmintics, but the medicinal reputation appears to be based mainly upon the effects of the bark of the trunk and branches.

Chiretta is, according to the U.S. pharmacopœia, the entire plant of *Agathotes Chirayta*, Don. As seen in commerce, it consists mainly of the roots and bare stems, with a few fragments of the leaves and flowers or capsules still attached, while the far greater portion of these organs have been broken off. The specimen shown, an original bundle, is 32 inches in length, five inches in width, and varying from one-half to one inch in thickness, thus presenting the form of an elongated parallelopiped in appearance ; its weight is about one pound. The stems fold back on themselves, so as to show principally the paniculate inflorescence, composed of numerous umbel-like cymes situated along the branches. The bundle is tied at both extremities and in the centre with a split cane, and the plant has the peculiar bitter taste to an intense degree.

A False Angustura Bark, which has been sold to a small extent in this city, was shown to me a short time ago. The small piece which I first saw was quite thin, covered with a greyish cork, exhibiting patches of an orange shade, while the inner surface was of a dark brown, so as to present at first sight an appearance reminding of the bark of *Strychnos Nux vomica*, which is usually designated as false angustura bark. The bark in question, however, is of such a fibrous texture that the idea of its probable identity with the strychnos bark is at once dispelled. The specimen shown is in slightly curved pieces, seven inches and less in length, and one-eighth of an inch and less in thickness ; intermixed with some half quills and a few quills. It consists altogether of the inner bark or bast layer, the outer bark having been thrown off by the cork. The suberous layer shows numerous small warts more or less confluent laterally, so as to form elevated patches, but mainly uniting in the direction of the axis to short, very irregular, longitudinal ridges. The cork is very soft, almost mealy, of a light brownish-grey colour externally, and of a decided pale orange-rust brown within. The surface layer being easily rubbed off, the orange-tinted patches are easily explained ; their colour, however, is never of the bright orange-red of the patches upon the strychnos bark. The inner bark consists of a dark brown parenchyma, in which coarse, light coloured bast fibres are imbedded in interrupted tangential rows. The inner surface of the bark is of a blackish-brown colour, very coarsely striated from the rather distant bast fibres, and often with patches of a soft wood closely adhering, which in some specimens has an almost copper-green tint. The bark breaks readily with a short but very distinct fibrous fracture, while the corky layer breaks much smoother, the bast fibres enclosed by it not protruding from the fracture to the same extent as those of the inner bark. The taste is purely bitter, and devoid of aromatic properties.

It will be observed that this false angustura bark differs very materially from both the true angustura and the strychnos bark. The former one of these two barks occurs in curved pieces, with a pale, almost ochre-coloured, cork, which is very friable and marked with suberous warts or by mainly longitudinal furrows. The inner surface is of a light brown-yellow, rather granular, not striate. The bark is very fragile and shows a smooth fracture, in which are numerous white shining striæ of crystals.

The latter (strychnos bark) is covered with a warty light greyish or yellowish friable cork, with frequently very large orange-red patches ; fracture nearly smooth, dark brown, divided by a lighter coloured line into two layers ; crystalline striæ absent ; inner surface even, grey-brown to blackish-brown, finely striate.

I have no means of ascertaining the origin of the false angustura bark, described above ; it most likely reached Philadelphia from New York.

Trompatilla, a Remedy for Hydrophobia.—Under this name was handed to me, by a friend, a sample of a drug which had been received by him from a friend residing in Mexico, where the article is said to be successfully used for the prevention and treatment of hydrophobia, for which complaint it is freely given in the form of decoction. It is stated to be obtained from *Bouvardia triphylla*, and consists of short segments of the stem and branches, varying from one-fourth to three-fourths of an inch in diameter, terete and slightly bent. The bark is thin, fragile, brown, and separates in a few pieces very readily from the wood, but adheres firmly to it in the largest number. The bark is covered with a comparatively thick layer of soft friable cork, which is rust-brown within, externally grey to blackish-brown, and marked with numerous shallow longitudinal fissures. The wood is rather hard, but splits easily and straight in the direction of the axis ; it shows concentric, somewhat irregular, zones, resembling annual rings, and is radially very finely striate from the numerous very fine medullary rays. The duramen has a purplish-gray tint, the alburnum is yellowish-white. There is no perceptible odour to either wood or bark ; the former is tasteless, the latter has a slight bitterish taste. The central pith is scarcely a line in diameter, and of a brownish to purplish-brown colour.

The genus *Bouvardia* belongs to the natural order of Rubiaceæ, tribe *Cinchonaceæ*, subtribe *Cinchoneæ*. De Candolle enumerates eleven species, all shrubby plants and natives of Mexico, having the leaves either verticillate or opposite. The scars on the specimens in question are three or four in a whorl, indicating that the plant belongs to the former section, and is most likely *B. triphylla*, Salisbury. The following description is translated from De Candolle (Prod. iv. 365.)

Bouvardia Jacquini, H. B. K., small branches triangular ; leaves somewhat rough, hairy beneath, smooth above, ternate, oblong ; corymbs subtrichotomous ; calyx lobes one-fifth the length of the roughish corolla tube ; corolla red, the tube $\frac{3}{4}$ inch long, varies with the leaves ; pubescent and glabrous.

The following synonyms are mentioned in the same place : *Ixora Americana*, Jacquin ; *Ixora ternifolia*, Car. ; *Houstonia coccinea*, Andrews ; *Bouvardia triphylla*, var. *a.*, Salisbury, and *Tlacoxochitl jasminiflora*, Hernandez.

Picric Acid Mistaken for Santonin. A vial found in a closet in a drug store, was labelled santonin ; the contents were crystalline, of a yellow colour, and of an intensely bitter taste, which prevented it from being used as santonin ; for the variety coloured yellow by light it might have been taken on superficial examination. It was handed to me for identification, and the investigation was performed at the College laboratory by Mr. W. L. Harrison of Petersburg, Va. The absence of santonin and of an alkaloid, especially berberina, was proved by appropriate tests, and the freedom from inorganic matter was established by incineration. The following summary gives an account of Mr. Harrison's examination.

The substance was in light yellow shining laminæ, taste very bitter and somewhat sour ; it reddens litmus and melts, when slowly heated, into a brownish-yellow liquid, which immediately becomes crystalline on cooling. When slightly heated it volatilizes unchanged ; at a higher temperature it takes fire, burning with a yellow, very smoky flame, and evolving irritating and very bitter fumes. It is soluble in cold water, forming a solution of brighter colour than the crystals themselves ; much more soluble in hot water, from which it crystallizes in thin long needles on cooling ; soluble in oil of vitriol, particularly when heated, and precipitated from the solution in the original state upon addition of water. With aqueous solutions of the alkalies it gives bitter, deep red solutions. Its aqueous solution, treated with excess of ferrous sulphate, then with excess of caustic alkali, gives a filtrate

of a deep blood-red colour, darker than the preceding, with alkalies alone. When sulphuretted hydrogen is passed to saturation into a saturated alcoholic solution, previously neutralized by ammonia, the liquid assumes an intense blood-red colour. These reactions and characteristics all correspond with those for picric acid.

PHOSPHORETTED RESIN.

Dr. W. H. Pile stated that he had made some phosphoretted resin according to the formula published by A. W. Gerrard, in PHARMACEUTICAL JOURNAL, December 6th, 1873, and re-published in *American Journal of Pharmacy*, January, 1874. He confirmed the statements made by the author, recommended the preparation, and laid particular stress on the directions to conform to the temperatures given in the process.

Mr. Edwin McC. Boring presented samples of Castile soap, and said that he had successfully cut very hard soap by previously heating the bars in an ordinary oven to between 150 and 200° F., care being taken not to leave them in long enough to make them too soft.

REPORT ON ELIXIRS.

Professor Maisch called the attention of the meeting to the circular issued by the American Pharmaceutical Association, containing the report of the Committee on Elixirs, John F. Hancock, Chairman; and he urged the adoption of the formulæ in order to secure uniformity. An extract of the report, giving the formulæ, will be found below :—

Compound Powder of Cochineal.

Take of Cochineal in Powder . . 120 grains.
Alum, in Powder . . . 120 „
Carbonate of Potassium . 120 „
Bitartrate of Potassium . 240 „
Mix. Keep in well-stoppered vial.

Compound Tincture of Cochineal.

Take of Compound Powder of Cochineal 120 grains.
Diluted Alcohol . . . . . 2 fl. ounces.

Slightly warm the diluted alcohol and mix with the powder; macerate in a stoppered vial for twelve hours, and filter for use. This is permanent, and imparts a beautiful red colour to elixirs and solutions which have no acid properties.

Spirit of Orange.

Take of Oil of Sweet Orange . 1 fluid ounce.
Stronger Alcohol . . 16 fluid ounces.

Mix. This is made in proportions to conform with the spirits of the U. S. P., and is a pleasant and convenient form of orange flavour.

Simple Elixir.

Take of Spirit of Orange . . . ½ fluid ounce.
Stronger Alcohol . . 4 fluid ounces.
Cinnamon Water . . 6 „
Syrup . . . . . 6 „
Mix.

This is a turbid mixture. For many purposes it is not necessary to filter before using, but generally it should be clear, particularly when used for physician's prescriptions, and in making some elixirs. Filtering-paper pulp, made by beating scraps of chemically pure filtering paper in a mortar, in the proportion of sixty grains of paper to half fluid ounce of water, added to sixteen fluid ounces of the elixir, agitated briskly for a few moments, and filtered, renders the elixir perfectly limpid. The paper is free from the chemical objections urged against carbonate of magnesium, chalk, etc., which are frequently used as clarifying agents.

The very pleasant taste and odour of this elixir, its freedom from colour and chemical impurities, commends it for general use as a medicating vehicle.

Red Elixir.

Take of Comp. Tinct. of Cochineal . : ½ fluid ounce.
Simple Elixir . . . . . 16 fluid ounces.
Mix.

This is sometimes preferred as a simple elixir because of its beautiful colour.

Elixir of Calisaya Bark.

Take of Tinct. Cinchona, U.S.P., 1870 . 22 fluidrachms.
Simple Elixir, sufficient to make 16 fluid ounces.

Mix and filter. This contains the *virtues* of two grains of Calisaya bark in one fluidrachm.

Elixir of Calisaya Bark with Iron.

Take of Elixir of Calisaya Bark . . . 15 fluid ounces.
Warm Distilled Water . . . 1 fluid ounce.
Citrate of Iron, *soluble* . . . 128 grains.

Dissolve the iron in the warm water and add the elixir. Filter, if necessary. Each fluidrachm of the unfiltered elixir contains one grain of the iron salt, and the virtues of nearly two grains of Calisaya bark.

Compound Elixir of Cinchona.

Take of Comp. Tinct. Cinchona, U.S.P., 1870 . . . . . 22 fluidrachms.
Simple Elixir, sufficient to make 16 fluid ounces.

Mix and filter. If not required for immediate use, this and also the Calisaya elixir should stand for about twelve hours before filtering.

Compound Elixir of Cinchona with Iron.

Take of Compound Elixir of Cinchona . 15 fluid ounces.
Warm Distilled Water . . . 1 fluid ounce.
Citrate of Iron, *soluble* . . . 120 grains.
Mix. Proceed as for Elixir of Calisaya with Iron.

Elixir of Citrate of Iron.

Take of—
Citrate of Iron, *soluble* . . . 256 grains.
Warm Distilled Water . . . 1 fluid ounce.
Simple Elixir . . . . . 15 fluid ounces.

Dissolve the iron in the warm water and mix with the simple elixir. Filter.

Elixir of Pyrophosphate of Iron.

Take of—
Pyrophosphate of Iron . . . 256 grains.
Warm Distilled Water . . . 1 fluid ounce.
Simple Elixir . . . . . 15 fluid ounces.

Make according to directions for Elixir of Citrate of Iron.

This is the same medicinal strength as Professor Diehl's formula.

Elixir of Citrate of Bismuth.

Take of—
Citrate of Bismuth and Ammonium 256 grains.
Warm Distilled Water . . . . 4 fluid ounces.
Water of Ammonia (drop by drop) sufficient.
Simple Elixir, sufficient to make 16 fl. oz. of finished elixir.

This is the same bismuth strength as Professor Diehl's formula, viz., two grains of citrate of bismuth and ammonium in each fluidrachm.

Elixir of Pepsin.

Take of—
Saccharated Pepsin, Scheffer's formula 256 grains.
Sherry Wine . . . . . 14 fluid ounces.
Simple Syrup . . . . . 2 „
Fluid Extract of Ginger . . . . . 25 drops.

Dissolve the pepsin in the wine; mix the fluid extract of ginger with the syrup, and mix altogether. Filter if necessary. Contains two grains of pepsin to the fluidrachm.

Elixir of Valerianate of Ammonium.

Take of—
Valerianate of Ammonium in Crystals 256 grains.
Compound Tinct. of Cochineal . . . ½ fluid ounce.
Simple Elixir . . . . . 15½ fluid ounces.

Dissolve the valerianate of ammonium in two ounces of the simple elixir, and carefully add water of ammonia until the solution is exactly neutral to test-paper. Mix with the balance of simple elixir, and then add the compound tincture of cochineal.

This is the formula of Professor C. Lewis Diehl, with the exception of the simple elixir. Notwithstanding this preparation contains a larger quantity than usual of the valerianate of ammonium (two grains of the salt in each fluidrachm), yet its unpleasant taste and odour is effectually masked by the fragrance of the simple elixir.

Elixir of Valerianate of Ammonium with Quinia.

Take of—

Sulphate of Quinia	128 grains.
Elixir of Valerianate of Ammonium	16 fluid ounces.

Mix. Filter if necessary. Sulphate of quinia is soluble in elixir of valerianate of ammonium to twice the quantity here ordered.

Compound Elixir of Sumbul.

Take of—

Tincture of Sumbul (Brit. Ph. 1867)	4 fluid ounces.
Syrup	4 „
Compound Tincture of Cochineal	½ „
Elixir of Valerianate of Ammonium	8 „

Mix.

The elixir is slightly turbid, owing to the resin of the sumbul, which, if filtered out, must lessen its medicinal powers. This is given as a type of *extemporaneous elixirs*, which should not be filtered, but dispensed with the direction, "*Shake the vial before pouring out each dose.*"

Elixir Pyrophosphate of Iron, Quinia, and Strychnia.

(C. Lewis Diehl's Formula.)

He says: "This requires particular manipulation, which precludes the use of simple elixirs.

"The following formula, the result of concert experiments of my friend, Mr. E. Scheffer, and myself, has been used by me since autumn, 1869, and I can recommend it as uniformly successful, when the manipulations are carefully conducted:—

Take of—

Sulphate of Quinia	60 grains.
Strychnia	1 grain.
Citric Acid	5 grains.
Stronger Alcohol	3 fluid ounces.
Spirit of Orange	80 minims.
Syrup	6 fluid ounces.
Pyrophosphate of Iron	½ troy ounce.
Distilled Water	7 fluid ounces.
Water of Ammonia	suf. quantity.

"Triturate the sulphate of quinia, strychnia, and citric acid together, until minutely divided, then add the alcohol and spirit of orange. Warm the syrup slightly (to about 150° F.) and add to the turbid mixture, when, upon stirring, the mixture becomes clear. To this add the pyrophosphate of iron, previously dissolved in the distilled water, and finally, carefully add water of ammonia, drop by drop, until the elixir is perfectly neutral to test-paper; filter. The finished preparation has a greenish yellow colour, a pleasant flavour of orange, and is permanent."

Bitter Wine of Iron.

(James T. Shinn's Formula, slightly modified.)

We have had several years' experience with the following formula, and it has given entire satisfaction to prescriber, dispenser, and consumer.

Take of—

Sulphate of Cinchonia	45 grains.
Sulphate of Quinia	15 grains.
Citric Acid	60 grains.
Citrate of Iron, *soluble*	240 grains.
Concent. Tinct. Fresh Sweet Orange Peel	3 fluid ounces.
Distilled Water	3 fluid ounces.
Sherry Wine	8 fluid ounces.
Syrup	2 fluid ounces.

Dissolve the sulphates and citric acid in two ounces of the water, and the iron in the remaining ounce of water; mix the two solutions, and add the other ingredients, previously well mixed together.

The only change from the original formula is in the kind and quantity of the orange flavour, for which we claim an improvement. (See *Proceedings of American Pharmaceutical Association*, 1864, p. 234.)

Elixir of Gentian with Iron.

Take of—

Extract of Gentian	128 grains.
Citrate of Iron, *soluble*	128 grains.
Distilled Water	1 fluid ounce.
Simple Elixir	15 fluid ounces.

Dissolve the extract and iron in the water, *warmed*, and add the simple elixir; filter.

Elixir of Bromide of Potassium.

Take of—

Bromide of Potassium	640 grains.
Red Elixir	16 fluid ounces.

Mix.

This contains five grains of the salt in each fluidrachm, and is given as a type. The red elixir does not seem to answer for the elixir bromide of calcium; caramel is a more suitable colouring substance for the calcium elixir. We prefer the simple elixir in this case, and to use no colouring substance.

Syrup of Liquorice Root.

Take of—

Select Liquorice Root, in moderately coarse powder	4 troy ounces.
Diluted Alcohol	suf. quantity.
Sugar	12 troy ounces.

Moisten and pack in a conical percolator; macerate for twelve hours; percolate to exhaustion. Place the tincture over a water-bath until reduced to ten fluid ounces, filter, and then add the sugar; lastly, sufficient distilled water to make sixteen fluid ounces of finished syrup.

The syrup of liquorice root, when carefully prepared, is more effectual and more convenient for masking the bitterness of quinia than is the very popular "compound elixir of taraxacum," and being free from the stimulating influence of alcohol, which is present in the elixir, is well adapted for children. The proper proportions will be one grain of quinia (any salt of it) to the fluidrachm, and if those for whom quinia is ordered will take the precaution to chew a small quantity of liquorice root previous to taking the quinia mixed with the syrup of liquorice, in the proportions here recommended, scarcely any bitterness will be observed. As a matter of course, acids mixed with quinia and liquorice syrup will immediately develope the bitter taste.

It has of late become fashionable to use glycerin as an antiseptic and solvent in elixirs, as well as other compounds of pharmacy, but our aversion to the general use of glycerin for internal administration, for various reasons, has prevented its introduction in our formulas.

The results of our investigations of liquid pepsin preparations will not warrant the introduction of more than the one formula, which is really a wine of pepsin, and has been found useful in many cases.

Mr. A. P. Brown stated that he had made some of these elixirs, and found them to answer their intended purposes well; the simple and red elixirs can be used as vehicles, and may be diluted with water without becoming turbid.

SOCIÉTÉ DE THÉRAPEUTIQUE, PARIS.

At the sitting of the above Society on Wednesday, January 28, under the presidency of Dr. Moutard-Martin, M. Martineau described a particular case in which he had administered for the second time, after an interval of a year, a draught containing 50 centigrams of hydrochlorate of trimethylamine to a patient suffering from articular rheumatism. On the second occasion it had the same effect as on the first, namely the almost sudden disappearance of the pain and swelling.

Metachloral and Caustic Pencils of Chloral Hydrate.—M. Limousin exhibited some specimens of metachloral and also of pencils of hydrate of chloral. The metachloral had been obtained by treating 1 part of hydrate of chloral with 3 parts of concentrated sulphuric acid, and washings the insoluble product obtained as long as the washing gave an acid reaction. The metachloral was afterwards dried with chloride of calcium, and reduced to a fine powder. The caustic pencils were obtained by mixing the hydrate of chloral with a small quantity of gum, and then coating them with a slight layer of paraffin, in order to preserve them from the action of damp air.

Metachloral, or insoluble chloral, has the same formula as anhydrous chloral (C_2HCl_3O), of which it is an isomeric modification. It is less caustic than hydrate of chloral, and it has the great advantage over chloral of not attracting moisture, and consequently allowing the treatment to be confined to a limited surface.

M. Dujardin-Beaumetz said that he had employed metachloral and recognized in it considerable advantages; he preferred it to iodoform, and he had obtained with it equally satisfactory, if not superior, results. Moreover, metachloral did not present the inconvenience which resulted from the penetrating and insupportable odour of iodoform. M. Beaumetz added, that in any case where the action of the powdered metachloral was found to be too irritating, its energy might be mitigated by mixing with it a certain quantity of lycopodium or other inert powder. He added that he had used the pencils of hydrate of chloral with advantage for the superficial cauterization of certain ulcerations. He also introduced them into the natural cavities, or into the fistulous passages of white tumours, to obtain the diminution and sometimes the cessation of local pain.

M. Martineau said that he had obtained very good results by the employment of hydrate of chloral in solution (1 part to 25 of water) for the dressing of cancerous surfaces, by means of charpie impregnated with the solution. He had obtained thus a modification of the surface, disappearance of the fetid odour, and diminution of the pain.

M. Constantin Paul said that he had obtained similar results in analogous cases—cancer of the womb and rectum—with suppositories containing one to two grams of hydrate of chloral, The calming effect appeared to be more prompt and more constant than that obtained with injections of carbonic acid.

M. Labée recalled the fact that Dr. Richardson had published some interesting observations respecting the external application of chloral, and that M. Francesco Accetella had, in 1871, recommended the employment of a solution of hydrate of chloral in external applications.

M. Isambert said that he did not share the enthusiasm of his colleagues for the properties of chloral. He had found its employment attended by inconveniences, and he regretted that the unlimited publicity that had been given to that medicament had prompted every doctor and patient to experiment with it. He had seen chloral, taken internally, often provoke a violent irritation of the stomach, and he found his patients not able to support it when administered as an injection.

M. Constantin Paul was surprised at the results obtained by M. Isambert. At the Bicètre he had had occasion to treat a large number of lunatics, during their period of mania, with injections of high doses of chloral. By this means he had avoided having recourse to the strait-waistcoat, and never had noticed a trace of intolerance.

M. Limousin said he had often seen the crystals of hydrate of chloral administered in doses of two to three grams in flour wafers, without the patients suffering an inconvenience.

M. Moutard-Martin said he had frequently administered chloral in the form of an injection, which was always well supported by his patients. He declined to admit—at least in a general sense—the irritating action of this medicine; he had himself taken for several days as many as eight of M. Limousin's *dragées* of chloral hydrate (equal to two grams) without experiencing any irritation. It was only after a prolonged use that he had begun to experience intolerance, and a sensation of heat, which he had found the use of the syrup or solution to determine much more rapidly.

It was generally considered that M. Isambert had employed the chloral with patients presenting a particular idiosyncracy.

Obituary.

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

On the 24th January, 1874, Mr. William Munton Carr, Chemist and Druggist, of Eynsham, Oxon.

Notes and Queries.

[385.] DARK BROWN HAIR DYE.—*F. S. F.* sends the following recipe:—

℞

Argent. Nit.	℥iij. gr. xij.
Aquæ Destill.	℥viij.

Dissolve and add gradually Liq. Ammon. Fort. q.s. to precipitate the silver until re-dissolved.

Aquæ Lavand.	℥ss.

[386.] COCCULUS INDICUS is used very largely in all the breweries in England, to replace *Humulus Lupulus*, hence the intoxicating properties of pale ales.—E. SCHUMANN.

[*** We do not believe that the slightest grounds exist for the above statement; but if Mr. Schumann possesses any evidence of the general use of *Cocculus indicus* in the manner stated we shall be glad to receive it from him.—ED. PH. J.]

[387]. TINCTURE OF PHOSPHORUS.—Can any reader favour me with a formula for Warburton Thompson's Tincture of Phosphorus?—R. B. HARDING.

[*** The following formula given by Dr. Ashburton Thompson, in a paper "On the Use of Phosphorus in Neuralgia," published in the *Practitioner* last October, is probably what is sought by our correspondent:—

"Phosphorus	1 grain.
Absolute Alcohol	5 drachms.
Glycerine	1½ ounces.
Spirit of Wine	2 drachms.
Spirit of Peppermint	2 scruples.

"Let the phosphorus be dissolved in the alcohol with a little heat; at the same time warm the spirit and glycerine together. Mix the two solutions while hot, and add the spirit of peppermint on cooling. One drachm of this mixture contains one-twelfth of a grain of pure phosphorus. These ingredients form a mixture perfectly bright and clear, possessing almost no phosphoric odour or taste, and of a high degree of stability, even under exposure to light. The amount of spirit gives it a burning taste which may be sometimes objected to; but if the patient be warned of this, probably no further remark will be

made about it. So far from causing offensive eructations, it seems to have a tendency to arrest existing flatulency." —Ed. Ph. J.]

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[388]. CAMPHOR INHALATION.—"*Inquirer*" would be glad to receive information respecting an easy and simple method of administering camphor by inhalation.

[*** The following is the formula for "Vapor Camphoræ" given in the 'Pharmacopœia of the Hospital for Diseases of the Throat':—

"Take of Spirit of Camphor . .	3 fl. drachms.
Rectified Spirit . . .	½ fluid ounce.
Water	to 3 fluid ounces.
Mix.	

A teaspoonful in a pint of water at 150° F. for each inhalation. To be inhaled slowly."—Ed. Ph. J.]

ANALYSIS OF THE ASH OF BOA-TAM-PAIJANG.—The seeds which some few years since were introduced under this name from Cochin China as a remedy for diarrhœa and dysentery, and were described in an article in this Journal (2nd series, vol. iv. p. 110) by Mr. D. Hanbury, who referred them to *Scaphium scaphigerum*, have recently been the subject of an ultimate analysis by M. F. Wurtz. 100 grams dried in a stove lost 11·5 per cent. of moisture; they then contained 84·9 per cent. of volatile and organic substances and 3·6 per cent. of fixed and mineral matters. The per-centage composition of the latter was as follows:—

Oxide of Manganese	17·096
Magnesia	14·083
Lime	12·750
Potash	7·222
Oxide of Iron	5·333
Phosphoric Acid	21·166
Carbonic Acid	14·250
Hydrochloric Acid	3·416
Sulphuric Acid	1·777
Loss	2·907
	100·000

The remarkable point in these results is the richness in manganese, a metal that is so rarely met with in plants.—*L'Union Pharmaceutique.*

SYRUP OF IODIDE OF IRON AND MANGANESE.—The following formula for the preparation of a syrup of iodide of iron and manganese is recommended by Mr. J. U. Lloyd (*Amer. Journ. Pharm.* [4] iv. 7) on the ground that it avoids the production of the large quantity of sulphate of potash, which results when the formula given in the U.S. Dispensatory and Parrish's Pharmacy is adopted:—

Sulphate of manganese . . .	240 grs.
Iodide of potassium	288 „
Iodine	744 „
Iron wire (small)	240 „
Sugar	17 oz. av.
Distilled water, q. s.	

Place the iodine, three ounces of distilled water, and the iron wire cut into small pieces, in a thin glass flask or a porcelain dish, shake or stir occasionally until the reaction ceases, and the solution has acquired a clear greenish colour without a tinge of yellow. Having introduced the sugar into a porcelain dish, filter the solution of iodide of iron upon it. Wash the filter by pouring into it two ounces of distilled water, allowing the same to filter into the sugar. Dissolve the sulphate of manganese and iodide of potassium separately in one-half an ounce of cold distilled water by trituration in a mortar; mix the two solutions together, and allow the sulphate of potash to precipitate, then carefully remove the mixture into a moistened filter-paper within a glass funnel, and allow the solution of iodide of manganese to filter upon the sugar. When well drained wash the precipitate within the funnel with one-half an ounce of cold distilled water, allowing it to filter into the sugar.

Finally, finish the operation by adding to the above enough distilled water to make the whole measure twenty fluid ounces: stir occasionally until dissolved, and filter.

Correspondence.

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

The Adulteration Act.

The numerous cases which have from time to time appeared in various publications throughout the country, in reference to the vexatious proceedings in connection with the operations of the Adulteration Act, induce me to ask a corner in the Pharmaceutical Journal for the present communication.

I do this the more readily as I perceive that arrowroot is, in some districts, the article pounced upon by the gentlemen who, in the capacity of inspectors, appear to act with what, doubtless, seems to them a very creditable zeal, but which, I humbly submit, is quite a misapprehension on their part as to the meaning and intentions of the operations of the said Act so recently enacted.

The following facts will speak for themselves, and may, I hope, assist in bringing about some modification of a measure doubtless beneficial if properly worked, but the very opposite, and therefore highly mischievous, if its general scope and real intentions have been misunderstood.

As an introduction to the following documents, I may shortly premise that two or three months ago I sent to a well-known firm in Greenock an original case of Port Natal arrowroot. This particular package was from a lot bought from one of the first houses in London. Not long since, the parties wrote me asking for a written guarantee as to the purity of the arrowroot I had sold them. Being an original package, I told them that, having examined the article before purchase, I believed it genuine, but declined any written guarantee, as I was not the maker.

Shortly after, I received the memorandum now sent, enclosing a certificate from the public analysts:—

"Sir,—You will see from the enclosed memorandum that we are prevented selling the last lot of arrowroot we had from you, on account of its being adulterated. We, therefore, return it to-day per rail. Please credit our account with 1 cwt.

"(Signed) Geo. and Jas. Morison.

"*Greenock, January 24th*, 1874."

"[*This certificate is given under the Act for the Prevention of the Adulteration of Food, etc.* (1872), *and refers only to the sample analysed.*]

"No. 206 F.

"Mr. D. Young, Inspector under the Food Act.

"Sir,—We have carefully microscopically examined the sample of arrowroot, No. 197, received from you on the 2nd inst., and find that it has been adulterated.

"The adulteration, which is not injurious to health, consists in the presence of from 10 to 20 per cent. of torrefied arrowroot, or other starch altered by heat.

"(Signed) Patterson and Ogilvie.

"*Greenock, January 10th*, 1874."

In accordance with the intimation conveyed in the note of Messrs. Morison, the case containing 1 cwt. of arrowroot came duly to hand, and I lost no time in taking out samples and sending them to four gentlemen for examination, whose

names and position in the scientific world as chemists and microscopists require no comment from me.

"Mr. Mackay,—I have carefully examined the sample of Natal arrowroot (with and without the polariscope) microscopically, and can certify that there is no trace of any other starch than that which is yielded by the *Maranta arundinacea*. The idea of torrefied arrowroot being used to adulterate it is simply nonsense.

"(Signed) THOS. C. ARCHER,

"Director of the Edinburgh Museum of Science and Art, and formerly Secretary of the Edinburgh Microscopic Society."

"*Edinburgh, Jan. 29th*, 1874."

"Sir,—I have chemically and microscopically examined the specimen of 'arrowroot' you placed in my hands, comparing it with the standard specimens in the Museum of the Pharmaceutical Society of Great Britain. It is genuine arrowroot of good quality.

"(Signed) JOHN ATTFIELD, F.C.S.,

"Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain; Author of a 'Manual of Chemistry, General, Medical, and Pharmaceutical,' etc.

"17, *Bloomsbury Square, Feb. 4th*, 1874."

"My dear Sir,—I have submitted the sample of starch you left with me yesterday to a careful microscopic examination and am of opinion that it is genuine arrowroot, the starch of a *Maranta*. Some of the particles have a small crack, commonly observed in Natal arrowroot, but I can discover no evidence of its having been torrefied, nor can I discover any maize starch in it.

"(Signed) T. REDWOOD, Ph.D.

"Professor of Chemistry and Pharmacy to the "Pharmaceutical Society of Great Britain.
&c., &c., &c.

"17, *Bloomsbury Square.*
"*5th Feb.*, 1874."

"My dear Sir,—I have subjected to microscopic examination the sample of Natal arrowroot which you left with me. I made upwards of twenty demonstrations of it—collected from various parts of the sample, and thus several thousands of the undivided starch grains have been seen by me. Of these I have found only six which were ruptured and flaccid, and could in any way whatever have been subjected to undue heat, if indeed their broken state had to do with anything else than mechanical causes.

"To apply the term adulteration to this, supposing it had been tenfold greater in amount, appears to me an absurdity.

"(Signed) DOUGLAS MACLAGAN, M.D.,

"Professor of Medical Jurisprudence in the Edinburgh University, &c., &c., &c.

"28, *Heriot Row, Edinburgh.*
"14*th February* 1874."

So convinced was I that the Greenock analysts were in error, that I addressed them the following letter:—

"119, George Street, Edinburgh.
"*7th February*, 1874.

"Gentlemen,—Some time ago I supplied Messrs. G. and J. Morison, with an original case of Port Natal arrowroot.

"On the 24th ult. these parties wrote stating that the arrowroot so sent by me was returned by them in consequence of the same having been found adulterated; and in confirmation of this, they sent me a certificate signed by you, and in which you declare that sample of said arrowroot, having been carefully examined, was found to be adulterated to the extent of 10 per cent. or 20 per cent. with 'torrefied arrowroot, or other starch altered by heat.'

"You will observe that such an authoritative statement from you is somewhat serious to me, and as I have had the same arrowroot examined by several eminent chemists, who disagree with your statement, I will be glad to hear from you in reply whether you still adhere to your certificate given as on 10th January, 1874.

"I remain, your obed. servant,

"(Signed) JOHN MACKAY.

"Messrs. Patterson and Ogilvie, Greenock."

Three days afterwards I received the following reply:—

"Dear Sir,—In reply to your favour of the 7th inst., we beg to say that in consequence of your letter we have again looked at the sample of arrowroot to which you refer, and find that it contains torrefied starch as reported by us. The question of per cent. is not one to which we will adhere, because it is only given as an approximate estimate. The quantity varied in different examinations, for which reason we qualify the statement, 10 to 20 per cent, by using the word *about*. The presence of over heated granules in this sample may have been due to carelessness in manipulating the drying of the arrowroot; but whether that was the case, or whether torrefied starch was directly added, does not concern us in our capacity as food analysts; we simply reported upon the sample as we found it, and have left the explanation as to how it came to be in that condition to those best acquainted with the particular variety of arrowroot under consideration.

"With these explanations, therefore, we adhere to our certificate.

"(Signed) PATTERSON AND OGILVIE.

"*Greenock, 16th, Feb.*, 1874."

I refrain from making any further remarks, although I feel strongly that some alteration ought to be made with as little delay as possible in working out the real provisions of the Adulteration Act, and thus prevent much annoyance and considerable loss to those who are not only entirely free from blame in the ordinary course of business, but who have no desire whatever to trade in any adulterated article.

JOHN MACKAY.

"*Edinburgh, 16th Feb.*, 1874."

THE PROPOSED ADDITIONAL SCHOLARSHIPS.

Sir,—I have just been reading the letter by "A Country Apprentice" in your last, and, on considering the matter, I agree with him so fully that I send this in support of his ideas.

Let us take the case of a young man whose classical education was very imperfect, but who afterwards worked hard all day behind the counter at the practical, and in his spare time got up the theoretical; shall such an one be debarred from these scholarships because subjects are introduced which have no relation to pharmacy?

If any young man is so fortunate as to be well up in French, German, Italian, Greek, Natural Philosophy, etc., by all means let him try to retain his knowledge, for all these things will be a source of pleasure and profit in after life, and it is well said that "knowledge is power."

P. B.

THE PROPOSED PHARMACY BILL FOR IRELAND.

Sir,—Being desirous for the advancement of pharmaceutical education in Ireland I cannot allow the statements of your correspondent "A.P.S." in your last issue to pass unnoticed,—inasmuch as they are calculated to make a totally false impression with regard to the nature of the proposed Pharmacy Bill for this country,—as also the object in view in the formation of the association to which he refers.

I refrain from comment on that part of his statement having reference to the dispensing of medicines in large establishments by duly qualified assistants, and not by the proprietors themselves, and can excuse his ignorance on no other ground than that of his youth.

Some months ago I had occasion to write to you on the subject of "Pharmacy in Ireland," and then endeavoured to show your readers that we have two distinct classes claiming the title of Pharmacist,—first, we have the licen-

tiate of the Apothecaries' Hall, who is the *only* apothecary or chemist having a legal right to despense medicine from the prescription of a duly qualified physician or surgeon, and second, we have a class of men who keep open shop for the wholesale or retail of drugs and who dare not dispense a prescription under a heavy penalty, and consequently have had no training whatever for the most important part of a pharmacist's duty. Now, the proposed Pharmacy Bill emanates from the latter class, and is designed to secure for them what has been the legal right and privilege of the licentiate apothecary for almost a century, and what has cost him no small amount of his time and money;—and, further, the only ground, as far as I can learn, on which the druggist claims this privilege is that he has kept open shop for the sale of drugs for a period of years. No wonder that our apothecaries form themselves into a "defence association" to guard their own rights; and I trust that not only they, but also the medical staff of Ireland will be fully alive to the importance of guarding the Irish people against the wholesale admission of a body of untrained men to pactise the responsible duties of a pharmacist. That the present "Act" regulating the dispensing of medicines by the apothecaries in Ireland needs amendment, none seem more ready to admit than the apothecaries themselves, but the amendment cannot be such as that now under discussion.

That the formation of the association of which your correspondent complains can in any degree injure the position of the present apothecaries' assistant, I fail to see, and can come to no other conclusion than that "A.P.S." must be an assistant in the employment of some one of our "druggists," or else he has totally mistaken the mission of the "Apothecaries' Defence Association."

J. B.

Belfast, Feb. 16*th*, 1874.

Where is Miss Comp?

Sir,—Will you allow me to ask if any of your readers can favour me with an introduction to this young lady? There have been some rumours to the effect that she has been seen recently about the west end of the city of Glasgow, but I have been unable to find out her place of abode. She is very much wanted; several "valentines" resembling prescriptions, addressed to her and initialled "J.G.," have been seen of late, but for want of full particulars it is to be feared they have not reached their rightful owner. Perhaps she is a companion of Mr. Pil. Philip introduced some time ago by Mr. Greenish. I thought these mysterious individuals had disappeared for good and all, after the exposure they received. I trust all having the interest of pharmacy at heart will hound them down.

17, *St. George's Cross,* J. M. Fairlie.
Glasgow, 10*th Feb.* 1874.

Mustard.

Sir,—I have frequent enquiries, by letter and otherwise, as to pure mustard suitable for the pharmacy, and more especially as to how the relative proportions of the flour of the white seed to that of the black can be secured. Allow me once again to refer to this subject in your Journal by suggesting a very simple means of securing the object in view. The *pure* flours of the black and the white mustard seed can, without difficulty, be obtained separately of any good manufacturer, and by procuring a 2lbs. tin of white, and a 9lbs. keg of black, there remains only the trouble of mixing them together in order to secure the desired result, closely approximating to the theoretical proportions necessary to the greatest pungency, at the same time supplying the requirements of the Pharmacopœia without the misgivings of anyone's private monitor, or dread of the public analyst.

Thomas Greenish.

20, *New Street, Dorset Square, Feb.* 18*th*, 1874.

"On the Use and Abuse of Food."

Sir,—My attention has been called to the abstract of a lecture delivered by a "Professor" Archer on my recent work on Food, and which has appeared in your Journal. I have not the honour of his acquaintance, and, to my shame be it said, I did not know of the existence of so great an authority on Dietetics; but he has shown himself in the character of a "candid friend," and I offer my profoundest acknowledgments for the notice with which he has favoured me.

There are, however, some *slight* inaccuracies in his remarks, (if this distinguished "Professor" were not so trustworthy, I might have ventured to use the harsher word—mis-statements), and with your permission, I will with all humility submit a few feeble denials to his courteous consideration. I have *not* written that the *Cycas revoluta* is a palm, but have used the words "the *Cycas revoluta* and other trees." I *have* stated that the potato was obtained from Chili, but my other statement is also true, that it does not grow well and is not in general use in hot climates. There *are* 100 species of fig, and I did *not* say that they were all edible. The Sahara includes the oases in it, and I did *not* say that the Date-palm grows in the sandy desert. The Guava grows extensively in the East Indies, and I did *not* say that it belonged to the East only. The prickly pear does grow in Majorca, and I did *not* say that that was the chief place to which we were to look for it. Quince *does* make a better marmalade than orange, notwithstanding his jingle on the word marmar. I did *not* say that cabbage was a most nutritious class of vegetable, but that it represents the least nutritious class of food. The Yucca referred to is stated not to be a bad substitute for potato, and it *does* supply arrowroot. Iron has been found in low class sugars, and it is of no moment that he has not detected it. There are *several* generic names of the plants supplying arrowroot, and among others I *did* mention the Jatropha, and other Euphorbiaceous plants. I *did* refer to Manna, from the manna ash in the words "tree manna." Nettles are boiled in milk, and the juice *is* eaten as nettle porridge, whilst they are *not* eaten separately like spinach. I did *not* say that Maize was a *native* of sunny—but the *product* of sunny climes, and it does not grow to perfection with the amount of sun which we have here. The Phaseoli *are* beans eaten in Mexico, and I *did* refer to the use of beans and peas in this country. The tomato *is* boiled and stewed, and the plantain *is* fried or baked like other vegetables. The *stem* of fennel growing in the East *has* an agreeable acidity. I did *not* say that either salt, vinegar, or pepper was an element in cloves or in cinnamon. Hasty pudding *is* made in the Peak of Derbyshire with oatmeal as well as with wheaten flour.

I fear that your readers may now deem the whole subject very trivial, and I am sure that I ought to apologize to this "Professor" or Director of an Industrial Museum, for taking the liberty to point out these errors. The public do not expect great men to write legibly and they should not require them to read very correctly. Democratic changes are, however, imminent, and as no one can now stand on his dignity, perhaps this "Professor" might be induced to honour some free Elementary School in his neighbourhood with his presence.

Again offering my deepest respects to the renowned lecturer, I am, etc.,

Edward Smith, M.D., F.R.S.

140, *Harley Street, W.,*
Feb. 18*th*, 1874.

[*** As a matter of course we give insertion to Dr. Smith's reply to the trenchant criticism of his work by Professor Archer, though the fact that it came to us in the shape of a report of the proceedings of a provincial society left us no option as regards its publication. Having done this, however, we think the tone both of the criticism and reply justify us in saying that as regards any future communications on this topic we must exercise such discretion as will prevent this journal from being made an arena for personal recriminations.—Ed. Pharm. Journ.]

A Caution and Request.

Sir,—I shall be greatly obliged by your giving publicity to the following:—A scoundrel, having the air and bearing of a gentleman, is going about with a prescription of which the following is a copy:—

"Captain Ward, Royal Engineers. ℞ Tr. Ferri. Sesqui, ʒij.; Æth. Chlor. ʒiij.; Tr. Digital. ʒiij.; Aq. Pur. ʒij.

m. A tablespoonful three times a day, in a wineglassful of water. ℞ Syr. Chloral. Hyd., ℥j; Pot. Bromid., ℈iv.; Aq. Anethi, ℥iv. m. A fourth part each night. (Signed) H. B. Norman."

He enquires how long it will take to prepare, persists in waiting for it; perhaps says he is very anxious to get it quickly, his servant having omitted to pack with his traps the two bottles he obtained a few hours before at a neighbouring town.

The medicine prepared, he asks the cost, when he is afraid he has not so much change, and is sorry to ask the favour of change for a cheque. In this way he obtained on Saturday last, at Southsea, six guineas for one forged cheque, and at Southampton five guineas for another. Both cheques purport to be drawn by "C. H. Blennahassel, Colonel, Royal Enginecrs," on Cox and Co., Craig's Court, Charing Cross, in favour of "A. C. Ward, Esq., Captain, Royal Engineers," who he professes himself to be, and endorses the cheque in the shop.

His real name is E. H. Gahan. He is a most accomplished swindler, and has forged many cheques on Cox and Co., who ought to assist in bringing him to condign punishment. I saw four of his forged cheques, amounting to £60, at Portsmouth Police Station, yesterday.

In April, 1872, the Leicestershire Banking Company offered £100 for his apprehension, and he was only discharged from prison in December last, after eighteen months incarceration.

He is an Irishman, about 30 years of age. The following is a fair description of his appearance and dress on Saturday last:—Height, 5ft. 7in. or 8in., slim build, brown hair, light brown moustache, whiskers and beard close shaved off, the roots of shaven air being very visible. Oval, thinnish face. Wore a brown, stiff, felt hat (but that article of dress I think he often changes, leaving one behind at the hotels he visits), dark brown paletot overcoat, slaty-coloured trousers (probably if the weather is muddy will be turned up), lay-down collar, black, long necktie with red or crimson spots.

Professes to be in a nervous, shaken, state of health, result of five years service in India, from whence he says he has recently returned, and is anxious to learn one's opinion of the probability of his recovery. Is extremely chatty and over polite. Probably will talk about Cheltenham (where his mother really resides), and Canada, where—at Quebec—he was formerly a banker's clerk. Any of your readers who will cause his arrest and send me a telegram to that effect will confer an obligation on the trade and public generally, and especially on

ROBERT CHIPPERFIELD.

P.S.—Should, unfortunately, any of your readers have been victimized by him, I shall be glad if they will at once communicate with me.

Southampton, Feb. 16th, 1874.

A CASE OF REAL DISTRESS.

Sir,—I am far from being an advocate in any sense for irregular practice or irregular practitioners. But I cannot help seeing that the anomalous distribution of our medical charities, both parochial and others, and the wants of the poorer classes in our large centres of population form at once the cause and the excuse of much laxity in this direction. The widow, however, for whose sake I write this letter, was the wife of a man who, although never qualified by diploma, was not a quack. He had studied medicine and obstetrics under eminent professors—the late Dr. Waller amongst others—and he was very well qualified to practice except for the lack of diplomas. This fact, however, precludes his relatives from appealing specially to the medical profession. As, however, he was regularly apprenticed to a chemist and druggist, and exercised that business for many years, both at Malmesbury and in Shoreditch, I am emboldened to appeal to your readers for help for his widow, who is left almost penniless by the death of her husband in his 61st year, which happened in December last. The married daughters are quite unable to assist her, and for years past the poor man and his family had been struggling with poverty. Any sums, however small, will be thankfully received by the widow herself [Mrs. Newby, of 41, Hassett Road, near Homerton Station, E.], or placed to a fund being raised for her benefit by the Rev. Mr. Kelly, St. Monica's, Hoxton, E.

A HOSPITAL PHYSICIAN.

"*Botany.*"—Cooke's "Manual of Structural Botany," s published by Hardwicke, Piccadilly; price 1s.

K. T.—You will find some information respecting, and a formula for, the preparation you mention, in the last volume of this Journal (vol. iii. pp. 678 and 697).

E. W. Lloyd.—We have carefully examined the sample forwarded, and see no reason to suppose that it is other than it was represented to be.

A. L.—(1) Yes. (2) Yes. (3) No. (4) It is asserted by Pasteur that fermentation is caused by the development of organized germs in suitable media; and that each kind of fermentation has its specific germ, without the presence of which in favourable circumstances such fermentation cannot be produced. This theory has been applied by the great French chemist to the manufacture of beer and vinegar, but its correctness is strongly disputed. See papers in the present series of the Pharmaceutical Journal; in vol. 1 by Liebig and by Williamson; in vol. ii. by Pasteur, (p. 634) and by Petit, (p. 409).

"*Syrupus.*"—(1) The price of the "Treasury of Botany" is 12s., and of Armstrong's "Introduction to Inorganic Chemistry," 3s. 6d. (2) Apply to the Secretary for a copy of the Regulations of the Board of Examiners. (3) We must refer you to the author of the book in question for an answer.

"*P.*"—In a communication to the second series of the Pharmaceutical Journal (vol. v. p. 16), Mr. Charles Symes stated that lemon-juice heated to 150°C., and excluded from air at that temperature, will remain unaltered for several months, provided the operation be effected in the winter. Mr. Schweitzer some years since, found that the addition of ten per cent. of alcohol to fresh lemon-juice prevented decomposition.

J. E. H.—Your question will be best answered by quoting from the regulations of the Board of Examiners. On and after the 1st October, 1874, the candidate will be required to "recognize the ordinary chemicals used in medicine; to possess a practical knowledge of the processes by which they are produced, and the composition of such as are compound; and to explain the decompositions that occur in their production and admixture, by equations or diagrams."

W. O. A.—See the paper read by Mr. Haffenden, and the discussion thereon, at the British Pharmaceutical Conference at Brighton, PHARM. JOURN. [3] vol. iii., p. 212, also a paper on p. 575 of the present volume.

"*An Associate.*"—You will find numerous recipes for pomatums, etc., scattered through the pages of the present series of the Journal; from these we do not doubt your own judgment will enable you to select the article best suited to your purpose.

"*International Prizes.*"—"*Vinegar*" has favoured us with a cutting from a local newspaper in which a prize given by a contemporary in connection with its "Column for Students" is exaggerated into an international prize awarded by the "proprietor of a distinguished scientific paper in the metropolis for a chemical analysis of poisoned food." We are glad to notice that our "distinguished scientific" contemporary has expressed its disapprobation of such an objectionable proceeding.

A. B. H.—The question is one we do not feel qualified to answer. We should recommend you to refer the matter to the Registrar, or to consult your solicitor respecting it.

F. J. Barrett.—The specific gravity of Extractum Ergotæ Liquidum should be, as nearly as possible, 1·000.

"*Alpha.*"—Albata, or German silver, is an alloy composed of copper, nickel, and zinc.

W. J. S.—(1) We think the discolouration must have been due to the presence of a small quantity of an iron salt, arising from a slightly solvent action of the caramel. (2) Red orpiment is realgar, the disulphide of arsenic.

"*Quæstio.*"—(1) The wire might be used until it is all dissolved, but we doubt the economy of the process. (2) We cannot undertake to say.

A. A., A. P. S.—The borax has a solvent action upon the gallic acid similar to that which it has upon several other substances.

COMMUNICATIONS, LETTERS, etc., have been received from Quaestio, Querist, M. P. S.

NOTES ON THE ARECA PALM.

Areca Catechu, L.

BY JOHN R. JACKSON, A.L.S., CURATOR OF THE MUSEUMS, KEW.

Some interest having lately arisen amongst pharmacists with regard to the Areca palm (*Areca Catechu*, L.) owing to its proposed introduction into the British Pharmacopœia as an officinal plant, a few notes on the tree itself and its uses may not be out of place.

The Areca palm is a handsome tree, growing to a height of from 40 to 60 feet, with a slender, erect trunk, averaging from one to two feet in circumference. It has regular, pinnate leaves, and long, linear leaflets, of a rich, dark-green colour. The circumference of the trunk is annulated or distinctly marked with the scars of the clasping petioles of former leaves. The fruits are each about the size of a hen's egg, consisting of a fleshy looking drupe, which, however, on cutting is found to be very fibrous, containing a seed about the size of a nutmeg, and like that well-known spice, ruminated or marked with thick, reddish-brown irregular lines throughout its entire substance. These fruits are borne in large bunches, springing from the crown of leaves. The spathe itself is used in some parts for making drinking vessels, for nailing over the bottoms of boats, and various other purposes.

The tree is known best as the betel-nut palm, and is cultivated in nearly all the warmer parts of Asia for the sake of the seeds, which are not only chewed in large quantities by the natives in countries where they grow, but are shipped to countries where the palm is not cultivated. The average annual produce of one tree is said to be about three hundred nuts. The tree is largely cultivated all over India, as well as in China, but is more abundant, perhaps, in Malabar, North Bengal, the lower slopes of the monntains of Nepaul, and the south-west coast of Ceylon. In Travancore alone there are nearly ten millions of these trees, the annual value of the produce of which is estimated at £50,000 sterling. It is said that about 80,000 piculs of the nuts are annually produced on the coast of Sumatra. Many varieties of the betel-nut palm are known to the natives under different local names ; the nuts also vary much in size, but their quality depends upon their appearance when cut through, "intimating the quantity of astringent matter contained in them. If the white or medullary portion which intersects the red or astringent part be small, and has assumed a bluish tinge, and the astringent part is very red, the nut is considered of good quality ; but when the medullary portion is in large quantity the nut is considered more mature, and, not possessing as much astringency, is not esteemed so valuable."

The nuts are usually gathered between the months of August and November. The seeds are removed from the husk and boiled in water. In the first boiling the water becomes red and thick, and this is afterwards evaporated into catechu, but whether it is imported into this country as a commercial article is uncertain. The mode of collecting the catechu in Mysore is thus described :—"The nuts are taken as they come from the tree, and boiled for some hours in an iron vessel. They are then taken out, and the remaining water is inspissated by continual boiling. This process furnishes *kossa*, or most astringent *Terra japonica*, which is black, and mixed with paddy husks and other impurities. After the nuts are dried they are put into a fresh quantity of water and boiled again ; and this water being inspissated, like the former, yields the best or cleanest kind of catechu, called *coony*. It is yellowish-brown, has an earthy fracture, and is free from the admixture of foreign bodies."

For the purpose of chewing, the nut is cut into narrow strips and rolled up with lime in the leaves of the betel pepper. The mixture has a hot, acrid taste, and aromatic and astringent properties. The habitual use of the betel-nut is considered by the natives to be very wholesome, but the effects are said by some to be due as much to the ingredients used with it as to the areca nut itself. Its constant use causes the teeth to become black and the mouth and lips of a brick red colour. In some parts of China the nuts, bruised and powdered, are mixed with the green food given to horses, and they are thus considered a preventive against diarrhœa. In the north of China small pieces of the nut are boiled and the decoction is taken as a domestic remedy in various visceral affections.

Though the use of the betel as a masticatory turns the teeth black, it is said to preserve them from decay in a remarkable manner, and this may be the reason why some English chemists have introduced the pulverized charcoal into this country as a tooth powder.

In Borneo the flowers, which are fragrant, are mixed with medicines and used as charms for the cure of many diseases. In some parts of India the juice of the young tender leaves mixed with oil is applied as an embrocation in cases of lumbago, and a decoction of the root is a reputed cure for sore lips, so that whatever may prove to be the value of the areca nut as an anthelmintic in this country, it is certain that the tree is much esteemed for its numerous uses in the East.

BUCHU LEAVES.*

BY PROFESSOR F. A. FLÜCKIGER.

The leaves of species of *Barosma* growing at the Cape, known under the name of buchu leaves, are but little used, and have not yet been the objects of a chemical or a microscopical investigation, although worthy in a high degree of both. The smell of buchu leaves appears to the author not alone to depend upon the essential oil, for in this respect it is more suggestive of peppermint. By long exposure to the cold of winter he has obtained from the oil a well-crystallized camphor which melts at 85° C. and commences to sublime at 110° C. It dissolves in bisulphide of carbon, from which it may be obtained in fine needles that might well be taken for peppermint stearoptine. The elementary analysis gave, carbon 74·08, and hydrogen 9 to 10, but it was not sufficiently satisfactory to construct a formula from. The oil poured off from the camphor of *Barosma betulina* does not boil under 200° C., and after being rectified over soda, answers to the formula $C_{10}H_{16}O$. The crude oil turns the plane of polarization to the left.

The aqueous infusion of the leaves contains some mucilage, and a body which belongs probably to the

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* Abstract of an article in the *Schweizerische Wochenschrift für Pharmacie*, Dec. 19, 1873.

quercitrin or rutin class; the extract is not altered by ferrous salts; it is coloured greenish brown by ferric chloride, and gives with acetate of copper a yellow precipitate which is soluble in potash. Further experiments are required to show what this body is.

In an anatomical point of view buchu leaves appear at first sight remarkable by the large spherical oil vessels, which however do not claim any especial interest. If a transverse section of a *Barosma betulina* leaf be made, three layers can be discerned in the inner tissue. The thickest, occupying the middle of the leaf, is coloured green by chlorophyll, which is much less the case with the considerably smaller layer occupying the space between the chlorophyll layer and the under side of the leaf. A third layer, in a section prepared in alcohol or oil, is scarcely perceptible. It appears as a small uncoloured zone directly under the epidermis of the upper side of the leaf, in which, differing from the under side, no oil vessels appear. There may be seen also the fibro-vascular tissue, the raphides, the cuticle and the epidermis constituting the skin tissue of the leaf.

If a section of *Barosma* leaf be placed in glycerine the epidermis of the upper side is raised by a mechanical action which resembles that which takes place when the epidermis of linseed, white mustard seed, quince seed, etc., is saturated with water. The delicate walls of the colourless cells in the last mentioned layer swell up, and protruding perpendicularly to the surface of the leaf, let a thick slime run out, in which the cell walls gradually disappear. At first there seems to be in this cellular slime an appearance of delicate stratification as in many other similar cases. The mucilage is not coloured by iodine, consequently it may be considered to approach nearer to cellulose. Under the influence of glycerine the mucilaginous layer of the leaves of *Barosma betulina* assumes the development described quite gradually; but it is produced much more quickly when the leaves are placed under water. In the latter case this layer occupies fully half the breadth of the section.

The leaves of the *Barosma crenulata* and *B. serratifolia* are, as is known, much thinner, being about half as thick as those of *B. betulina*. When these thinner leaves are placed in alcohol the mucilaginous layer remains scarcely perceptible, but in water it swells equally with that of the other kind. The breadth of this layer is then proportionately much more considerable in the thinner species, taking up two-thirds the breadth of the section of a leaf.

Whilst we are accustomed to find the epidermis to be the seat of the mucilaginous formation in the seeds, and to meet with special mucilage cells in the cortex, in the buchu leaf this function belongs to a row of cells (collenchyma) in the interior, without the epidermis having any share in it, if we, at least, leave out of consideration the fact that here and there isolated prolongations of cells extend from the epidermis into the mucilaginous layer.

The author does not know whether other leaves present similar conditions; in *Althæa* leaves, after quite a cursory examination, this appeared to him to be no more the case than in those of *Sesamum indicum*, which are tolerably mucilaginous. *Empleurum serrulatum*, on the other hand, resembles *Barosma*.

RHEUM OFFICINALE.

BY PROFESSOR BAILLON.

The following information respecting the new species of *Rheum*, which is now considered to be the true origin of the officinal rhubarb, has been supplied by Professor Baillon to M. Regnaud for insertion in a new edition of Soubeiran's 'Traite de Pharmacie.'*

"Besides the *Rheum Rhaponticum*, which yields the Rhapontic rhubarb, Linnæus recognized four species of the genus *Rheum*, to which have successively been referred the origin of the true rhubarbs of China and Russia. These were the *Rheum Rhabarbarum* (afterwards named *R. undulatum* by Linnæus himself), *R. compactum*, *R. palmatum* and *R. Ribes*. The latter, to which has been attributed the origin of Persian rhubarb, or rather of the products which are received through Persia, has never been more than a culinary herb. As to the three other species, they have all contributed (from the root) certain European and native rhubarbs.

"A species more recently discovered in India, *R. Emodi* or *R. australe*), has, like the preceding, been considered to yield the Chinese and Russian rhubarbs; but it would appear that it only produces a kind peculiar to India.

"As to the true plant, a native of Thibet, which furnishes to commerce both the Russian and Chinese rhubarbs, it has only been known since 1867, in which year M. Dabry de Thiersant, consul-general of France at Shanghai, procured from Thibet some stalks of the species which yields this valuable drug, and which, cultivated in the garden of the Faculty of Medicine at Paris and in the Vallée de Montmorency by M. Girandeau, have received from M. H. Baillon the name of *Rheum officinale*. It is a very large species, exceeding a man in height, and remarkable for the considerable development of its inflorescence. The flowers are whitish, having a very deeply concave receptacle, with a marked perigynic insertion of the stamens, which in other respects resemble those of all the genus *Rheum*. The gynæcium is inserted profoundly in the most depressed portion of the receptacular cavity, and the edges of this cavity are furnished with well-developed unequal glands of a beautiful green colour at their summit. The leaves of this species answer perfectly to the indications formerly given by Bokharian and Chinese merchants to Pallas and others concerning the true officinal rhubarb plant, namely, that the leaves have a limb of a delicate green colour, in shape like an open fan, and also as analogous as possible to that of the leaves of the *Ricinus communis*. It is by this that the species is especially distinguished from *R. palmatum*, to which more than any other the origin of this medicament has been referred in recent times, upon the authority of Guibourt. But the leaves of the latter are whitish, unequally trilobed, and more or less pointed at the top. The *R. officinale*, however, belongs to the same botanical section as *R. palmatum*, as well as *R. hybridum* and *R. dentatum*, which are different plants, but have the same nervation. Here the nerves diverge at starting from the base of the limb, they are then palmate, and the two lateral nerves are destitute on the outside, for a certain distance from their base, of all parenchyma. Above this point the base of the parenchyma forms a kind of auricle, which renders the limb markedly cordate at the base. The dimensions of the limb extend to nearly a metre

* 'L'Union Pharmaceutique,' vol. xv., p. 21.

in each direction ; it is however a little broader than it is long, and the petiole is about the same length. In the plants that have been raised, some leaves have been noticed which were more than a metre and a half long. Their edges are unequally divided into triangular lobes a little unequal among themselves, and the nerves, ramified and prominent beneath, are in this species, together with all the surface of the parenchyma, entirely covered with a fine white down. When the plant has become fully developed it has scarcely any roots, for these are gradually destroyed, and the plant draws its nourishment from the soil only by small adventitious roots which could not be employed in medicine. But, contrary to the other species enumerated, and of which the root can be prepared and employed, this developes above ground a stem and cylindro-conical branches, 20 or 30 centimetres high, and of the thickness of an arm or a leg. These are the only portions which, cleansed from the so-called bark, divided transversely and longitudinally, and properly dried and prepared, can be used in medicine. They bear leaves, and after the fall of these, there remains on the surface only the brown dried base of the petioles, together with the remains of the ochrea ; these vestiges together constitute the pretended bark.

"In the axil of each of these aërial leaves there is necessarily a bud. These acquire frequently a considerable development, and are elongated into leafy branches ; such is the cause of the ramification of the aërial portions of this plant. Each of these buds, detached at a suitable season, will in its turn easily take root from its base, and may thus be used to multiply the plant. Since each of these buds sends off a collection of cellular, fibrous and vascular elements, which it directs obliquely across the true fleshy, spongy bark, towards the ligneous axis of the stem, this, as well as the large branches, is permeated by oblique systems having the same structure as the branches. The presence in the true Thibet rhubarb of the stellate spots which are seen in sections, answers, therefore, precisely to the morphological nature of the portion employed as a medicament."

THE ALKALOIDS OF THE CINCHONA BARKS.*

BY O. HESSE.

(*Continued from p.* 672).

There remains now only the cinchonidine of Wittstein to be considered. As Crawford stated that its sulphate was readily soluble in ether, it was hoped that it might have been easily separated from the other sulphates, which are difficultly soluble in ether. But all experiments in that direction remained fruitless, so that I resolved to apply to Professor Wittstein himself, who at my request willingly gave me the small quantity of alkaloid which remained from his experiment. But he was no longer able to provide me with a specimen of the bark. It seemed to me, however, certainly important to obtain the bark also, because it was the one which Howard had asserted contained a special modification of Pasteur's cinchonidine, which he named "paltochine" from *Cinchona Palton*. It was, therefore, with great pleasure that I found my efforts in this direction did not remain without result, for Professor Wiggers sent to me (1) a portion of the bark upon which Wittstein had operated, and (2) specimens of the same bark, which Professor Wittstein had obtained for Professor Wiggers from the house of Ammon and Geith, at Nuremburg. Lastly, I was indebted to Professor Flückiger for a specimen of this bark, which he had himself obtained direct from the above-named firm. The whole of the specimens were completely in accord with each other.

Howard attributed this bark at first to the *Cinchona Palton*, Pav., though he afterwards referred it to another species, which he named *C. rosulenta*, which Weddell reckons as a sub-species of *C. succirubra*. From this species is also derived the Ocaña bark that in recent years has been frequently met with in commerce.

In the above-mentioned bark Wittstein found 3·2 per cent. of alkaloids, which consisted principally of cinchonidine, and were entirely free from quinine and cinchonine. In a letter written from C. Zimmer to Geith, the former stated that this bark contained a new alkaloid, but not any quinine.

According to my analysis of this bark by a method which I know to give exact results, it contains as follows :—

I. *Wittstein's Bark.*—17·1 grams were used, and were found to contain : 0·049 gram of amorphous base, which was not coloured green by chlorine and subsequent treatment with ammonia, and probably was cinchonicine ; also 0·084 gram of cinchonine, and 0·292 gram. of neutral tartrate, dried at 100°, containing 0·232 of alkaloid.

II. *Ammon* and *Geith's Bark*, not quite like the preceding, 20 grams were used : they contained 0·051 gram of amorphous base, probably cinchonicine, 0·438 gram of hydrated tartrate and 0·112 gram of cinchonine.

The percentage yield of these specimens of bark in alkaloid was therefore as follows :—

	Experiment. I.	Experiment. II.
Cinchonine	0.49	0.56
Cinchonidine	1·35	1·72
Amorphous Base (*Cinchonicine*)	0·25	0·25
	2·09	2·53

That these two analyses should not exactly agree is what might be expected ; but it would appear that this bark contains a considerable proportion of cinchonine, which Wittstein allowed to mix with his cinchonidine. The alkaloid obtained as tartrate was exactly identical with the alkaloid obtained from Wittstein's preparation in the following manner. The compound was dissolved in dilute sulphuric acid, the solution, slightly warm, neutralized with ammonia, and then tartrate of potash and soda was added, whereby a copious crystalline precipitate was formed, and only cinchonine was to be found in the mother liquor. The precipitate, well washed with cold water, was decomposed with ammonia, and the alkaloid was then allowed to crystallize from boiling alcohol. It was thus obtained in shining scales and needles, which contained no water of crystallization ; it was lævogyrous, and fused at 202° C. (corrected observation 207° C.).

An analysis was made of this substance, dried at 100° C., which gave :—

I. 0·245 gram. gave 0·173 H_2O. The estimation of the carbon is wanting, as the india-rubber tube between the potash apparatus and the potash tube became defective during the experiment.

II. 0·1446 gram gave 0·412 gram CO_2 and 0·105 gram H_2O :—

	Calculated for $C_{20}H_{24}N_2O$.	Wittstein's formula required.	Found. Wittstein.		Hesse.	
C	77·92	77·14	77·36	77·27	.....	77·69
H	7·79	7·14	7·18	7·29	7·84	8·06

Of the salts of this cinchonidine it was sought to prepare the neutral hydrochlorate, which, according to Crawford, could not be produced. For this purpose an alcoholic solution of the base was exactly neutralized with hydrochloric acid, and the solution cautiously evaporated ; whereupon the salt quickly crystallized out in white needles, but these, after the lapse of a few days, were

* Translated from the 'Vierteljahresschrift für praktische Pharmacie,' vol. xxii., p. 366.

varied by octahedral crystals. The hydrochlorate so obtained was only sparingly soluble in ether.

The chloroplatinum salt, obtained in the usual manner, resembled exactly the ordinary platinochloride of cinchonidine. Dried at 120° C. it gave :—

I. 0·3487 gram 0·0960 Pt.
II. 0·2976 gram 0·0826 Pt.

Calculated as :—

$C_{20}H_{24}N_2O$, $2HCl + PtCl_4$. Pt = 27·40.
$C_{18}H_{20}N_2O$, $2HCl + PtCl_4$. Pt = 28·49.
Experiment I. gave . . . Pt = 27·50.
Experiment II. gave . . . Pt = 27·75.

The neutral tartrate, obtained by decomposing the hydrochlorate with tartrate of potassium and sodium, presented the characters of the ordinary cinchonidine salt.

0·559 gram dried at 120° C. yielded 0·025 gram H_2O= 4·47 per cent. (calculated 4·48 per cent.).

The neutral sulphate also resembles the ordinary cinchonidine sulphate, and, like that, when crystallized from water and not effloresced, contains six molecules of H_2O. Crawfurd spoke of this salt as easily soluble in ether, but my experiments have indicated that it possesses no other characters of solubility than those of the ordinary cinchonidine sulphate.

Lastly, the acetate has to be compared with the ordinary acetate of cinchonidine, and here again no difference can be observed between the two salts.

From these experiments it therefore follows that Wittstein's cinchonidine was a mixture of cinchonine and Pasteur's cinchonidine. The proportion of cinchonine to cinchonidine was probably as 1 : 2 ; whilst in the bark it is nearly 1 : 3.

Next we must examine how it stands with respect to paltochine, which, according to Howard, is contained in Wittstein's cinchona bark, as well as in *C. peruviana*, and which is also produced during the manufacture of cinchonidine. It was conceivable that between cinchonidine and cinchonine a compound should be formed analogous to racemic acid, which under certain conditions would be decomposed, but in others would exhibit peculiar properties.

To obtain some certain information on this point, at first equal quantities, but afterwards the before mentioned proportions of the two alkaloids, cinchonine and cinchonidine, were taken, glycerine was poured over them, and they were then exposed to a temperature of 170° C. Gradually the alkaloids dissolved in the glycerine, without anything worthy of note being observed. After the lapse of an hour the heat was removed, and the cooled mass exhausted with ether ; upon evaporation crystals were deposited, among which the forms of cinchonine and cinchonidine could be clearly distinguished ; consequently no combination had taken place. Similarly, no combination could be detected when equal quantities of both alkaloids were dissolved together in boiling alcohol and neutralized with sulphuric acid. It was noticed, however, that in this latter case the sulphate of cinchonidine dissolved more easily in the solution containing sulphate of cinchonine than in pure water. But when this solution was concentrated it did not deposit a double salt, and both sulphates crystallized at a suitable concentration in the forms peculiar to them. In all cases therefore where the sulphate of cinchonine and the sulphate of cinchonidine occur together in solution, the supposititious alkaloid—*i.e.* a mixture of cinchonine and cinchonidine—will be originated.

According to my experiments the "carthagine," said by Gruner to be discovered in the "China flava dura" or "Carthagena China dura," is also a mixture of alkaloids. I am indebted to Professor Wiggers for the authentic material used in these experiments also. The pseudoquinine of Mengadurque also appears to have been analogous to paltochine.

It now remains to ascertain how the foregoing results, obtained with Wittstein's cinchona bark, can be brought into agreement with those obtained by Henry and Delondre in their investigation of their quinidine.

Delondre and Bouchardat describe the cinchona bark in question under the name "red bark of Mutis," and stated that they had obtained from it 1·2 to 1·4 per cent. of sulphate of quinine. This result agrees satisfactorily with mine, if we substitute "sulphate of cinchonidine" for "sulphate of quinine." Since those chemists did not know of Winckler's discovery of cinchonidine, they consequently represented all the barks which contained cinchonidine as containing quinine instead. For they state explicitly that the red bark was the bark in which Henry and Delondre were so fortunate as to find quinidine. But they meant by this quinidine the quinidine of Pasteur, *i.e.*, conchinine, of which this bark happens not to contain a trace. That those chemists were not operating upon conchinine, but upon quinine mixed with cinchonidine, would also appear from the following.

The quinidine of those chemists forms with acetic acid a well crystallized salt. This property belongs to quinine as well as to cinchonidine, but not to conchinine,* the acetate of which is amorphous, and is deposited as a syrupy mass upon the evaporation of its solution. Further, the quinidine of those chemists gives with hydrochloric acid a salt which sometimes appears in crystals, resembling those of crude boracic acid, and sometimes in needles. These properties recall those of the hydrochlorate of cinchonidine. Also, the sulphate solution gives with iodide of potassium a semi-crystalline precipitate, which after solution in hot water yields upon the cooling of the solution white prisms of hydriodate, which evidently consist only of hydriodate of cinchonidine, since they cannot be those of hydriodate of conchinine, the difference in solubility of the latter in hot and cold water being insignificant.

From alcohol Henry and Delondre obtained crystals with 5·8 per cent. of water of crystallization. Conchinine always crystallizes from alcohol with $2\frac{1}{2}H_2O$, but readily loses $\frac{1}{2}H_2O$ in dry air, the pellucid transparent crystals becoming at the same time milk-white and opaque. But then they always contain 10 per cent. = $2H_2O$, which they give off when heated to 120° C., without being in the least fused. But Henry and Delondre's quinidine fuses together with heat ; it behaves just like a mixture of one part of quinine and two parts of cinchonidine crystallized from alcohol, when quickly heated. Finally it should also be mentioned, that according to Bouchardat and Boudet† the quinidine of Henry and Delondre is lævogyrous, whilst conchinine, as we have seen, rotates a beam of polarized light considerably to the right.

We have also in the quinidine of Henry and Delondre essentially the same alkaloid as that of which Winckler first gave a satisfactory explanation, and of which he believed himself to be the discoverer. Although this alkaloid by usage should retain the name of quinidine, yet I would now protest against it, because it is a name that has been used and would be used sometimes for one and sometimes for another alkaloid.

(*To be continued.*)

THE VARIOUS PREPARATIONS OF KOUMISS AND THEIR USE IN MEDICINE.‡

BY V. A. JAGIELSKI, M.D. BERLIN,

Late Physician in the Prussian Army, etc.

Though authorities may differ on other points of the subject, they all unite in the opinion that chronic diseases, and especially those of a consumptive or emaciating nature, are developed by anti-hygienic influences. Logically, then,

* The acetate of conchinine of Van Hejningen deposited crystals after a long time, which were a mixture of cinchonidine salts.

† *Neues Jahrb. Pharm.*, vol. xxiii., p. 288.

‡ From the *British Medical Journal*, Feb. 21st, 1874.

to combat these diseases, and to cure them, particularly in their early stages, they must be treated with means which will correct or arrest the morbific impulse. Primarily, the atmospheric conditions which surround the patient ought to be suitably chosen; and secondly, but no less urgently, the diet must be so regulated, if possible, as to act the part of both "physic and food." In this relation, the practice of medicine is becoming more and more distinguished, in both its "science and humanity", by the importance which it now gives to dietetic remedies in therapeutics. We have in them facilities for the physiological and chemical treatment of certain obstinate diseases that resist purely remedial agents, and they are real handmaids of the greatest service to the practitioner. Chief of these remedies, and indeed, epitomizing them, is the milk of animals, because in its composition it comprises all the nutritive requirements of the body. Yet, perfect as milk is in all the elements of a facile alimentation, disease has oftentimes so enfeebled the digestive powers, that even it cannot be assimilated in sufficient quantity to maintain healthy life. Fortunately, however, there is a chemical sensitiveness in milk, which predisposes it to such physical and internal changes as will enable it to accomplish the prompt and perfect nutrition of the organism by overcoming the pathological obstacles. We have an example of this in the koumiss of the Tartars, which is fermenting mare's milk. Its magic effects are manifested in the robust constitution and the complexions of the nomadic people of the Russian Asiatic steppes, who during the warmer season live exclusively upon it, to recruit the health and strength which they have lost through the privations and exposures of the previous winter.

That milk will undergo vinous fermentation, and yield a certain quantity of alcohol, is not generally known. Every educated person, however, has heard that the Tartars drink the milk of their mares in a state of fermentation, called koumiss. Samara and Orenburg were the first places which were chosen for a resort of cure in chronic chest diseases. To Dr. Stahlberg belongs the great merit of inducing the Russian Government to assist him in opening the first koumiss institution in Moscow, and afterwards in Tsarskoe Silo, near Petersburg, the milk of mares being used which were expressly imported from the Tartar steppes; and it is from Vienna that we have heard recently of the great success of koumiss, introduced again by Dr. Stahlberg.

The milk of all animals is convertible into koumiss by one and the same method; but, as the several milks differ among themselves in the quantitative relation of their components, so also will there be corresponding variations in the koumiss which is produced from them. Qualitatively, however, the koumiss from different kinds of milk may be considered uniform, as has been shown in my special work on koumiss published in 1870, and in my paper in the *Milk Journal*, April 1871. More immediately in connexion with this paper, however, I present the analytical results of Wanklyn, obtained from cow's milk *medium koumiss*. A quart bottle of this medium or B koumiss* (manufactured in London by E. Chapman and Co.), which holds about 12,000 grains of koumiss, contains as follows:—(It was examined when twelve days old; specific gravity, at 62° F. 10.28.)

Water	10,662	grains.
Alcohol	192	,,
Casein and Albumen	128	,,
Lactose	582	,,
Lactic Acid	130	,,
Fat	36	,,
Ash	90	,,
Carbonic Acid	180	,,
	12,000	

* This analysis is not contained in J. A. Wanklyn's book on *Milk Analysis* published by Trübner and Co., 1874, which gives only "Full" Koumiss tables.

The 90 grains of ash contain, approximately, 60 grains of phosphate of lime and 30 grains of mixed chlorides of sodium and potassium.

The three gradations of koumiss, designated as Nos. 1, 2, and 3, represent the irrepressible changes which it undergoes in time, while fermentation continues in the bottles. In the process of conversion of the milk into koumiss, the following changes take place. By the interaction which is promoted, casein is set free in a highly attenuated molecular condition. The lactose is partially converted into alcohol, carbonic, and lactic acids; and incidentally a bouquet of fragrant volatile products is generated (according to Morfit), which may perhaps be regarded as adjuvant in the remedial effect of the koumiss. The fermentation, once started, will continue, no matter how cold the temperature, or how closely the koumiss may be corked in bottles. Thus, the products arise in time from the minimum in No. 1 to the maximum in No. 3. In passing through these gradations, the koumiss retains all its general properties, but changes some of its specific adaptations, as will be explained directly. In all cases, the koumiss is a milk-like fluid. In its fresh No. 1 state, it is a still liquor, and has an agreeable, sweetly-acidulous taste, recalling sweet almonds. As it approaches the No. 2 gradation, it becomes more acidulous, assumes a sparkling character, and requires to be drawn from the bottle through a special tap. In No. 3, the sweet taste is replaced wholly by the acidulous, which also has sometimes a slight shade of bitterness; and the koumiss not only sparkles, but rushes through the tap in a rich creamy foam. These changes progress so rapidly in warm weather, that the bottles should be kept in a cold cellar, and treated with the same care as champagne wine. The distinctive character of koumiss is that of being the most assimilable of nutriments. Every quart bottle contains, approximately, 970 grains of solid respiratory and plastic food, according to Wanklyn, and each of its elements is in a state to promote digestion of the others by the feeblest stomach.

The original koumiss of the Tartars is made from mare's milk; but, in my judgment, cow's milk is an equally good raw material, if not better; and there is no doubt that this koumiss gives highly successful results in proper cases, as shown here, in Odessa, Warsaw, Cracow, etc. It is not thin, like mare's milk; and besides, it gives a koumiss free from every disagreeable odour and taste. Moreover, cow's milk, by its composition, affords facility for varying the composition and consistence of the koumiss-product according to the indications of particular cases. This is an important consideration, as through its means the chemist is enabled by his proper skill to make full koumiss, pure whey koumiss, medium koumiss, and extra kinds of special composition for special diseases, like diabetic koumiss, etc.

The physical and chemical characteristics of koumiss render it an aid upon which we can rely with great confidence for the treatment of extreme debility and all the phases of impending marasmus. A long and favourable experience justifies me in giving an empathic assurance on this point. Koumiss not only contains a large proportion of lactic acid, which is a prime constituent of the gastric juice, but holds the casein in that state of vitality which gives it the property of metamorphosing itself and the other constituents of the milk into healthy lymph and blood.

The physiological features of the several constituents of koumiss may shortly be specified as follows.

The *lactic acid* activates the digestive powers, diminishes the temperature and the frequency of the pulse, and regulates the mucous secretion. It has an additional specific action in certain diseases, as, for instance, in diabetes.

The *casein*, *albumen*, and *fat*, restore the plastic and heat-giving materials of the body, and act as a chemical inspiration, so to speak, to promote assimilation of its associate constituents.

The *lactose* increases the weight of the body and gives heat.

The *alcohol* produces sleep, diminishes heat, and forms fat.

The *carbonic acid* allays nausea, calms gastric irritation, augments diuresis, increases the energy of the heart's impulse, and diminishes the frequency of the heart's contractions.

As to the more minute acids and fragrant compounds, I prefer not to speak until my experience and observations in regard to them have become more mature.

It will thus be seen that the process of double fermentation in the artificial preparation of cow's koumiss has done nearly all the preliminary work which would fall otherwise on the digestive organs. There is no other derivative of milk or any other substance which can be substituted for it with corresponding advantages, for it may constitute a sole diet, as my own experience has proved, in many cases of chronic dyspepsia, both simple and complicated. Dr. Braczinski of Berlin speaks in his monograph of koumiss from cow's milk as one of the most valuable aids in the medical practice of Warsaw; and Dr. Neugebauer of Warsaw makes a special mention of a case, in his private practice, of a young nobleman, presenting all the symptoms of tabes dorsalis, which was entirely cured in six weeks by treatment with cow's milk koumiss. This confirms my own experience with a mild case of a similar kind. Dr. Küttner, in Dresden, has also reported to me many gratifying results which he has obtained with koumiss in dyspepsia and debility. Dr. With of Brunerhaven writes in strong favour of fresh koumiss for all catarrhal diseases of the stomach, bowels, lungs, and in anæmia. In Dr. Kwasnicki's Polish translation of my treatise on koumiss (1870), there is a note which records Dr. Nowakowski's and Dr. Przystanski's confirmation of my own experience in the use of cow's koumiss. An appendix to the same translation gives the clinical experience of Professor Chalubinski at the University of Medicine in Warsaw, which prompts him to recommend earnestly the use of cow's koumiss in catarrhal disease of the mucous membranes of the gastro-intestinal and respiratory tractus, and in debility from whatever cause. Dr. Edward Charlton, the late Surgeon-Major Ross, and Dr. R. Dawson, have also written to me in praise of koumiss as a valuable dietetic remedy; and Dr. Campbell Morfit, of the U.S.A., found, in his own case, that the British koumiss acts with the most decided benefit in catarrhal diseases and obstinate constipation, and increases weight rapidly. Mr. Ceely of Aylesbury, and many other brethren in this country, share the same opinion as those whose families I had the pleasure of advising. Neftel, Stahlberg, Schnepp, Marra, Weinberg, etc., have contributed largely to the medical literature of this subject, which has in the last few years increased considerably, as I presently count over thirty authors, who all agree on the main points of therapeutical success of koumiss, from whatever milk it may have been prepared. I will not prolong this paper by enumcrating the cases reported in those works, as I shall arrange them in a proper order in the second edition of my treatise on koumiss; but so much I must say, that all these authors confirm the brilliant therapeutical results described so well by the father of koumiss literature, Dr. John Grieve of Edinburgh, late physician to the Russian army, when his paper, written with emphasis and with an undeniable noble feeling throughout, was read by Dr. Black, July 12th, 1784, in Edinburgh, regretting that koumiss should still remain unknown in the most enlightened parts of Europe, although a horde of Tartars, etc., had been using it for some ages past. I only do my duty in paying the greatest possible respect to the memory of Dr. Grieve, because even to-day his correct conceptions, his skilled judgment, his well defined indications, have not found a better and nobler expression on this subject after the lapse of almost a century, and I willingly indorse Virchow's words,—"I have two faults over which I rejoice conscientiously: the one, that I consider the old physicians as 'brave' observers; and, perhaps the still greater one, of believing in their therapeutics."

Passing on to the indications of koumiss, I purposely omit to speak more specially of its physiological effects, which can only be understood by the full knowledge of its separate ingredients, and the operation of each; involving investigations that belong rather to a separate work, including the cumulative effects or sum total of the effects of koumiss.

Full Koumiss (A) is made from cow's milk, preserving the whole of the cheesy matter and as much of the butter or cream as is compatible with digestion and manufacture. It is adapted for cases of great emaciation with weakness of the digestive organs, when little liquid and no solid food can be taken; also for all complaints which are not of a febrile character, the bodily temperature especially not exceeding 100 deg. Fahr.; and for patients who have previously improved under the use of *Medium Koumiss* (B). This is the artificial representant, as nearly as possible, of the mare's milk koumiss, not obtainable in this country; and can be made by mixing ass's milk with cow's milk in the proper proportions, or by adjusting the natural components of cow's milk alone, so as to diminish the casein and butter and augment the lactose and salts, thus making the koumiss more facile of digestion. It is suited to delicate or sensitive stomachs, which revolt against the buttermilk taste of the full or A koumiss, in which the cheesy matter proves too rich; and is also a more sensitive koumiss, of more agreeable taste, so as even to satisfy a very capricious palate. Should there be in some exceptional cases a dislike even to the B koumiss, then I would prescribe, especially for children or ladies, whey or C *Koumiss* No. 2 or 3, mixed with one-third part of fresh milk, warmed, if wanted, at the time of drinking, to be taken at first in small doses frequently during the day (one pint bottle *per diem*), increasing every two days *usque ad libitum* (three or four pints and more per day). Some persons, again, will prefer a little sugar dissolved in a tablespoonful of warm water put first into the tumbler, then the fresh milk, and on this let the koumiss out with all its force to mix thoroughly. A small quantity of champagne wine with it will augment the alcohol in a very pleasant way, if necessary.

The specific gravity of B koumiss varies between 1035 and 1070 in its fresh state, though, by the process of fermentation, it may sink below 1028 in consequence of the lactose breaking up into lactic and carbonic acids and alcohol. It may be used for diseases of the stomach and lungs instead of solid food, especially when the patient frequently asks for an acidulous drink, which in this case will not raise the temperature or irritate the stomach by a too sudden ingestion of solid matter. In this koumiss is also found that, in the second stage of fermentation, the cheesy matter appears in separate layers, which, however, by shaking, can be easily reduced to a homogeneous milky fluid by combining with the serous layers, and the molecular condition is then so uniform that no flakes are noticeable, as in the genuine mare's milk koumiss. I may notice here that cheesy matter in the solid form, separated from the milk by means of rennet, curds, etc., is quite indigestible, even in small quantities, and can only be adopted for food when fermented in the shape of Stilton or Cheshire cheeses, etc., which are prepared, with or without the addition of cream, all over the globe; whereas, in a well fermented koumiss, the cheesy matter appears as a homogeneous, soft mass, which constantly develops bubbles as long as it is moist, and the flakes dissolve on the tongue like snow, with an acidulous and a pleasant sensation. No wonder, then, that it does not give the stomach the slighest trouble in digestion or absorption; and I can safely say that I have never found any other form of cheesy matter, by any course of preparation, that possessed similar properties, although I have made innumerable attempts to produce a soft cheese which would prove digestible in larger quantities, so as to replace

loss of flesh in certain wasting diseases. In my experiments, I found that the dry residue of koumiss, after filtration or evaporation, affords a granular mass of acidulous taste, containing undecomposed lactose, albumen, and salts, which, when made into lozenges with the necessary additions, are so easy of digestion, that a few of my friends consumed nearly a pound of them after dinner—*pour la bonne bouche et digestion!* I would not seem, however, to recommend A koumiss after a hearty meal, though I shall never forget Plymouth, where, after reading my paper on koumiss, a very eminent gentleman contended in sober earnest that, having taken some of Chapman's Full Koumiss in the museum, for the supposed purpose of removing indigestion after a full breakfast that had disagreed with him, instead of feeling better he became worse, as if a "plenus venter digerat libenter" when it becomes still more extended.

I have been often called upon to answer most amusing questions with regard to koumiss, though I must confess I correct with the greatest pleasure the errors committed by others on the subject of milk-fermentation. Many look upon koumiss as a drug-medicine, and think that with one or two bottles, taking a tablespoonful every two hours, a decided effect ought to follow; just as some persons fancied that guano, when first introduced, would make plants grow *ad oculos demonstrandum* (before their own eyes!). I regret that the age of wonders has passed, although there is still a credulous portion of humanity to conjure up wonders in their own imagination. Koumiss is, however, undoubtedly entitled to be regarded as a medicine that "heals to nourish, and, in nourishing, gives strength and weight in the shortest possible time;" which is a truth daily confirmed in proper cases. In any case, this remedy is, at all events, harmless, occasioning no anxiety to the physician, and much more likely to produce the good effects he desires, especially in cases where drug-treatment is apt to fail. I ought to state that I never had the opportunity of procuring a sufficiently large quantity of mare's milk for koumiss, so as to make fair trial of it in practice; and my conclusions as to the comparative merits of mare's and cow's milk koumiss are strictly of a deductive nature, based on the analysis.

FORMULÆ FOR PEPSIN PREPARATIONS.*

BY HENRY BIROTH.

All formulæ for elixirs and other preparations containing pepsin, heretofore published in the various pharmaceutical journals, differ so greatly in regard to doses, as well as the mode of preparing, that the demand for *uniformity* and *simplicity* in these preparations has become quite necessary. Now, for the last two years I have been manufacturing pepsin, and consequently have paid much attention to the different preparations in which pepsin is used. The results are the following formulæ, which I submit to the pharmaceutical profession. They are based upon the dose of the remedies used therein, and their simplicity is evident. Elixirs, etc., can be prepared according to these formulæ instantly, when prescribed or kept on hand, in the smallest quantities; they are elegant, palatable, and may be modified by the physician *ad. lib.*

The dose for children is from a half to one *tea*spoonful; for adults, from a half to one *table*spoonful.

Each teaspoonful contains, in grains—

Pepsin.	Iron.	Bismuth.	Quinine.	Strychnia.
2	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{128}$

Each tablespoonful contains, in grains—

Pepsin.	Iron	Bismuth.	Quininc.	Strychnia
8	4	2	1	$\frac{1}{32}$

Syrup of Pepsin.

Powdered Pepsin	256 grains.
Muriatic Acid	1 drachm.
Syrup Orange Flower Water	16 ounces.

Mix.

Wine of Pepsin.

Powdered Pepsin	256 grains.
Muriatic Acid	1 drachm.
Sherry Wine	16 ounces.

Mix.

Elixir of Pepsin.

Powdered Pepsin	256 grains.
Muriatic Acid	1 drachm.
Orange Flower Water	8 ounces.
Bitter Almond Water	2 ounces.
Simple Syrup	2 ounces.
Glycerin	2 ounces.
Deodorized Alcohol	2 ounces.

Mix.

Elixir of Pepsin and Iron.

Elixir of Pepsin	16 ounces.
Citrate of Iron, soluble	128 grains.

Mix.

Liquid Pepsin.

Powdered Pepsin	256 grains.
Muriatic Acid	1 drachm.
Glycerin	6 ounces.
Water	10 ounces.

Mix.

Aromatic Liquid Pepsin.

Powdered Pepsin	256 grains.
Muriatic Acid	1 drachm.
Glycerin	6 ounces.
Orange Flower Water	8 ounces.
Bitter Almond Water	2 ounces.

Mix.

Elixir of Pepsin and Bismuth.

Elixir of Pepsin	16 ounces.
Ammonio-Citrate of Bismuth	64 grains.

Mix.

Elixir of Pepsin and Quinine.

Elixir of Pepsin	16 ounces.
Sulphate of Quinine	32 grains.

Mix.

Elixir of Pepsin, Iron, and Bismuth.

Elixir of Pepsin	16 ounces.
Citrate of Iron, soluble	128 grains.
Ammonio-Citrate of Bismuth	64 grains.

Mix.

Elixir of Pepsin, Iron, and Quinine.

Elixir of Pepsin	16 ounces.
Citrate of Iron, soluble	128 grains.
Sulphate of Quinine	32 grains.

Mix.

Elixir of Pepsin, Iron, Quinine, and Bismuth.

Elixir of Pepsin	16 ounces.
Citrate of Iron, soluble	128 grains.
Ammonio-Citrate Bismuth	64 grains.
Sulphate of Quinine	32 grains.

Mix.

Elixir of Pepsin, Iron, Quinine, Bismuth, and Strychnia.

Elixir of Pepsin, Iron, Quinine, and Bismuth	16 ounces.
Sulphate of Strychnia	1 grain.

Mix.

Remarks.—To obtain a good preparation, pepsin has to be treated with water and acid, allowing it to swell and dissolve; then filter, and add the other ingredients, alcohol last. The salts of iron and bismuth should be perfectly soluble, otherwise a few grains of carbonate of ammonia are to be added when rubbed together.

* From the *Pharmacist* for February.

PREPARATIONS OF INDIAN HEMP.*

The dried leaves of bhang are sometimes smoked alone or mixed with tobacco; but the more common form of taking bhang is to make it up with flour into a cake, or a majún or sweetmeat, which has a green colour. There is also a common method for habitual drinkers of "banghí," viz., of infusing the leaves in cold water in a pestle and mortar, and pouring off the clear liquor through a cloth strainer.

The eating of these sweetmeats by persons unaccustomed to them produces the most violent mania and excitement, and the eyes become red and inflamed.

I recollect, says Baden Powell, at Lahore, a case of attempted suicide by a youth, where it appeared he had purchased sweetmeats which contained bhang, of which he was not aware; he had not even taken bhang before. After a time he became almost frantic, rushing wildly about hither and thither, and at last threw himself into a well, whence he was fortunately rescued; after this, he fell into a kind of heavy sleep or stupor and then recovered. Persons who are accustomed to the excitement of bhang are not usually so violently excited.

The common majún to be met with in the bazaars is often merely sugar, perhaps with ghí, and the bhang without the other ingredients.

The principal forms in which hemp is met with in the markets of the East† are: 1, *haschich;* 2, *bhang;* 3, *gunjah;* 4, *churrus;* 5, a variety of electuaries, pastes, etc., in all of which butter or some other oleaginous matter is the basis of formation.

I. The first, or *haschich*, is the Arabian name given to the dried tops of the plant grown in Upper Egypt, the meaning of the word being "herb," or "*herbe par excellence;*" the tops are gathered some time before the seeds are come to maturity.

II. *Bhang* is an Indian preparation, consisting of the larger leaves and capsules, which, according to Dr. O'Shaughnessy, is the cheapest form used in India, and therefore in common use among the lower orders for smoking, etc.; from it is prepared an intoxicating drink, and it forms a part of the confection called majoon.

III. *Gunjah* is the chief Indian form of the dried plant, and consists of the dried tops of *Cannabis* after flowering and from which the resin of the leaves has not been removed; it is chiefly sold in the Calcutta bazaars for smoking, in bundles two feet long and three inches in diameter; the colour is dusky green, the odour agreeably narcotic, the whole resinous and adhesive to the touch. The specimens I have examined consist of a central stem with branches, round which are aggregated elongated oval masses about 1½ inches long, and closely pressed together by adhesive resinous matter; when steeped in water these masses can be teased out, and are found to consist of the tops of the plant—that is, the flowers, fruit, and smaller leaflets.

IV. *Churrus* is the resinous secretion alone, and is, therefore, the most powerful shape in which hemp may be used; but it is at the same time expensive, and is not met with in Europe, except as a museum specimen. The specimens in Dr. Christison's museum are variously-sized nodulate, round masses, from the size of a pea to that of a walnut, and of greenish black colour. It is collected during the hot season by scraping the leaves and tops. Dr. O'Shaughnessy states that in Central India and Nepal men in leathern dresses brush forcibly through the plants, and the resin which adheres to them is then scraped off. And Dr. McKinnon states, that in Nepal the resin is gathered on the backs of native coolies. Dr. Royle says, "The glandular secretion is collected from the plants on the hills by the natives pressing the upper part of the young plants between the palms of their hands, and scraping off the secretion which adheres."

V. In the preparation of the electuaries, etc., butter is used as the means of separating the active principle, consequently these compounds are very apt to become rancid.

They are thus described by M. Charnac in the "Annuaire de Thérap." for 1846:—1. Preparations mixed with honey or melted sugar. 2. A more active form called *haschich kava-mesk* (musked drug), containing musk, essence of roses and almonds, of pasty consistence, and of the colour of impure honey; the quantity used being about the size of a walnut. 3. Two kinds are found at Smyrna, called Israël, the one a fine powder, the other a roll of firm mastic consistence. 4. A black round kind has great aphrodisiac repute among the Fellahs, but in this case it is found that cantharides is added to increase the effect.

At Cairo the compound from which the various conserves are prepared is thus made. Equal parts of well-sifted haschich, butter, and water are put in a vessel on the fire; after some boiling, the water is dissipated, the residue is twisted in a cloth to isolate the fatty matter, and to this the different spices are added.

Haschich is to the Arabians what opium is to the Turks and Chinese. *Hachach*, signifying in Arabian drunkard, is the epithet applied to those who eat haschich.

The Arabians smoke the powdered plant, free of seeds, which contain fatty, disagreeable-tasted matter, along with tobacco.

VI. Landerer describes a tincture of hemp used at Cairo, called chatsraky, made by infusing in spirit for three weeks, with a gentle heat, the varnish-covered bark sliced from the stems when the plants are in flower.

As the activity of the preparations of hemp depends on the presence of a resinous varnish on the leaves, and consequently, as the most active of these is found to contain the largest quantity of resin, it becomes a matter of great importance to decide upon the proper period for collecting the plant.

M. Gastinell, an apothecary at Cairo in 1849, states that he found the active powers of hemp to depend on a resinous matter which forms on the leaves as the seeds ripen. Again, M. de Charnac observes, that in Egypt the tops of the plants are used at the end of flowering, but before complete maturity of the seeds. And Mr. Jameson, Director of the Botanic Gardens at Saharumpore, makes a like statement in a letter dated 17th August, 1849. As this letter contains an interesting account of hemp in that part of India, it has appeared to me to be well worthy a place in this essay. He says:—

"In Kimaon and Gurhwal *cannabis* is grown in large quantities, partly in order to obtain its resinous secretion, and partly for its bark, from which a strong coarse cloth called *bungila* is manufactured; it forms the dress of the poorer inhabitants, particularly through Gurhwal. It is sown in July and October. From the female plants only the churrus is procured. Towards the beginning or middle of October the seeds begin to form, and when in this unripe state the upper part of the plant is pressed between the palms of the hands, it deposits upon them a yellowish-green secretion, which is scraped off with a blunt knife; this is the well-known churrus. From the male plant bhang and cath are prepared. Bhang is prepared by drying the leaves and other parts of the plants, both male and female, and is thus used:—A small quantity is put into a mortar with a little water and pounded, the refuse water being thrown away; an additional quantity of water is then added, from half a pint to a pint, depending on the strength required, and well mixed; it is then strained through a fine cloth, the residue thrown away, and the liquid is ready for drinking, a wine glassfull or more being taken at a time. Gangah is the thin preparation, and is the produce of the upper portion of the stem, that is about 1½ foot; it is only used in the hookah, to smoke; this also applies to the churrus. The gangah is carefully dried and mixed with an equal

* From the Official Catalogue of the Indian Department at the Vienna Universal Exhibition.

† Derived from a memoir by Alexander Christison, J.B.S.E., "On *Cannabis Indica*, Indian Hemp."

quantity of tobacco, and well rubbed together in the palm of the hand; it is then ready for the hookah. We have thus three preparations:—1, churrus; 2, bhang, or subzi; 3, gangah, or ghangah. The first is only prepared on the hills, and the two latter are common to both hill and plain, but bhang is principally prepared in the latter. At Bhaeit, about 16 miles from Saharumpore, it is prepared in large quantity, and is subject to a heavy duty; yearly from 40,000 to 50,000 maunds are produced (a maund is equal to 80 lbs.) The reason why the churrus is not prepared in the plain is because the plant does not secrete the resinoid principle, showing that its secretion is connected with climate. But still, the plants are identical in external characters, and you will, I think, find that the European and Indian plants are also identical. In order to ascertain the fact, I send you a small packet of hemp seeds procured at one of the Gurhwal villages, where it is grown in vast quantity. In your letter you say that the active principle forms on the stems and leaves; this is not the case, as it is only procured when the seeds are in an unripe state; attempt to procure it before this period, and none will be forthcoming. It will appear strange how ignorant natives can distinguish female from male plants. Were you to see the plant growing, your surprise would soon be removed; the female plant when ready for making churrus has at its upper part a 'bunchy' appearance, whereas the male plants have become by this time mere stems and leaves, the flowers also having fallen off.

"In October, in crossing the Himalayas from Almorah to Missouri, I have passed through dozens of villages 6000 to 8000 feet above the level of the sea, and seen hundreds of men, women, and children, all employed in making churrus. The plant grows to a height of from 10 to 14 feet."

VARIOUS METHODS FOR THE PREPARATION OF BINIODIDE OF MERCURY.*

BY E. B. SHUTTLEWORTH.

In devising or selecting a formula for the preparation of any compound, there are three considerations which are essential to a correct and satisfactory conclusion. These are, that the contemplated product be obtained (*a*) of the best quality; (*b*) at the lowest cost; (*c*) with the least trouble. As a general rule, the relative importance of these conditions is indicated by the order in which they are given; quality is, or should be, the great essential, while cost and convenience are of secondary consequence. Too often, however, this order is reversed, and all considerations are made subordinate to that of cost; but, in no case can this be justifiable; it is only when the matter of quality is satisfactorily settled that we are at liberty to decide in favour of that process which promises to be the most economical. The question of economy is, however, to the pharmacist a most important one, and, in cases of scarcity of material or high prices, merits his best attention.

A case in point is that of the red iodide of mercury—a compound which is almost invariably prepared by the pharmacist. The recent inflation in the price of iodide of potassium, and the high figure which it at present maintains, demand the utmost economy in its use. In view of this it may be opportune to review the various processes which have been devised for the preparation of the biniodide of mercury, so that we may be able to obtain the best results with the least possible expenditure of materials.

The first process which might be noticed is that in which the biniodide is formed by a direct union of the elements composing it. Mercury and iodide are triturated, or agitated together, a little alcohol being added to control the reaction. In inexperienced hands this process yields an imperfect product, is exceedingly wasteful and troublesome, and may be so dismissed.

A better process is that of the British Pharmacopœia:—4 parts of perchloride of mercury, dissolved in 60 parts of boiling water, are mixed with 5 parts of iodide of potassium, in 20 parts of boiling water. The iodide is, theoretically and practically, one-tenth of one part in excess of that actually required for the decomposition. Its object is to prevent contamination of the product with the mercuric salt. This excess appears useless, first, because, with any ordinary care, the operator can ascertain the moment the decomposition is complete; and, again, if any slight excess of mercuric salt happened to be present, it would certainly be removed in the subsequent copious washings to which the biniodide is subjected. This excess is not only wasteful as far as the iodide of potassium is concerned, but of the biniodide also, as the latter salt is soluble in the former. The use of boiling water is unnecessary, as the quantity ordered would, if cold, dissolve the salts readily. The precipitate from a hot solution is more granular than that from one which is cold, and for the preparation of ointments it will be conceded that the finer and softer salt is to be preferred.

In the process of the U. S. Pharmacopœia the excess of iodide is the same as that of the B. P., but cold water is applied for solution.

The most satisfactory and economical results I have obtained from the decomposition of the salts alluded to, have been by employing 4 parts of the mercuric salt, in powder, dissolved in 64 parts of cold water, adding a sufficient quantity of solution of iodide of potassium (4·9 parts in 10 parts of water). The yield will be 6·7 parts of a salt sufficiently dry to be pulverulent. This is very little short of the theoretical yield; 271 parts $HgCl_2$ require for decomposition 332 parts KI, and should produce 454 parts (6·701) HgI_2.

Another method which may be easily and economically pursued is that in which iodide of iron is used instead of iodide of potassium. The relative prices of iodine and iodide of potassium are generally as 21 to 19, and 254 parts iodine are equal to 332 of iodide of potassium. If, therefore, we mix 3·75 parts of iodine with 4 parts of cold water and sufficient iron wire to saturate, allowing the mixture to stand for several hours, heating towards the close of the reaction, we shall obtain a solution of iodide of iron equivalent in iodine strength to the quantity of iodide of potassium required to decompose 4 parts of perchloride of mercury. The yield will be about 6·7 parts, and the quality of the product is equal to that produced in any other way, but the precautions of using the iron solution as soon as possible, and of washing the precipitate as soon as deposited, must be observed; otherwise the product might be contaminated with a basic ferric chloride, which in time is thrown down. It will be seen that this method is as economical as could well be devised; the operator getting the profits of the manufacturer of iodide of potassium, minus the labour of the former in making the iodide of iron.

The last process which we shall notice is that devised by Mr. Williams, described in the *Chicago Pharmacist*. In this, the use of a large quantity of water for the solution of the mercuric salt is obviated by employing a concentrated solution of chloride of ammonium, in which the mercuric salt dissolves readily. Four parts of perchloride of mercury are dissolved in four parts of water to which 2 parts of chloride of ammonium have been added, 5 parts of iodide of potassium are dissolved in 5 parts of water, and the solutions are mixed. It will be seen that, in this way, 9 parts of water suffice for solution, while otherwise, at least 70 would be required. This is a great convenience, especially when large quantities are operated upon; but, according to trials which I have made, the method is not economical, on account of the biniodide being soluble in the solution of chloride of ammonium. By draining the newly formed salt as soon as deposited

* From the *Canadian Pharmaceutical Journal*.

the loss may be rendered smaller than if water were at once added to the mixture; but the product will not exceed 6·150 parts against 6·701, the theoretical yield, or 6·700, the yield by the method with simple water. In large operations, some of this dissolved biniodide may be recovered by evaporating to dryness the drainings and first washings, washing away the deposited chloride of ammonium, and thus leaving the more insoluble biniodide. The operation must be performed quickly, or the biniodide will also dissolve. Williams's method cannot be recommended except where expedition and convenience are considerations paramount to that of cost. The product is of a darker colour and more granular than by other methods, and somewhat resembles that prepared by the old Edinburgh process, in which the compound formed by a direct union of mercury and iodine is dissolved and crystallized from a solution of chloride of sodium.

A word in regard to Williams's method for purifying the green iodide of mercury.* I have lately tried this plan and found it to work very satisfactorily, being equally efficient, quite as convenient, more expeditious, and much more economical than the process with alcohol. The washing may be best performed by repeated agitation and decantation, using fresh solution of chloride of sodium.

DROPS.†

BY HORATIO N. FRAZER.

The importance of accuracy in the compounding and dispensing of medicine can only be measured by its service in the prevention and cure of disease, and since the time when its preparation and use were first regarded and studied as an art, much thought and labour have been expended on devices for making standards by which intelligent aids to the medical profession would be able to dispense and give the medicine with a uniformity tended to convince all parties concerned that the original idea and directions of the physician had been correctly understood and carried out.

The results of these efforts in a practical form have been made apparent by the almost universal use of the pharmacopœias in the different countries where they are published, by the profession for which they are made; the benefit derived from their use making it thought necessary in some countries to enforce it by law, the absence or non-enforcement of which law creates so much confusion at times in the United States.

Notwithstanding these standards have been made and endorsed by the highest authority, approximate measures are very often used by physicians in their prescriptions, sometimes with a want of knowledge which in an apothecary would be called culpable, but more often with a thoughtlessness which oftentimes entails serious consequences. And the use of the word drops is not the least of these.

A drop, as defined by Webster, is "the quantity of fluid which falls in one small spherical mass," or the smallest bulk of liquid which can be conveniently measured. More definitely, it means that portion of a liquid which separates from the bulk of the liquid when its weight overcomes the attraction of its particles to it, and will vary with the fluidity of the liquid, its weight, the amount of solid matter held in solution by it, the temperature at which it is dropped, and the size and shape of the vessel used.

The idea generally meant to be conveyed by the term drop is the bulk of a minim. But from the annexed table it will be seen that it varies from about one-third to nearly twice its measure, and is consequently unreliable for preparing medicine. An instance occurred a short time ago, which came to the knowledge of the writer, where the difference between the size of the drop from the nose of a dispensing bottle and the end of the stopper, made such a difference in the appearance of a prescription that the druggist lost the trade, not only of the patient but of several more on that account.

This is an evil which a druggist cannot avert, for even under the same circumstances, the bulk of no two drops from the same bottle are exactly equal, and the remedy for the evil rests, not with the pharmacist, but with the physician, whose duty it is, and whose interest it willsoon be, to protect him from it.

Below is added a table of the number of drops to a fluid drachm of United States officinal medicines that are usually given in the form of drops, together with some of the unofficinal which are more generally used; it was noticed that the drops from a two or four ounce prescription bottle, were in every case smaller than those from a quart or pint tincture, ranging from ten to twenty more to the fluid drachm:—

From Quart Tincture Bottles.

Tinctura Kino	111
,, Opii	105
,, Opii Camphorata	93
,, Gelsemii	97
,, Stramonii	95
,, Ferri Chloridi	105
,, Aconiti Radicis	120
,, Digitalis	90
,, Veratri Viridis	115
Vinum Opii	80
,, Ergotæ	72
,, Colchici Radicis	74
,, Ipecacuanhæ	75
Oleum Olivæ	80
,, Amygdalæ	30
,, Terebinthinæ	90
Syrupus Pruni Virginianæ	60
,, Simplex	55
,, Scillæ	56
,, Acaciæ	50
,, Ipecacuanhæ	60
Extractum Ergotæ Fluidum	96
,, Veratri Viridis Fluidum	100
,, Gelsemii Fluidum	97
,, Conii Fluidum	92
Spiritus Chloroformi	120
,, Ætheris Nitrosi	111
Liquor Potassæ	65
Alcohol	106
Chloroformum Purificatum	160
Glycerina	49
Aqua Ammoniæ	47

From Pint Tincture Bottles.

Acidum Carbolicum 95 per cent	70
,, Muriaticum	58
,, Aceticum	76
,, Aceticum Dilutum	60
,, Nitricum	71
,, Sulphuricum	115
,, Sulphuricum Aromaticum	114
,, Nitro-Muriaticum	61

Unofficinal Preparations from Original Bottles.

Acidum Hydrocyanicum Dilutum, from oz. bottle	48
Compound Syrup Phosphates (Parrish's)	50
Syrup Pyrophosphate of Iron (Qt. Tr.)	57
McMunn's Elixir	86
Tincture Calabar Bean (Qt. Tr.)	112
Chlorodyne	90
Fleming's Tincture Aconite	110
Godfrey's Cordial	60

* See Pharm. Journ. [3] vol. iii., p. 1015.

† From the *Pharmacist* for February.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 28, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square,*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PUBLIC ANALYSTS.

WHEN we undertook some weeks ago in dealing with this subject to express the opinion that Dr. STEVENSON'S article in the *Practitioner* of last January was in many respects injudicious, and, considering recent occurrences, exceedingly ill-timed, we did so with no desire to be hypercritical, and least of all was it our disposition to bear hardly upon those chemists who occupy the position of official analysts. However, it was impossible to overlook the fact that the work done by these public officers, ostensibly in the interests of the community, has been so repeatedly of a merely "harassing" nature in regard to traders that there is a risk of the application of the Adulteration Act becoming, under existing conditions, a public scandal.

We should very much regret to see such a result brought about in any way, or to find that at the very onset of an attempt to make the skill of chemists generally available for the public good, discredit should be thrown upon such services. But it seems that our friendly admonitions upon this subject have been strangely misconstrued by the Editor of the *Practitioner*, who has been wrathfully excited by our remarks, and has, with Hibernian energy of language, devoted five pages of his journal to denouncing their error and perversity. He commences by the announcement that in doing so he is merely acting under urgent compulsion, though we fail to recognize any foundation for this statement, and think, on the contrary, that he might have improved the character of his journal by publishing something more useful and interesting to his readers than the flimsy rhodomontade he has produced under the heading "Spiritus Etheris (*sic*) Nitrosi."

By an ingenious assumption, the article which is made the subject of this diatribe is termed a "drug," and it is assumed that the writer of the article in the PHARMACEUTICAL JOURNAL was at the time labouring under intoxication "with the success of the accused druggists whom he so warmly supported." This condition is supposed to have prevailed to such an extent that the writer, in "the excitement of his immoderate joy" makes apparent his real hopes and intentions of "driving a coach-and-four" through the Adulteration Acts. Within the short space of the half-page occupied with these introductory flourishes of the editorial shillelah, most of the leading facts of the case referred to are misstated or distorted; but it would probably be superfluous to correct these errors, as our readers are well acquainted with the real circumstances, and we do not hesitate to rely upon their recognizing the fact that the tone of our article was rather that of lamentation than rejoicing.

The Editor of the *Practitioner* wisely abstains from dealing with "the arguments" by which, he asserts, we sought "to throw discredit on the attempts of analysts to pin tradesmen down to a definite standard of purity in the articles they sell," and we greatly commend his discretion in doing so. But he cannot contain himself in regard to the manner in which we speak of Dr. DUPRÉ. Here the pent-up vials of his wrath burst their bonds and flow over, and his readers are informed that this is "not to be tolerated." This gushing declaration, unfortunately involves an impeachment of Dr. DUPRÉ, not only as regards the propriety of his conduct as a public analyst, but also as regards his veracity. We are aware Dr. DUPRÉ has been suspected, and in some instances accused, of having himself instigated the prosecutions in regard to *Spiritus ætheris nitrosi*. It has also been considered that if such were the case he very gravely exceeded his legitimate functions, and we are disposed to concur with this opinion, inasmuch as we hold that the public analyst should retain a fully independent position, by restricting himself to the establishment of facts alone, without laying himself open to the imputation of "hobby riding." In our comments upon the Westminster case we incidentally expressed this opinion, though we felt bound to accept Dr. DUPRÉ'S repeated distinct declarations that he had nothing to do with those proceedings being taken. The Editor of the *Practitioner*, however, represents Dr. DUPRÉ as having instigated the prosecution, and then quarrels with us for condemning the false position in which he placed himself. Confusion worse than this it is impossible to imagine, and Dr. DUPRÉ may well say, "Save me from my friends."

In the same incoherent vein it is asserted that the view of the facts of the prosecution on which we are told this Journal "presumes to lecture Dr. DUPRÉ" is demonstrably incorrect, and after some study of the subject the *Practitioner* proceeds to denounce certain fallacies assumed to have been adopted by Mr. ARNOLD and ourselves. First, that the article was not a "medicinal but only a popular preparation." This fallacy, however, is neither ours nor Mr. ARNOLD'S, but only a creation of the *Practitioner's* fancy.

Then it is asserted that it is not true Dr. DUPRÉ'S inspectors asked for and purchased "sweet spirits of nitre." Whether it be so or not, we cannot say, but if any one cares to refer to the evidence of Mr. ROGERS, the inspector, they will see that, while the summons was for selling spirits of nitrous ether, he distinctly states he asked for "four ounces of sweet spirits of nitre." Our view of this is that the whole proceeding was a muddle.

The next fallacy of which we are accused is the

proposition that nitrous ether is cheaper than alcohol. Here again the fancy of our contemporary has been at work. We certainly have not furnished any ground for this charge. Again, we are accused of adopting as a third fallacy, the opinion that the preparation of the Pharmacopœia cannot be made of uniform strength, or kept unaltered. To those who are readers of this Journal, it is needless to offer any refutation of such a statement; but we may just mention in proof of its want of foundation, that the very same journal in which appears the article that has so profoundly moved the Editor of the *Practitioner*, there is a report of a discussion on this subject, in the course of which it was clearly shown, as on many previous occasions, that spiritus ætheris nitrosi can be made of uniform strength according to the process of the British Pharmacopœia.

It was therefore unnecessary to bring forward any analytical evidence of Dr. DUPRÉ'S to demonstrate this fact, or to disprove an imaginary statement to the contrary. But the table of analytical results which our contemporary publishes introduces a new feature of bewilderment. We reproduce the details of these analyses, in order that we may not be supposed to misrepresent them.

	No. 1.	No. 2.	No. 3.
Specific gravity . . .	·824	·836	·839
Corresponding alcoholic strength	89·5 p.c.	84·8 p.c.	83·6 p.c.
Real nitrous ether . .	1·35	2	1·98
Free volatile acid, as acetic acid	1·19	none	·9
Free fixed acid . . .	trace	none	none.

The analysis No. 2 refers to a sample prepared by Dr. DUPRÉ according to the pharmacopœial process in February, 1872. The analysis No. 3 represents the condition of this sample in November, 1873. The analysis No. 1 represents a sample purchased by Dr. DUPRÉ of a "very famous wholesale establishment," and labelled "Spiritus Ætheris Nitrosi, Brit. Pharm." This latter sample, it is stated, was seriously deficient in nitrous ether, and otherwise obviously impure and carelessly made.

Without dwelling on the fact that in these analyses there is no very great difference in the amounts given of "real nitrous ether," we may at least point out that the preparation described as having been made by Dr. DUPRÉ is, according to the data given, very unlike what it should be according to the Pharmacopœia. This is the more remarkable, since Dr. DUPRÉ adopts a method of analysis which is represented as indicating the true amount of nitrous ether. This method was described by him at the trial, though with somewhat unaccountable reluctance. The only interpretation we can put upon the fact that the analysis above quoted gives 2 per cent. instead of 10 per cent. as the amount of real nitrous ether in the Pharmacopœia preparation is that the Editor of the *Practitioner* has got into a fog and misrepresented Dr. DUPRÉ.

We are glad, however, to find it possible to agree with our contemporary in something, and we cordially concur with him in the opinion that the Westminster Board of Works was feebly represented on the occasion in question. We would also suggest that they were equally ill-advised, and that in future attempts to do public service in repressing adulteration, one essential requisite for attaining success will be the possession of some real acquaintance with the circumstances of any case they take in hand. To avoid miserable failure, waste of time, and persecution of unoffending tradesmen, such knowledge is essential, and without it it is only by chance that those engaged in conducting a prosecution can escape being made to appear ridiculous.

The Editor of the *Practitioner* further takes us to task for venturing to throw doubt on Dr. STEVENSON'S allegation that "shameful" irregularity exists in the strength of citrate of iron and quinine as sold in the shops; but again this instance of our "presumption" is imaginary. We refer him to what we really did say on this subject, and we also advise him to obtain information as to the conditions which mainly determine the manufacture of inferior qualities of this and other pharmaceutical preparations. If he succeeds in obtaining this, and will publish it in his journal, he may, perhaps, contribute towards the abolition of the practice somewhat more effectually than by indulging in sensational declamation.

THE PARIS SCHOOL OF PHARMACY.

During a recent discussion on the French budget M. P. BERT asked for a first annual grant of 400,000 francs to be expended in reconstructing the "École Supérieure de Pharmacie" at Paris. The reasons which he urged in favour of the grant were that the present establishment was without sufficient collections, without laboratory, and without *matériel*. He said that there were five hundred pupils paying 100 francs per year for the laboratories, although the school was only organized for 200; consequently there were many for whom room could not be made in the laboratories, and these pupils were prevented from passing their examinations. Moreover, the foundations had become unsafe, and there was a danger that at any moment the whole building might fall into ruins. The motion was eventually withdrawn on the understanding that the Government intended to ask next year for a considerable sum of money to be applied to the national scientific establishments. It transpired in the course of the discussion that the city of Paris is the proprietor of the School of Medicine in Paris, whilst the state is the proprietor of the School of Pharmacy.

COCCULUS INDICUS.

WE notice that the *Lancet*, in referring to a recent question in our Notes and Queries' column, as to whether there is any legitimate use for the *Cocculus Indicus* imported into this country, replies—"We say certainly not; and have no hesitation in affirming

that a very large proportion of it is put into malt liquor, to give it strength and headiness." As considerable diversity of opinion exists upon this subject we think our contemporary would be doing a public service in publishing the evidence it doubtless possesses upon which such a statement is made. We would also take the liberty of suggesting that it would be as well to give at the same time the correct authority for the insertion of the word "largely" in the statement that "grains of paradise, liquorice and sugar are largely used as adulterants" of beer, which is at present referred to the report of the Superintendent of the Inland Revenue Laboratory. We have understood that report to say that adulteration was detected in only six samples of beer, or of materials used in brewing beer, during 1872, from all the breweries in the United Kingdom. It should also be remembered that sugar can be used in any quantity in brewing beer, provided the quantity used is entered on what is termed "The Brewers' Entry Paper." It is then charged with duty equivalent to the malt duty. It is only when not so entered that its use is considered by the revenue authorities as an adulteration, or rather as a fraud on the revenue.

ECHOES OF THE PAST.

Although we have no wish to disinter a disagreeable subject that has now slept in peace for some time, a paragraph quoted in the *Bulletin* of the Bordeaux Society of Pharmacy from the *Tribune Médicale*, under the title "The duties of a pharmacist interpreted by an English jury," is at once so racy and true that we reproduce it without further comment :—

"Dr. L. was called to attend an "*alcoolique*," attacked by *delirium tremens*.

"He prescribed half an ounce of tincture of digitalis in an equal quantity of distilled water.

"Mr. Fisher, the pharmacist, refused to execute the prescription.

"Whilst the physician protested and the pharmacist resisted, the patient died.

"An inquest was held; opinions were divided. The affair was laid before the jury, who declared—

"(1) That death was the result of natural causes, accelerated by the abuse of drink.

"(2) That the pharmacist, Mr. Fisher, was wrong in not executing the prescription of Dr. L.

"Meanwhile the therapeutists continue to argue.

"We have asked ourselves how the English jury would have decided the contention in the case where, Mr. Fisher having executed the prescription, it had been proved that the patient had died poisoned.

"It is probable that the verdict would have been drawn up in the following terms :—

"(1) Mr. X. is dead naturally.

"(2) Drink has assisted him to die.

"(3) Tincture of digitalis has done the rest.

"(4) Mr. X. is therefore dead according to rules.

"(5) Nevertheless, Mr. Fisher was wrong in executing the prescription of Dr. L.

"Rabelais said, 'The practice of medicine is a farce played with three characters, the physician, the patient, and the disease.' Is there not here an opportunity of adding, 'And played sometimes with a fourth, the jury, which is certainly not the least amusing of the four?'"

INTRODUCTION OF TEA.

We have been favoured with a communication from Mr. Daniel Hanbury, in which he states that having recently had occasion to search some old newspapers in the British Museum, he observed the following advertisement in the *Mercurius Politicus*, No. 435, September 23rd to 30th, 1658. Though it is probably well known to antiquaries, it may be interesting to some of our readers :—

"That Excellent, and by all Physitians approved, *China* "Drink, called by the *Chineans*, *Tcha*, by other Nations "*Tay alias Tee*, is sold at the *Sultaness-head*, a *Cophee-* "*house* in *Sweetings* Rents by the Royal Exchange, "*London*."

POISONING BY MISTLETOE BERRIES.

In the *British Medical Journal* for February 21, Dr. J. Dixon, of Whitehaven, publishes a case of a boy who exhibited severe symptoms of poisoning after eating mistletoe berries. The patient was fourteen years of age, and was found lying in the street in a state of insensibility, within forty minutes of the time of eating the berries. The first impression was that he was in a state of alcoholic intoxication, but no trace of alcohol was found in the breath or subsequent vomit. An emetic of sulphate of zinc was administered, which brought off eight partly masticated berries. There were indications of considerable cerebral hyperæmia, which was appropriately treated, and the boy was well the next morning. He stated that soon after eating the berries he began to feel giddy, and from that time had no recollection of what transpired.

According to the *Bulletin Thérapeutique*, an attempt made by a Paris merchant to utilise the sewage of that city in the cultivation of lâbiate plants in the plain of Gennevilliers has been so successful that at the present time three hectares of land are devoted to the raising of peppermint alone. The plant is said to grow with such vigour that three collections are made in each year, whilst the essential oil obtained from it by distillation is asserted to be superior in delicacy of aroma and flavour to that imported from England. So satisfied are the directors of the Pharmacie Centrale with the results, that they express their readiness, should any pharmacien be sufficiently enterprising to extend the experiment to the neighbourhood of the manufactory at St. Denis, to undertake to use all the products.

An Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, when the following papers will be read :—"Note on the Decomposition of a Lozenge," by Mr. T. Greenish; and the "Chemistry of Ngai Camphor," by Mr. Sydney Plowman, Senior Bell Scholar in the Society's Laboratories.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON,

February 18th, 19th, and 20th, 1874.

Present—Messrs. Allchin, Barnes, Benger, Bottle, Carteighe, Corder, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, Taylor, and Umney.

Dr. Greenhow was present on the 18th, on behalf of the Privy Council.

MAJOR EXAMINATION.

Four candidates presented themselves and passed, and were declared qualified to be registered as Pharmaceutical Chemists :—

Pank, Philip Durrell .....North Walsham.
Cooke, William Kendle .....Brighton.
Savage, John Welch.....Wells.
Roach, Herbert William ... .London.

MINOR EXAMINATION.

Seventy-nine candidates were examined. *Forty-five* failed. The following *thirty-four* passed, and were declared duly qualified to be registered as Chemists and Druggists :—

*Knights, James West.....St. Ives.
*White, William Thomas .....London.
Bettle, Joseph Alfred .....Bedford.
Equal. Harding, Edward .....Greenheys.
Equal. Smith, Thomas James .....Spalding.
Knight, Alfred George.....Swansea.
Equal. Brooks, Charles Theodosius.....London.
Equal. Jesser, Alfred Henry .....Southampton.
Equal. Peat, Joseph .....Workington.
Scobie, James .....Perth.
Kirby, Thomas William .....Liverpool.
Equal. Equal. Baker, John Hopper.....Bristol.
Equal. Equal. Green, Alfred .....Wakefield.
Equal. Cox, Joseph Bethell .....Lynn.
Equal. Gardiner, William Eustace .....London.
Whitney, William John .....London.
Wardley, Samuel Frederick.....Lowestoft.
Equal. Cross, John .....Northampton.
Equal. Davies, Thomas.....Liverpool.
Wrack, Frederick George.....Lincoln.
Cardwell, Ernest .....Lytham.
Equal. Equal. Holgate, Sam Verity .....York.
Equal. Equal. Martin, John Wesley .....Stratford.
Equal. Agger, Joseph Edward .....King's Lynn.
Equal. Budworth, William Seth.....Bolton.
Equal. Jones, Evan Jones .....Lampeter.
Parminter, Urban.....Exeter.
Thomas, Archibald .....Northampton.
Turner, George Thomas ....London.
Equal. Dampney, Richard Shephard ...Chard.
Equal. Heath, Frederick Devon .....High Wycombe.
Robinson, Thomas Ward.....Hull.
Equal. Evans, Evan Thomas .....Carmarthen.
Equal. Gibson, James .....North Shields.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

Certificates were received in lieu of the Society's Examination, as follows :—

Certificates of the University of Cambridge.

Hardwick, Arthur.....Sheffield.
Piper, Walter George .....Norwich.
Poulton, Arthur.....Newton Abbot.
Robinson, Alfred Edward.....Birmingham.

Certificates of the Royal College of Surgeons.

Gallienne, William J. Norman...Torquay.
Munro, Hugh .....Hampton Wick.

Certificate of the Society of Apothecaries.

Thorpe, Henry Stanley .....Hertford.

Certificate of the College of Preceptors.

Burford, George Henry .....Ipswich.

* Passed with Honours.

ERRATA.

On p. 619, col. 1, Mr. Cracknell's name should have appeared in the list of Examiners present on the 23rd of January.

On p. 637, col. 2, line 9 from top, the name of John Taylor should have been inserted in the list of "Associates in business" as of Torquay, instead of in that of "Associates" as of Carlisle.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

SESSION 1873-4.

The fifth general meeting was held in Anderson's University, on Wednesday, 18th February, at 9 p.m.; Mr. John Currie, president, in the chair.

The minutes of the previous meeting having been confirmed, the Secretary (Mr. J. A. Clarke) made a short statement in connection with the late festival, in which he said that owing to the illness of the Treasurer an exact financial account could not be given.

An apology for absence from Mr. Kinninmont was then read, after which Mr. John Hunter proposed a motion to the effect—"That the members of this Association should subscribe 1*s*. each towards raising a fund for the purchase of a microscope for the use of the members of the Association, and that the Pharmaceutical Society should be applied to for a grant of £5 towards the same object."

Several members spoke in connection with the motion, all disapproving of asking from the Pharmaceutical Society so small a sum as £5, and it was suggested that the money should be obtained rather by each member subscribing a little more than was stated in the motion.

The Chairman thought that a subscription ought to be started for a library, as well as for a microscope, and he asked Mr. Hunter if he would embody that in his motion.

Mr. Hunter then withdrew his motion, substituting the following :—"That a committee be formed for the purpose of canvassing the various districts of the city, for subscriptions for the purchase of a microscope, and also for the foundation of a library."

This motion was seconded, and agreed to.

A paper being passed round, subscriptions to the amount of £5 were promised, although the number of members present was small.

Members of committee were then appointed. The Chairman gave notice that at the next meeting of the Assistants' Branch a paper would be read by Mr. Bray.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 19th February, 1874. Professor Odling, F.R.S., President, in the chair. The ordinary business of the society being completed, the President called on Mr. James Bell, of the Laboratory, Somerset House, to deliver his lecture "On the Detection and Estimation of Adulteration in Articles of Food and Drink."

The Lecturer, after some preliminary remarks on the fiscal regulations with regard to adulteration, began with a description of the microscopic appearance of the various kinds of starch, as many of them, from their cheapness, are largely employed for the purposes of adulteration. He then considered the characters of pure coffee, and of the various substances used to adulterate it, pointing out the most convenient methods for their detection. Tea,

pepper, and mustard were afterwards treated of in the same way. Owing to want of time, Mr. Bell was unable to complete his lecture, so that the adulteration of cocoa, tobacco, and beer was not touched upon. This admirable and instructive lecture was copiously illustrated by the most beautifully executed drawings of the structure of the various substances, as exhibited under the microscope. After the lecture many of the Fellows availed themselves of the opportunity afforded them of looking over the extensive collection of microscopic preparations connected with the subject. We hope to be able to publish a fuller abstract of this lecture next week.

The meeting was finally adjourned until Thursday, March 5, when the following papers will be read—"On the Condition of the Spontaneous Inflammability of Charcoal," by Mr. A. F. Hargreaves. "Researches on the Action of the Copper Zinc Couple on Organic Bodies: Part IV., On Ethyl Bromide; Part V., On the Bromides of the Olefines," by Dr. J. H. Gladstone and Mr. A. Tribe. "Action of Benzyl Chloride on Camphor: Part II.," by Dr. D. Tommasi. "Action of Trichloracetyl Chloride on Urea," by Dr. D. Tommasi and Mr. R. Meldola. "On Sulphocyanide of Ammonium and Sulphocyanogen," by Dr. T. L. Phipson. "On the Action of Hydrogen on Finely Divided Metals," by Mr. A. Tribe.

Parliamentary and Law Proceedings.

Prosecution under the Pharmacy Act.

On Tuesday, February 17, at the Gainsborough Police Court, Mr. Marwood Sanderson, chemist and druggist, of Lofthouse, was summoned by Superintendent Prest for having sold a preparation of strychnine to one Louise Dixon, on the 29th December, without having duly recorded the same.

Mr. Buchanan, coroner, said that on the 31st December last he held an inquest at Lofthouse on the body of one Louise Dixon. Evidence was given to show that death had been caused by poisoning from strychnine. A paper was found in deceased's room, bearing a label, "Sanderson's vermin destroyer," or something of that sort. This afforded a clue as to the source whence the poison had been procured, and he himself called at defendant's shop, where the assistant said that Louise Dixon went to the shop, asking if they kept any vermin killer. He told her that they did, at the same time telling her that it was a dangerous poison. She said that it was required for some rats which came from an adjoining stable, and he then sold her the preparation. The assistant said it was customary to keep a record of the sales of poison, but the deceased woman went out of the shop before he had an opportunity of getting the poisons book duly filled up.

Defendant's assistant deposed to the accuracy of the coroner's statement, and Mr. Betell, analytical chemist of Middlesbrough, said that he found the powder contained about 15 per cent of strychnine.

In answer to the case, defendant said he was sorry he had not been at home himself, because when he had any doubt about the intentions of people who wanted poisons, he always mixed up some spurious or harmless compound, and labelled it as the genuine article.

The Bench imposed a penalty of £5 and costs.—*Middlesborough Daily Gazette.*

The Charge of Poisoning by Morphia at Carlisle.

At the Carlisle Assizes, on Friday, February 20, before Mr. Justice Denman, Dr. Alexander Charles McLeod was charged with the manslaughter of his wife, Annie McLeod, on the 15th of October last.

Mr. Thurlow and Mr. Fenwick appeared for the prosecution; Mr. Charles Russell, Q.C. and Mr. J. H. Fawcett defended the prisoner.

Mr. Thurlow briefly stated the case to the jury. He said the prisoner at the bar was charged with the manslaughter of his wife under very peculiar and most distressing circumstances. It appeared that he had formerly been a surgeon in the Madras Army, and had been in India for 20 or 30 years. Having left India, he and his wife had come to reside in Carlisle a year or two ago, where they appeared to be strangers. He was a surgeon of long standing and experience, and one would imagine he ought to have understood all ordinary matters with respect to the administration of medicine. The charge against the prisoner was that he so negligently—indeed, with criminal negligence—administered to his wife a poison called morphia, on the 15th October, that she died from the effects of it. Some short time previous to the 15th October, it appeared the deceased woman and the prisoner had the misfortune to have one of their children ill of typhoid fever, and owing to having nursed the child in its illness, Mrs. McLeod was in a weak and bad state of health, and for some days previous to the above date, she appears to have obtained no sleep whatever. In the middle of that day Mrs. McLeod appears to have been very ill indeed, and the prisoner determined on getting something to make her sleep. He therefore went to the shop of a chemist named Todd, and bought 20 grains of morphia. The general opinion, he believed, amongst medical men was that one-half, one-quarter, or one-sixth of a grain of this medicine was quite sufficient to give to a patient at first; it depended to a large extent whether a person had been addicted to taking it, for if so, then it could be given in much larger quantities; but he was unable to lay before them whether the deceased woman was in the habit of taking this morphia; that might be thrown out by the two learned gentlemen who defended the prisoner. The prisoner went to the chemist and bought this morphia, for which he paid 8*d.*, taking a bottle with an old label upon it endorsed, "muriate of morphia," and that bottle would be produced, so that the jury would see that it could hold 20 grains of morphia quite easily when shaken down. This was about four o'clock in the afternoon, and he appears to have gone home, but instead of giving the deceased one-sixth or one-eighth of a grain he had given her a grain, and to have repeated increasing doses every half-hour, up till near seven o'clock, when it was supposed he must have given his wife about 16 grains of the morphia; and it appeared he had even administered it to her without weighing it, the consequences being that she shortly afterwards became so ill that she eventually died. The learned counsel proceeded to blame the prisoner for not having called in medical assistance to his wife earlier, and said that, being in the midst of so many distinguished medical men, he was very much in fault. After referring to the treatment administered by Drs. Walker and McLaren when called in to see the deceased, Mr. Thurlow concluded by reminding the jury that if they were of opinion that the prisoner had administered this morphia to the deceased heedlessly, negligently, and criminally, thereby causing death, then it would be for them to find a verdict of manslaughter; if, on the other hand, they thought it had been accidentally administered, then it would be their duty to acquit him.

Evidence having been given by the servants in support of the opening statement,

William Rushton deposed that he was assistant with Mr. Joe Todd, druggist. Dr. McLeod came to the shop on the 14th or 15th of October last. He asked for 20 grains of muriate of morphia. Witness supplied him and weighed it carefully. (Identified the bottle.) Wished to replace the old label on the bottle with a new one, but defendant objected, as the bottle belonged to a medicine chest, Witness charged him 8*d.* for it. Had no doubt it was 20 grains.

By the Judge: Would not have sold that quantity to any one not a medical man.

Cross-examined: Dr. McLeod had previously got morphia in the form of a paste. At the Coroner's inquest,

when the bottle was produced with the residue, witness said he thought there would be ten or twelve grains left. The bottle was then more than half full. Dr. McLaren interrupted by saying it was not so much. Had no entry of the sale in his book.

Dr. Robert Walker deposed that about seven o'clock in the evening of the 15th of October, Dr. McLeod called at his house, and said his wife was very ill and he was afraid she had taken too much morphia, and he asked him to go and see her. On the way, he told him his wife had been attending upon a sick child, that she had had very little sleep for about a week, that he had given her some morphia to make her sleep, but he did not know how much. He said he had given her one grain at first, and after that a dose every half-hour in unknown quantities; he guessed the doses. The first dose, he said, he gave her about half-past four. He said she did not go to sleep till after the last dose. He seemed in a very excited state. Mrs. McLeod was lying on the hearthrug in the drawing room, with a blanket round her. She was insensible—in a state of coma. Her breathing was difficult; her pupils were contracted; she was livid on the face. Witness tried to rouse her by shaking her, but failing to do so, went for a stomach-pump, and injected hot water. The fluid which came out was of the colour of port wine. Dr. McLeod said he had given the morphia in port wine. Was away scarcely five minutes in going for the stomach-pump. On his returning, found her in the lobby rolled in a blanket. He again tried to rouse her, and did all he could by applying mustard plasters to her legs and ammonia to her nostrils, but failed.

By His Lordship: Dr. McLeod helped him.

Cross-examined: About 8 o'clock he sent for Dr. McLaren, who gave her an injection of atropine, which is an antidote to morphia. He was with her till about 10 o'clock, when she died. In his opinion the deceased died from the effects of morphia. He made a *post mortem* examination along with Dr. McLaren.

By his Lordship: The *post mortem* alone would not have been conclusive. It indicated she had died by some opiate. There was no apoplexy. The *post mortem* appearances were consistent with death from morphia; otherwise no other cause apparent. All the organs were healthy. Morphia was a very ticklish drug, and had to be administered very carefully.

The Judge: Is it not a fact that sometimes a person in a state of disease will stand more deadly poison than a person in health?

Dr. Walker: That is so.

Mr. Thurlow: What dose will produce death.

Dr. Walker: One grain has produced death.

The Judge: Do you know that of your own knowledge, or from reading?

Dr. Walker: From reading.

The Judge: Yes, but have you not read of a much larger quantity not proving fatal?

Dr. Walker: I have heard of 20 grains not proving fatal.

Dr. Walker, in answer to questions from the Bench, said he thought it was a case for the administration of morphia; he thought one grain was too much to begin with, and that to repeat the dose every half hour was too frequent. This was a matter of judgment, and in his judgment it would be wrong to do so.

Cross-examined: Dr. McLeod did all he could to assist in attending upon his wife, and was perfectly candid in speaking of what he had done. In conversation, he did not seem conscious that he had made an error. Witness knew he had been in the profession 33 years, principally with the army in the East, where morphia is very considerably used. There is a complaint which has all the symptoms of of delirium tremens but is not produced by drunkenness; the principle characteristic being insomnia. He had heard of cases where persons, without being guilty of intemperance, had, in fact, delirium tremens. In such cases the first thing is to produce sleep, and if the ordinary means failed, medicine should be used—morphia, chloral, bromide of potassium, digitalis, and other preparations. Morphia is supposed to affect the patient rather rapidly, but the rapidity would depend in some degree upon whether the patient had had solid food or not. There is an opinion that the effect of doses of morphia is not cumulative—that, operating quickly, its effects pass off rapidly. Witness did not quite subscribe to that opinion, but it is an opinion of some. He had heard of as many as forty grains being taken in a day with impunity. He had heard of a patient taking as many as 22 grains of acetate of morphia, which has the same relative strength.

Mr. Russell: Have you not heard of 180 grains being given in a day?

The Judge: That is an extreme case, and will not help you at all.

By the Judge: I have heard that morphia administered in a hot country like India passes off more rapidly than in a cold climate like ours.

Dr. McLaren deposed that he was sent for by Dr. Walker at 20 minutes to 9. He confirmed Dr. Walker's evidence, and the results of the *post mortem*. He was of opinion that death was caused by some preparation of opium. Soon after he went in, prisoner gave him a bottle with a little morphia in it—less than three grains. The bottle was about a fourth full. At the coroner's request, he tested the capacity of the bottle; 20 grains, loosely put in, filled it, but by shaking it could be reduced to half that bulk. When Dr. McLeod showed him the bottle he told him he had given his wife the whole of ten grains except what was left there; that he had first given her a weighed grain about four o'clock, and that afterwards he had given her larger doses which he had guessed from the first dose, and he said he should have gone on giving it until it produced an effect. Witness asked him if Mrs. McLeod was in the habit of taking morphia, and he said "No." In witness's judgment Dr. McLeod's treatment was not proper. The doses were excessive. Morphia generally takes effect in twenty minutes to half an hour. Within certain limits morphia is cumulative. It passes much more rapidly out of the system than a mineral poison. A second dose given after the first has taken effect increases the effect of the first dose. The effect has been delayed in some instances as long as six hours; and in giving a second dose in such cases it should be a smaller dose, except in a case of great urgency.

This was the case for the prosecution, and Mr. Thurlow summed-up his evidence, which, he argued, substantiated his contention that the prisoner had shown gross and criminal negligence and carelessness in the case. The only controverted point was the quantity of morphia in the bottle, but he contended there was sufficient proof that it contained 20 grains, and as only three grains were left, Dr. McLeod must have given her 17 grains.

His Lordship intimated that there were two cases in 'Russell on Crimes' in which the law laid down applied to the present case. The law in those cases was expounded by Chief Baron Pollock and Chief Justice Cockburn; the gist of which was compressed into this question by the Judge: Taking all the circumstances into account, was the prisoner guilty of such gross negligence as to make him criminally answerable?

Mr. Russell next proceeded to address the jury for the defence. After referring to the painful circumstances of the case he spoke of the prisoner's long service and medical experience in India, where, he urged, the use of morphia was more widely known. He quoted from an analogous case in which Lord Ellenborough had said that it would be a case of manslaughter where death resulted from the grossest ignorance or the most criminal conduct. He also quoted a case where a druggist, having two bottles before him, put the ingredients into the wrong bottles, which resulted in the death of one of the parties who partook of the contents of the bottle; with reference to this case Chief Justice Earle had said that they ought not

to call upon the prisoner for his defence, and that they could not convict unless there was such a negligence as the law meant by the word felonious. The learned counsel contended that had the deceased been any other lady than his wife to whom he had administered the morphia, there might have been an action in the civil court. Then with regard to the amount of morphia contained in the bottle, he contended that it had never been clearly proved that there were more than ten grains in the bottle. He next proceeded to speak of the effect which morphia had upon the human system compared with other poisons; and concluded his address to the jury by impressing upon their minds that it was to afford ease to his wife and restore her to health which prompted him to administer to her the morphia.

Dr. Robertson, physician for more than 25 years at Nottingham, said some eight years ago he gave his practice into charge of Dr. McLeod, and in his opinion he was a most careful practitioner.

This was all the evidence for the defence, and

The Judge then proceeded to sum up. He said that the law was that whether a man be a medical man or not, if he dealt with dangerous medicines he was bound to bring to the use of them proper skill, and he was bound also to use proper care and attention, so that no person should be injured by his want of skill or attention in dealing with dangerous ingredients. He further considered it made no difference whether he was dealing with a patient, or acting as a volunteer medical man dealing with a friend, or even with his wife. But he would admit that there might be cases where the circumstance that a man was dealing with those most dear to him would be an element in considering whether he exercised his best judgment and did his very best in the conduct of the case. As to the present case he would assume that there was ample evidence that the death of Mrs. McLeod was caused by an administration of morphia; but still, if any of them had grave doubts upon that point they must give the prisoner the benefit of such a doubt. Assuming that morphia had brought about death, the Judge proceeded to speak of the properties of the drug, which he pointed out was extremely variable in its effects, and while it produced one effect upon one person it produced a very different effect upon another person. What constituted criminal negligence? If a man brought adequate skill to the administration of a drug, if he brought due care and honest attention to the case, then he was not criminally responsible for any error of judgment; but if, on the other hand, a man did not bring proper skill and knowledge to the use of a poison, if there was clear—he would not say gross, for that expression might mislead them, and lead them to suppose that everything short of gross negligence was not criminal negligence—negligence, then he would be criminally responsible, and it would be for the jury to find the prisoner guilty.

After a short consultation the jury returned a verdict of Not Guilty.

Prosecutions under the Adulteration Act.

Alleged Adulteration of Bread.

At the Edgware Police Court on Wednesday, February 18th, William Smith, baker, of Harrow, was summoned for selling bread adulterated with alum.

The bread had been analysed by Dr. Redwood, the county analyst, who had certified that it contained alum.

At the application of Mr. Fryer, who appeared for the defendant, an adjournment from the first hearing of the case had been granted for the purpose of obtaining a further analysis.

Dr. Redwood now deposed that he had found alum present equal to 40 grains in the 4lb. loaf.

In cross-examination by Mr. Fryer, he said the bread was burnt in a platinum dish, and dissolved in porcelain dish. He could not say that the analysis was conducted by his own hands throughout. The boiling on porcelain would, in some instances, evolve silica, which might give alum in the result, but such was not the case in this instance.

Mr. Fryer then called

Professor Wanklyn, who said that he had analysed a sample of bread by order of the Court, and found that there was no alum present.

Mr. Serjeant Cox, said that the evidence was so conflicting that the summons must be dismissed, each party to pay their own costs.

The above report appeared in the columns of the *Daily Telegraph*, where it has been succeeded by the following correspondence:—

"TO THE EDITOR OF 'THE DAILY TELEGRAPH.'

"Sir,—With reference to the case tried yesterday at Edgware, and reported in your paper of to-day, in which a baker was charged with having adulterated his bread with alum, on a certificate signed by me as public analyst for the county, I trust you will allow me to state that although the chemical evidence received by the magistrates was evenly balanced for and against the fact of alum being present in the bread, such would not have been the case if other evidence which was tendered had been received. At the previous hearing of the case, it was arranged that portions of the bread to which my certificate referred should be analysed by Mr. Wanklyn on behalf of the baker, and by some other analyst on behalf of the prosecution. The chairman of the Quarter Sessions proposed Dr. Hardwicke as the third analyst, and his analysis went to prove that the bread contained more than forty grains of alum to the 4lb loaf; but, as Dr. Hardwicke was not present, the presiding magistrate refused to receive the certificate or even to allow it to be read or referred to. I had also made two analyses of the same bread subsequent to the one on which my certificate was founded, and these were made entirely with my own hands, and one of them by a process in which the imaginary objection urged by Mr. Wanklyn to my first analysis could not apply; but I was not allowed by the Bench to state these results, which fully confirmed the accuracy of my first analysis.

"The result of this and some other cases in which proceedings have been taken under the Adulteration Act shows the necessity of having legal assistance to conduct the prosecutions, instead of leaving them, as the county cases are now left, to be conducted by the Inspectors. This is especially the case where the defendants are professionally represented. I consider that the failure of the case heard yesterday at Edgware was entirely due to the want of legal assistance in preparing and presenting the evidence for the prosecution.—I am, &c.,

"T. Redwood,

"Professor of Chemistry to the Pharmaceutical Society of Great Britain, and Analyst under the Adulteration of Food, Drink, and Drugs Act.

"17, Bloomsbury Square, Feb. 19."

"TO THE EDITOR OF 'THE DAILY TELEGRAPH.'

"Sir,—Dr. Redwood's letter, which you publish to-day, is calculated to convey a somewhat erroneous impression respecting what he is pleased to term 'the failure of the case heard yesterday at Edgware.'

"Whilst quite agreeing with Dr. Redwood that the two unfortunate bakers were defended by Mr. Fryer (who conducted their case) with conspicuous ability, I am disposed to attach some importance to their being entirely innocent of the crime which had been laid to their charge.

"I say most distinctly that they are innocent, inasmuch as there is no real evidence against them; and, on the other hand, there is most positive proof in their favour. The evidence against them was a report of Dr. Redwood's

setting forth that the bread they were selling contained some forty grains of alum in four pounds of bread. This report was based upon an analysis of Dr. Redwood's, wherein 1000 grains of the bread, after being burnt and treated with certain chemicals, yielded some 0·2 grains of a certain white precipitate.

"By an error of Dr. Redwood's this 0·2 grains of white precipitate was reckoned as alumina, and calculated as indicating 40 grains of alum in the 4lb loaf, whereas, even if it proceeded from alum in the bread, it must have been phosphate of alumina, and would indicate only about 22 instead of 40 grains of alum in the 4lb. loaf, as had been certified.

"The analysis was quite untrustworthy, as, I think, any chemist who should chance to see these details will admit. Dr. Redwood described himself as having burnt up 1000 grains of bread and mixed the resulting ash with nitric acid, and actually evaporated the mixture to dryness in a porcelain vessel. Such a proceeding is calculated to charge the mixture with silica and alumina. Having done this, Dr. Redwood renders the mixture powerfully alkaline, and then boils it in the porcelain dish; and, in short, the Doctor appears to have taken pains to ensure the presence of silica and alumina in the liquid to which he ultimately applied the test for alumina.

"It is not surprising to me that under these circumstances Dr. Redwood obtained 0·2 grains of alumina; but I do not regard this 0·2 grains of alumina (or phosphate of alumina) as any evidence against the bakers.

"Inasmuch as I have myself burnt up 1,500 grains of the same bread, and having carefully abstained from the addition of silica and alumina, have not been able to detect any alum, I consider that I am justified in maintaining that the two bakers have not alumed the bread.

"Such being the facts of the case, I do not suppose that any number of Crown advocates could have extricated Dr. Redwood from the difficulties which he attributes to Mr. Fryer's advocacy.—I am, Sir, yours, etc.,

"J. Alfred Wanklyn.

"117, Charlotte Street, Fitzroy Square, Feb. 20."

"TO THE EDITOR OF 'THE DAILY TELEGRAPH.'

"Sir,—A controversy on scientific technicalities would be out of place in the columns of a newspaper, and therefore I do not propose to follow the example of Mr. Wanklyn in your impression of to-day, but I must beg to be allowed to deny the statement and inferences contained in his letter to the effect that I had described a certain precipitate as alumina which was really phosphate of alumina, and that I had used apparatus in conducting the analysis from which that alumina might have been derived.

"The precipitate to which I referred was not phosphate of alumina, but alumina, and the quantity which, speaking from memory—for I was not allowed to refer to my notes—I represented as rather less than two-tenths of a grain, was 0·18 grain, which corresponds to 44 grains of alum in a 4lb. loaf. Dr. Hardwicke's analysis of the same bread indicated 46 grains in that quantity, and two subsequent analyses made by myself closely coincided with my previous result.

"The question of the possibility of the alumina found having been derived from the porcelain dish used in the process is a practical one which chemists only can decide; and I am quite willing to rest my reputation upon the assertion that Mr. Wanklyn's objection is a perfectly imaginary one, which I defy him to substantiate.—I am, Sir, yours, etc.,

"T. Redwood.

"17, Bloomsbury Square, Feb. 21."

Adulteration of Tea.

At the Sheffield Town Hall, on the 17th February, before Ald. Fairburn and H. Harrison, Esq., Messrs. Edward Davy and Thomas Potter Davy, of South street, Sheffield Moor, tea dealers, were summoned for unlawfully selling "as unadulterated a certain article of food, to wit, a quarter of a pound of tea, which was then in fact adulterated." The information was laid by Mr. Croft, the chief sanitary inspector; and Mr. Binney appeared for the defence.

Mr. Croft, in opening the case, stated that he appeared on behalf of the Health Committee. The case was one of very great importance, and it was the first that had occurred in Sheffield. The Health Committee was not desirous of pushing the matter to the extent of seeking a very heavy penalty. It was the wish of the committee to protect the public without placing any undue restrictions on trade, and the present case had been brought to test the question. The proceedings had been taken solely with the object of protecting the public, and not with the view of harassing the commerce and trade of the town.

Henry Bramwell, one of the inspectors appointed by the corporation to assist in carrying out the Adulteration of Food Act in Sheffield, said that on the 19th December he purchased at the shop of the defendants on Sheffield Moor a quarter of a pound of tea for sixpence. He told the assistant who served him that he had purchased the tea to have it analysed, sealed the packet in his presence, and took it to Mr. Allen, the borough analyst. Mr. Staniforth, inspector, gave corroborative evidence.

Mr. Allen, the borough analyst, was then called. He said on the 19th Dec. the last two witnesses brought him six samples of tea. He analysed the one in question and he found the tea was free from sandy or magnetic matter, and no foreign leaves were detected. There had been considerable adulteration by the addition of exhausted tea leaves, thus adding to the weight and bulk of tea, and considerably reducing its strength. Such adulteration was not injurious to health. The adulteration was to the extent of 25 or 30 per cent. Exhausted tea-leaves were largely used in the adulteration of tea.—In answer to Mr. Binney, Mr. Allen said the method now adopted by chemists for analysing tea was much more uniform than it was nine months ago. Opinion as to the best mode of analysing tea had very much changed during that period, and the methods were much more perfect. He based his conclusion on the results obtained by three distinct methods. The percentage of tannin was less than he had found in any one of a large number of genuine teas, and the woody fibre was higher. The proportion of the ash soluble in water also clearly proved the tea to have been previously infused in water. As compared with the average composition of genuine black tea, the three methods he had employed corresponded in pointing to an adulteration by exhausted tea-leaves to the extent of about 30 per cent., or about 20 per cent. as compared with the poorest genuine tea examined.

Mr. Binney said whether the defendants had offended against the law or not, it was plain that the present state of the law placed persons in similar positions to the defendants under very great hardship. They had not only to bear with the merchants in China—and it was well-known how teas were prepared there—but with persons in London, who were credited with adulterating tea. The defendants purchased tea which was made up in China and sent to England, and they had not the slightest means of ascertaining whether the article sold to them was what it was represented to be. By ocular inspection adulteration in such a case could not be detected, and therefore the defendants had only the same means of ascertaining whether the tea was pure or not as the authorities had adopted in this case. If his clients had infringed the law they had done so most unwittingly, for it was utterly impossible for them to ascertain the genuineness of the teas they sold. Speaking of the state of the law, he referred to the action the Sheffield Grocers' Association had taken in the matter, and read the letter which they had received from the Home Office. He contended that the amount of difference in this case was not sufficiently gross to warrant the bench in convicting. He thought it would be sailing

very much too near the wind to convict respectable tradesmen of such an offence, when there was nothing injurious and no foreign matter in the tea. The tea simply contained exhausted leaves; and he could not see the difference between selling tea of a low quality and toning down good tea with exhausted leaves. He did not dispute that tea of a low quality had been sold; but then only 2s. per pound was paid for it. He hoped the bench would not convict his clients of the offence, as they had not knowingly or intentionally offended.

The Bench retired to consider their decision, and on returning into court Mr. Fairburn said it was very evident that the Act of Parliament contemplated the protection of the public against the adulteration of food. The magistrates were there to carry out the Act of Parliament, and under the circumstances they felt bound to convict the defendants. The fine would only be a nominal one, as it was the first case of the kind that had come before them. They could easily see the very great difficulty under which tea dealers were placed, but it was no excuse that they were ignorant of the adulteration. The onus was thrown upon them of selling a genuine article. No doubt this Act of Parliament was operating to a great extent rather hardly upon tea dealers, still it only showed the necessity of respectable tea dealers trading with men who would not sell them an adulterated article when representing it to be pure. The defendants would have to pay a fine of 20*s.* and costs. In imposing that fine, the magistrates considered they were only protecting the public. They considered the tea had been adulterated and they were satisfied that they had only carried out the Act.

Adulteration of Mustard.

At Longton, on Wednesday, Feb. 18, Mr. John Grainger, grocer, Normacot, was summoned for selling adulterated mustard. The report of the analyst was produced stating that the mustard was largely adulterated with flour and turmeric, and that it was not actually injurious to health when used as a condiment, but was valueless for medical purposes. Mr. Welch, for the defence, said it was hard that tradesmen should be proceeded against in reference to food which they did not adulterate. The magistrates said it was not their duty to criticize the law, but to administer it as they found it. Mr. Welch said the law would be altered before long. Defendant was fined 1*s.*, the costs being £1 17*s.* 6*d.* Two similar charges were heard against other defendants and the same fine and costs inflicted.

Obituary.

GEORGE MEGGESON.

On the 21st February, 1874, Mr. George Meggeson, Pharmaceutical Chemist.

The late Mr. George Meggeson was of Yorkshire birth and parentage, and served his apprenticeship in one of the York wholesale drug houses towards the close of the last century. He then came to London, and conducted the business of Widow Stavely and Co., wholesale druggists, with great satisfaction to the estimable lady at the head of the firm, and the greatest friendship continued to exist between them during her lifetime. On that business being relinquished, he commenced business in conjunction with some partners, under the firm of Cook, Farley, and Meggeson, upwards of sixty years ago, in the same premises as at present continued by his successors in Cannon Street. Mr. Meggeson took the travelling department, principally in the northern counties and Scotland, where his energy and perseverance, uniformly honourable mode of dealing, and high sense of integrity, endeared him to everyone with whom he came in contact. Like many mercantile men, at some periods of a long career in life, he met with crosses and losses in the path in which he moved, and not the least were those of some of his early partnerships. His indomitable energy and honesty of purpose enabled him, however, to surmount all difficulties, and on taking the management of the business into his own hands his enterprise was ever alive to the advancement of his varied pursuits, and not the least important of those was the manufacture of the medicated lozenges so well known to the trade in connection with his name.

After retiring from business, several years ago, he devoted his time to many useful purposes, and amongst others was elected a member of the Council of the Pharmaceutical Society, upon which he continued to serve until 1864. He was particularly useful in regard to the financial affairs of the Society.

In politics he was a liberal-minded Conservative. As a companion his affability and friendship were greatly esteemed; his kindness of heart and hospitality was unbounded. He married late in life, and leaves a widow to mourn the loss of one so highly and justly appreciated. Throughout a long life he enjoyed excellent and robust health, so much so that within a few months of his death he was able to visit Hastings; but only to return home to Gunnersbury, where he slowly, peacefully and calmly sunk to rest at the age of about ninety. Without physical pain or mental disturbance, George Meggeson passed away after a long, busy, and useful life, leaving behind an affectionate remembrance which it will take long to efface from the minds of those who knew him intimately, valued his friendship, and esteemed his character.

WILLIAM PROCTER, JUN.

Intelligence has just been received of the death of this distinguished American pharmacist, who was for many years the Editor of the *American Journal of Pharmacy*, and one of the Professors of the Philadelphia College of Pharmacy. From a letter received from Professor Bedford, of New York, by Mr. Henry Deane, which has been kindly placed at our disposal, we learn that he died shortly after midnight on the night of Monday, February 9. He had lectured with unusual acceptance the previous evening, and on returning home had expressed to his wife his pleasure with the attention of the students, and his own satisfaction with the lecture. After a very pleasant chat they retired about twelve o'clock. Soon Mrs. Procter noticed a change in his respiration and spoke to him; then tried to rouse him. As he did not answer, she called her son, and immediately returned to the bedside, but in the meantime Mr. Procter had expired. He had long been troubled with an affection of the heart, and a *post mortem* examination disclosed considerable ossification of the aorta. He was buried by the side of his first wife, in the cemetery at Mount Holly, in sight of his country home.

Mr. Procter was in 1853 elected an Honorary Member of the Pharmaceutical Society of Great Britain. He was also an Honorary Member of the Pharmaceutical Conference.

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

On the 13th February, 1874, Mr. John Anstey Chave, Pharmaceutical Chemist, of Uxbridge. Mr. Chave had been a Member of the Pharmaceutical Society since 1842.

On the 16th February, 1874, Mr. Charles Bunn, Pharmaceutical Chemist, of St. Botolph Street, Colchester. Mr. Bunn had been a Member of the Pharmaceutical Society since 1853.

On the 21st February, 1874, Mr. John Rigby Lewis, Chemist and Druggist, of Runcorn.

On the 13th February, 1874, in his 71st year, Mr. James Routledge, for many years a member of the firm of Davy, Yates and Routledge, Park Street, Southwark.

Correspondence.

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

Follow the School.

Sir,—As a constant reader of your Journal, and as one who has always taken a deep interest in pharmaceutical progress, permit me to express my gratification that attention is again being drawn to pharmaceutical education. For a long time past I have seen, with regret, advertisements in various journals which indicate that the wide-spread evil of "cram" seems to flourish to an unprecedented extent in English pharmacy. It was, therefore, with much satisfaction that I noticed in your recent leading article, in which you refer to Dr. Temple's remarks on examinations, also in your correspondence columns, distinct advocacy of the principles of examination following the school (by school I suppose is meant the shop and the college), in opposition to the baneful practice which apparently obtains of the school following the examination. In parenthesis, let me say that I have much too high an opinion of the Council and professors of the Pharmaceutical Society to suppose for one moment that either would descend to encourage "cram," which means superficial and useless information; if they did, the benches of their school would be crowded, and not, as I lament to see, thinly attended.

In veterinary education the system of examinations following the schools is carried out with great success. As some of your readers may like to know how this object is accomplished, I will give them a brief description of our mode of working.

The Board of Examiners at the Royal College of Veterinary Surgeons consists of one or more eminent anatomists, physiologists, chemists, and botanists, together with several leading practical veterinary surgeons. The professors at the teaching schools are also *ex officio* members of the court; they are present at the examinations, but do not question the candidates for diploma.

Such is the wholesome dread of "cramming," and the importance attached to methodical study by those intrusted at the present day with veterinary education, that no person can present himself for examination for diploma whose regular attendance on the prescribed lectures, demonstrations, and practical instructions has not been certified in writing, first by each professor to the principal of his school, and subsequently by the principal to the Council of the Royal College. I may add that the Royal College only recognizes those schools that are incorporated with it by charter, or by the Queen's sign manual. My readers will now see that in the veterinary world the principle of the examinations following the teaching, and not the reverse, is carried out, and that it thereby recognizes the fact that those whose lives have been spent in teaching are better judges of what are the requirements of genuine education than those who have not had the same kind of experience.

In the interests of sound education, in the interests of pharmacists, and in the interests of the public at large, it is imperative that those who have the power to confer licences to practice pharmacy should not grant a privilege of such literally vital importance to anyone "crammed" with just sufficient knowledge (? knowledge) to pass the required examination.

In order that the evil of "cramming" may be crushed, and genuine pharmaceutical knowledge fostered, it seems to me that the Examining Board at Bloomsbury Square should, if possible, be constituted like that of the veterinary profession—namely, of men practically engaged in pharmacy and of scientific teachers of eminence; also that they should both unite in endeavouring to establish that course of education and that kind of examination which would pass none but those who had been thoroughly educated in the principles and practice of their art.

In conclusion, allow me to express the hope that the time is not far distant when the Pharmaceutical Society will justify the power vested in it by the Government, as well as the confidence placed in it by the public, by insisting on every candidate for its diploma giving evidence, not only of his having been in a shop for three years, but also of his having diligently pursued systematic courses of practical and theoretical instruction at a School of Pharmacy recognized by the Society's Council.

Richard V. Tuson, F.C.S.,
Professor of Chemistry, Materia Medica, and Toxicology, in the Royal Veterinary College.

Where is Miss Comp?

Sir,—Permit me to introduce to Mr. J. M. Fairlie's notice the recipe for the "Mist. Composit." of J. G., an M.D. and Fellow of the Faculty of Physicians and Surgeons, Glasgow, which I presume is the "Miss Comp" he is in search of, as it is often ordered as "Mist Comp," and as J.G. writes somewhat indistinctly, the "t" has perhaps been mistaken for a second "s". But the following will show there is not much of mist(ery) about it.—

℞ Hydrochlor. Ammon. . . . . ℥ss
Acidi Hydrochlor. dil. . . . . ℥ii
Syrupi Eastoni. . . . . ℥ii
(*vel* Syr. Ferri. c. Quinæ et Strych. Phosph.)
Decoct. Tritici Repen. ad . . . . ℥viij ℿ
Ft. Mist.

This recipe under the above mystical cognomen is intended to be dispensed at the establishment of one who prides himself in being a member of the Pharmaceutical Society. It shows there is some "tacit understanding" between the two individuals interested, and that they know and can appreciate the value of the old Scotch saying "If you claw me I'll claw you."

The prescriptions are (for this is not the only one) sent *under cover* addressed to the chemist; and at other times, a card with the chemist's name and address in full is handed the patient, with the injunction that they are only to be dispensed at that establishment. Unfortunately for their plans, however, some patients look with considerable suspicion on this dictation by the physician what chemist to go to, and assert their independence by showing that they have a mind of their own, generally by going to the chemist they are in the habit of patronizing. Thus, of course, these plans come to be known, and as all right-thinking people will agree, deserve to be exposed.

It is a pity for their own sakes that gentlemen of such position and respectability should lend themselves to artifices of this nature. In this age of enlightenment some patients are as able to read prescriptions as chemists themselves, and if there is anything that will tend to lower the two professions in the eyes of the public to the level of quackery it is such miserable tactics. I could say more on the subject, but conclude in the meantime by expressing the hope that the pharmaceutical and medical press will give the system no peace until it is entirely abolished.

A. P. S.

Glasgow, 24th Feb., 1874.

R. Chipperfield.—We do not think there is anything objectionable in the notice you refer to.

"*Inquirer*"—So much would depend upon the conditions of sale, that the question is one for a solicitor to answer. We may remark however that it is a mistake to suppose that a "patent medicine stamp" confers or protects proprietary rights in any preparation.

"*Student.*"—(1) Membership of the Pharmaceutical Society is not necessary in order to be placed on the Register of Chemists and Druggists; there is therefore no compulsory annual subscription. (2) It is only requisite for you to keep the Registrar informed concerning any change of address.

"*Maranta.*"—A candidate who fails in an examination is not eligible to present himself at a fresh examination until after an interval of three months.

"*Querist.*"—Dissolve the sulphate of iron in a little of the water, add the tincture of tolu to the compound tincture of camphor and pour these into the remainder of the water, agitate, and add the acid and the iron solutions last. A little resin will separate; this might be prevented by the addition of two drachms of mucilage added to the water before the addition of the tinctures, but such would be exceeding the strict letter of the prescription. The only other alternative would be straining out the separated resin, which would be more reprehensible.

Communications, Letters, etc., have been received from Mr. E. Lloyd, Mr. T. Luke, Mr. G. W. Fowler, Inquirer, A. P. S.

NOTE ON A DECOMPOSED LOZENGE.*

BY THOMAS GREENISH, F.C.S.

During my stay at Bradford, Mr. Rimmington put into my hands two ginger lozenges, one in an early, the other in a more advanced stage of decomposition; these lozenges formed part of a parcel sent to him from a London house several years ago. Very soon after they came into his possession, some of them showed symptoms of change which rendered the lozenges unfit for sale, and they were returned to the maker. The two now in my possession, are all that remain, and they were retained in order to watch the progress of decay. The change commenced in different parts of the lozenge at or about the same time, and it seemed as though at these particular spots some ingredient had absorbed moisture, which, gradually extending, had ultimately broken down the lozenge into a soft mass having the consistence of granular honey, but rather more tenacious.

Mr. Rimmington had observed and watched the growth of a fungus on one of these lozenges: it is visible to the naked eye as a small greyish white spot. To determine the probable cause of the decomposition and the nature of this fungus were the objects I had in view in the microscopic examination to which I subjected them. The small spot consisted of the mycelium or root processes of one or more fungi. I took a small portion on the point of a knife and transferred it to the slide; under a power of about 120 diameters, I observed a fungus of which I made a drawing at the time. There was also another, but as the latter is one of almost universal occurrence in all decaying vegetable matter, I shall not further allude to it; but to the former one I shall have occasion to refer again. I then took a little of the more fluid portion of the lozenge, diluting it with water, and under a power of 600 linear I found the oospore, which in the cryptogamia is equivalent to the seed in the higher order of plants.

Pursuing the investigation further, I placed on another slide a little more of the soft gummy matter, and with a power of 250 linear, I found that it was a mass of apparently little else than starch grains, and the granules were those of the potato; but the hilum was scarcely perceptible, and the lamination invisible.

In an examination of starch grains, the size and form of the granule, the shape of the hilum, also its position on the larger or smaller end, the distinctness of the lamination concentric round the hilum or in segments, together with the general outline, serve to distinguish one starch granule from another. In the examination of dextrin, which is starch in an altered condition, it will be found that the hilum is indistinct, and the lamination almost obliterated. The cause of the lamination in starch granules is said by Nageli to be due to the originally homogeneous deposit in the cell in process of growth becoming differentiated, separating into layers containing different amounts of water.

The starch present may have formed part of the composition of the lozenge as starch, or it may have entered as dextrin. I have found that when granules of starch have been exposed to moist heat, some of the granules are broken, the *débris* of the broken granules being present, others are distorted. If exposed to a comparatively dry heat, the starch granules have some parts of their structure exaggerated, as, for instance, an enlargement of the hilum, and other characteristic markings. From the absence of lamination and the imperfect condition of the hilum, I have concluded that these lozenges are largely composed of starch in the condition of dextrin, and that the hygrometric character of the dextrin was the predisposing cause of their destruction. The dextrin and glucose of Germany are the produce of the potato starch, while that of English manufacture consists mainly of sago.

At this point the next question arises—Whence comes this fungus? It is a micro-fungus of the same genus as that to which the potato disease is said to be due. I would say it is found associated with the potato disease. I cannot satisfactorily account for its presence, but will advance a theory which may or may not be accepted. I have already shown that the lozenge is mainly composed of dextrin, and that the starch granules of which the dextrin is composed are those of the potato; it is also well known that after a potato has shown symptoms of disease and is rendered unfit for food, the starch granules remain intact, and are utilized. It points, therefore, to the possibility, perhaps probability, that the dextrin found in these lozenges was the produce of diseased potatoes, that some of the spores of the fungus clung to the starch, passed with it through all the vicissitudes to which it was exposed in its conversion into dextrin, entered with that substance into the lozenge, and finding in the decomposing lozenge a nidus suitable for its development, threw out its mycelium and fructified, giving rise to the fungus, the subject of the present inquiry.

If the habit of intelligent observation, such as was shown by Mr. Rimmington, were more generally cultivated, our evening meetings would never be in want of interesting and instructive subjects.

[*The discussion on this paper is printed at p.* 721.]

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, March 4, 1874.

ON A PECULIAR CAMPHOR FROM CHINA.*

BY DANIEL HANBURY, F.R.S.

Although the Chinese make large use of ordinary camphor, that is to say, of the camphor produced in Japan and Formosa by *Cinnamomum Camphora*, F. Nees et Eberm., it is well known that they attach a much higher value to the camphor obtained in Sumatra and Borneo from the stem of *Dryobalanops aromatica*, Gärtn.

But there is a third kind of camphor standing intermediate in value between these two, and much less known, to which I desire to draw attention.

Rondot, in his work on Chinese commerce,† published in 1848, after speaking of the camphor of China, and before describing Malayan or Dryobalanops camphor, has a remark in reference to the drug under notice, to the following effect:—

> There exists also another sort of camphor, extremely white, which is extracted from the leaves of a plant known in China under the name of *Ngai*, a variety of *Artemisia*. It occurs in crystals, which are very pure, clear, brittle, with a shining fracture; it is much esteemed in China.

Our author quotes the prices of these sorts of camphor for the *pecul* of 133⅓ lb., thus:—

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, March 4, 1874.

† *Etude Pratique du Commerce d'Exportation de la Chine*, Paris, 1848. 34-38.

Formosa camphor	25	dollars.
Japan camphor	30	„
Ngai camphor	250	„
Malay camphor, first quality	2000	„
„ „ second quality . . .	1000	„

Other references to Ngai camphor are very slight, and imply that the writers had no practical acquaintance with the substance. Such, in fact, was my own case: I only knew of Ngai camphor by name, and I therefore drew attention to it in the *Admiralty Manual of Scientific Inquiry* (1871), by asking the following question—"*What is the camphor said to be obtained from a species of Artemisia* (*Wormwood*) *called* Ngai?" This brought a reply from Mr. Frederic H. Ewer, of the Imperial Maritime Customs, Canton, who kindly sent to me specimens of Ngai camphor, together with a small branch of the plant from which it is made.

The specimens represent two forms of the camphor, the one a perfectly colourless crystalline substance, in flattish pieces, as much as an inch in length; the other, which Mr. Ewer regards as the crude state of the drug, is a crystalline powder of a dirty white, mixed with some fragments of vegetable tissue. The purer sample has an odour scarcely distinguishable from that of ordinary camphor; but the odour of the other is perceptibly contaminated with a smell like that of wormwood. Ngai camphor, like that of Dryobalanops, sinks in water. The investigation of its other properties and its chemical relations having been undertaken by my friend Professor Attfield, will form the subject of a separate communication from his pupil, Mr. Sydney Plowman.

The plant sent by Mr. Ewer is no species of *Artemisia*, though a member of the same order. It proves to be *Blumea balsamifera*, DC., a tall, coarse-looking, herbaceous plant of Eastern Asia, an abundant weed in Assam and Burma, and common throughout the Indian Islands. It is well-known to emit when bruised a strong odour of camphor, and in Burma, a crude camphor is even extracted from it. Many years ago, a European named O'Riley purified some of this camphor, and attempted to bring it into notice as an article of commerce. According to Mason,* he made more than 100 lb. of it, which he sent to Calcutta, where it was reported to be as good as ordinary camphor.

It is probable that the *Blumea* is not the sole source of Ngai camphor, for according to Mr. Ewer the character 艾 (*Ngai*) is applied to designate several plants, including both *Labiatæ* and *Compositæ*. The camphor is used not only in medicine, but also in the manufacture of the scented kinds of Chinese ink. Mr. Ewer states that about 15,000 dollars' (£3000) worth is annually exported from Canton to Shanghai and Ningpo, whence it finds its way to the ink factories of Wei-chau and other places.

THE CHEMISTRY OF NGAI CAMPHOR.†

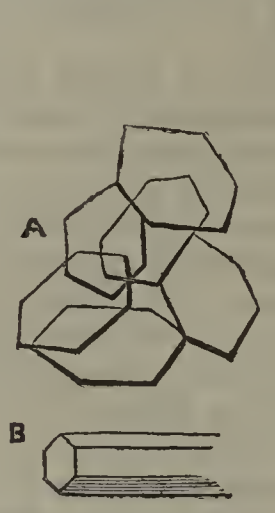
BY SYDNEY PLOWMAN,

(*Senior Bell Scholar in the Laboratories of the Pharmaceutical Society of Great Britain.*)

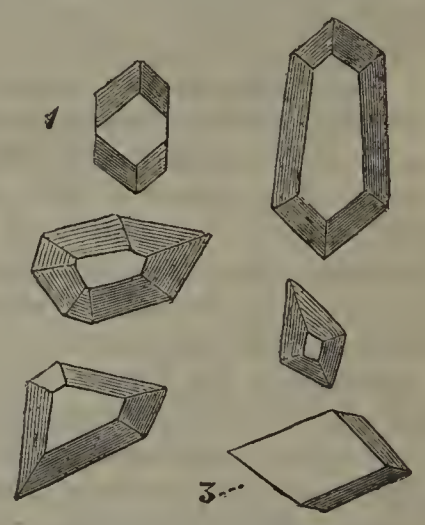
In this paper I desire to record the results of a partial chemical and physical investigation of a new camphor. Rather less than half an ounce of this substance was given by Mr. Daniel Hanbury, F.R.S., to Professor Attfield, and the Professor kindly placed it in my hands with the suggestion that I should endeavour to ascertain whether it was identical with, isomeric with, or distinct from, either Borneo camphor or the common laurel camphor, its appearance, odour, etc., indicating its alliance to one or other of these camphors. The amount of Ngai camphor at disposal being very small, its physical characters were first investigated, and afterwards such chemical operations conducted as involved the least expenditure of material.

Ngai camphor occurs in non-transparent grains, possessing considerably greater hardness and brittleness than laurel camphor. On the upper portion of the bottle in which it had been kept for several months numbers of small, separate, well-defined crystals were formed by its spontaneous sublimation. Laurel camphor placed under exactly the same conditions in another bottle sublimed much more freely, so that masses of crystals rather than single crystals were deposited in the upper portion of the bottle in which it had been kept. A specimen of Borneo camphor, although it has remained in the museum of the Society for several years, has not sublimed in the slightest degree, for the bottle still remains entirely free from adhering crystals.

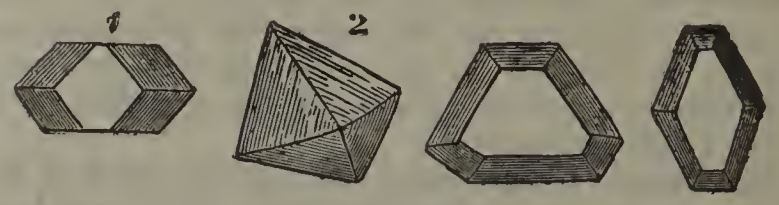
In order to compare their crystalline forms a grain of each was placed in separate tubes, covered with microscopic glass, and exposed for a month to a temperature at no time exceeding 24° C. The sublimate of laurel camphor, when viewed microscopically, was found to consist of masses of six-sided tabular crystals with a few six-sided prisms scattered amongst them. Their volatility was so marked that even while under the microscope they lost the sharpness of their angles and soon degenerated into ill-defined masses.



CRYSTALS OF LAUREL CAMPHOR.



CRYSTALS OF NGAI CAMPHOR.



CRYSTALS OF BORNEO CAMPHOR.

The Borneo and Ngai camphors, on the other hand, sublimed in singularly beautiful, well-defined, and for the most part solitary crystals, which preserved their angular sharpness extremely well. They resembled each other in a remarkable degree, and it would be impossible to give any characters by which they could be distinguished, some of the crystals of the two

* *Burmah, its People and Natural Productions*, 2nd ed., 1860. 483.

† Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, March 4, 1874.

being absolutely identical in outline (1). They were principally of a pyramidal form, with a varying number of sides, generally truncated, but sometimes perfect, then appearing as the halves of octahedra (2), while a few seemed to belong to the doubly oblique prismatic system (3).

As a great difference in the volatility of each had been observed, the tension of the vapour of each was next sought to be obtained. In order to determine this, a small fragment of each was introduced into one of three barometer tubes placed side by side in a mercurial trough, and allowed to remain twenty-four hours. After making due allowances for the variation of the atmospheric pressure, the mean depression of the mercurial column in two experiments was in the case of laurel camphor 4·5 millimetres, of Ngai 2·8 millimetres, and of Borneo 2 millimetres. The thermometer in each experiment stood at 12° C.

Fragments of each after immersion in water floated, but on placing them under the exhausted receiver of the air-pump, so that interstitial and adhering air might be removed, the Ngai and Borneo camphors readily sank, while the laurel camphor persistently floated. The specific gravities of the Ngai and Borneo camphors were therefore taken by placing a weighed quantity in a specific gravity flask with camphor water (the density of which does not differ appreciably from that of distilled water), exposing *in vacuo* for some hours, and proceeding in the usual manner. The specific gravity of laurel camphor was determined by obtaining a fully saturated solution of camphor in a mixture of spirit and water, in which a fragment floated indifferently in any part after exposure *in vacuo*. The specific gravity of the liquid was determined in the usual way, and of course represented that of laurel camphor. By these modes of procedure the specific gravity of laurel camphor was found to be ·995, that of Ngai camphor, 1·02 and of Borneo, 1·011.

The melting point of each was found by introducing a small quantity into a thin narrow tube, sealing one extremity and immersing in melted paraffin, and gradually heating till the little column of camphor became transparent, and noting the temperature of the surrounding paraffin ; by so doing the melting point (or rather, the mean of the melting and solidifying points) of laurel camphor was found to be 177° C., of Ngai camphor 204° C., and of Borneo camphor 206° C.

Laurel camphor, exposed to a stream of washed but not dried gaseous hydrochloric acid, at the ordinary pressure and temperature, absorbed it rapidly, and in a few minutes became a colourless, perfectly transparent liquid. Ngai camphor under the same conditions absorbed the gas extremely slowly, and though kept in a constant current for several hours, did not absorb sufficient to become fluid, but still remained in fragments, though surrounded by a small quantity of a colourless liquid. It seemed after the lapse of some time to cease to absorb more gas, for no further apparent effect was observed after a certain point was reached. Borneo camphor when treated in a like manner behaved in every respect similarly to Ngai camphor.

Gaseous hydrochloric acid, dried by passing it through strong sulphuric acid, when passed over laurel camphor, quickly converted it, as before, into a colourless liquid. The Ngai camphor was affected by the dried gas as by the moist, but somewhat more slowly, while the Borneo was not visibly acted upon at all, even after exposure to the stream of dried gas for many hours ; but on removing it, it was found that the grains adhered together, showing that some slight absorption had taken place.

Berthelot and Pélouze each state that Borneo camphor, when left in contact with moderately concentrated nitric acid, is converted into a floating oil, which, when added to water, deposits a body identical with laurel camphor. Ngai camphor, when left in contact with nitric acid of a specific gravity of 1·42 for an hour was found to be changed into a yellowish floating oil with the evolution of dense, ruddy fumes. This oil when separated and added to water, with constant stirring, gave a deposit possessing exactly the odour of laurel camphor, and this deposit, when collected, washed, and dried by exposure in a bell jar over sulphuric acid was quickly converted into a liquid by passing a stream of dried hydrochloric acid gas over it. It was impossible to perform any more experiments in this direction upon it, since the whole of the Ngai camphor at disposal was so extremely small that scarcely sufficient for this experiment could be used without giving up some equally important operation. It would, however, have been very interesting to have obtained sufficient of this deposit to have made an ultimate analysis of it, so as to have determined whether it had the same composition as laurel camphor.

Laurel camphor, when treated in a similar manner with nitric acid, yielded an oil floating on the acid, without, or with very slight, evolution of nitrous fumes. This oil, when separated and added to water, yielded a deposit having a terebinthinate as well as a camphoraceous odour.

On making an ultimate analysis of each camphor, the following results were obtained :—

		Experimental.	Theoretical.
Laurel camphor . .	C	78·2	78·94
	H	10·44	10·52
	O	11·36	10·54
		100·00	100·00

		Experimental.	Theoretical
Borneo camphor . .	C	77·66	77·92
	H	11·68	11·69
	O	10·66	10·39
		100·00	100·00

		Experimental
Ngai camphor . . .	C	77·56
	H	11·6
	O	10·84
		100·00

It should be stated that the Ngai camphor used in the combustion was in the state in which I received it. The crystals appeared to be pure, but the amount was insufficient to admit of the performance of any operations having purification as their object. The Laurel camphor and Borneo camphor were also simply museum specimens.

The substance used for the combustions was chromate of lead. This was first fused, to burn off any dust possibly existing in it, and next powdered and heated throughout the whole length of a long tube while air was passed over it. By these means any moisture possibly absorbed during the powdering was removed. The ends of the tube were then closed while it was still being heated, and the contents, as soon as cool, were transferred, with the camphor, directly into

the combustion tube, mixed with a wire, the absorption tubes attached, and the operation set going at once. It was considered that by these means the presence of any moisture was completely avoided. The oxygen was estimated as usual by difference.

The vapour density of Ngai camphor was determined by Hofmann's process. This consists of a graduated barometer tube, containing mercury, into which is introduced a small quantity of the substance under examination. This tube stands in a little cup, also containing mercury, and is itself enclosed in a larger tube, having an outlet at top and bottom. A delicate thermometer is suspended between the tubes. The vapour of oil of turpentine, or of some body having a high boiling point, is then passed through the space between the tubes. The substance readily volatilizes at a temperature much below its boiling point in air, since it is under greatly diminished pressure, and since a weighed quantity has been introduced the volume of the vapour can be read off, and after due corrections for temperature and pressure the vapour density can be calculated in the usual manner.

Ngai camphor, under these conditions, readily volatilized at a temperature of 158° C., and under a pressure of ·094 metre, though its boiling point, under ·760 metre pressure, is probably about 210° C. The vapour of Ngai camphor read off when both the temperature and height of the mercurial column were constant, gave a density of 78·98. This does not quite agree with the formula that might be deduced from the ultimate analysis ($C_{10}H_{18}O$), for that would give a density of 77, but considering the difficulties of the process it was considered fairly consistent with it.

The conclusion arrived at from the above experiments is that Ngai camphor is isomeric with Borneo camphor; that is to say, it possesses the same elements in the same centesimal proportions, the same number of atoms in the molecule, and as far as can be determined the same chemical constitution, but differs in physical properties, viz., its much higher volatility, its perceptibly different odour, and somewhat greater hardness and brittleness. It has been omitted to mention that Ngai camphor has an odour closely approximating that of laurel camphor, but much less powerful, while Borneo camphor, in addition to its weak camphoraceous odour, has a disagreeable peppery one also.

Ngai camphor may, therefore, like Borneo, be looked upon as a monatomic alcohol of the series $C_nH_{2n-3}HO$, viz., $C_{10}H_{17}HO$, the aldehyd of which is laurel camphor, $C_{10}H_{16}O$.

I cannot conclude these remarks without tendering my most sincere thanks to Professor Attfield for the great encouragement and many suggestions I have received at his hands during the investigation.

[*The discussion on this paper is printed at p.* 722.]

NOTE ON A PROPOSED METHOD OF STORING AND DISPENSING SMALL QUANTITIES OF HYDROCYANIC ACID.*

BY F. BADEN BENGER.

The uncertain strength of hydrocyanic acid as met with in pharmacy has formed the subject of frequent lamentation from pharmacists and medical men for many years past.

Mr. Towerzey, in a paper read at a recent meeting of the Bristol Pharmaceutical Association, was, I think, the last to point out this variation of strength, arising, as he said, mainly from the highly volatile nature of the HCN, and its consequent loss every time the bottle was opened. Mr. Towerzey ended, as others have done, by suggesting a metallic cyanide as a substitute. Hydrocyanic acid is, however, a remedy not likely to disappear from physicians' prescriptions very suddenly, and I therefore venture to bring before the Society a little contrivance for storing and dispensing small quantities of it, which I believe will be found useful. It consists, in fact, of a bottle from which the contents may be removed without taking out the stopper. A small glass tube, shaped like the barrel of an ordinary half-ounce syringe, is drawn out to a rather long, fine point at one end, and sealed in the flame of a spirit lamp or Bunsen's burner; it is then filled with the acid and a piece of vulcanized sheet india-rubber tied *tightly* over the mouth. When required for use, the point is scratched with a file and broken off; by pressing the finger on the india-rubber diaphragm any required quantity of acid can be taken out, only the same bulk of air entering the tube when the pressure is removed. It is then placed, with its point below the surface of mercury, in a little upright glass vessel.

By this method the only loss of HCN is the small quantity which diffuses in the air contained in the tube as it is gradually emptied, and is not sufficient to be of practical importance. It is of course necessary to bind the india-rubber tightly over the mouth of the tube, which should be of yellow glass, or varnished by a dip in solution of shellac coloured with coralline.

Vulcanized india-rubber must be used, as the HCN diffuses rapidly through pure india-rubber.

Not the slightest deterioration was found to have occurred in acid so kept for fourteen days. These tubes can be filled and sent out by wholesale houses instead of bottles, and can be as easily re-filled.

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, March 4, 1874.

COD LIVER OIL AND THE METHODS OF MASKING ITS TASTE.*

BY M. GUICHARD.

The introduction of a new medicinal product—cod liver oil bread—gives a certain interest to the consideration of the various methods that have been recommended for the administration of cod liver oil. In the first place, let us consider in a few words how the oil is prepared. The methods of preparation, varying in each country, may all be reduced to the choice of livers of good quality, cleansing them, and removing the oil that will run from them without the application of heat; a small quantity of colourless oil is thus obtained. The livers are then heated, either by means of the sun or in a water bath, or in a double-bottomed vessel heated by steam, the temperature being maintained between 60° and 70° C.; they then yield a quantity of nearly colourless or slightly coloured oil, which is allowed to cool, and filtered. These are the two medicinal oils. The livers, next heated over a bare fire, furnish at first a light oil that is used for burning, and, being further heated, a brown oil that is used industrially. For these latter oils they also mix with the picked livers others taken from unhealthy fish. Instead of being white and roundish, these are angular, rather long, and sometimes spotted with green and red. In Newfoundland, when the oil has been removed which runs off at the temperature of boiling water, the residue is simply submitted to pressure, and a brown oil is thus obtained. The residues from these various operations are

* *Répertoire de Pharmacie*, N.S., vol. ii., p. 1.

employed as manure. It is therefore the colourless or slightly coloured oil that should be used in medicine.

Cod liver oil is taken with facility by young children, who become quickly accustomed to its taste. This is not the case, however, with older children and adults, for whom it is therefore sought to mask the flavour. It has been recommended to take the oil before a meal, pinching the nose, then swallowing the oil, and afterwards a few spoonfuls of soup before releasing the nose. Others have said that the oil should be taken in the middle of a meal, previously placing upon the tongue a pinch of salt, and afterwards chewing a crust of bread and washing the mouth with a draught of wine or coffee. Again, it has been recommended to take a glass of ferrated water, rum and water, or a peppermint lozenge after swallowing the oil. For the eructations precipitated oxide of iron is given. To take the oil enclosed in capsules would evidently be the best means of attaining the object, but it is necessary to take too large a number.

In other cases the oil has been associated with substances of various natures intending to disguise the taste without diminishing its therapeutic properties ; but it is necessary sometimes that the action of the adjuvant should not be lost sight of. Cod liver oil has been associated with various syrups,—syrup of iodide of iron, anti-scorbutic syrup, syrups of orange peel, cinchona, tolu, etc. Ferrated cod liver oil, oil with 0·05 per cent. of essence of bitter almonds added, or shaken with double its volume of cherry laurel water ; oil with 1 per cent. of essence of eucalyptus added, or 20 drops of either to each spoonful, have all been proposed. Chloral has been added in the proportion of 10 per cent. of the oil. It has also been attempted to make a paste with the oil and powdered gluten to be taken in unleavened bread. The cod liver oil bread just introduced has the same object, but I do not think that this product will have a greater success than the other, to which it is much inferior. I think that the heat would act upon the oil, and that the altered products which resulted would predispose the oil to rancidity. It is therefore a product that should be eaten fresh, and consequently could only be prepared in large towns. To the foregoing I will add two methods hitherto unpublished. The first was mentioned to me by the late M. Deschamps, of Avallon, and consists in preparing a salad with cod liver oil. M. Deschamps spoke very highly of this plan, which is certainly not more extraordinary than that of the bread, and at least does not induce any alteration in the oil. The other plan is to crumble small pieces of sardine into a spoonful of oil. Children take very well to this association, and I have seen it succeed with many persons to whom I have recommended it as a last hope. They commence by eating the sardine alone, then with the oil of the sardine, and afterwards for this is substituted the cod liver oil. Another method recently indicated consists in heating 400 grams of the oil, 20 grams of roasted coffee and 10 grams of animal black in a closed flask for a quarter of an hour in a water-bath at 50°C. The mixture is left in contact during two or three days and shaken occasionally, then filtered : it appears only to have the taste of coffee.

Other processes consist in the introduction of the oil into a pharmaceutical preparation, which modifies more or less its appearance. Such are the various forms of jellies, and cod liver oil cream, which is an emulsion of equal parts of oil and mucilage of gum tragacanth, aromatized with a little alcohol and essence of bitter almonds. The syrups of cod liver oil are of the same nature. The following is the formula of a ferruginous syrup recommended in Germany :—

Powdered Gum Arabic	68 grams.
Distilled Water	60
Syrup of Lacto-phosphate of Iron	180
Pale Cod Liver Oil	250
Essence of Bitter Almonds . .	6 drops.

At other times, these syrups contain the oil more modified. Such is the following formula, where the oil is partly saponified :—

Pale Cod Liver Oil	100
Powdered Gum Arabic	50
Cherry Laurel Water	20
Orange Flower Water	20
Simple Syrup	200
Calcined Magnesia.	4

M. Deschamps, of Avallon, has recommended a soap of castor oil to be taken in 20 centigram pills, but it is necessary to take from 40 to 60 per day. Other processes suppress the cod liver oil and replace it by such substitutes as the iodized and phosphoretted oils and the extract of the water of cod livers. All these preparations might be useful in certain circumstances, but evidently cannot replace cod liver oil. As to the extract of the water of cod livers, it appears to me to want at least one important element—the oil. Finally, the last method of administering it is as an injection.

NEW PROCESS FOR THE MANUFACTURE OF UNALTERABLE BEER.*

BY M. PASTEUR.

It is well known that beer is eminently unstable ; during the heat of summer it does not resist for more than a month or six weeks the causes of its deterioration. The wort which is used in its preparation is still more difficult to preserve. At a slightly elevated temperature the beer wort may become, in the course of a few hours, especially in stormy weather, the seat of various alterations. These alterations exercise a great influence upon the processes of manufacture, and it may be safely stated that all the practices of the art of brewing are dominated by the necessity of fighting against their disastrous effects. One of the most expensive of the practices adopted to secure to a certain extent the preservation of wort and beer consists in the employment of ice and more generally of low temperatures.

What, then, are these changes which so influence this important industry? If they were known, might we not hope to combat them by more simple and economical means than those at present adopted? In a paper, of which the following is an abstract, recently read before the French Academy, M. Pasteur described a further utilization in the art of brewing of the results of his investigations respecting the phenomena of fermentation. The following are the more essential conclusions arrived at by M. Pasteur :—

1. All the changes in beer, whether manufactured or in the course of manufacture, and in the wort used in its production, are correlative with the development and multiplication of microscopic organisms, which he calls, for this reason, "*ferments de maladie.*"

2. The germs of these ferments are introduced from the air, the original ingredients, and the utensils used.

3. Whenever a beer does not contain any of these living germs, which are the immediate cause of its spoiling, that beer is unalterable, whatever may be the temperature of its manufacture or storage.

4. He states that he has demonstrated that in the employment of the actual processes of the brewery all the worts, yeast and beers contain the germ of the *maladies* peculiar to those substances.

If such beer as is met with in commerce, manufactured by the processes adopted in the breweries of France, Germany or England, be exposed in bottles to a temperature of from 15 to 20° C., after an interval of a few weeks it invariably alters and becomes unfit for consumption. In some exceptional cases, preservation would not be possible except by the addition of a larger quantity of hops than usual. At the same time, and parallel with the progress of the alteration itself, there occurs a multiplication of various microscopic organisms. If beer wort be

* *Comptes Rendus*, lxxvii., 1140.

placed in a vessel open to the air, but sheltered from any dust in the atmosphere by the opening being at the end of a sinuous tube, in the manner adopted in M. Pasteur's well-known experiments, it will remain in a perfect state of preservation for months or even years. But if a drop of commercial beer be introduced—since the most limpid beer always contains a few globules of yeast in suspension—the alcoholic fermentation is set up on the following day and the must is converted into beer. If beer so prepared be kept at the temperature of summer heat it undergoes alteration, and M. Pasteur finds that with the globules of yeast are always associated to a greater or less extent the *ferments de maladie* before referred to. He therefore infers that germs of these ferments exist in all commercial beers. But if beer specially prepared so as to be free from all germs of *ferments de maladie* be added to the wort, then the resulting fermentation produces perfectly sound beer, free from all living organisms other than the globules o falcoholic yeast.

M. Pasteur's investigations have led him to the conclusion that both wine and beer are liquids not alterable in themselves ; the causes of their alteration must be sought outside of their nature and composition. They undergo chemical modification, such as becoming flat, when exposed to contact with oxygen, or "age," in consequence of reactions between the constituent elements, principally under the influence of slow and sparing oxidization. But these changes of the liquid do not correspond to the "état maladif," properly so-called ; often they contribute to its amelioration. For beer to become "sour," "putrid," "lactic," it is necessary that foreign organisms should become developed in its interior. This is true of all temperatures, and beer free from these organisms might make a tour of the world without undergoing any other fermentation than the alcoholic. The same may be said of beer wort, which, if previously boiled, so as to destroy the vitality of the germs it might contain, will remain unaltered if it be protected from the dust that floats in the air.

The same order of facts are presented by beer yeast, but here we have to do with more complex phenomena. Beer and beer wort are dead substances, indestructible until submitted to exterior causes of deterioration ; but the yeast, on the contrary, is a living organism. That beer yeast is eminently changeable is well known. During the summer, and even at the lowest temperature, it alters its consistence in a few days, acquires a putrid odour, and loses its activity as a ferment. These alterations are accompanied by the development of microscopic organisms, bacteria, vibrions, lactic ferment, and various moulds. The question arises whether these have their origin in a modification of the yeast cells or in the dust of objects with which the yeast has been in contact.

In reply, M. Pasteur states that he has succeeded in preparing a pure yeast free from all foreign germs. In this state it appears as inert as a mineral substance, and neither mould, vibrions, bacteria, or acetic or lactic ferments ; not even the *Mycoderma vini*—so near to yeast in its structure and mode of development—appears in it. Further, it preserves its fermentative character, although, when compelled to live for some time upon its own substance, its protoplasm is profoundly modified, as happens always with cells when the usual phenomena of assimilation are suspended.

M. Pasteur does not give precise details as to how he prepares this pure yeast, but he says the method is based on the following physiological facts. Whilst beer yeast lives and multiplies in contact with the air more rapidly and easily than in contact with carbonic acid, the *ferments de maladie*, on the contrary, are impeded in their life and propagation by the presence of oxygen. He considers that in this characteristic they resemble the vibrio which he believes to be the butyric ferment, and which oxygen deprives of movement and of action as a ferment. The result of this peculiarity has been that the attempt to manufacture beer in closed vessels free from contact with air, according to the process introduced by M. Pasteur some time since, has failed hitherto, from the conditions favouring the production of these noxious ferments. Profiting from this difference in the action of pure air upon yeast and the *ferments de maladie*, he obtains a small quantity of pure yeast, which added to beer wort previously boiled and carefully sheltered from contact with the dust of the atmosphere, readily multiplies and yields a plentiful supply.

These are the principal points of M. Pasteur's communication so far as they would interest the readers of this journal, and it is not necessary to give technical details. It will be sufficient to say that after the wort has been raised to ebullition in its preparation it is kept sheltered, only pure yeast is added, and fermentation allowed to take place. After this the beer may be treated in the usual manner, as, with the exception of the *Mycoderma vini* and the *Mycoderma aceti*, the foreign ferments do not find a suitable medium for their development in finished beer, and these two may be excluded by simple precautions. M. Pasteur states that beer so prepared and kept in ordinary recently tarred vats, or in bottles, is preserved indefinitely, even at a temperature of 20° to 25° C. Far from becoming spoilt with the lapse of time, it appears to improve by a kind of "ageing" analogous to that which takes place with wines.

NOTE ON NUTMEG STEAROPTENE*

BY PROFESSOR FLÜCKIGER.

According to previous writers, the stearoptene which is obtained in extremely small proportions from the essential oil of nutmeg,—either from *Myristica fragrans*, Houtt., or *M. fatua*, Houtt. (*M. tomentosa*, Thimb.)—is soluble in water. The author has obtained it beautifully crystallized from spirit in extremely light scales, the form of which is not determined. Notwithstanding often repeated recrystallizations it retained the smell of nutmegs. It melted at 54° C., and, as might have been expected, was by no means soluble in water, but only in the ordinary solvents of substances of this class. By glacial acetic acid it is at first coloured red. This short notice, it will be seen, is full of contradictions of what has been previously published respecting myristicin. Even its composition differs from that found by Mulder. The mean of four analyses made by Dr. Buri, in the author's laboratory, gave C=75·4, H=12·28. The author proposes to attempt to construct a formula from these results, and also to study the deri vatives of this stearoptene.

SAFFLOWER.†

Carthamus Tinctorius.

These seeds yield by expression an oil which, when properly prepared and refined, is transparent and of a light yellow colour. It is used in India for culinary and other purposes. This oil deserves more attention than it has hitherto received in this country, and if once fairly introduced, there is no doubt whatever of its becoming a staple import. It is used in some of the Government workshops as a "drying oil." It is believed to constitute the bulk of the celebrated "Macassar oil." The seed is exported under the name of Curdee or safflower seed. In Oude it is sown in October, either alone or along the edge of wheat crops ; both light and heavy soils are adapted to it. It is cultivated in every village, but not extensively. There would be no difficulty in further cultivating it to any extent. The cost of the seed, which is called "Barré," is 18⅔ seers per rupee, and the cost of the oil is from three to four seers per rupee.

* From the *Schweizerische Wochenschrift für Pharmacie*, Dec. 19, 1873.

† From the Official Catalogue of the Indian Department at the Vienna Universal Exhibition.

The Pharmaceutical Journal.

SATURDAY, MARCH 7, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

ADULTERATIONS IN FOOD AND DRINK.

EVERY day brings fresh testimony to the fact that there has existed, and still exists, a lamentable amount of popular ignorance upon the subject of the detection of adulterations in food. We therefore think that Mr. JAMES BELL did good service in the lecture which he delivered recently before the Chemical Society on "The Detection of Adulterations in Articles of Food and Drink."

The lecturer first pointed out that the practice of adulterating articles of food and drink was not of recent date, for that Acts of Parliament for the suppression of such practices were passed a century ago. Until the passing of the recent Adulteration Act, the suppression of adulteration had been confined to the Revenue authorities, and although such action had been intended primarily for revenue purposes, yet the public were much benefited, for no commodities are vended so pure as those which are subject to revenue supervision. As starches of various kinds have been extensively used for adulterating mustard, spices, cocoa, etc., a very elaborate description of many of them was given, and how by their form, size, and markings they may be distinguished. The various physical and chemical properties of coffee and its principal adulterants were next commented upon, and it was stated that, combined with the use of the microscope, the specific gravity of an infusion is one of the best means of determining the percentage of adulteration, especially when chicory or other sweet roots have been used. Tables showing the comparative colouring power of coffee, and its various adulterants, and also the specific gravity of infusions of the same, were exhibited, but the former is only regarded as a preliminary test. The microscopic tissues of coffee, which are characteristic, are the spindle-shaped "flights," and the thick-walled irregular cells, and these are distinguished very easily from the thin-walled cells, spiral tissue, and dotted tubes common to the various roots. Chicory and dandelion are distinguished from other roots by the presence of laticiferous tissue, but it is only an experienced microscopist who can distinguish the one from the other. The seeds used for adulteration, such as beans, peas, etc., may be microscopically identified by the tissues of the outer integument and by the starch cells, and also by the starch granules, which are often found whole, even after roasting. Other substances recently found were rye, acorns, locust beans, dog biscuits, and mustard husks.

The next subject taken was tea, and the lecturer minutely described the microscopical structure of the serrations, hairs, and the cells composing the epidermis of the tea-leaf, and showed how they differed from similar structures of the elder, sloe, willow, etc.: but it appears that adulteration of this kind is seldom now attempted. Such adulteration as is now practised is mostly done abroad, and principally consists of facing the tea with a greenish powder. Two specimens of facing powder used in Shanghai were exhibited, one of which consisted entirely of Prussian blue, and the other corresponded in composition to soapstone with an admixture of oxide of iron. It has been said that turmeric is sometimes used in the facing of tea, but the lecturer had never met with a case of the kind. To examine the facing powder, a portion of tea should be agitated with water in a test-tube, filtered through muslin, and the sediment which subsides examined microscopically and chemically. Prussian blue is readily recognized by its bright blue angular fragments, which are turned brown by potash. One sample of tea was shown adulterated with 20 per cent. of ground quartz, and 8 or 9 per cent. of magnetic oxide of iron, and another with magnetic oxide of iron only, and in both cases the adulterant was so artfully rolled up within the leaves that there was nothing suspicious in the appearance of the tea, but it felt exceptionally heavy. A specimen of tea imported as "Maloo mixture" was also exhibited, which was found to consist of exhausted tea leaves which had been redried. The method relied on for proving the presence of exhausted tea leaves consists in estimating the amount of ligneous matter, tannin, and gum in the sample; and, if such leaves be present, the first of these will be found in excess, and the two latter deficient, unless catechu, or some such body, and gum, have been added in making up the tea. In twelve samples of tea, as ordinarily imported, the amount of ligneous matter ranged from 47·66 to 60·12 per cent.; the gum from 4·06 to 7·15 per cent.; and the tannin from 9·50 to 18·19 per cent., excluding a sample of Assam fannings, which only gave 3·70 per cent.

The last subject taken was pepper, and samples of ordinary white and bleached peppercorns were exhibited, both of which, but especially the latter, were largely coated with chalk. The ordinary adulterants of pepper were stated to be linseed meal, mustard husks, rice, the bran and flour of various cereals, etc., the microscopical characters of which, as well as of genuine pepper, were minutely described. Some of the adulterants may be readily detected; for instance, if rice has been used, the particles, from their camphor-like appearance, may be picked out by the use of a pocket lens; fragments of mustard husks may be recognized by the naked eye from their cup-like shape; and if ground chillies are present, the pepper should be diffused in water and filtered

through a hair or muslin sieve, when the deep red particles of the chillies may be picked out and recognized by the taste.

INDUSTRIAL CHEMISTRY.

THE Council of the Society of Arts have recently made arrangements for the delivery of a series of lectures on subjects coming under the above heading, and in doing so they have manifested a very praiseworthy recognition of one of the most pressing necessities of the present time, viz., a more general attention to the scientific aspects of our manufacturing industries. The first lecture of the series was delivered on Friday evening, by Mr. FREDERICK FIELD, F.R.S., the subject being, "Paraffin and its Manufacture." The attendance was very large, and the account given of the discovery and preparation of this interesting material was highly interesting. Several entirely new methods of purifying paraffin were illustrated by very striking experiments. The lecture table was covered with various forms of candles, etc., made of artificial paraffin, as well as the natural material known as ozokerite, and great interest was shown on the part of the audience. The chair was taken by Professor ODLING, who prefaced the lecture with some introductory remarks on the importance of industrial chemistry, in which he happily and forcibly illustrated how much that subject is or ought to be a matter of every-day interest to every one. We heartily wish success to the enterprizing attempt made by the Society of Arts to popularize and promote the consideration of matters which are so essentially connected with our national welfare.

THE SCHOOL OF PHARMACY.

IT will be seen by reference to the advertisement of the School of Pharmacy in the present Journal, that the courses of lectures on Chemistry and Pharmacy, and Botany and Materia Medica have just recommenced. To students who have but a limited time at their disposal, the present period is a very favourable time for studying at the School of Pharmacy; for between the 1st of March and the 31st of July, they have the opportunity afforded them of not only attending in the laboratory, and at the usual courses of Chemistry and Pharmacy, and Botany and Materia Medica, but *also* the summer course of Systematic and Practical Botany, at the Royal Botanic Society's Gardens, in Regent's Park.

POISONING BY HYDRATE OF CHLORAL.

THE *Lancet* states that a case was mentioned at a late medical meeting at Wiesbaden of a man, aged 36, who swallowed six drachms of hydrate of chloral with the intent to commit suicide. When received at the hospital half-an-hour afterwards, he was in a profound sleep, with congested face, heavy breathing, and pulse 100. After a short time the face became livid, and the respiration intermittent; this again was followed by general pallor, absence of pulse, and contraction of pupils. Electricity was used at intervals to induce regular breathing, and subcutaneous injections of nitrate of strychnia to stimulate the heart's action; and finally the patient awoke "quite refreshed," thirty-two hours after the ingestion of the chloral.

IT is announced that on Saturday, March 14, a lecture will be delivered in the Museum, in the Royal Botanic Society's Gardens, Regent's Park, by Professor BENTLEY, "On the Properties and Uses of *Eucalyptus globulus* and other species of Eucalyptus." The lecture is to commence at 4 o'clock.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

Wednesday, March 4th, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present: Messrs. Atherton, Greenish, Hampson, Radley, Robbins, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick, and Williams.

The minutes of the previous meeting were read and confirmed.

CONVERSAZIONE.

The Secretary read a letter from the authorities at South Kensington Museum granting the use of the building for the Conversazione in May next. A committee was appointed to carry out the arrangements.

THE HISTORICAL SKETCH OF PHARMACY.

A letter was read from Professor Redwood, undertaking to edit and complete the 'Historical Sketch of Pharmacy,' in accordance with the request of the Council at their last meeting.

DEATH OF MR. MORSON.

The PRESIDENT said: Gentlemen,—It is with feelings of much regret that I have to inform you, the Pharmaceutical Society, and all connected with it, have just sustained a great loss in the death of our valued friend, Mr. Morson, which occurred yesterday. Mr. Morson had been out of health for some months, but when I saw him about three weeks ago, I little thought he was so near his end. Mr. Morson was one of the founders of the Society, and was Mr. Jacob Bell's right hand from the commencement of the Society until Mr. Bell's death in June, 1859, when Mr. Morson was vice president, and was elected president in July of the same year. Mr. Morson was on the Council from 1841 to 1850, and again from 1854 to 1870. Mr. Morson always took the greatest interest in the Society, and for years had been constant in his attendance—calling at Bloomsbury Square almost daily to see what was going on. He was one of the first examiners, and remained on the board for twenty-eight years. Mr. Morson was a most intelligent man, possessing a great amount of information on a variety of subjects. He was also an excellent scientific chemist, was Fellow of the Linnæan Society, and member of the Royal Institution, and was well acquainted with many of the leading scientific men on the Continent. Mr. Morson was a most interesting and genial companion, and a man I was always proud of as belonging to the same calling as my own; and with your permission I will move that a letter of sympathy and condolence be sent to the family.

The VICE-PRESIDENT said: I rise with feelings of the deepest sympathy to support the proposition of our President. I feel, gentlemen, that pharmacy in general, and our Society in particular, have lost a most sincere and earnest friend. I recollect Mr. Morson as being attached to this Society from its earliest days. I had the honour of sitting at this Board under his presidency, and often admired his tact and his sound judgment on matters of business. I think the fact of Mr. Morson having been the third vice-president and the fourth president of the Society speaks much for the position he held in days when it was in its infancy; and though we know that his death has happened in the natural order of things, we cannot help feeling deep regret at his passing away from us. I hope we shall all endeavour to follow his bright example. I have much satisfaction in seconding the proposal of our President, that a letter of condolence and sympathy be sent to his family.

Mr. SANDFORD and Mr. WILLIAMS also spoke in very feeling terms of the late Mr. Morson, with whom they had both been on terms of great intimacy, the latter having been, in early life, for ten years assistant to Mr. Morson.

The motion having been carried, the President and Vice-President and Messrs. Sandford and Williams were appointed to draw up the letter.

The President also alluded to the recent loss of another old member and friend of the Society, Mr. Geo. Meggeson.

DONATION TO THE MUSEUM.

A letter was read from Mr. Peter Squire, accompanying a specimen of Coca (*Erythroxylon Coca*), which he had been requested by Dr. Sieveking to present to the Society. The letter was ordered to be entered on the minutes, and thanks awarded to Dr. Sieveking.

The following letter was read from Dr. Flückiger, of Strassburg, and ordered to be printed :—

"Strassburg, 20th Feb., 1874.

"Dear Sir,—I beg to return my best thanks to you and the Pharmaceutical Society of Great Britain for PHARMACEUTICAL JOURNAL, 1870, 1871, 1872, 1873, kindly sent, and since continued, to the library of the Pharmaceutical Institution of our University.

"I hope that members of your Society, or students, desirous of becoming a little acquainted with the scientific part of pharmaceutical education in this country, will be so kind as to call on me and to afford me the opportunity of proving my grateful feelings respecting English pharmacy, to which I am so much indebted.

"Believe me to remain, dear Sir,

"Yours very respectfully,

"Professor FLÜCKIGER,

"Director of the Pharmaceutical Institution.

"Thomas Hyde Hills, Esq.,

"President of the Pharmaceutical

"Society of Great Britain."

Mr. GREENISH said he was sure any English pharmacist visiting Strassburg would meet with a very kind reception from Professor Flückiger. Only the previous week he had received from the Professor a copy of his very interesting paper on Buchu leaves, a translation of which had appeared in the PHARMACEUTICAL JOURNAL. The original paper, however, was illustrated by two beautiful drawings, which assisted greatly in the comprehension of the details. He hoped that at one of the Society's evening meetings the Professor of Botany might be induced to point out, by means of a black board, the principal results of Professor Flückiger's investigation.

Mr. SUTTON also spoke from personal experience of the kindness with which Professor Flückiger received English visitors connected with pharmacy.

HONORARY MEMBERS.

Mr. SANDFORD drew attention to the fact that any gentleman who desired to propose the election of honorary members must put the names on the list during the following month. He gave notice of his intention to propose Professor Bentley.

Mr. SCHACHT said if no objection were made, which he did not apprehend, he should propose the name of Dr. Porter Smith, who had been a donor to the museum, and always showed himself ready to impart any information he possessed.

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

Cooke, William Kendle.
Pank, Philip Durrell.
Roach, Herbert William.
Savage, John Welch.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following Pharmaceutical Chemists were elected Members of the Society :—

Cooke, William Kendle .....Holt.
Galloway, George Ross.....Inverness.
Roach, Herbert William .....London.
Savage, John Welch..... .....Wells, Somerset.

Chemists and Druggists.

The following registered Chemists and Druggists were elected Members of the Society :—

Balkwill, William Hancock.....Kingsbridge.
Carr, John.....Hamilton, Canada.
Jones, Henry.....Wimborne Minster.
Miller, Thomas Stark ....Broughty Ferry.
Sirett, Henry.....Brackley.
Williams, Thomas Howell .....London.

ASSOCIATES.

The following, having passed their respective examinations, and being in business on their own account, were elected "Associates in Business" of the Society.

Minor.

Dunston, Alfred .....Timberland, nr. Sleaford.
Lloyd, Edward ... .Abergele.
Peach, Richard Walter .....Donington.
Sale, Thomas John .....Lowestoft.
Sykes, Edwin John .....Buxton.

Modified.

Barlow, George Edward .....Pocklington.
Macdonald, John .....Old Swan, Liverpool.
Thirlby, William .....Leicester.

The following having passed their respective examinations, were elected "Associates" of the Society :—

Minor.

Agger, Joseph Edward.....King's Lynr.
Bladon, William George .....Cheltenham.
Bolt, Richard Taunton.....Tavistock.
Broomfield, Robert William ...Harrogate.
Budworth, William Seth .....Bolton.
Capes, John Henry Cooper .....York.
Cole, Edward Henry.....Leeds.
Donald, David .....Perth.
Evans, Evan Thomas .....Carmarther.
Feaver, John.....Truro.
Fisher, Sidney .....Wolverhampton.
Gibson, James ....North Shields
Green, Alfred .....Wakefield.
Herbert, John .....Kingston-on-Thames.
Holgate, Sam Verity .....York.
Jesser, Alfred Henry ....Southampton.
Kemp, George ....Birmingham.
Martin, John Wesley ... .Stratford.
Parminter, Urban.....Exeter.
Polley, John .....Chester.
Shaw, Stephen .....London.
Stamford, Frederick.....St. Austell.
Symonds, Henry ....Norwich.
Thompson, Frank Farrow .....Cambridge.
Wardley, Samuel Frederick.....Lowestoft.
Warren, Francis William.....Weston-super-Mare.

Modified.

Bradsley, Joshua .....Glasgow.
Penrose, Thomas Samuel.....Launceston.
Wavell, William John .....Brighton.

The following having passed the Preliminary Examination, were elected "Apprentices or Students" of the Society :—

Allwork, Frank .....Brighton.
Bathe, Frederick James .....Chippenham.
Bevan, William.....Ipswich.
Brasnett, Robert John.....King's Lynn.
Cant, Hemington .....Stratford.
Dixon, Richard Dobson .....Sharow.
Embley, John .....Brierfield.
Ford, Robert .....Plymouth.
Gallienne, W. J. Norman .....Torquay.
Greenwell, Alexander John.....Newark.

Hardwick, Arthur.....Sheffield.
Harman, Arthur .....St. John's Wood.
Harpham, John.....Newark.
Harsley, John William.....Sheffield.
Hartlande, Charles .....Oldbury.
Hart, James .....Sunbury.
Hay, Richard Mayman.....York.
Horton, Thomas .....Peterborough.
Hunt, Tom George .....Snaith.
Jones, Thomas Glynne.....Llanidloes.
Jones, John Thomas.....Pembroke.
Lec, Alexander Milne .....Strichen.
Matthews, Arthur.....Bristol.
Mead, Charles John .....Wimborne.
Munrow, Hugh.....Hampton Wick.
North, Josiah .....Reading.
Nowell, Barns .....London.
Pollard, George Frederick .....Burnley.
Porteous, William Nicol .....Edinburgh.
Poulton, Arthur .....Newton Abbot.
Reade, Leonard James.....Wolverhampton.
Stahr, Victor Emanuel .....London.
Townsend, Joseph Edward .....Peterborough.
Thorpe, Henry Stanley .....Hertford.
Whyte, Alexander .....London.
Wood, Edward James .....Reading.
Wright, Robert.....South Shields.

The name of William Robert Jones, of 6, Belvedere, Runcorn, Cheshire, was restored to the register.

The following were appointed Local Secretaries for their respective towns :—

Hogarth, William.....Preston.
Robinson, Alfred Francis .....Darlington.
Sant, George .....Woodstock.
Grindley, William.....Chester.

Finance.

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

Benevolent Fund.

The report of this Committee was read ; it contained a circular which had been drawn up by the special Committee to be sent to the trade, and recommended the following grants to be made :—

To an aged chemist and druggist residing at Kelvedon, in Essex, £10.

To the widow of a chemist and druggist residing at Leeds, £20.

An application from another widow, residing at Bristol, which had not arrived in time to go before the Committee, was mentioned by Mr. Stoddart, and after a short discussion, a grant of £10 was made in this case also.

The name of Edwin Markland, of Kelvedon, Essex, was ordered to be placed on the list of approved candidates for annuities.

Library, Museum, and Laboratory.

The report of this Committee was read. It recommended the purchase of the following books :—'Miller's Elements of Chemistry,' 'Lindley and Moore's Treasury of Botany,' 'Armstrong's Organic Chemistry,' 'Schorlemmer's Chemistry of the Carbon Compounds,' 'Wight's Icones Plantarum Indiæ Orientalis.'

It appeared that the average daily attendance in the library was 14, and in the evening 2·45. The report and recommendations were adopted.

House.

The report and recommendations of this Committee, which simply dealt with certain small repairs, etc., to the premises, were received and adopted.

The Jacob Bell Memorial Scholarships.

A letter was read, asking if a young man might be allowed to compete for the Bell Scholarship, notwithstanding that he could not comply with the regulations as recently amended. One of the grounds of his application was that, owing to deafness, he intended to leave the practical business of pharmacy, and study scientific chemistry as a profession. The Secretary was directed to reply that the Council could not admit the applicant to compete except in accordance with the regulations.

Pharmaceutical Congress at St. Petersburgh.

A report was read from the Committee appointed at the Council at their last meeting to consider the following letter :—

"*The Organization Committee of the Fourth International Pharmaceutical Congress in St. Petersburgh*, 1874.

"[No. 3.]

"15th January, 1874.

"To the Pharmaceutical Society of Great Britain.

"At the sitting of the International Pharmaceutica Congress at Vienna, on 10th September, 1869, the next session was fixed for the year 1872, and St. Petersburgh chosen as the place of assembly. From motives of expediency, and in accordance with the wish of several foreign societies, the Congress was, however, postponed till 1874.

"After overcoming all opposition, and with the highest sanction to holding the same, the Organization Committee, in the name of the Pharmaceutical Society of St. Petersburgh, gives notice to your esteemed Society that the fourth International Congress of Pharmaceutical Societies and Unions will take place in St. Petersburgh in August, 1874.

"The following questions have been submitted for discussion :—

"1. How far the personal responsibility of the pharmaceutist extends in executing the duties of his calling.

"2. What would be the best mode of organizing the Apothecaries' Committee of Revision.

"3. Is it necessary that the pharmaceutical professorship should be held by a pharmaceutist ?

"4. Has not the time arrived for instituting an international pharmacopœia ?

"In case your esteemed Society would wish to submit any further question, you are requested to send the same to the Committee before the 15-27th March next, in order that the ministerial sanction to these questions may be obtained, and the programme of the Congress published in time.

"(Signed)

"The President of the Organization Committee,

"H. Schroeder.

"Secretary, E. Rennard.

The Committee reported that they were not able to suggest any questions for discussion at the Congress in addition to those already named ; but they were of opinion that it was desirable to send a representative or representatives to the Congress at St. Petersburgh, in August, 1874.

Mr. Schacht inquired on what grounds the Committee recommended the sending of a deputation to the Congress.

Mr. Williams said he had voted against the proposition in committee, but the grounds upon which it was carried were, that it would be only right, graceful, and proper that a deputation should go to St. Petersburgh, to show the interest taken in England in foreign pharmacy, and, if possible, to give the Pharmaceutical Society and its members the benefit of a report as to the character of Russian pharmacy. The question of the formation of an international pharmacopœia was one which no doubt might usefully be discussed, though his own opinion was against such a proposal at present, except probably in a very modified form, and having reference only to a limited number of very powerful drugs or preparations.

Mr. HAMPSON, as one of the Committee who had voted in favour of a representative going to the Congress, said he understood the opinion of the Council at the previous meeting was almost unanimous in favour of such a step. He would therefore only very briefly state the grounds on which he supported it. In the first place, he thought it desirable to send a representative for the sake of showing a national friendly spirit, but beyond that it was also desirable that the Society should be represented, and that our representative should, when necessary, give an opinion on the points brought under discussion. He understood the German pharmacists, when occasion served, always showed a very friendly feeling towards this Society; and when previous conferences had met without English representatives being present, their absence was openly referred to with regret. It was difficult to estimate the exact value of the step, but on the face of it it seemed very desirable.

Mr. SCHACHT said there was no doubt a great deal in the observations just made, which every one must cordially agree with; but with regard to the question of an international Pharmacopœia, he thought it was entirely a matter for the future, and questioned whether there were ten pharmacists in the whole of England who had formed any opinion upon the subject. On that ground, therefore, it was quite unnecessary to send a deputation. Taking the general desirability of such a thing as being admitted, it was a question whether they could afford the expense; and as at a committee meeting on the previous evening a proposal for taking certain steps in the direction of education had been postponed until the balance-sheet was prepared, in order that it might be clearly seen what the financial position of the Society was, he should certainly feel disposed to oppose the grant for any purpose likely to lead to such problematical good as the suggestion now brought forward. He meant no disrespect whatever to the Committee who had made the recommendation, in asking to let the matter stand over, as other matters had to do, for a short time.

Mr. GREENISH could not think the discussion at the Congress would be limited to the four questions of which they had heard. At the first three Congresses it was very much regretted that their Society was not represented. If Spain, Italy, France, and Austria could each send representatives to such a conference, surely Great Britain should not be unrepresented there. Considering the advance of pharmaceutical education in this country during recent years, he thought the time had arrived when the British pharmacist should take his position abreast of his colleagues on the Continent.

Mr. SANDFORD said they had sent a deputation to Vienna on a former occasion, but he never heard that anything particular came of it.

Mr. GREENISH said that the Journal of that date contained the remarks made by their representatives at that Congress.

After some further discussion, the recommendations of the Committee were received, but not adopted, with the view to the matter being further considered before a decision was arrived at.

PARLIAMENTARY.

The report of this Committee was read, recommending that proceedings be taken in the case of a person who had infringed the Pharmacy Act. The Solicitor was now in attendance, and read the case and opinion which had been submitted to the late Attorney-General and counsel, with reference to several points arising out of the Adulteration of Food and Drugs Act. It was a somewhat lengthy document, and after its perusal an animated discussion arose as to the desirability of publishing it in the Journal. It seemed, however, to be the general opinion that it would be more likely to mislead members of the trade than to give them really useful information; and it was ultimately resolved—

"That the case and opinion be open, in the discretion of the Secretary and the Solicitor, for the use of chemists and druggists when threatened with or actually defendants to proceedings under the Adulteration Act."

Mr. HAMPSON thought a more practical course of action would be for the Parliamentary Committee to meet and consider whether something could not be done in influencing the present Government to alter the Adulteration Act. There was no doubt that amendments would be brought forward in the new Parliament, which met to-morrow; and they ought not to allow any opportunity to pass without doing what they could to procure such alterations as seemed desirable.

Mr. SANDFORD thought Mr. HAMPSON'S suggestion a very good one, and would be very happy to second a resolution to that effect. It was then resolved unanimously—

"That the Parliamentary Committee be requested to consider the objectionable points of the Adulteration Act as affecting chemists and druggists, and that they at the earliest convenient time take steps to represent to the Government the objectionable points of the Act of Parliament, and urge upon the Government the necessity of their amendment."

The report of the Committee was then received and adopted.

POISONING BY VERMIN-KILLER.

Mr. SUTTON took the opportunity while the Solicitor was present, to ask him a question with regard to a poisoning case which had recently taken place before the magistrates on the borders of Suffolk, where a woman had attempted to poison a child with a vermin-killer obtained from a veterinary surgeon, which contained strychnia. Fortunately vomiting set in, and the child was not killed; but it appeared that the person who sold the poison made no entry of the sale, and did not appear to be aware of the obligation to do so. When the trial came on, he would most certainly be asked how it was possible for persons to get poison in that way, and he wished to know what steps should be taken to investigate the case, so as to punish the seller.

The SOLICITOR said the Society could proceed against the seller for infringing the Registration clause, but the police could proceed for selling the poison without conforming to the proper regulations. The Society always felt some reluctance to proceed in these cases, especially where a veterinary surgeon was concerned.

Mr. SUTTON said the magistrate had asked him about it, and he had given it as his opinion that the police should be directed to take action in the matter.

The SOLICITOR said that was the proper course to be adopted.

The VICE-PRESIDENT said it was important that it should be noticed in such a case as this that the Act did not allow veterinary surgeons to sell poisons.

ADDITIONAL SCHOLARSHIPS.

The report of the Special Committee appointed to consider the proposal for instituting additional scholarships was read. It stated that, after much discussion, it was deemed necessary to have definite information as to the probable income and expenditure of the Society in future years, before coming to any resolution upon this point, and instructions, therefore, had been given for the necessary statement of account to be prepared. The Committee, however, recommended that the limit of age for the Jacob Bell Scholarship should be altered from 21 to 22.

Mr. SCHACHT said it was much against the wishes of some of the members of the Committee that the question had been postponed, but it was done in deference to the very strong expression of two of the officials with regard to the probable income of the Society in future. He was very glad to find, therefore, from the balance-sheet, which was just about completed, that during the past year there had been a purchase of Government securities to the amount of £2500.

The report of the Committee was then received and adopted.

PRELIMINARY EXAMINATIONS.

The Committee appointed to consider the new regulations for conducting the Preliminary Examinations reported that they had had considerable correspondence in reference thereto, and the replies from all the centres appointed had been satisfactory, with the exception of Newcastle-on-Tyne, in which town no person had been found to undertake the duty of superintendent. The Committee recommended the addition of Aberystwith to the list of centres already approved by the Council.

They also recommended, that the consideration of the method of conducting the Preliminary Examination in Scotland be deferred until after the deputation from the Board of Examiners in Scotland visited London in the course of the present month.

The SECRETARY said that of the superintendents recommended for appointment, fifty-five were members of the Society and pharmaceutical chemists, and four members chemists and druggists. The deputies named were—Thirty-five members, pharmaceutical chemists; eight members, chemists and druggists; one associate in business; two pharmaceutical chemists not members; nine chemists and druggists not connected with the Society; and two persons not on the register of chemists and druggists.

The report and recommendations of the Committee were received and adopted, and the following appointments were made:—

SUPERINTENDENTS OF EXAMINATIONS.

England and Wales.

Barnstaple	Goss, Samuel.
Berwick-on-Tweed	Carr, William Graham.
Birmingham	Southall, William.
Boston	Marshall, Robert.
Brighton	Gwatkin, James T.
Bristol	Stoddart, W. W.
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Cross, William.
Cardigan	Jones, J. E.
Carlisle	Thompson, Andrew.
Carmarthen	Davies, R. M.
Carnarvon	Lloyd, William.
Cheltenham	Smith, Nathaniel.
Chester	Grindley, William.
Colchester	Manthorp, Samuel.
Darlington	Robinson, Alfred F.
Doncaster	Dunhill, W. W.
Dorchester	Evans, A. J.
Exeter	Walton, Ralph.
Guernsey	Arnold, Adolphus.
Hereford	Jennings, Reginald.
Hull	Bell, C. B.
Jersey	Ereaut, J., jun.
Leamington	Jones, S. U.
Leeds	Reynolds, Richard.
Leicester	Cooper, Thomas.
Lincoln	Maltby, Joseph.
Liverpool	Abraham, John.
Lynn	Atmore, George.
Macclesfield	Bates, W. J.
Manchester	Wilkinson, William.
Northampton	Bingley, John
Norwich	Sutton, Francis.
Nottingham	Atherton, J. H.
Oxford	Prior, G. T.
Peterborough	Heanley, Marshall.
Plymouth	Balkwill, A. P.
Portsmouth	Rastrick, J. L.
Preston	Hogarth, William.
Reading	Hayward, W. G.
Salisbury	Atkins, S. R.
Scarborough	Whitfield, John.
Sheffield	Wilson, Edward.
Shrewsbury	Cross, W. G.
Southampton	Dawson, O. R.
Stafford	Averill, John.
Swansea	Brend, Thomas.
Taunton	Prince, Henry.
Truro	Serpell, Samuel.
Worcester	Witherington, Thomas.
York	Davison, Ralph.

Scotland.

Aberdeen	Davidson, Charles.
Dumfries	Allan, William.
Dundee	Hardie, James.
Edinburgh	Mackay, John.
Glasgow	Kinninmont, Alexander.
Inverness	Galloway, G. R.
Perth	Reid, Neil.

DEPUTY-SUPERINTENDENTS OF EXAMINATIONS.

England and Wales.

Barnstaple	Symons, William.
Berwick-on-Tweed	Carr, Robert.
Birmingham	Churchill, W. J.
Boston	Pilley, Henry Thomas.
Brighton	Savage, W. W.
Bristol	Schacht, G. F.
Cambridge	Church, H. J.
Canterbury	Amos, D.
Cardiff	Kernick, S. P.
Cardigan	Williams, John.
Carlisle	Hallaway, John.
Carmarthen	Davies, R. M., jun.
Carnarvon	Jones, John.
Cheltenham	Barron, William.
Chester	Hodges, William.
Colchester	Shenstone, J. B. B.
Doncaster	Shaw, Henry W.
Dorchester	Durden, Henry.
Exeter	Delves, George.
Guernsey	Collenette, A.
Hull	Baynes, James.
Jersey	Ereaut, John.
Leamington	Davis, Henry.
Leeds	Smeeton, William.
Leicester	Cooper, Henry.
Lincoln	Battle, John Scoley.
Liverpool	Shaw, John.
Lynn	Willis, Cottingham.
Macclesfield	Wood, Richard.
Manchester	Wilkinson, George.
Northampton	Mayger, W. D.
Norwich	Corder, Octavius.
Nottingham	Fitzhugh, Richard.
Oxford	Thurland, Henry.
Peterborough	Buckle, Frank George.
Plymouth	Balkwill, George.
Portsmouth	Rastrick, Robert J.
Preston	Barnes, James.
Reading	Timothy, T. N.
Salisbury	Orchard, E. J.
Scarborough	Fryer, Charles.
Sheffield	Ward, William.
Shrewsbury	Cross, W. G., jun.
Southampton	Spearing, James.
Stafford	Averill, Henry A
Swansea	Layng, Thos. B.
Taunton	Fouracre, Robert.
Truro	Richards, J. E.
Worcester	Virgo, Charles.
York	Cooper, Thomas.

Scotland.

Aberdeen	Kay, J. P.
Dumfries	Carruthers, R. B.
Dundee	Laird, William.
Edinburgh	Ainslie, William.

Glasgow ..... ,, Davison, Thomas.
Inverness..... Galloway, George.
Perth ..... Strang, Peter.

THE MUSEUM.

In pursuance of notice, Mr. HAMPSON moved:—

"That the Museum be opened from 9 a.m. until 5 p.m., and from 7 p.m. to 10 p.m., daily, except on Saturday, when it shall be open from 9 a.m. to 2 p.m., and that the Library and Museum Committee be requested to arrange for the carrying out of this resolution."

He said he brought this motion forward, feeling it was rather anomalous to have the library open in the evening, and the museum closed, and he was emboldened in the present course by the fact, that when the proposition for opening the library in the evening was considered, it met with the unanimous sanction of the Council. He was told, however, that the attendance at the library was not very good; but he thought it not unlikely, if the museum were opened also, it would lead to a much better attendance. Assistants were generally allowed certain evenings in each week, and this was very often the only time they could occupy themselves in reading special books or viewing museums of such a character.

Mr. GREENISH seconded the motion.

Mr. BOTTLE was sorry to differ from two gentlemen whose opinions he so much respected; but he thought this was not a movement in the proper direction at the present time, because he did not think it likely that the museum would be very much used, and there would be a considerable difficulty and expense in carrying out the arrangement.

Mr. ATHERTON did not think there would be any insuperable difficulty in arranging for some one to take charge of the museum in the evenings for the time required, and suggested that the matter should have a year's trial.

Mr. SHAW said it appeared this matter had not yet been brought before the Library, Museum, and Laboratory Committee. That would seem to be the proper course, because the Committee could discuss the matter fully, and consider what arrangements were necessary.

After some further discussion, the following amendment was proposed and carried :—

"That the matter be referred to the Library, Museum, and Laboratory Committee to consider and report to the Council."

REPORT OF EXAMINATIONS.

February, 1874.

ENGLAND AND WALES.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	4	4	0
Minor	79	34	45
	83	38	45

Certificates received in lieu of the Preliminary :—

University of Cambridge	4
Royal College of Surgeons	2
Society of Apothecaries	1
College of Preceptors	1
	8

The SECRETARY read a memorandum from the Board of Examiners, expressing their satisfaction at the efficient manner in which the Curator (Mr. Holmes) had replenished the specimens of Materia Medica and Botany used for the examinations.

NORTH BRITISH BRANCH.

The SECRETARY read a letter from the Secretary of the North British Branch, stating that the Council of their Branch had resolved to take larger and more convenient rooms at 119, George Street, Edinburgh, at an annual rental of £75, to which they would move at Whitsuntide term. The premises had been taken on lease for five years, with the option of leaving in three years.

PHARMACEUTICAL MEETING.

Wednesday, March 4th, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting having been read and confirmed, the following donations were announced, and the thanks of the Society awarded to the donors :—

A specimen of hydrochlorate of amylamine, from Mr. Robbins; some Bergamot oranges, from Mr. Clayton; some fine specimens of myrrh; an original bundle of Cannabis Indica; some nux vomica bark, from Mr. A. H. Squire; germinating cocoa-nut, from Mr. Hetherington.

The President drew attention to a specimen of Coca (*Erythroxylon Coca*), presented by Dr. Sieveking through Mr. Squire, and also to some photographs of Indian scenery, sent over by Mr. C. H. Wood, Quinologist to the Indian Government. They were exhibited by Mr. Baldock, F.C.S. Also to a book of botanical specimens, from Messrs. Butler and McCulloch, Covent Garden.

COCA.

Professor BENTLEY said it was well known that Coca, the botanical source of which was *Erythroxylon Coca*, had recently been recommended in this country by Dr. Sieveking as a new medicinal agent. Attention was first called to it by Spence, well known for his travels in South America, who described the leaves as being chewed by the natives, who attributed to them the most extraordinary properties. It was asserted that, by their use, a person was enabled to go a considerable time without food, and an enormous quantity was used in South America, as much, according to Johnston, as 30,000,000 lbs. annually. Other writers did not speak so highly of it as Mr. Spence; but there was no doubt it did possess some very powerful properties, not serving as a food, but still allaying the feeling of hunger. It was also used by mountaineers, who said it enabled them to reach high elevations without difficulty of respiration. Like most substances used in this way, it had injurious narcotic effects upon the constitution; and a new base had been discovered in it, to which the name *Cocaine* had been given. *Coca* had been used for some time on the Continent as a remedial agent, and to some degree in England; and several years ago he had called attention to it as being worthy of an extended trial.

NOTE ON A DECOMPOSED LOZENGE.

Mr. GREENISH then read a note on a decomposed lozenge. The paper is printed at p. 709, and gave rise to the following discussion :—

The VICE-PRESIDENT could not quite adopt Mr. Greenish's theory, because though he had noticed the decomposition described in ginger lozenges, he had never met with it in other lozenges. This seemed to show that it arose from some other cause than the decomposition of dextrin derived from starch. He had also found that this decomposition, which began with a few little specks and rapidly extended, was much more frequent when the lozenges were exposed to the air than when carefully stored in stoppered bottles. Indeed, by using care in this respect, there was little danger to be apprehended. It would be interesting to know whether similar decomposition had been noticed in other lozenges than ginger.

Mr. HAMPSON was disposed to coincide with Mr. Bottle's opinion, having also noticed the susceptibility of ginger lozenges to fungoid growths. This seemed to show that the decomposition arose from the ginger, and not from the starch dextrin used generally in the preparation of lozenges.

Mr. COOPER said he had noticed the same occurrence in

pepsine lozenges, for which he was totally unable to account.

A Peculiar Camphor from China.

Mr. Daniel Hanbury, F.R.S., then read a paper on "A Peculiar Camphor from China." This was followed by a paper on "The Chemistry of Ngai Camphor," by Mr. Sydney Plowman. The papers are printed at pp. 709 and 710, and gave rise to the following discussion :—

The President, in inviting discussion on Mr. Plowman's paper, said it was very pleasing to see students in the laboratory coming forward with papers of this practical kind, and he hoped they would have many such in future.

Mr. Moss said Mr. Plowman had gone very thoroughly into his subject, and had shown that in many respects Ngai camphor was identical with Borneo camphor, whilst in some others it differed from the latter ; but there was one important character which he had not investigated, viz., the action of an alcoholic solution on the plane of a ray of polarized light. Common laurel camphor rotated the ray to the right, and so did Borneo camphor; this new variety might or might not do the same. If he understood rightly, Mr. Hanbury referred Ngai camphor to a composite plant, and it was known that from the volatile oil of feverfew flowers, there was deposited a camphor, which, though it had precisely the same composition as laurel camphor, rotated the ray to the left. It might therefore be that the Ngai camphor, though it had the same composition as the Borneo, might rotate the ray to the left, so that in this one natural order (*Compositæ*) there would be two camphors, one bearing the same relation to Borneo camphor as the other did to laurel camphor. Mr. Plowman had determined the specific gravity in a very ingenious manner ; but perhaps he might have managed it with less trouble by fusing a little in a spherical mould, introducing a horsehair into it whilst melted, and subsequently weighing the cooled and solidified globule in the ordinary way.

Mr. Plowman said it had occurred to him to perform the experiment with polarized light, but it would have been almost impossible to do so without sacrificing the whole of the camphor at his disposal. With regard to the specific gravity, the objection to Mr. Moss's project would be, that the specific gravity of Ngai camphor was so very near to that of water itself, that a fair quantity must have been used. Moreover, in weighing it in water, it would have been difficult to secure free play of the balance, so that he doubted whether his own method were not more trustworthy.

Professor Attfield thought the remarks of Mr. Moss were very useful, and would no doubt lead Mr. Plowman to continue his researches when he obtained more material. The biological and chemical relations, which Mr. Moss had alluded to, were very interesting ; indeed, his own impression of the usefulness of the paper was pretty much that suggested by what had fallen from Mr. Moss, namely, that it would throw light on the isomeric relations of the different camphors. It certainly seemed probable, from the results which Mr. Plowman had obtained, that this Ngai camphor was the twin-brother of Borneo camphor, just as feverfew camphor was the twin-brother of ordinary laurel camphor. Researches of this kind had more than pharmaceutical or therapeutical interest, for they were researches into a domain of chemistry which had not been much explored until recent years—a domain in which they found substances extremely closely allied, but not identical. A former Bell scholar of the Society, Mr. Pedler, had thrown light on compounds similarly related, in a research which might briefly be described. Some years ago, M. Pasteur found that ordinary fusel oil, amylic oil, was really composed of two distinct amylic alcohols, resembling each other in chemical properties, but differing in their action on a ray of polarized light, the one turning the ray to the left, the other having no action on the ray. Mr. Pedler, reflecting on this fact, was able to harmonize the apparently contradictory observations and statements of eminent chemists. Frankland and Duppa had noticed that valerianic acid, the oxidation product of amylic alcohol, had a strong action on polarized light, whilst a previous observer, Wurtz, had found that valerianic acid had no action on polarized light. It occurred to Mr. Pedler that probably one observer had prepared his valerianic from the active amylic alcohol, and the other from the inactive. Forthwith, Mr. Pedler set to work to produce the two amylic alcohols in the pure state, separated them from each other, and prepared from each some valerianic acid. The two specimens of acid, identical in all common properties, he then examined, and, sure enough, found that valerianic acid obtained from rotatory amylic alcohol was itself rotatory, whilst that from the non-rotatory alcohol was non-rotatory. So in the case of the camphors. There was ordinary laurel camphor which rotated the ray considerably to the right, whilst its twin-brother, the feverfew laurel camphor, turned the ray in the opposite direction. Further, when the two were oxidized by nitric acid, you got two camphoric acids, each of which twisted a ray of plane polarized light, the dextro-rotatory camphor giving dextro-rotatory camphoric acid, whilst the other gave levo-rotatory camphoric acid, a mixture of the two acids being, as might be expected, inactive. By acting on Borneo camphor with nitric acid, as Mr. Plowman had said, you got an oil, which, in contact with water, gave you ordinary camphor; and, by similarly acting on Ngai camphor, an oil resulted, which, in contact with water, gave what apparently was ordinary camphor. Now he (Professor Attfield) would venture to predict that the camphor obtained by oxidation and hydration from Borneo camphor would differ in its action on polarized light from that which was obtained by the action of nitric acid and water upon Ngai camphor. He would not be surprised if the one product thus obtained proved to be common laurel camphor, and the other fever few laurel camphor. At all events, he thought Mr. Plowman would find the Ngai camphor and its products to be isomers of Borneo camphor and its products, and hoped that gentleman would continue his researches, and carry them out to the utmost limit.

The Dispensing and Storing of Hydrocyanic Acid.

A note by Mr. F. Baden Benger was then read, "On a Proposed Method of Storing and Dispensing Small Quantities of Hydrocyanic Acid." The paper is printed at p. 712, and gave rise to the following discussion :—

The President said this was an interesting paper, because these little points of practice were always valuable. He should like to know if any gentleman had seen such an arrangement before.

Mr. Umney said it was quite new to him ; he did not think it would meet with much favour with wholesale houses, on account of the difficulty in packing it safely.

Professor Attfield said another objection occurred to him, viz., that the mercury in which the point of the tube was placed might get upset; and if it were not replaced, the risk of alteration of the acid might be greater than before. This, however, might be avoided if, instead of placing the vessel in a cup of mercury, an india-rubber cap were placed over a thicker quilled extremity. The tube might also be graduated with five-minim or ten-minim marks.

The President then read the letter from Professor Fluckiger which appears in the proceedings of the Council.

Researches.

The President, in terminating the proceedings, said he hoped they should have more papers from students in the laboratory of a similar character to that just read by Mr. Plowman.

Professor Attfield said he hoped so too, but that unfortunately very little inducement was held out to students to do more than acquire sufficient practical chemical knowledge for the purposes of every-day pharmacy. It was extremely seldom that a pupil stayed long enough in the Society's laboratories to conduct the simplest gravimetric

analyses. Even the Bell scholars, who commenced with some knowledge of chemistry, and who worked for a whole session, could not be expected to reach the confines of chemical knowledge in ten months, much less attempt any exploration of regions previously unknown. Of Senior Bell scholars something might be expected; but, unfortunately for research, at the close of Mr. Plowman's tenure, the Senior Scholarship would cease to exist.

NORTH BRITISH BRANCH, EDINBURGH.

A meeting was held in the Society's Rooms, St. Giles Street, on Wednesday evening, 25th Febuary, at half-past 8 o'clock. There was a good attendance. Mr. J. R. Young, President, in the Chair. Dr. M'Kendrick, Assistant-Professor of Physiology in the University, gave an address on the Chemistry of certain Physiological Processes which take place in digestion, nutrition, and excretion. After showing that both physical and mental work resulted in the waste of the tissues, Dr. M'Kendrick said that in order to make up for that waste it was absolutely necessary that new material should be introduced into the body. That was the physiological explanation of the necessity of food. He then enumerated the various quantities of the different kinds of food required to maintain a man whose work entailed an average waste of material, and explained that milk, by which the young of all mammals were at first nourished, was a typical food, because it contained a due proportion of all the constituents essential to proper food. Having then examined the chemical action of the saliva, the gastric juice, the bile, and the pancreatic and intestinal juices in disintegrating and preparing for absorption the material of the food, and having given a brief outline of the chemistry of the blood and a description of the channels for removing the products of the several processes, he concluded by remarking that he had said sufficient to show that a great many of the functions of the body were, after all, purely chemical and physical processes, and that just as physiologists had been able to apply exact methods, physical and chemical, to the observation of the subject, had they been advancing in their knowledge of physiology. It was at one time supposed that all these were vital actions dependent upon vital force. No doubt they were concerned with vitality; but digestion, respiration, and even nutrition, to a certain extent, might be regarded as chemico-physical processes.

A hearty vote of thanks was passed to Dr. M'Kendrick for his interesting and instructive lecture.

The Secretary drew the attention of the meeting to the alterations connected with the examinations, some of which were to come into operation on 1st October, 1874, and on 1st January, 1875, also on 1st January, 1877. He further mentioned that having recently been supplied from London with full printed particulars as to the nature of those changes, he would be glad to supply copies to all those who wished for them.

The Year Book of Pharmacy, and three monthly numbers of the Pharmacist from Chicago were laid on the table as presentations to the Library of the Society in Edinburgh.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

At the January Friday evening meeting, Dr. Porter Smith gave a discourse on "Chinese Medicine and Pharmacy." The subject was illustrated by a large number of specimens of Chinese materia medica collected by Dr. Smith during a lengthened residence in Central China. This collection now forms part of the museum in Bloomsbury Square, and was kindly lent for the occasion by the Council of the Pharmaceutical Society. We hope soon to have the opportunity of presenting Dr. Smith's highly interesting paper in the pages of this Journal.

At the evening meeting, held on Friday, February 15th (Mr. Schacht, the President, in the chair), a lecture on Ozone was given by Dr. Watts, F.C.S., of Oxford.

Abstract of Lecture on Ozone.

BY DR. WATTS, F.C.S.

About the year 1785, Van Marum, having the opportunity of working with the great electrical machine belonging to the Teyler Museum (Geneva), occupied himself in performing again the experiments of Priestley and Cavendish, and studied the action of the electric spark upon various gases. His work, which was extensive, and published in several volumes, was unfortunately wholly empirical; neither were his observations accompanied by any deductions, theoretical or otherwise, likely to further the advancement of chemical or physical science. However, he noticed as a fact that the passage of the electric spark through atmospheric air or oxygen developed in the gas a peculiar odour, and that the gas thus electrized was capable of attacking mercury. To use his own words: "Oxygen standing over water experiences *no* effect on electrization, but the gas acquires a very strong odour, which appears to me to be very distinctly the odour of the electric fluid." It is, therefore, to the sagacity of Schönbein, who fifty years later, 1840, re-discovered this odorous gas of Van Marum, that we are really indebted for the first recognition of ozone as a distinct variety of matter. He observed that the oxygen gas resulting from the decomposition of water by the action of a powerful electric current possessed an odour similar to that which had previously been noticed by Van Marum, and he succeeded in establishing the facts that a body not necessarily identical, but possessing similar properties, was formed under the three following conditions:—1. When electric sparks are passed through air. 2. By electrolysis. 3. When certain bodies, especially phosphorus, are slowly oxidized in air or oxygen. He therefore discovered the most important means for the production of ozone, and, as an after-work, established its principal properties and reactions. The properties of ozone are now very generally known. It liberates iodine from potassium iodide; discharges vegetable colours; oxidizes metals; converts many metallic protosalts into persalts; and exerts generally an energetic oxidizing power.

At this period it was not known that the reactions of ozone resulted simply in the oxidation of the substance submitted to its influence; but in 1845 Marignac and De la Rive showed that the final result of its action upon potassium iodide was potassium iodate; that manganese oxide was produced from the corresponding chloride, etc.; and from such evidence they drew the very legitimate conclusion that ozone was, as regards its constituent matter, probably identical with ordinary oxygen. Their opinion was very materially strengthened by the succeeding investigation of Fremy and Becquerel (Annales de Chimie [3], xxxv. 62), who, while verifying the whole of Marignac's work, succeeded in converting pure oxygen entirely into ozone. This they effected by passing the electric spark through the gas, the latter being in contact with solution of potassium iodide; in this manner the ozone was constantly decomposed with liberation of iodine, while the oxygen gas gradually disappeared.

Schönbein was now obliged to reject his original opinion that ozone was a new elementary body, but at the same time he refused to adopt the conclusion of Marignac and of Fremy and Becquerel, that it was oxygen which had assumed, under the electric influence, a particular condition of chemical activity. He preferred, on the contrary, to erect an interpretation of his own, which was at that time not only wholly unwarranted by analysis, but in direct contravention of some of his own experiments, viz., that ozone was a peroxide of hydrogen. This assumption was for a long time supported by the experiments of Williamson in England, who found *water* in the products of the decomposition of ozone by heat;

and also by those of Baumert in Germany, who endeavoured to show that the weight of oxygen absorbed by a solution of potassium iodide did not correspond with the theoretical weight calculated from the proportion of iodine liberated.

The absolute freedom of ozone from any proportion of hydrogen was, however, definitely established in 1856 by Professor Andrews, of Belfast, with whose work a new era opens in the history of ozone. Having pointed out the causes of error in Williamson's and Baumert's experiments, he first showed that the weight of oxygen absorbed and amount of iodine liberated did exactly correspond; and afterwards, in 1860, in conjunction with Professor Tait, published a series of precise quantitative experiments, which were more successful in unravelling the question of the constitution of ozone than those of any chemist who had preceded them.

1. Their first point was that oxygen under the electric influence contracted in volume, and that the gas when thus contracted gave the reactions peculiar to ozone. That the contracted gas, when submitted to a heat of about 300°, re-expanded to its original volume, while at the same time the ozone reactions disappeared. 2. That the amount of iodine liberated from a solution of potassium iodide, by bringing the ozonized gas in contact with it, exactly corresponded to, or was the exact chemical equivalent of, a weight of oxygen, equal in volume to the amount of contraction after electrization; and hence that the contraction of any given volume of gas could be ascertained, without actual measurement, by estimating the quantity of iodine which it was capable of liberating. 3. That the absorption of oxygen from the ozonized gas was unattended by any further contraction in volume. Andrews and Tait succeeded in deducing no satisfactory chemical expression for the composition of ozone, but shortly afterwards Dr. Odling put forward the suggestion that, inasmuch as the formation of ozone was attended with contraction of the original oxygen, and inasmuch as there were satisfactory reasons for supposing the molecule of ordinary oxygen to be already composed of two atoms, the *simplest* constitution which it was possible to assign to the molecule of ozone was that it was formed by the addition of a third atom to the previously existing oxygen molecule, and to represent it by the expression O_3=2 vols. It will be seen that upon this supposition all the phenomena observed by Andrews and Tait are satisfactorily explained.

In 1872 Sir Benjamin Brodie published in the *Philosophical Transactions* the result of nearly fourteen years' work on "the action of electricity upon various gases," a large portion of which time was devoted to the study of the quantitative reactions of ozone. Operating with the then newly-devised induction tube of Siemens, he succeeded in ozonizing oxygen to a much greater extent than had hitherto been possible; and employing a novel arrangement of gas pipette, he was enabled to measure and transfer, without loss, different volumes of this eminently alterable gas. Soret had shown in 1865 that when oil of turpentine or cinnamon was brought into contact with ozonized, and consequently contracted, oxygen, that further contraction took place, and that apparently the whole molecule of ozone was absorbed; but he failed to show that the final diminution was *exactly* twice the initial contraction, which would have been the case if Odling's suggestion were correct. Brodie's experiments afford precise information upon this, as well as upon most other points in connection with ozone. Using sodium hyposulphite, he found that the ratio of the entire diminution in *volume* suffered by the original oxygen to the diminution in *volume* of the electrized oxygen, was, as a mean of twenty-seven experiments, 3·02 to 2·02, and the same numbers were obtained when turpentine was employed. By employing stannous chloride, he ascertained that the *weight* of oxygen absorbed from the ozonized gas was exactly three times the *weight* of the oxygen absorbed from the same gas by potassium iodide. By these experiments the molecular formula of ozone, O_3, was finally and definitely substantiated.

The various points were illustrated during the lecture by experiment.

MANCHESTER CHEMISTS' AND DRUGGISTS' ASSOCIATION.

The third ordinary monthly meeting was held at the rooms of the Association on Wednesday evening, January 14th. There was a good attendance. It had been announced that no special paper would be read, but the proceedings would be of a conversational character.

The Chairman (Mr. W. S. Brown) gave a short address, in which he referred to the recent prosecutions under the "Adulteration of Food and Drugs Act," to the prospective alteration in the requirements of the Board of Examiners of the Pharmaceutical Society, and other subjects of interest to the meeting.

A general conversation then took place on the topics introduced by the chairman.

Mr. Louis Siebold exhibited a small balance of American manufacture, which he considered extremely suitable for pharmacists' use. It was sold at a very moderate price, and was nevertheless capable of being used in delicate analyses.

Mr. W. Wilkinson made some remarks on the phosphoretted tolu resin prepared as suggested by Mr. Abraham, jun. He had found that a small quantity of water was absorbed by the resin in the process. This fact had not been noticed in the published report of Mr. Abraham's communication.

Mr. Pidd had made some experiments in the hope of discovering an accurate method of determining the strength of dilute spirit by observing its action when combined with iodine on starch, but had failed to obtain very uniform results.

The fourth ordinary meeting was held in the Memorial Hall, Albert Square, on Wednesday evening, Feb. 25th. Mr. W. S. Brown, President, in the chair.

Tea was provided, and there was a large attendance of members and associates.

Mr. John Plant, F.G.S., delivered a lecture on "Coal: its Origin and Chemistry." The lecturer illustrated his subject by a remarkably fine collection of specimens, drawings, photographs, maps, etc., and his accurate knowledge of the subject, combined with a very happy delivery, rendered the lecture a great treat to his hearers.

A cordial vote of thanks having been awarded to Mr. Plant for his gratuitous services, the meeting terminated.

LIVERPOOL CHEMISTS' ASSOCIATION.

The ninth general meeting was held at the Royal Institution, February 12th, the President, Dr. Symes, in the chair.

The minutes of the previous meeting were read and confirmed.

Donations to the Library:—'Year-Book of Pharmacy,' and 'Proceedings of the British Pharmaceutical Conference at Bradford, 1873,' from the Executive Committee; current numbers of the Pharmaceutical Journal, etc., to the museum; a specimen of neutral iodide of potassium; six specimens illustrating the various stages in the manufacture of pure glycerine; also a specimen of crystallized glycerine, from Mr. Mason.

Mr. Alfred H. Mason, F.C.S., Vice-President, read papers on "Crystallized Glycerine," and "Croton Chloral."

Mr. Mason said:—At a time when the organ of the pharmaceutical profession deplores the lack of a single paper for the evening meeting of what we are pleased to call our parent society, it is somewhat a good sign to see two or three papers announced for our general meetings. In the subjects I am about to bring before your notice I do not aspire to any originality. It is scarcely to be expected in these days of high pressure in our daily duties

that we can do much in this way, but I think that if we take any given subject, glean all the information we can, and bring it forward in a concentrated form, even if it only calls up old remembrances to most of us, it must have a freshness for some; or if we watch the progress of any new therapeutical agent (some of us may have better opportunities for doing this than others), it may lead to healthy discussion, from which we may gain much information, and so conduce to the prosperity of our Association.

Crystallized Glycerine.

In a paper which I had the honour to read before you last session on Glycerine* I stated, taking high authority, that glycerine was uncrystallizable. This statement I must correct, and in substantiation call your attention to the specimen of crystallized glycerine which is presented to your museum. My attention was first drawn to this in a report† upon the articles exhibited in the Vienna Exhibition, which stated that "Sarg exhibited several glass vessels filled with some beautiful crystals of glycerine." The statement added—"Like phenoline, benzoline, and many other organic combinations, glycerine only crystallizes in a state of perfect purity, and the minutest foreign matter deprives it of this property; once in a solid state it will only melt in a high summer temperature. Under certain conditions the crystals attain a size which allows their angles to be measured." I have obtained a specimen of this glycerine,‡ which was supplied in a narrow-mouthed bottle, labelled, "*Krystallisirites Glycerin. Patent F. A. Sarg's, Sohn & Co.*" The result of my examination convinced me that absolute purity was not necessary to bring the specimen to the crystalline form in which it now exists. Being very hygroscopic, atmospheric influence of mean temperature is quite sufficient to liquefy it, and, once liquid, exposure to intense cold will not cause it to congeal. The peculiar mousey odour is present. Contact with calcic oxalate produces slight turbidity, and heated with sulphuric acid and absolute alcohol there is discoloration. The method of production, being patented, is a secret; it commands a fancy price. Its usefulness is questionable; as a chemical curiosity it is interesting.

In the discussion which followed, Mr. Martin Murphy, F.C.S., said the specimen was very interesting. He was of opinion that, as in carbolic acid, the presence of water was sufficient to prevent crystallization.

Mr. Edward Davies, F.C.S., said he had a specimen of carbolic acid, with one atom of hydration, which was in a perfect state of crystallization, and had been so for some months.

Mr. T. F. Abraham had observed a remarkable phenomenon, that if crystallized carbolic acid had become liquid from atmospheric influence, if the stopper of the bottle were just twisted tight, crystallization would again set in.

The President, Dr. Cooke, and others took part in the discussion.

Croton Chloral.

In this paper, Mr. Mason gave the chemical history, formation, and physical characteristics of croton chloral hydrate—its therapeutic value, dose, and pharmaceutical application.

An interesting discussion followed.

On the motion of Mr. Abraham, seconded by Mr. Murphy, an unanimous vote of thanks was conveyed to Mr. Mason for his communication, and carried with acclamation.

YORK CHEMISTS' ASSOCIATION.

The ninth annual meeting of this Society was held on Friday evening, the 20th of February, at the King's Arms Hotel, the President, Mr. George Dennis, in the chair.

The following report was read by the Secretary (Mr. T. W. Wilson):—

"During the past year your committee have held meetings and considered various questions affecting the welfare of the trade generally, and this Society in particular; and they have great pleasure in recording their satisfaction at the unanimity which has prevailed amongst the members.

"The Adulteration Act, introduced into the House by the Member for Birmingham, is now exciting great anxiety, and numerous prosecutions have been instituted throughout the country. Your committee have given this their serious attention, and it became a question with them whether some steps should not be taken to assist in protecting the interests of the whole body of chemists and druggists, and more especially the members of this Society. Seeing how multifarious are the articles dealt in by our trade generally, we are rendered particularly liable to prosecution at any time. Your committee have, however, thought it expedient to leave this question for the consideration of the annual meeting.

"The annual dinner, held on the 16th of April last, was in every way satisfactory, the heartiest good feeling and cordiality being manifested by all present. Your committee would recommend that a similar reunion be held at as early a date as convenient.

"The annual statement of accounts for the past year showed a balance in hand of the Treasurer (Mr. Thomas Cooper) of £4 19*s.* 3*d.* This is somewhat less than that of the previous year, which may be accounted for by the falling off of two or three members, and the death of another,—but the committee venture to express their satisfaction that this will bear favourable comparison with previous years."

The balance-sheet having been audited, a vote of thanks was accorded to the officials of the Society, who were unanimously re-elected. The annual dinner was appointed to take place on Tuesday, the 17th of March.

A long discussion ensued on the provisions of the Adulteration Act, and it was resolved—"That this Society present a memorial to the city Council, asking them to defer the appointment of a public analyst for this city until some alteration has been made in the Adulteration Act, and that communications be addressed to the city members asking for their co-operation in getting the Act revised, or a fresh bill introduced during the ensuing session."

Proceedings of Scientific Societies.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

The Adulteration of Butter.

On Saturday evening, January 17, at a meeting of the Society of Medical Officers of Health, held at the Scottish Corporation Hall, under the presidency of Dr. Hardwicke, a paper was read by Dr. C. Meymott Tidy upon "Butter and its Adulteration."

Dr. Tidy said that butter was generally prepared from cream collected from time to time and allowed to get slightly sour. It was then churned, or, in other words, rapidly stirred. The best temperature for churning was from 50 to 55 degrees Fahrenheit, and hence most churns had an outside vessel either to warm or to cool the apparatus as it appeared necessary. Churning should not be too slow, or the flavour of the butter would be entirely destroyed, nor too fast, or the butter would be soft and frothy. Butter was also made from fresh cream and from entire milk. This should stand until it was sour, and then be churned at a higher temperature than cream—namely, 60 degrees. More butter was obtained from entire milk than from cream, but there was more work in the churning and it took longer. Milk on an average yielded from 4·5 to 5·5 per cent. of butter, and it might be roughly stated that a cow yielded about one pound of

* Pharm. Journal, April 12th, 1873.
† *Chemist and Druggist*, July 15th, 1873.
‡ Kindly supplied by Messrs. Schmedes and Co., London.

butter daily. It was next taken out of the churn and washed with water, so as to get out the adherent whey. That operation was important, as the butter would otherwise decompose more rapidly. It was then salted, about 4 per cent. of salt being a fair quantity to be added. The amount of stearin, olien, and palmatin in the composition of butter was practically *nil*. The first adulteration of butter was water. Let them dry 100 grains of pure butter in a weighed capsule for several hours at 220 degrees Fahrenheit, and from 5 to 8 per cent. of water would be produced. Water was incorporated with the butter chiefly when it was in a semi-solid state, and also by beating out and sprinkling. He had been able thus to incorporate 28 per cent. of water with butter. Out of 130 samples of butter purchased at different shops in Kent seven contained from 7 to 9 per cent. of water, 21 from 9 to 10 per cent., 34 from 10 to 13 per cent., 42 from 14 to 17 per cent., 17 from 18 to 24 per cent., and 9 over 25 per cent. Thus, water might become a very serious adulteration of butter. It was his practice, when analysing butter in his capacity as public analyst, to state in his certificate the amount of water if over 10 per cent., and to leave the magistrate to draw his own conclusion. The next adulteration was salt. To trace this they should incinerate the remainder of the 100 grains used for drying. In 12 specimens of undoubtedly pure butter, the average amount of salt traceable was 5·2 per cent., and out of 27 samples of butter indiscriminately purchased he found that two contained less than 3 per cent. of salt, two between 3 and 4 per cent., three between 4 and 5 per cent., four between 5 and 6 per cent., ten between 6 and 7 per cent., two between 7 and 8 per cent., one between 8 and 9 per cent., two 10 per cent., and one 17 per cent. Over 7 per cent. of salt he considered excessive. Adulteration was also produced by the incorporation with butter of dripping, lard, suet, and other fats. These could not be mixed with butter when they were in a melted state, but only when they were cold, and hence the mixture was never perfect. The fats, unlike real butter, contained stearin, palmatin, etc., in considerable amount. To trace the presence of these fats let them note the melting and solidifying points. Butter melted upon an average at 75 degrees, and solidified at 63, dripping melted at 79·5, and solidified at 72·5, and suet melted at 82, and solidified at 75. Another test was the taste. The taste of real butter could be detected even when it had been most extensively mixed. Pure butter melted quickly on the tongue, and there was no sense of granulation, but when adulterated with other fats it melted far more slowly, and a peculiar granulated feeling in the mouth was produced as the last few grains disappeared. The odours of butter and of dripping were easily distinguishable, but the smell of lard when mixed with butter was not soon detected. Good butter was generally of a rich yellow colour, entirely uniform, but when adulterated the colour was very much paler, and it was marbled, owing to the imperfect admixture of other fats. He regarded streaky butter generally with suspicion. In good butter a uniform surface was produced by passing a clean knife rapidly over it, but impure butter had a granular appearance. Dr. Tidy concluded by describing other but more technical ways of detecting bad butter, such as the action of ether and the use of the microscope with polarized light.

At the instance of Dr. Hardwicke, the Society passed a cordial vote of thanks to Dr. Tidy for his interesting remarks on so important a subject.

A short discussion ensued, in which Dr. Stevenson, Dr. Bernays, and Dr. Tripe joined, and the general conclusions of the lecturer were confirmed. Dr. Bernays observed that from 5 to 6 per cent. of water undoubtedly improved butter, and the addition of more than 7 per cent. of salt would render it uneatable. When in a butter sold for 1*s.* per pound he found no less than 22½ per cent. of salt and water he could not think it cheap at the price.

The above report, which appeared in the *Times*, having been republished in *The Grocer*, has called forth a vigorous protest from a correspondent of the latter journal in respect to one statement that Dr. Tidy is reported to have made—namely, "That butter is generally prepared from cream collected from time to time and allowed to get slightly sour." Again, "That butter may be prepared from milk, which should stand until it is sour before being churned."

In the course of his remarks the writer says :—"Dr. Tidy, by his name and authority, licenses a practice which is, in fact, the principal cause of the quantity of vile stuff that is produced, and that people are condemned to see placed upon their tables in the form of butter. . . . . The difference between good butter and bad is generally the difference of preparing it from sweet cream or sour, and this means again the difference of a little increase of labour in making it frequently enough to ensure the cream being sweet. The best butter is that which is made every day from cream of only twenty-four hours' standing. . . . . I have, for the sake of experiment, made butter in every way that I have any knowledge of its being able to be made—with sweet cream, with sour, with cream skimmed from the milk, with milk and cream together after standing twelve hours or more, with milk almost warm from the cow, with raw cream, and with clotted cream. The result of my experiments is most undoubtedly to show that with all or any of these methods excellent butter can be obtained, except from the sour cream. It also has proved that not only is the butter very inferior that is made from sour cream, but that there is no advantage whatever to be gained by allowing it to become sour, except the slight save in the labour of making it more frequently. It yields exactly the same quantity of butter when sweet as when sour. Cream when sour becomes thick, and in churning the butter comes perhaps a little quicker than with sweet raw cream. But if a rapid and easy mode of churning be desired, it can be far better arrived at by following the Devonshire custom of scalding the milk, when the cream, which rises completely to the surface, becomes very thick on cooling, and can be made into butter in a few minutes in a basin, and by being stirred with a spoon I have seen butter come in two minutes and a half. Cream taken off a given quantity of milk scalded in this fashion yields exactly the same amount of butter as an equal quantity of the milk unscalded produces when churned unskimmed, showing that the whole of the butter is extracted from the milk by either method. Butter churned from sweet milk is excellent in flavour, and is perhaps superior to any other in texture, the large proportion of liquid in which the butter comes appearing to have the effect of working the particles together with more uniform smoothness. The process, however, entails such an increase of time and labour above that required for churning cream, and with a result in no way compensating for this expenditure, that few people, I should think, would use this method of making butter except those who adhere to it from old custom. . . . . The one great principle in the manufacture of good butter is the making it from cream the sweetest of the sweet. The mode of churning is entirely secondary."

Obituary.

THOMAS NEWBORN ROBERT MORSON.

Mr. Morson died at his residence, 38, Queen Square, Bloomsbury, on the 3rd instant, in the seventy-fifth year of his age. The announcement of the death of one so extensively known and respected, will, we are sure, be received with deep regret wherever the intelligence is conveyed, not only in this country, but abroad. Of English pharmacists there is perhaps none whose reputa-

tion has been so wide-spread as that of Mr. Morson, and there have been few, if any, who have acquired and maintained so high a character in the scientific department of pharmacy, especially as a manufacturer of what are called high-class chemicals.

He was born at Stratford-le-Bow, in the eastern suburb of London, and received his early education at Stoke Newington. Having lost his parents while he was yet young, and being left without family guardian or connections, he was thrown to a great extent upon his own resources; but he possessed within himself an endowment more valuable than worldly inheritance. With a mind remarkable for activity and power of perception he overcame the difficulties of his early life, became the founder of a business of world-wide reputation, and formed acquaintance, which ripened into intimate friendship, with some of the greatest chemists and philosophers of the age in which he lived. When only fourteen years of age he was apprenticed to an apothecary in Fleet Market (now Farringdon Street), but he had no liking for medical practice, and therefore adhered to the pharmaceutical rather than the medical and surgical part of the business he was placed in. His predilection lay in the direction of chemistry, and this was probably favoured by the circumstance of his being thrown into association with men of kindred tastes, who formed a little society for the investigation of scientific subjects, and whose meetings were held in the neighbourhood of Fleet Street. It was here he first made the acquaintance of Faraday, and acquired so strong a bent in favour of scientific chemistry, that he determined to make its application as far as possible the aim of his future pursuits. After the expiration of his apprenticeship he went to Paris, and entered the establishment of M. Planche, a pharmacien, with whom he lived for some years. He thus acquired a thorough knowledge of the French language as well as French pharmacy, and made the acquaintance of men whose friendship he cultivated in later years. He was still a young man when he returned to London and established himself in business as a chemist and druggist in the house in which he had been apprenticed, in Farringdon Street, the late proprietor, Mr. Morley, having retired from the retail department, which was previously associated with his practice.

The chemist and druggist of those days was generally a chemist only by name, but not so Mr. Morson. In a little room at the back of his shop was produced the first sulphate of quinine made in England, and the same may be said of morphia. Nor were these operations merely experimental. From entries in his ledger it appears that he supplied sulphate of quinine to a wholesale druggist at eight shillings a drachm, and morphia at eighteen shillings a drachm. His chemical knowledge and manipulative skill were now bringing him into notice, and he was frequently applied to for rare chemicals; but the premises in Farringdon Street did not admit of the cultivation of this branch of the business, which was, nevertheless, the most congenial to his taste. We have heard him say that he would probably have hesitated for many years before engaging more extensive premises (for he was naturally cautious and very averse to speculation), had he not been encouraged and supported in that step by the lady to whom he had just then united himself in marriage, and who with much spirit and judgment added ample pecuniary means. He moved from Farringdon Street to Southampton Row, and soon afterwards purchased premises in Hornsey Road, where he built a laboratory for the manufacture of creasote, morphia, and other chemical products. We need not further trace his career as a chemical manufacturer, for in this capacity he is everywhere known, at least by name.

But Mr. Morson's fame has not been merely that of a manufacturer. He was a man of enlarged mind and cultivated intellect. Thrown upon the world in early life, with absolutely no relations, he was, nevertheless, surrounded by men of talent and high position, with whom he associated on terms of mutual friendship. He was a member and regular attendant of the meetings of the Royal Institution, and a prominent member of the Society of Arts. His house was a place of resort for men of genius, where Graham and Fownes as chemists, Robert Brown, Bennett, Bowerbank, and Gray as naturalists; Muller, Johnson, and Cruickshank as artists; Richard Horseman Solly and Captain Bagnold as patrons of science and art, with many others of kindred tastes, found hospitable reception and congenial associations. A Sunday evening in Southampton Row or Hornsey Rise often afforded an opportunity for the social intercourse of men such as those we have named, who found ample scope for the discussion of their favourite topics in Mr. Morson's company.

We have hitherto referred to a time when pharmacy in this country had not yet quickened from the embryo state of its existence prior to the establishment of the Pharmaceutical Society. When vitality began to be manifested among the previously inert members of the disunited body with which Mr. Morson was associated rather by name than in character, it could not be supposed that he would be an inactive observer of what was passing around him. Accordingly, we find him in the foremost rank of those who originated the Pharmaceutical Society, and there was no one more frequently consulted, or whose opinion carried greater weight among his fellow-workers in the cause of pharmaceutical regeneration. He was constantly appealed to by his friend Jacob Bell on any difficult questions, and articles prepared for publication in the PHARMACEUTICAL JOURNAL were often submitted to him, and, to use an expression of Mr. Bell's, were frequently seasoned with the "Attic salt" from Southampton Row.

Mr. Morson, at this period, had an European reputation as a scientific manufacturing chemist, and his character in this respect, together with his acquaintance with many of the scientific celebrities of the Continent, as well as his familiarity with the French language, enabled him to render great service to the young Society, in the development of which he took a lively interest.

Distinguished foreigners, attracted by the proceedings of English pharmacists, were generally entertained by Mr. Morson. French was almost as freely spoken as English, not only by Mr. Morson himself, but by the members of his family, who had received much of their education in France; and here, therefore, might be found, when they were staying in London, those scientific foreigners who took an interest in pharmacy. Guibourt, Cap, Liebig, Mitscherlich, Rose, and many others of similar stamp, have been guests at various times at Southampton Row, Queen Square, or Hornsey, and have been indebted to Mr. Morson for an intimate acquaintance with the Pharmaceutical Society, its provisions and proceedings. Mr. Morson was for many years on the Council of the Pharmaceutical Society; he was for a still longer period a member of the Board of Examiners, and he used to be a very constant attendant at the evening meetings of the Society. In 1844 he was elected Vice-President of the Society, and for four successive years he continued to fill this office, after which he was made President for a year, and again for about two years in 1859-60.

Mr. Morson retired from the Council of the Pharmaceutical Society in 1870, but his interest in the objects and operations of the Society remained undiminished, and up to the time at which his last severe illness commenced, he was almost a daily visitor at 17, Bloomsbury Square. His health, however, had sensibly failed for many months before his death, and he often expressed himself as sensible that his end was approaching. In the early part of January he had an attack of paralysis, from which he never recovered. Although he did not live to extreme old age, yet, we may say of him, that the work he was enabled to accomplish has entitled him to be classed among the most distinguished of the pharmacists of this country.

Correspondence.

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

Evening Lectures.

Sir,—As the new regulations for the Minor Examination will come into operation in October next, when candidates will be required to possess a more extended knowledge of the principles of chemistry, I beg to propose, for the advantage of those students who cannot attend the morning lectures, that evening lectures on Chemistry be given at the same fees, provided that 50 students enter their names before September; and that it be announced weekly in the Journal. If the Chemistry course should prove a success, I hope the Council will also announce lectures on Botany and Materia Medica.

So long as the Society continues an educating body, I think more real good can be done at Bloomsbury Square, with its well organized and efficient staff than could be accomplished by any scheme of provincial education, and also at far less cost to the Society. In passing, I would remark that we are all very much indebted to Mr. Schacht for bringing forward the subject of extra Scholarships, and I quite coincide with him in wishing to see the rank and file of pharmacy brought up to a good standard throughout the country.

If the Society grant these Scholarships, they will prove a great stimulus to country students, who in studying for them will be preparing themselves to receive more advanced technical instruction at Bloomsbury Square afterwards.

Amicus.

What is Sweet Spirit of Nitre?

Sir,—One of your correspondents, some time after the late sweet spirit of nitre prosecution, reported in your issue of Dec. 6th, very pertinently asked what was sweet spirit of nitre. As far as your columns are concerned, I can see no reply has been vouchsafed to him as yet. I therefore venture to ask you to refer him to the Spiritus Nitri Dulcis, P.L. 1745, which I presume was the standard in those days for that at present, at least, vexatious article. In your issue of November 8th, you were kind enough to publish a letter from me, in which I suggested that the opinion of the trade and the analysts might be given as to what is the standard for an article, whether the B.P. or the so-called *popular* article, always assuming that the latter was according to some Pharmacopœia, and I indicated as a test case sweet spirit of nitre. Now there are many others which I might have selected, but as this is the very one which was so soon after the bone of contention, I hope you will pardon and insert the following remarks.

When Dr. Dupré gave evidence that the article supplied and analysed, no matter whether as spirit of nitrous or nitric ether, or sweet spirit of nitre, was sp. gr. ·867—and that was inferentially substantiated by the evidence for the defence as the right thing—it must be clear to everybody that somebody had added 10 per cent. of water, if we are to take even the weakest spirit strength (or highest sp. gr.), ·850, of any of the pharmacopœias of this country as a standard; but if, as the counsel for the defence is reported to have said, the Pharmacopœia might be thrown to the winds, why I suppose we may have any percentage of water added to the official article. However, that will not do for cow's milk. By the way, there are no characters or tests at page 169 B.P. for that. As regards the trade, some wholesale druggists and manufacturing chemists also openly advise their customers by their price lists that they supply P.B., sp. gr. ·850 and ·900. One says B.P., P.L., and *seconds;* and another, a medallist at several exhibitions, quotes sp. gr. ·834, ·845, and ·850. Well, disclaiming all intention of riding a harassing hobby, I would invite opinion where amongst all these is the public scandal. If you will permit me, in elucidation of the very evident want in the Adulteration Act—I mean some method of fixing a standard for all manufactured articles which have not derived or coined names—I will add an experience, which shows how some chemists and druggists look upon the matter. A customer of the firm I have the honour to represent told me when I waited on him just after the report, that one of his neighbours came to him in great trepidation about the possible results of further analyses, and wanted to know how to meet them. Our friend laughed outright at the other's terror, and replied, The more purchases for analyses from him the better he should like it, as he did not know of anything but the Pharmacopœia as a guide. I may add, he always insists on being so supplied; and so now, I think, should every one who has the handling of medicines or drugs, or whatever names you choose to call them by.

A Drug Traveller.

What becomes of the Cocculus Indicus?

Sir,—Three weeks ago I asked the question, "Is there any legitimate use for the 1066 bags of Cocculus Indicus now held in stock" in London? I have not as yet had a satisfactory answer to the question, considering the importance it may assume. The Pharmaceutical Journal should be the medium for solving and answering such a question. We have here a narcotic drug coming into our country in vast quantities, as I suppose each bag averages 112lbs. It has always been considered a drug, and yet never entered into any pharmacopœia preparation.

Fifty years ago druggists, when the laws were not so strict as they are now, used to sell this berry for one purpose and only one—that was, for catching fish, making them drunk, and causing them to go floating down the stream, just as drunken men now go floating along, and commonly make a short float of it. Now I would ask another question, "Is it unreasonable to suspect that when many a bench of magistrates sit in solemn conclave over a drunken man, and commit him to gaol for a month, they ought to sit in solemn conclave over Cocculus Indicus? This would be cutting at the root and beginning at the beginning.

Is there no test for Cocculus Indicus in decoction or extract, and where are our analysts who are constantly summoning people for putting 15 per cent. of water into milk?

Richard Sturton.

Cambridge, March 4th, 1874.

*** We hope some correspondent will throw light upon this subject, to which attention has several times been called in this journal, and not long since in the House of Commons by Lord Enstace Cecil.—Ed. Pharm. Journ.

S. Steele.—It is not compulsory to pass the Major examination.

W. G. Bladon.—The remarks at the Council scarcely bear the interpretation you put on them. It would be unwise to initiate a discussion on School in that restricted sense of the word in which you write. In recent numbers of the Pharmaceutical Journal, School has been treated as including pupilage in the shop as well as some thoughtful study under competent teachers; and the proposition was that the function of the examiners should be restricted to the testing of such training; in short, that examination should not lead but follow education.

A. Cross.—We are not aware that the point has been decided. It is a question that should be referred to a solicitor.

"*Inquirer.*"—Rub the extract to a thin paste with a few drops of water; add the liniment, and shake well together. Label, "To be shaken."

G. W. Fowler.—We believe that in some parts of the country Syrupus Papaveris is sold under that name.

J. W. Martin.—Your letter has been handed to a member, who has promised to bring its contents directly under the notice of the Board.

"*Narcissus.*"—Bentham's 'Handbook of the British Flora' or Hooker's 'Student's Flora of the British Islands.'

"*Zero.*"—The works mentioned are suitable for the purpose, but, as a rule, it is advisable to have the most recent editions.

W. S.—The mixture cannot be made without the ammonia causing a separation of the quinine as a resinous mass, which is soluble in ether. See the "Characters and Tests" for Ferri et Quinæ Citras in the British Pharmacopœia.

"*Excelsior.*"—Pereira's 'Elements of Materia Medica,' edited by Bentley and Redwood; Garrod's 'Essentials of Materia Medica,' Royle's 'Manual of Materia Medica,' or Scoresby-Jackson's 'Note Book of Materia Medica.'

Communications, Letters, etc., have been received from Messrs. Armstrong, Arnall, Towerzey, Symes, A. Deck, Wilson, H. A. Howe, J. McMillan, Justitia, Statim, T. P. H., A. B.

FERROUS PHOSPHATE.

BY GEORGE CLARIDGE DRUCE.

This preparation, like so many of the iron compounds, is very unstable, exposure to the air, and more particularly to high temperatures when drying, causing rapid oxidation, and converting it into a more insoluble and consequently less useful form.

Ten samples were tested by means of a standard solution of red chromate of potassium, with the following results :—

	Pharmacopœia per centage of purity.
No. 1	72·
„ 2	98·
„ 3	53·2
„ 4	54·4
„ 5	2·
„ 6	104·
„ 7	5.
„ 8	100·1
„ 9	72·8
„ 10	73·6

Nos. 1, 3, 4, 9, and 10 were ordinary shop samples ; 1, 4, and 9 were imperfectly washed, showing decided presence of sulphates ; No. 3 will be afterwards referred to ; No. 5 was a very old trade specimen, yellowish white in colour and almost completely oxidized ; No. 7 was made according to official process, but dried at a *high* temperature ; No. 8 was a fine specimen, and though at least two years old, was of full strength and free from sulphates ; No. 2 was prepared in small quantity, and washed till perfectly free from sulphates ; No. 6 was also specially prepared, and when dried mixed with an equal weight of sugar ; after two months' time it was again tested, and showed no appreciable variation in strength.

No traces of arsenic were found in any of the samples, with the exception of No. 3, which gave unmistakable evidence of its presence, and on a special analysis showed that arseniate of iron had been given instead of the phosphate.

I believe the phosphate of iron might be kept longer unchanged were the freshly washed precipitate mixed with sugar, so that the powder dried at 140 might represent 50 per cent. of ferrous phosphate : its name might then be changed to *Ferri Phosphas Saccharata*.

CHLORAL HYDRATE AND CAMPHOR.

BY J. F. BROWN.

When camphor in fine powder is rubbed in a mortar with an equal weight of pure crystallized hydrate of chloral, the mass becomes damp, and slowly dissolves to form a syrupy liquid, strongly resembling glycerine in appearance.

A rise in temperature of about 3° Fahr. accompanies this change, showing that a chemical reaction of some kind must evolve heat more than sufficient to counterbalance the loss of sensible heat which always attends the passage of a substance from the solid to the liquid state.

No acid or irritating fumes, however, were perceptible during the solution, and the resulting liquid was neutral to test paper.

It was unaffected by solution of silver nitrate, left a greasy stain when dropped upon paper—permanent for some hours—and retained the taste and smell of its components.

A slip of paper dipped into it did not ignite very quickly when brought near a light, but burnt with a bright white flame, having emerald green edges.

It was readily soluble in alcohol and ether, but distilled water converted it into a soft translucent solid, from which, after some time, hydrate of chloral appeared to be dissolved out, leaving the camphor in crystalline grains.

These facts appear to point to an abstraction of water by the camphor, and solution of the latter in the liberated chloral ; but such an avidity for water is not shown by camphor under ordinary circumstances, and the cause of this curious liquefaction is not easily discernible.

[*** Some time since the *Medical Record* quoted from an American source a statement that if camphor be powdered by rubbing it in a mortar with a few drops of spirit, and an equal weight of chloral hydrate added, a liquid is produced which is a valuable local anæsthetic. Mr. Lennox Browne, writing to the *British Medical Journal* (March 7th, p. 304), confirms this statement, and says that it is of the greatest value as a local application in neuralgia. Mr. Browne having employed it during several months, has found great and sometimes instantaneous relief to follow its application in every case. It is only necessary to paint the mixture lightly over the painful part and allow it to dry. The application never blisters, though it may occasion a tingling sensation of the skin. The compound has also been found of great service in the relief of toothache.—Ed. Ph. Journ.]

THE ALKALOIDS OF THE CINCHONA BARKS.*

BY O. HESSE.

(*Continued from p.* 692).

V.—Cinchonine.

Cinchonine was first observed by Dr. Duncan, of Edinburgh ; it was afterwards, in 1811, more closely investigated by the Portuguese physician, Gomez, and declared to be the active principle of cinchona bark, until Houtton-Labillardière remarked that the cinchonine prepared according to the method of Gomez possessed an alkaline property ; and this observation being communicated to Pelletier and Caventou, who were occupied in the investigation of cinchona barks, they characterized this substance, in 1820, as a true vegetable alkaloid.

The slight solubility of this alkaloid in alcohol allowed of its preparation in a state of purity from its first discovery ; nevertheless, as it belonged to the difficultly combustible class of substances, several formulæ were constructed upon the basis of imperfect analytical results. Thus Pelletier and Dumas proposed $C_{39}H_{39}N_4O_3$, and Laurent $C_{19}H_{11}N_2O$, until Regnault acknowledged the formula of Liebig, when doubled, to be the most correct.

Notwithstanding that the behaviour of this base with alcohol rendered the preparation of pure cinchonine easy, yet its properties and salts were too little studied ; and thus it became possible for cinchonine from Huanuco bark,† under the name of "huanokine," and that from quinoidine,‡ under the name of β cinchonine, to be again introduced into chemical literature as newly discovered. The crystallizable cinchonine of Howard§ must also be referred here, the sulphate of which was apparently prevented from crystallizing through a slight excess of sulphuric acid.

After having ascertained by repeated investigations that

* Translated from the 'Vierteljahresschrift für praktische Pharmacie,' vol. xxii., p. 366.

† Annalen der Chemie und der Pharmacie, vol. c. p. 341.

‡ Archiv für Pharmacie, ciii. 273.

§ Neues Repertorium für Pharmacie, vol. xvi. p. 426.

only one cinchonine was produced, namely, that discovered by Pelletier and Caventou, it became necessary to repeat my comparative experiments, since E. Willm and E. Caventou,* had asserted that all cinchonine was accompanied by a slight mixture of a second very similar alkaloid, hydrocinchonine, which could not be separated except by decomposing the cinchonine by means of permanganate of potash. In order to decide this point I prepared hydrocinchonine according to the directions of Willm and Caventou, and made the following observations.

The hydrocinchonine crystallizes in shining colourless prisms, soluble in alcohol in nearly the same proportion as cinchonine. It dissolves at 20° C. in 534 parts of ether, and at 16° C. in 1360 parts of water. In boiling water it is notably soluble, the solution depositing, upon cooling, the greater part of the dissolved substance in small prisms. The alcoholic solution has an alkaline reaction, and can be neutralized by acids, yielding neutral salts which crystallize well. Of these the hydrochlorate crystallizes in colourless prisms, readily soluble in water and alcohol, difficultly in a solution of common salt. The hydriodate crystallizes also in white prisms, which dissolve with difficulty in a solution of iodide of potassium, easily in water, and very freely in alcohol. The neutral sulphate resembles the ordinary sulphate of cinchonine, both in form and solubility, as the neutral and acid tartrates resemble the corresponding cinchonine salts. If excess of bicarbonate of soda be added to an aqueous solution of the tartrate the alkaloid gradually separates as a mass of crystalline warts, and carbonic acid is disengaged. Tartaric acid does not, therefore, prevent the precipitation of the hydrocinchonine. If a solution of it in dilute sulphuric acid be mixed with a solution of permanganate of potash, the latter is decolourized at the ordinary temperature, after a considerable time.

With the help of the latter reaction, it was not difficult to obtain the substance in question from cinchonine which had been prepared from barks of *C. succirubra*, *C. Pitayensis*, *C. Calisaya*, *C. ovata*, and *C. lancifolia*, var. *discolor*. Large, well formed, apparently homogeneous crystals of sulphate of cinchonine, as well as small crystals, the first and the last crystallization, and the mother liquor, all yielded hydrocinchonine. In general, 19 parts of crystallized permanganate of potash dissolved in cold water were used in completely decomposing the cinchonine of 17 parts of sulphate of cinchonine dissolved in very dilute sulphuric acid. In operating at the ordinary temperature, and adding the manganic solution drop by drop to the acid solution whilst stirring, no disengagement of gas could be noted. In all cases a relatively small quantity of hydrocinchonine was obtained. This constancy in the yield led me to suppose that hydrocinchonine might be only a decomposition product of cinchonine, formed according to the following equation :—

$$C_{20}H_{24}N_2O + Mn_2H_2O_8 = C_{20}H_{26}N_2O + 2MnO_2 + 4\,O.$$

The cinchonine would in this case acquire hydrogen as quinine does under analogous circumstances, only here the oxygen remaining from the decomposition would react upon a fresh quantity of cinchonine.

We have seen that hydrocinchonine is considerably more soluble in water than cinchonine. If, therefore, an aqueous solution of sulphate of cinchonine be partially precipitated by ammonia, and the precipitate be left for some time in contact with the supernatant solution, eventually, if hydrocinchonine be actually present in the cinchonine, a solution would be produced containing comparatively much hydrocinchonine, which, after a small addition of permanganate of potash would be obtained pure. Experiment showed to me, however, that in fact the cinchonine could be decomposed with a small quantity of manganate, but that the formation of hydrocinchonine in any quantity worth mentioning did not occur. Further, cinchonine, which under other conditions would easily have yielded some hydrocinchonine, was boiled with water, and this solution acidulated with SO_3, and treated with solution of manganate, but again no appreciable quantity of hydrocinchonine was obtained.

From my experiments I inferred that cinchonine contained no hydrocinchonine, but that the latter was formed in small quantity during the oxidation of cinchonine, and further experiment showed me that a certain portion of this was again decomposed. Hydrocinchonine, therefore, must be classed with the decomposition products, and is not within the limits of the present memoir.

With respect to the properties of cinchonine, it should be mentioned that if the pure alkaloid be boiled with an aqueous solution of sulphate, oxalate or hydrochlorate of ammonia, the alkaloid is gradually dissolved, whilst ammonia is evolved. From this solution the cinchonine salts of the respective acids crystallize upon cooling and after the necessary concentration. In this manner the neutral oxalate of cinchonine can easily be prepared.

Experiments relative to the rotatory power of cinchonine had already been made by Bouchardat, which gave for it in alcoholic solution $\alpha\, r = +237{\cdot}5°$; in a weak solution of the hydrochlorate $\alpha\, r = +190{\cdot}4°$. De Vrij gave for Pelletier's cinchonine in solution as hydriodate $\alpha\, j = +242{\cdot}58°$, and for Erdmann's huanokine $\alpha\, j = +242{\cdot}55°$. In my experiment the cinchonine was dissolved in 95 per cent. alcohol, and with this solution the following data were obtained :—

I. For $p = 1294$, and $l = 220$, $\alpha\, j = +\ 6{\cdot}45°$.
II. For $p = 10{,}409$, and $l = 220$, $\alpha\, j = +5{\cdot}18°$.

According to these experiments—

	I.	II.	Mean.
$\alpha\, j =$	$+226{\cdot}50°$	$+226{\cdot}46$	226·48

Neutral sulphate of cinchonine, $2\,C_{20}H_{24}N_2O,\ H_2SO_4 + 2\,H_2O$, in alcoholic solution, gave—

For $p = 5{\cdot}00$, and $l = 200$, $\alpha = +20{\cdot}05°$; or
$\alpha\, j = +200{\cdot}5°$; or
Cinchonine $\alpha\, j = +244{\cdot}12°$.

The same salt gave—

I. With 1 molecule of SO_3 added in aqueous solution, when $p = 4{\cdot}7687$, and $l = 200$, $\alpha = +20{\cdot}46°$

II. With 6 molecules of SO_3 added, also in aqueous solution, when $p = 4{\cdot}7088$, and l 200, $\alpha = +\ 19{\cdot}80°$.

After twenty-four hours this solution still gave a deviation of $+19{\cdot}81°$, consequently no variation from the former worth mentioning.

From these experiments may be calculated—

		I.	II.
For the salt . .	$\alpha\, j =$	$+214{\cdot}40°$	$+210{\cdot}24°$
For the alkaloid	$\alpha\, j =$	$+261{\cdot}49°$	$+255{\cdot}86°$

On the other hand, the hydrochlorate, $C_{20}H_{24}N_2O\,HCl + 2\,H_2O$, gave—

I. In alcoholic solution, when $p = 3{\cdot}3558$, and $l = 220$, $\alpha = +12{\cdot}16°$.

II. In aqueous solution, strongly acidulated with hydrochloric acid, when $p = 3{\cdot}3373$, and $l = 200$, $\alpha = +12{\cdot}62°$.

We have, therefore—

		I.	II.
For the crystallized hydrochlorate	$\alpha\, j =$	$+164{\cdot}58°$	$+189{\cdot}07°$
For the alkaloid	$\alpha\, j =$	$+203{\cdot}58°$	$+233{\cdot}52°$

The specific rotatory power of cinchonine is therefore increased if the alkaloid be in combination with sulphuric acid, so that with 1 molecule of base and $\frac{1}{2}$ molecule of acid it equals + 244·12°, but with equal molecules of base and acid + 261·49°. This augmentation amounts in the first case to 17·74°, and in the second to 17·37 ; consequently a mean of 17·56° for each molecule of sulphuric acid entering into combination. But as soon as the highest point of saturation is reached, a further addition of acid causes a diminution of the rotatory power. Hydrochloric acid, on the contrary, in the proportion of equal molecules, decreases the rotatory power ; but this is

* Annalen der Chemie und der Pharmacie,

increased when the acid is present in excess. It will, therefore, be seen that an estimation of cinchonine by means of the polariscope, like that of the before-mentioned alkaloids, is highly complicated, and cannot easily be made with any pretension to exactness.

(*To be continued.*)

THE EUCALYPTUS PLANTATIONS OF ALGERIA.

A correspondent of the *Pall Mall Gazette* writes as follows :—The Eucalyptus, a tree of the myrtle family, was introduced from Australia into Algeria about eleven years ago, and flourished surprisingly. It was not, however, until within the last seven years that any extensive plantations were made. A few days since we made an excursion to visit those on the estates of M. Trottier, M. Ramel, and M. Cordier. The seeds from which these trees have grown were mostly sent by Mr. Edward Wilson, whose persistent generosity in aid of all efforts for acclimatization cannot be too gratefully acknowledged.

On M. Trottier's estate at Hussein Dey we walked under tall trees, the *Eucalyptus globulus* (blue gum trees), on an average fifty feet high, which seven years ago were planted with seeds not so big as a mustard seed; this particular plantation was on bad soil, and had not had very experienced care, yet the growth of the trees was marvellous. In this ever-green wood all around us were tall reddish smooth stems, with the bark hanging down in a ragged, untidy manner, for the tree sheds its bark in winter, and grey willow-like leaves were waving on flexible boughs. For about twenty-five feet the stems of the trees in the inner part of the plantation rose up with no branches at all, but on the skirts of the wood the trees sent out branches in the light and air nearly to the ground. It produced a curious impression to walk in the dim twilight of this Australian-African forest, and to think that this was also a wood of the miocene period. Beautiful is not the word I should apply to its appearance, but in exchange for bare sun-baked earth or deadly swamps I must say these Eucalyptus forests are most grateful and the smell delightfully resinous, warm, and gummy. The multitude of birds in the branches and their busy twitterings added much to the pleasant impression. I measured these trees as I walked along, and found them from forty to forty-five inches in circumference, those on the borders of the wood always of course a few inches larger. M. Trottier thinks the red gum, *Eucalyptus resinifcrus*, which is not yet planted in any great numbers, will be the most hardy tree, and consequently best suited to the neighbourhood of Algiers; one red gum which I measured was thirty-one inches in circumference and its age just six years, having been sown in February, 1868. This tree was in the perfection of health, and the same may be said of all the Eucalyptus trees in the plain.

All the large plantations in Algeria are the *Eucalyptus globulus*, but as time goes on, varieties are being tried. On M. Cordier's magnificently wooded farm in the dismal region of the Maison Carrée, we saw a hundred different kinds of Eucalyptus. We were accompanied by some gentlemen who were the principal authorities on trees in this colony, and they seemed to expect much from the *E. Colosea*, which is a hardier tree in the sun than the *globulus*, and is already growing in the desert at Lagouat. M. Cordier showed us one *E. globulus* which was eleven years old, and measured eighty-one inches in circumference, and he told me of some at Bonfarik in the plain which were some inches larger and not so old. There seemed to be a general impression that the Eucalyptus was a fever-destroying tree, and of the greatest importance to the colony from that point of view; but as general culture goes on, as well as plantations, the sanitary improvement in the plain ought not all to be set down as certainly due to the *Eucalyptus globulus*. The aromatic odours of these gum-tree plantations in the dismal part of the plain at the mouth of the fever-breeding River Harach instead of the malaria vapours is certainly an incalculable benefit; but I will not assert positively that the fever is destroyed. If the growing forests are judiciously managed, they must be a source, in fourteen or fifteen years, of great profit, as wood is very dear here, and the Eucalyptus is a fine hard wood, and makes excellent sleepers for railways, and is useful in all places where a sound wood that will stand damp is required. We walked in the four-year-old plantations at the Maison Carrée, where are 20,000 gum trees on ninety acres of unhealthy soil; these trees are now from fourteen to twenty feet high, and look as if they would grow to large forest trees after their fashion in about six years more.

Many village communities in the plain have planted scores of gum trees in this neighbourhood, and feel the benefit, but at present there is certainly an exaggerated manner of speaking of the Eucalyptus. It is praised as a scent, as cigars, as a medicine, as a tonic, as a throat lozenge, and above all as a bath. Branches and leaves are put into hot water, and I am assured by those who have tried it, that such baths remove rheumatic pains, neuralgia, and the debility left by the malaria incidental to the country. The flower of the Eucalyptus tribe is very like the myrtle flower; it is very full of honey, and attracts a multitude of flies and bees, and the birds naturally follow, for they find not only food, but thick, warm, leafy cover in winter, and shelter from the burning sun in summer. Some species of Eucalyptus have large and very beautiful flowers. We noticed with delight the gorgeous red staminous flower of the *E. tetraptera* bursting the pyramidal top of its square-sided flower-box.

Finally, our opinion is that the Eucalyptus tree may prove the most powerful element of civilization as yet put in force in the coast of North Africa; that in a very few years it will be self-sowing, and thus take its place as a naturalized subject, there is very little reason to doubt. At Cannes, on Lord Brougham's grounds, the young trees come up from the seed of the old ones under their branches, and in a few years we may confidently expect the same process to take place in Algeria. This year the seed ripens plentifully on the seven-year-old trees. Thus, in a few years we may see the one thing most longed for on the Barbary coast—that is, shade from the fierce sun. We may also have a most profitable crop, and the healthy influence of these resinous-scented gum trees as a counteraction against malaria. The Eucalyptus tribe seems to meet not only the requirements of health, comfort, and pleasure, but of commerce and general prosperity.

POPPY SEED.*

Papaver Somniferum.

The seeds yield by expression about 50 per cent. of a bland and very valuable oil, of a pale golden colour, fluid to within 10° of the freezing point of water. It dries easily, is inodorous, of agreeable flavour, and partially soluble in alcohol. By simple exposure to the rays of the sun in shallow vessels the oil is rendered perfectly colourless. It is expressed by means of a heavy circular stone, placed on its edge, made to revolve by a long lever, and the apparatus is worked by draught bullocks.

The seed has no narcotic qualities, but has a sweet taste, and is used, parched, by the lower class of natives as a food; it is also much used by the sweetmeat-makers as an addition in their wares. This and the seed of the Teel (*Sesamum orientale*) are the only seeds, with the exception of the cocoa-nut, which are used for that purpose.

THE COPPICING OF CINCHONAS.

We learn, says the *Agricultural Gazette* of India, quoted in the *Gardencrs' Chronicle*, from a recent report of the superintendent of the Bengal Cinchona Plantations, that most satisfactory results have been obtained in the

* From the Official Catalogue of the Indian Department at the Vienna Universal Exhibition.

Sikkim plantations, by treating the *Cinchona succirubra* as a coppice tree. This result does not in the least surprise us; we have long been under the belief that most varieties of Cinchona, and certainly the succirubra, would, when cut over and coppiced, yield far better results than if barked under the so-called mossing system, advocated by the Superintendent of the Neilgherry Plantations. It is, we think, much to be regretted that coppicing has not had a full trial on the Neilgherries; but we are glad to learn that the Madras Government have at length determined to give coppicing a fair trial. It is well that this experiment should commence in time. In a few more years the roots of Cinchona trees may have passed down into the inhospitable subsoil, and the growth of the trees may be stopped, when coppicing may be the only choice. The high cultivation applied to the surface soils of the plantations at Sikkim and on the Neilgherries will have done much to keep the roots of the trees in the cultivated upper soil; but, whether this is so or not, coppicing experiments on a sufficiently large scale should no longer be delayed in our Government Cinchona plantations. We agree thoroughly with Dr. Henderson, in thinking that the methods of culture in these experimental plantations cannot be too varied, provided always that the experiments are carefully conducted, and the results thoroughly observed and recorded by competent persons.

PRELIMINARY ACCOUNT OF AN INVESTIGATION ON THE TRANSMISSION OF SOUND BY THE ATMOSPHERE.*

BY JOHN TYNDALL, D.C.L., LL.D., F.R.S.

This notice embraces the scientific results of an inquiry on Fog-signals, undertaken at the instance of the Elder Brethren of the Trinity House, and communicated with their friendly concurrence to the Royal Society.

The investigation was begun on the 19th of May, 1873, and continued till the 4th of July. It was resumed on the 8th of October, and continued to the end of November. It also includes observations made during the dense fog which enveloped London on December 9 and the succeeding days.

Gongs and bells were excluded from this investigation, in consequence of their proved inferiority to other instruments of signalling. The experiments were made with trumpets blown by powerfully compressed air, with steam-whistles, guns, and a steam syren, associated with a trumpet 16 feet long.

Daboll's horn, or trumpet, had been highly spoken of by writers on fog-signals. A third-order apparatus of the kind had been reported as sending its sound to a distance of from 7 to 9 miles against the wind, and to a distance of 12 to 14 miles with the wind. Holmes had improved upon Daboll; and with two instruments of Holmes, not of the third but of the first order, our experiments were made. On the 19th of May at 3 miles distance they became useless as a fog-signal; at a distance of 4 miles, with paddles stopped and all on board quiet, they were wholly unheard. At a distance of 2 miles from the Foreland the whistles tested on May 19 became useless. The 12 o'clock gun, fired with a 1lb. charge at Drop Fort in Dover, was well heard on May 19, when the horns and whistles were inaudible. On the 20th of May the permeability of the atmosphere had somewhat increased, but the steam-whistle failed to pierce it to a depth of 3 miles. At 4 miles the horns, though aided by quietness on board, were barely heard. By careful nursing, if I may use the expression, the horn-sounds were carried to a distance of 6 miles. The superiority of the 18-pounder gun, already employed by the Trinity House as a fog-signal, over horns and whistles, was on this day so decided as almost to warrant its recommendation to the exclusion of all the other signals.

Nothing occurred on the 2nd of June to exalt our hopes of the trumpets and whistles. The horns were scarcely heard at a distance of 3 miles; sometimes indeed they failed to be heard at 2 miles. By keeping everything quiet on board, they were afterwards heard to a distance of 6 miles—a result, however, mainly due to the improved condition of the atmosphere. Considering the demands as to sound-range made by writers on this subject, the demonstrated incompetence of horns and whistles of great reputed power to meet these demands was not encouraging. On the 3rd of June the atmosphere had changed surprisingly. It was loaded overhead with dark and threatening clouds; the sounds, nevertheless, were well heard beyond 9 miles. On June 10th the acoustic transparency of the air was also very fair, the distance penetrated being upwards of $8\frac{3}{4}$ miles. The subsidence of the sound near the boundary of the acoustic shadow on the Dover side of the Foreland, and before entering the shadow, was to-day sudden and extraordinary, affecting equally both horns and guns. We were warned on June 3rd that the supremacy of the gun on one occasion by no means implied its supremacy on all occasions, the self-same guns which on May 20th had so far transcended the horns being on this day their equals and nothing more. The 11th of June was employed in mastering still further the facts relating to the subsidence of the sound east and west of the Foreland; the cause of this subsidence being in part due to the weakening of the sonorous waves by their divergence into the sound shadow, and in part to interference.

The atmosphere on the 25th of June was again very defective acoustically. The sounds reached a maximum distance of $6\frac{1}{2}$ miles; but at 4 miles, on returning from the maximum distance, they were very faint. The day had, as it were, darkened acoustically. On this day the guns lost still further their pre-eminence, and at $5\frac{1}{2}$ miles were inferior to the horn. No sounds whatever reached Dover Pier on the 11th; and it was only towards the close of the day that they succeeded in reaching it on the 25th. Thus by slow degrees the caprices of the atmosphere made themselves known to us, showing us subsequently that within the limits of a single day, even within a single minute, the air, as a vehicle of sound, underwent most serious variations. The 26th of June was a far better day than its predecessor, the acoustic range being over $9\frac{1}{4}$ miles. The direction of the wind was less favourable to the sound on this day than on the preceding one, plainly proving that something else than the wind must play an important part in shortening the sound-range.

On the 1st of July we experimented upon a rotating-horn, and heard its direct or axial blast, which proved to be the strongest, at a distance of $10\frac{1}{2}$ miles. The sounds were also heard at the Varne light-ship, which is $12\frac{3}{4}$ miles from the Foreland. The atmosphere had become decidedly clearer acoustically, but not so optically; for on this day thick haze obscured the white cliffs of the Foreland. In fact, on days of far greater optical purity, the sound had failed to reach one-third of the distance attained to-day. In the light of such a fact any attempt to make optical transparency a measure of acoustic transparency must be seen to be delusive. On the 1st of July a 12-inch American whistle, of which we had heard a highly favourable account, was tried in place of the 12-inch English whistle; but, like its predecessor, the performance of the new instrument fell behind that of the horns. An interval of twelve hours sufficed to convert the acoustically clear atmosphere of July 1st into an opaque one; for on the 2nd of July even the horn-sounds, with paddles stopped and all noiseless on board, could not penetrate further than 4 miles.

Thus each succeeding day provided us with a virtually new atmosphere, clearly showing that conclusions founded upon one day's observations might utterly break down in the presence of the phenomena of another day. This was most impressively demonstrated on the day now to be referred to. The acoustic imperviousness of the 3rd of July was found to be still greater than that of the 2nd,

* Communicated to the Royal Society, January 15th, 1874. (Proceedings, vol. xxii. p. 58).

while the optical purity of the day was sensibly perfect. The cliffs of the Foreland could be seen to-day at ten times the distance at which they ceased to be visible on the 1st, while the sounds were cut off at one-sixth of the distance. At 2 p.m. neither guns nor trumpets were able to pierce the transparent air to a depth of 3, hardly to a depth of 2 miles. This extraordinary opacity was proved conclusively to arise from the irregular admixture with the air of the aqueous vapour raised by a powerful sun. This vapour, though perfectly invisible, produced *an acoustic cloud* impervious to the sound, and from which the sound-waves were thrown back as the waves of light are from an ordinary cloud. The waves thus refused transmission produced by their reflection echoes of extraordinary strength and duration. This, I may remark, is the first time that audible echoes have been proved to be reflected from an optically transparent atmosphere. By the lowering of the sun the production of the vapour was checked, and the transmissive power of the atmosphere restored to such an extent that, at a distance of 2 miles from the Foreland, at 7 p.m., the intensity of the sound was at least thirty-six times its intensity at 2 p.m.

On October 8 the observations were resumed, a steam syren and a Canadian whistle of great power being added to the list of instruments. A boiler had its steam raised to a pressure of 70 lbs. to the square inch; on opening a valve this steam would issue forcibly in a continuous stream, and the sole function of the syren was to convert this stream into a series of separate strong puffs. This was done by causing a disk with twelve radial slits to rotate behind a fixed disk with the same number of slits. When the slits coincided a puff escaped; when they did not coincide the outflow of steam was interrupted. Each puff of steam at this high pressure generated a sonorous wave of great intensity; the successive waves linking themselves together to a musical sound so intense as to be best described as a continuous explosion.

During the earlier part of October 8 the optical transparency of the air was very great; its acoustic transparency, on the other hand, was very defective. Clouds blackened and broke into a rain and hail shower of tropical violence. The sounds, instead of being deadened were improved by this furious squall; and, after it had lightened, thus lessening the local noises, the sounds were heard at a distance of $7\frac{1}{2}$ miles distinctly louder than they had been heard through the preceding rainless atmosphere at a distance of 5 miles. At 5 miles distance, therefore, the intensity of the sound had been at least doubled by the rain—a result entirely opposed to all previous assertions, but an obvious consequence of the removal by condensation and precipitation of that vapour the mixture of which with the air had been proved so prejudicial to the sound. On this day a dependence was established between the pitch of a note and its penetrative power—the syren generating 480 waves being slightly inferior to the horns, while generating 400 waves a second it was distinctly superior. The maximum range on October 8 was 9 miles. On October 9 the transmissive power had diminished, the maximum range being $7\frac{1}{2}$ miles. On both these days the syren proved to be superior to the horns, and on some occasions superior to the gun.

On the 10th and 11th, a gale having caused our steamer to seek safety in the Downs, we made land observations. The duration of the aërial echoes was for the syren and the gun, 9 seconds; for the horns, 6 seconds. The duration varies from day to day. We sought to estimate the influence of the violent wind, and found that the sound of the gun failed to reach us in two cases at a distance of 550 yards to windward, the sound of the syren at the same time rising to a piercing intensity. To leeward the gun was heard at five times, and certainly might have been heard at fifteen times the distance attained to windward. The momentary character of the gun-sound renders it liable to be quenched by a single puff of wind; but sounds of low pitch generally, whether momentary or not, suffer more from an opposing wind than high ones. We had on the 13th another example of the powerlessness of heavy rain to deaden sound.

On the 14th the maximum range was 10 miles, but the atmosphere did not maintain this power of transmission. It was a day of extreme optical clearness; but its acoustic clearness diminished as the day advanced. In fact, the sun was in action. We proved to-day that by lowering the pitch of the Canadian whistle, its sound, which had previously been inaudible, became suddenly audible. The day at first was favourable to the transmission of the longer sound-waves. After a lapse of three hours the case was reversed, the high-pitched syren being then heard when both gun and horns were inaudible. But even this state of things did not continue, so rapid and surprising are the caprices of the atmosphere. At a distance of 5 miles, at 3.30 p.m., the change in transmissive power reduced the intensity of the sound to at least one half of what it possessed at 11.30 a.m., the wind throughout maintaining the same strength and direction. Through all this complexity the knowledge obtained on July 3 sheds the light of a principle which reduces to order the apparent confusion.

October 15 was spent at Dungeness in examining the performance of Daboll's horn. It is a fine instrument, and its application was ably worked out by its inventor; still it would require very favourable atmospheric conditions to enable it to warn a steamer before she had come dangerously close to the shore. The direction in which the aërial echoes return was finely illustrated to-day, that direction being always the one in which the axis of the horn is pointed.

The 16th was a day of exceeding optical transparency, but of great acoustic opacity. The maximum range was only 5 miles. On this day the howitzer and all the whistles were clearly overmastered by the syren. It was, moreover, heard at $3\frac{1}{2}$ miles with the paddles going, while the gun was unheard at $2\frac{1}{2}$ miles. With no visible object that could possibly yield an echo in sight, the pure aërial echoes, coming from the more distant southern air, were distinct and long-continued at a distance of 2 miles from the shore. Near the base of the Foreland cliff we determined their duration and found it to be eleven seconds, while that of the best whistle echoes was six seconds. On this day three whistles, sounded simultaneously, were pitted against the syren, and found clearly inferior to it.

On the 17th four horns were compared with the syren, and found inferior to it. This was our day of greatest acoustic transparency, the sound reaching a maximum of 15 miles for the syren, and of more than 16 for the gun. The echoes on this day were continued longer than on any other occasion. They continued for fifteen seconds, their duration indicating the atmospheric *depth* from which they came.

On October 18th, though the experiments were not directed to determine the transmissive power of the air, we were not without proof that it continued to be high. From 10 to 10.30 a.m., while waiting for the blasts of the syren at a distance of 3 miles from the Foreland, the continued reports of what we supposed to be the musketry of skirmishing parties on land were distinctly heard by us all. We afterwards learned that the sounds arose from the rifle-practice on Kingsdown beach, $5\frac{1}{2}$ miles away. On July 3rd, which, optically considered, was a far more perfect day, the 18-pounder, howitzer, and mortar failed to make themselves heard at half this distance. The 18th was mainly occupied in determining the influence of pitch and pressure on the syren sound. Taking the fluctuations of the atmosphere into account, I am of opinion that the syren, performing from 2000 to 2400 revolutions a second, or, in other words, generating from 400 to 480 waves per second, best meets the atmospheric conditions. We varied the pressure from 40 to 80 lbs. on the square inch; and though the intensity did not appear to rise in proportion to the pressure, the higher pressure yielded the hardest and most penetrating sound.

The 20th was a rainy day with strong wind. Up to a

distance of 5½ miles the syren continued to be heard through the sea- and paddle-noises. In rough weather, indeed, when local noises interfere, the syren sound far transcends all other sounds. On various occasions to-day it proved its mastery over both gun and horns. On the 21st the wind was strong and the sea high. The horn-sounds, with paddles going, were lost at 4 miles, while the syren continued serviceable up to 6½ miles. The gun to-day was completely overmastered. Its puffs were seen at the Foreland; but its sound was unheard when the syren was distinctly heard. Heavy rain failed to damp the power of the syren. The whistles were also tried to-day, but were found far inferior to the syren. On the 22nd it blew a gale, and the Galatea quitted us. We made observations on land on the influence of the wind and of local noises. The shelter of the coastguard station at Cornhill enabled us to hear gun-sounds which were quite inaudible to an observer out of shelter; in the shelter also both horn and syren rose distinctly in power; but they were also heard outside when the gun was quite unheard. As usual, the sound to leeward was far more powerful than those at equal distances to windward. The echoes from the cloudless air were to-day very fine. On the 23rd, in the absence of the steamer, the observations on the influence of the wind were continued. The quenching of the gun-sounds, in particular, to windward was well illustrated. All the sounds, however, gun included, were carried much further to leeward than to windward. The effect of a violent thunderstorm and downpour of rain in exalting the sound was noticed by observers both to windward and to leeward of the Foreland. In the rear of the syren its range to-day was about a mile. At right angles to the axis, and to windward, it was about the same. To leeward it reached a distance of 7⅓ miles.

(*To be continued.*)

PROFESSOR HUXLEY ON SCIENCE TEACHING AND EXAMINATIONS.

On the occasion of his installation as Lord Rector of the University, on the 27th of February, Professor Huxley chose for the subject of his inaugural address, "Universities; Actual and Ideal." The address, which is published *in extenso* in the current number of the *Contemporary Review*, contained many references having special interest to pharmacists, such as limitation of the subjects of the medical curriculum, the true objects of university endowments, the endowment of research, teaching in the lecture room, and examinations.

Referring to the activity of thought in the present day, the Professor said:—

"Men are beginning, once more, to awake to the fact that matters of belief and of speculation are of absolutely infinite practical importance; and are drawing off from that sunny country 'where it is always afternoon'—the sleepy hollow of broad indifferentism—to range themselves under their natural banners. Change is in the air. It is whirling feather-heads into all sorts of eccentric orbits, and filling the steadiest with a sense of insecurity. It insists on reopening all questions and asking all institutions, however venerable, by what right they exist, and whether they are, or are not, in harmony with the real or supposed wants of mankind. And it is remarkable that these searching inquiries are not so much forced on institutions from without, as developed from within. Consummate scholars question the value of learning; priests contemn dogma; and women turn their backs upon man's ideal of perfect womanhood, and seek satisfaction in apocalyptic visions of some, as yet unrealized, epicene reality."

After a tribute to the disposition shown in recent changes by the universities to meet the needs of the present day, a rapid sketch was given of the origin of such institutions, commencing with the dictum of Charlemagne, that "right action is better than knowledge; but in order to do what is right, it is necessary to know what is right":—

"In a couple of centuries, the schools he sowed broadcast produced their crop of men thirsting for knowledge and craving for culture. Such men gravitating towards Paris, as a light amidst the darkness of evil days, from Germany, from Spain, from Britain, and from Scandinavia, came together by natural affinity. By degrees, they banded themselves into a society, which, as its end was the knowledge of all things knowable, called itself a '*Studium Generale*;' and when it had grown into a recognized corporation, acquired the name of '*Universitas Studii Generalis*;' which, mark you, means not a 'Useful Knowledge Society,' but a 'Knowledge-of-things-in-general Society.'"

The development of the University was traced, and this led up to the subject of endowments, upon which Professor Huxley said:—

"In Aberdeen, these endowments are numerous, but so small that, taken altogether, they are not equal to the revenue of a single third-rate English college. They are scholarships, not fellowships; aids to do work—not rewards for such work as it lies within the reach of an ordinary, or even an extraordinary, young man to do. You do not think that passing a respectable examination is a fair equivalent for an income, such as many a grey-headed veteran, or clergyman, would envy, and which is larger than the endowment of many Regius chairs. You do not care to make your University a school of manners for the rich; of sports for the athletic; or a hot-bed of high-fed, hypercritical refinement, more destructive to vigour and originality than are starvation and oppression. No; your little bursaries of ten and twenty (I believe even fifty) pounds a year enable any boy who has shown ability—in the course of his education in those remarkable primary schools which have made Scotland the power she is—to obtain the highest culture the country can give him; and when he is armed and equipped, his Spartan Alma Mater tells him that, so far, he has had his wages for his work, and that he may go and earn the rest.

"When I think of the host of pleasant, monied, well-bred young gentlemen, who do a little learning and much boating by Cam and Isis, the vision is a pleasant one; and, as a patriot, I rejoice that the youth of the upper and richer classes of the nation receive a wholesome and a manly training, however small may be the modicum of knowledge they gather, in the intervals of this, their serious business. I admit, to the full, the social and political value of that training. But when I proceed to consider that these young men may be said to represent the great bulk of what the Colleges have to show for their enormous wealth, plus, at least, a hundred and fifty pounds a year apiece which each undergraduate costs his parents or guardians, I feel inclined to ask whether the rate-in-aid of the education of the wealthy and professional classes, thus levied on the resources of the community, is not, after all, a little heavy? And, still further, I am tempted to inquire what has become of the indigent scholars, the sons of the masses of the people whose daily labour just suffices to meet their daily wants, for whose benefit these rich foundations were largely, if not mainly, instituted? It seems as if Pharaoh's dream had been rigorously carried out, and that even the fat scholar has eaten the lean one."

After some remarks respecting the "value of Science as knowledge and discipline," he expressed his gratification that the Scotch universities had added natural history and chemistry to the subjects of examination. He then said:—

"I do not know what the requirements of your examiners may be, but I sincerely trust they are not satisfied with a mere book knowledge of these matters. For my own part, I would not raise a finger, if I could thereby introduce mere book work in science into every Arts curriculum in the country. Let those who want to study books devote themselves to Literature, in which we have

the perfection of books, both as to substance and as to form. If I may paraphrase Hobbes' well-known aphorism, I would say that 'books are the money of Literature, but only the counters of Science,' Science (in the sense in which I now use the term) being the knowledge of fact, of which every verbal description is but an incomplete and symbolic expression. And be assured that no teaching of science is worth anything, as a mental discipline, which is not based upon direct perception of the facts, and practical exercise of the observing and logical faculties upon them. Even in such a simple matter as the mere comprehension of form, ask the most practised and widely informed anatomist what is the difference between his knowledge of a structure which he has read about, and his knowledge of the same structure when he has seen it for himself; and he will tell you that the two things are not comparable—the difference is infinite. Thus I am very strongly inclined to agree with some learned schoolmasters who say that, in their experience, the teaching of Science is all waste time. As they teach it, I have no doubt it is. But to teach it otherwise, requires an amount of personal labour and a development of means and appliances, which must strike horror and dismay into a man accustomed to mere book work, and who has been in the habit of teaching a class of fifty without much strain upon his energies. And this is one of the real difficulties in the way of the introduction of physical science into the ordinary University course, to which I have alluded. It is a difficulty which will not be overcome, until years of patient study have organized scientific teaching as well as, or I hope better than, classical teaching has been organized hitherto. . . . .

"When the material well-being of the country depended upon rude pasture and agriculture, and still ruder mining; in the days when all the innumerable applications of the principles of physical science to practical purposes were non-existent even as dreams; days which men living may have heard their fathers speak of; what little physical science could be seen to bear directly upon human life, lay within the province of Medicine. Medicine was the foster-mother of Chemistry, because it has to do with the preparation of drugs and the detection of poisons; of botany, because it enabled the physician to recognize medicinal herbs; of comparative anatomy and physiology, because the man who studied human anatomy and physiology for purely medical purposes was led to extend his studies to the rest of the animal world. Within my recollection, the only way in which a student could obtain anything like a training in physical science, was by attending the lectures of the professors of physical and natural science attached to the medical schools."

Professor Huxley then alluded to the responsibilities of the medical practitioner, and appealed to the medical students present not to spare even so much as an hour for studies which did not tend directly to fit them for their duties. He continued :—

"If I had the power to remodel medical education, the first two years of the medical curriculum should be devoted to nothing but thorough study of anatomy and physiology, with physiological chemistry and physics; the student should then pass a real, practical examination in these subjects; and, having gone through that ordeal satisfactorily, he should be troubled no more with them. . . .

"We are told that the medical man ought to be a person of good education and general information, if his profession is to hold its own among other professions; that he ought to know botany, or else, if he goes abroad, he won't be able to tell poisonous fruits from edible ones; that he ought to know drugs, as a druggist knows them, or he won't be able to tell sham bark and senna from the real articles; that he ought to know zoology, because—well, I really have never been able to learn exactly why he is to be expected to know zoology. There is, indeed, a popular superstition, that doctors know all about things that are queer or nasty to the general mind, and may, therefore, be reasonably expected to know the 'barbarous binomials' applicable to snakes, snails, and slugs; an amount of information with which the general mind is usually completely satisfied. And there is a scientific superstition that physiology is largely aided by comparative anatomy—a superstition which, like most, once had a grain of truth at bottom; but the grain has become homœopathic, since physiology took its modern experimental development, and became what it is now—the application of the principles of physics and chemistry to the elucidation of the phenomena of life.

"I hold as strongly as any one can do, that the medical practitioner ought to be a person of education and good general culture; but I also hold by the old theory of a faculty, that a man should have his general culture before he devotes himself to the special studies of that faculty and I venture to maintain, that, if the general culture obtained in the faculty of arts were what it ought to be, the student would have quite as much knowledge of the fundamental principles of physics, of chemistry, and of biology, as he needs, before he commenced his special medical studies. . . . .

"Methuselah might, with much propriety, have taken half a century to get his doctor's degree; and might, very fairly, have been required to pass a practical examination upon the contents of the British Museum, before commencing practice as a promising young fellow of two hundred, or thereabouts. But you have four years to do your work in, and are turned loose, to save or slay, at two or three and twenty.

"Now, I put it to you, whether you think that, when you come down to the realities of life—when you stand by the sick-bed, racking your brains for the principles which shall furnish you with the means of interpreting symptoms, and forming a rational theory of the condition of your patient, it will be satisfactory for you to find that those principles are not there—but that, to use the examination slang which is unfortunately too familiar to me, you can quite easily 'give an account of the leading peculiarities of the *Marsupialia*,' or 'enumerate the chief characters of the *Compositæ*,' or 'state the class and order of the animal from which Castoreum is obtained.'

Next in order the endowment of research was dealt with as follows :—

"If a student of my own subject shows power and originality, I dare not advise him to adopt a scientific career; for, supposing he is able to maintain himself until he has attained distinction, I cannot give him the assurance that any amount of proficiency in the Biological Sciences will be convertible into, even the most modest, bread and cheese. And I believe that the case is as bad, or perhaps worse, with other branches of science. In this respect Britain, whose immense wealth and prosperity hang upon the thread of applied science, is far behind France, and infinitely behind Germany. . . . .

"Great schemes for the endowment of research have been proposed. It has been suggested, that laboratories for all branches of physical science, provided with every apparatus needed by the investigator, shall be established by the State; and shall be accessible, under due conditions and regulations, to all properly qualified persons. I see no objection to the principle of such a proposal. If it be legitimate to spend great sums of money on public libraries and public collections of painting and sculpture, in aid of the man of letters, or the artist, or for the mere sake of affording pleasure to the general public, I apprehend that it cannot be illegitimate to do as much for the promotion of scientific investigation. To take the lowest ground, as a mere investment of money, the latter is likely to be much more immediately profitable. To my mind, the difficulty in the way of such schemes is not theoretical, but practical. Given the laboratories, how are the investigators to be maintained? What career is open to those who have been thus encouraged to leave bread-winning pursuits? If they are to be provided for by endowment, we come back to the college fellowship system, the results of which, for literature, have not been

so brilliant that one would wish to see it extended to science; unless some much better securities than at present exist, can be taken that it will foster real work.

"In the meanwhile, there is one step in the direction of the endowment of research which is free from such objections. It is possible to place the scientific inquirer in a position in which he shall have ample leisure and opportunity for original work, and yet shall give a fair and tangible equivalent for those privileges. The establishment of a faculty of science in every university, implies that of a corresponding number of professorial chairs, the incumbents of which need not be so burdened with teaching as to deprive them of ample leisure for original work."

Finally, the system of teaching and examination came under review:—

"But supposing the professorial forces of our university to be duly organized, there remains an important question, relating to the teaching power, to be considered. Is the professorial system—the system, I mean, of teaching in the lecture-room alone, and leaving the student to find his own way when he is outside the lecture-room—adequate to the wants of learners? In answering this question, I confine myself to my own province, and I venture to reply for physical science, assuredly and undoubtedly, No. As I have already intimated, practical work in the laboratory is absolutely indispensable, and that practical work must be guided and superintended by a sufficient staff of demonstrators, who are for science what tutors are for other branches of study. And there must be a good supply of such demonstrators. I doubt if the practical work of more than twenty students can be properly superintended by one demonstrator. If we take the working day at six hours, that is twenty minutes apiece—not a very large allowance of time for helping a dull man, for correcting an inaccurate one, or even for making an intelligent student clearly apprehend what he is about. And, no doubt, the supplying of a proper amount of this tutorial, practical teaching is a difficulty in the way of giving proper instruction in physical science in such universities as that of Aberdeen, which are devoid of endowments; and, unlike the English universities, have no moral claim on the funds of richly endowed bodies to supply their wants.

"Examination—thorough, searching examination—is an indispensable accompaniment of teaching; but I am almost inclined to commit myself to the very heterodox proposition that it is a necessary evil. I am a very old examiner, having, for some twenty years past, been occupied with examinations on a considerable scale, of all sorts and conditions of men, and women, too,—from the boys and girls of elementary schools to the candidates for honours and fellowships in the universities. I will not say that, in this case as in so many others, the adage, that familiarity breeds contempt, holds good; but my admiration for the existing system of examination and its products, does not wax warmer as I see more of it. Examination, like fire, is a good servant, but a bad master; and there seems to me to be some danger of its becoming our master. I by no means stand alone in this opinion. Experienced friends of mine do not hesitate to say that students whose career they watch, appear to them to become deteriorated by the constant effort to pass this or that examination, just as we hear of men's brains becoming affected by the daily necessity of catching a train. They work to pass, not to know; and outraged science takes her revenge. They do pass, and they don't know. I have passed sundry examinations in my time, not without credit, and I confess I am ashamed to think how very little real knowledge underlay the torrent of stuff which I was able to pour out on paper. In fact, that which examination, as ordinarily conducted, tests, is simply a man's power of work under stimulus, and his capacity for rapidly and clearly producing that which, for the time, he has got into his mind. Now, these faculties are by no means to be despised. They are of great value in practical life, and are the making of many an advocate, and of many a so-called statesman. But in the pursuit of truth, scientific or other, they count for very little, unless they are supplemented by that long-continued, patient 'intending of the mind,' as Newton phrased it, which makes very little show in examinations. I imagine that an examiner who knows his students personally, must not unfrequently have found himself in the position of finding A's paper better than B's, though his own judgment tells him, quite clearly, that B is the man who has the larger share of genuine capacity.

"Again, there is a fallacy about examiners. It is commonly supposed that anyone who knows a subject is competent to teach it; and no one seems to doubt that anyone who knows a subject is competent to examine in it. I believe both these opinions to be serious mistakes; the latter, perhaps, the more serious of the two. In the first place, I do not believe that any one who is not, or has not been, a teacher is really qualified to examine advanced students. And in the second place, examination is an art, and a difficult one, which has to be learned like all other arts.

"Beginners always set too difficult questions—partly because they are afraid of being suspected of ignorance if they set easy ones, and partly from not understanding their business. Suppose that you want to test the relative physical strength of a score of young men. You do not put a hundredweight down before them, and tell each to swing it round. If you do, half of them won't be able to lift it at all, and only one or two will be able to perform the task. You must give them half a hundredweight, and see how they manœuvre that, if you want to form any estimate of the muscular strength of each. So, a practised examiner will seek for information respecting the mental vigour and training of candidates from the way in which they deal with questions easy enough to let reason, memory, and method have free play.

"No doubt, a great deal is to be done by the careful selection of examiners, and by the copious introduction of practical work, to remove the evils inseparable from examination; but, under the best of circumstances, I believe that examination will remain but an imperfect test of knowledge, and a still more imperfect test of capacity, while it tells next to nothing about a man's power as an investigator."

PRESENTATION TO MR. ARCHIBALD PATERSON, CHEMIST, GLASGOW.

A number of the friends of Mr. A. Paterson entertained him to supper in the Waverley Hotel, on Friday evening, the 6th inst., on the occasion of his leaving the firm of W. and R. Hatrick and Co., wholesale druggists, to commence business on his own account in Govan. Dr. A. M. Robertson occupied the chair, and Mr. Jas. L. Hatrick acted as Croupier. After supper, and the usual loyal and patriotic toasts had been proposed and responded to, the Chairman, in proposing the toast of the evening, "The Health of Mr. Paterson," delivered an appropriate speech, and concluded by handing to Mr. Paterson an address and a purse of sovereigns, in the name of a large number of subscribers. The toast was drunk with enthusiasm, Mr. Paterson replying in feeling terms.

The other toasts were—"The Drug Trade," proposed by the Croupier, and acknowledged by Mr. James M. Fairlie; "The Glasgow Chemists and Druggists' Association," proposed by Dr. Moffat, and acknowledged by Mr. Jos. A. Clarke (Secretary); "The Medical Profession," by Mr. J. L. Hatrick, acknowledged by Dr. Thomas Dryden Moffat; "The Ladies," by Mr. J. R. Sutherland, acknowledged by Mr. Dunn; "The Chairman," by Mr. Paterson, and "The Croupier," by Mr. J. McMillan.

The evening was spent in a most agreeable manner.

The Pharmaceutical Journal.

SATURDAY, MARCH 14, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE AMENDMENT OF THE ADULTERATION ACT.

THERE is now a wide-spread feeling existing that the Adulteration Act will require considerable and careful revision if it is to escape the fate of becoming a dead letter through the impossibility of outliving the numerous absurdities which crop up in connection with it from day to day. Therefore, although the inconveniences suffered in connection with it by pharmacists have hitherto been rather those of apprehension than otherwise, it will doubtless have been noted with satisfaction that at the last Council Meeting of the Pharmaceutical Society the Parliamentary Committee was requested to consider the objectionable points of the Act as affecting chemists and druggists, with the view of bringing them before the Government and urging the necessity of their amendment. The time is none the less opportune in that the Marquis of SALISBURY, who showed his interest in the subject by taking charge of the present Act whilst it was passing through the House of Lords, is a member of the Government to whom the objections will be submitted.

Such a step must not be construed as showing any sympathy with those who are rightly convicted of adulterating their goods. As Dr. VOELCKER remarks, in the valuable paper which we print in another part of the present number, the honest dealer has nothing to fear from having what he supplies examined. The danger is, that frequently the case has to be decided by an authority as ignorant of the subject "as a new born babe," assisted by an analyst positive in proportion to his ignorance and inefficiency. Among other defects of the Act, many of its provisions are obscure. Mr. Justice BLACKBURN has said of one section that "it was so drawn that it was difficult to say what it meant." Others involve hardships that have repeatedly drawn from magistrates the semi-apology that they are compelled to administer the law as they find it. It is not, therefore, surprising that the answers to the questions recently submitted by the Council to the late ATTORNEY-GENERAL and his colleagues, were of such a nature that their publication was thought to be more likely to mislead members of the trade than to give them really useful information.

Notwithstanding this, a medical contemporary says that the account of the proceedings does not read as if the ATTORNEY-GENERAL'S opinion was highly favourable to the practice of selling adulterated drugs, and that the cautious reticence of the Council may perhaps serve as a cogent hint to chemists not to make unpleasant inquiries as to the meaning of the law, but to make their arrangements to comply with its strict letter. This is called a sensible suggestion, and a hope is expressed that it will be acted upon.

We need not say that the insinuation with regard to chemists and druggists is uncalled for by any proceedings that have hitherto taken place under the Adulteration Act. Indeed, were we inclined for a *tu quoque*, we might remind our contemporary that of the four prosecutions, which are all that have hitherto been carried to a hearing in relation to medicinal substances, that which—because of its failure—has called forth the greatest amount of indignation on the part of certain medical journals was against a medical practitioner.

But the chemists and druggists are not alone in seeking for a revision of the Act. In all parts of the country the subject is exciting considerable discussion. We learn from the *South London Press* that at a numerously attended meeting of the tradesmen of Camberwell, held last week, a resolution was carried to the effect that an Association should be formed for the purpose of assisting in carrying out the provisions of the Adulteration of Food, Drink, and Drugs Act, so that while it should effectually protect the purchaser, it might not weigh unjustly on the trader. The resolution also pledged the new Association to watch the interests of all trades in furnishing such legal assistance and competent analysts as may be necessary, and to assist the public in obtaining unadulterated articles.

The meeting recognized that the object sought by the Act was a good one, but felt that the manner in which it had hitherto been carried out was faulty. As ratepayers they objected to the heavy expenses thrown upon the rates through the blundering of persons engaged in enforcing the Act. It was considered also that there was a great difference between the retail dealer who sold the goods as he received them from the wholesale dealer, and who might have been selling an adulterated article for years without knowing it, and the one who adulterated himself, yet both were punished alike. To protect the former, and to assist in causing the punishment to fall upon the real offender, is to be the *raison d'être* of the new Association.

COCA LEAVES.

As a contribution to the information sought by Dr. Sieveking, as to whether the extraordinary virtues attributed to the leaves of *Erythroxylon Coca* might not prove available for therapeutic purposes, Mr. Alexander Bell, of Nelson in Marsden, writes (*British Medical Journal*, March 7th), that large quantities of the leaves and various preparations from them, have for some years past been imported into this country

where they have been successfully used in dyspepsia, flatulency, colic, convulsions, and in the debility following severe acute affections, anæmia, scurvy, etc. Three or four drachms of the leaves, either chewed or in infusion, or ten to fifteen grains of the hydro-alcoholic extract, are a medium dose. In large doses, it is said to cause delirium, and finally cerebral congestion. In small doses, it acts as a stimulant, facilitates digestion, and relieves the sensation of fatigue. In moderate doses, it excites the nervous system in such a manner as to render the performance of muscular exertion much easier, and producing a sensation of calmness. The above appears to be the substance of the statements made in a pamphlet published by Dr. Mantegazza, in 1859, a translation of which appeared at that time in this Journal, and was also referred to in an article that appeared in 1870. *

WASTE PIPES OF CISTERNS.

The Water Companies Act of 1872 empowers the Companies, when the arrangements for a constant supply are completed, to demand that all waste pipes from water receptacles shall discharge the overflow above ground in such a manner as to call attention to any defective points in the apparatus for regulating the supply, and thus prevent the waste of water. In a recent report to the Vestry of Marylebone parish, Dr. Whitmore points out that this regulation will also accomplish a higher and far more important object, and that by disconnecting the waste pipes with the drains, it will prevent the waste of human life. The *Medical Times and Gazette*, commenting on this report, instances a house in Harley Street, the sanitary arrangements of which were inspected in consequence of the death in it of a professional gentleman from enteric fever. The arrangements were found to be generally excellent, with the serious defect, that the waste pipes from the water-cisterns passed directly into the drains; and thus, in the event of the traps not being effective, allowed the sewer gases a ready means of access to the water.

Mr. Morson was buried on Saturday last at Highgate Cemetery. A considerable number of pharmacists attended to pay their last tribute of respect to the deceased. Besides Professor Redwood and Mr. Henry Deane, there were present, Mr. T. H. Hills (President of the Pharmaceutical Society), Mr. A. Bottle (Vice President), Mr. Williams (Treasurer), Professors Attfield and Bentley, Messrs. Sandford, Greenish, Hampson, Bremridge, Bird, Taylor, Preston, and others.

The Honorary Membership of the Ontario College of Pharmacy has been conferred on Dr. W. Handsel Griffiths, author of "Notes on the Pharmacopœial Preparations," "Posological Tables," and other works.

* Pharm. Journ., 2nd Series, vol. i. p. 616, and 3rd Series, vol. i. p. 42.

Transactions of the Pharmaceutical Society.

BENEVOLENT FUND.

Subscriptions Received During February, 1874.

London.

	£	s.	d.
Allchin, Alfred, England House, Primrose Hill Road, N.W	0	10	6
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Middleton, Francis, 338, Oxford Street, W.	1	1	0
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Peacock, George, 4, Napier Road, Kensington	0	5	0
Radermacher, C. J., 17, Albion Road, Holloway	1	1	0
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COUNTRY.

Alresford, Huggins, John	0	10	6
Aylesbury, Dickens, Rowland	0	5	0
,, Turner, John	0	5	0
Berwick, Davidson, John	0	10	6
,, Carr, William G.	0	10	6
Beverley (*Yorkshire*), Robinson, James M.	0	5	0
Bishop Stortford, Speechley, George	0	10	6
Bowness-on-Windermere, Birkett, Charles	0	2	0
Bradford, Blackburn, Bailey	1	1	0
Bristol, Jones, W. W.	1	1	0
Broseley, Stevens, John	0	10	6
Burnham (*Essex*), Ellis, William	0	5	0
Carlisle, Thompson, Andrew	0	10	6
Cirencester, Smith, Charles S.	1	1	0
,, Skinner, Thomas	1	1	0
Cockermouth, Cooper, William John	0	5	0
Colchester, Bates, T. W.	0	5	0
,, Cole, F. A.	0	5	0
,, Manthorp, Samuel	0	5	0
,, Prosser, Evan T.	0	5	0
,, Shenstone, J. B. B.	0	5	0
Colsterworth, Wing, Samuel W.	0	10	6
Dedham, Kirkman, C. J.	0	5	0
Diss, Cupiss, Francis	0	10	6
,, Gostling, Thomas P.	0	10	6
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,, Thrower, Edward A.	0	10	6
Douglas (*Isle of Man*), Beearey, William A.	0	5	0
Dublin, Simpson, Robert	0	5	0
Durham, Burdon, John, (*Claypath*)	0	10	6
,, Rollin, John G.	1	1	0
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,, Scawin and Wortley	0	10	6
Ealing, Barry, T. S.	0	10	6
Emsworth, Waters, H. G.	0	10	6
Fareham, Batchelor, Charles	0	5	0
Faringdon, Ballard, Arthur	0	10	6
Florence, Groves, Henry	1	1	0
Folkestone, Cadman, Daniel C.	0	10	6
,, Stainer, John	1	1	0
Gainsborough, Marshall, John F.	0	10	6
Grantown, Duncan, William	0	5	0
Guildford, Martin, E. W.	0	10	6
,, Shepherd, George P.	1	1	0
,, Bingley, Frederick B.	0	10	6
,, Busby, Henry H.	0	10	6
,, Thompson, Thomas	0	5	0
,, Pavitt, W. T.	0	2	6
Hampton (*Middlesex*), White, J. W.	0	5	0
Harleston, Muskett, James	0	10	6
Hartlepool, Jackson, William G.	1	1	0
Harwich, Bevan, Charles F.	0	10	6
Heckington, Sumners, M. C.	0	5	0
Honiton, Turner, George	0	10	6
Hull, Baynes, James	0	10	6
,, Balk, William	0	10	6
,, Shepherdson, Welburn	0	10	6
Huyton (*Liverpool*), Machin, F. J.	0	5	0
Hyde, Oldfield, Henry	0	10	6
Jersey, Millais, Thomas	1	1	0
,, Ereaut, John, jun.	1	1	0
Kelvedon, Watmore, James	0	4	0
Kibworth, Potter, Fanny E.	0	5	0
Kilmarnock, Rankin, William	1	1	0
,, Borland, John	0	10	6
Kingston-on-Thames Smith, Tenison (*Norbiton*),	0	10	6
Kirkintilloch, Morton, Thomas	0	2	6
Longton, Prince, Arthur G.	0	10	0
Ludlow, Cocking, George	0	5	0
,, Foster, Henry	0	5	0
,, Grieves, Herbert	0	5	0
,, Marston, Alfred	0	5	0
,, Nickson, James	0	5	0
Maldon, Wallworth, David	0	5	0
Maryport, Cockton, John	0	5	0
Merthyr, Thomas, Rees	0	5	0
Newport (*Mon.*), Gratte, Henry J.	0	5	0
,, ,, Morgan, William	0	5	0
,, ,, Phillips, John	0	10	6
,, ,, Young, John	0	10	6
,, ,, Pearman, Henry	0	10	6
,, ,, Price, George	0	5	0
,, ,, Paine, Charles	0	10	6
,, ,, Cherry, Edwin	0	10	6
,, ,, Jones, H. W. B.	0	5	0
,, ,, Faulkner, Henry	0	2	6
Northallerton, Warrior, William	0	10	0
Northampton, Barry, J.	1	1	0
Nuneaton, Iliffe, George	0	10	6
,, Lester, Henry	0	5	0
Odiham, Hornsby, John H.		10	6
Rugby, Garratt, John C.	0	5	0
,, Garratt, Samuel	0	5	0
,, Lewis, Thomas C.	0	10	6
Rye, Smith, Alfred W.	0	10	6
St. Austell, Geldard, John	0	5	0
St. Leonards-on-Sea, Thomas, Horace	1	1	0
Shrewsbury, Woodhouse, George	0	5	0
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,, Brayshay, Thomas	0	10	6
,, Bainbridge, R. R.	0	2	6
,, Salmon, William	0	5	0
Stony Stratford, Cox, Mrs. J. J.	0	10	0
Sydenham, "C. H."	0	10	6
Tenbury, Slade, John	0	5	0
Thirsk, Thompson, John	0	10	6
,, Foggett, William	0	10	6
,, Ayre, George	0	10	6
Tickhill, Crowther, Thomas	0	10	6
Uttoxeter, Woolrich, C. B.	0	10	6
Waltham Abbey, Marshall, J. A.	0	10	6
Weymouth, Cole, Walter T.	0	5	0
,, Groves, Thomas B.	0	10	6
Windsor, Squire, James	0	5	0
,, Grisbrook, Edward	0	5	0
Yarm, Reed, George	0	10	6
Ystytty, *Llanrwst*, Davies, Thomas	0	5	0

DONATION.

Merthyr, Thomas, Mrs. Rees	1	1	0

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, March 5th, 1874. Professor G. C. Foster, in the chair. After the minutes of the previous meeting had been read and confirmed, and the ordinary business of the Society transacted, a paper "On the Spontaneous Combustion of Charcoal" was read by the author, Mr. A. F. Hargreaves, in which he pointed out the best wood for charcoal for the manufacture of gunpowder, and also the best method of charring it. It appears that if it is ground too soon after being burnt the charcoal is liable to take fire spontaneously.

The other communications were, "Researches on the Action of the Copper-Zinc Couple on Organic Bodies: Part V., On the Bromides of the Olefines; Part VI., On Ethyl Bromide," by Dr. J. H. Gladstone and Mr. A. Tribe. "Researches on the Preparations of Organo-Metallic Bodies of the C_nH_{2n} Series of Hydrocarbons," by Dr. D. Tommasi. "Note on the Action of Trichloracetyl Chloride on Urea," by Messrs. R. Meldola and D. Tommasi; and "The Agglomeration of finely divided Metals by Hydrogen," by Mr. A. Tribe.

The meeting was finally adjourned until Thursday, 19th March, when there will be a lecture "On Dissociation," by Professor J. Dewar.

THE FARMERS' CLUB.

DR. VOELCKER ON MILK, ITS SUPPLY AND ADULTERATION.

At the monthly meeting of the above Club on Monday, March 2nd, an important and interesting discussion took place on the subject of milk, with especial reference to its adulteration. The subject was introduced by Dr. Voelcker in a paper, of which the following are the principal points:—

Milk may be regarded as a kind of model food. It supplies all the various elements of nutrition which are required to build up the bony frame and muscular tissue of the young, and, at the same time, supplies materials for the support of respiration and keeping up the animal heat of the body. Undiluted with water, milk is both a readily digestible and valuable, if not indispensable, article of food for children. Breeders of high-priced shorthorns know full well how essential it is to the early development of a sound and strong frame, round which the flesh and fat may be afterwards deposited in symmetrical forms, not to stint the calf in milk; and it is to be feared that the children of the artisan and the poor in towns and of the agricultural labourer in the country frequently are not nearly so well supplied with milk, both as regards quantity and quality, as the progeny of a well-cared for herd

of shorthorns, or Ayrshire or Devon cows. If it be remembered that the bodily health of the adult is affected in no small degree by the amount and quality of the food with which the infant from the time of its birth and throughout the period of childhood is fed, and also that much physical suffering might be prevented if children were not stinted in a milk diet, it is doubly desirable that the scanty allowance of milk in which the children of the poor are generally indulged should be unadulterated and of the best quality that can be procured. We hail, therefore, with pleasure the enforcement of the Food Adulteration Act, for there can be no question that before the Act came into practical operation, the milk sold alike to rich and poor in London and other large towns was watered much more generally, and to a greater extent, than it is at present in places where public analysts keep a watch over the milkman. Every honest dealer in milk entertains the same feeling with regard to the intentions of this Act, and the measure of success with which it has been carried into practice; for it cannot be to the interest of the upright dealer to have to meet the competition of the unprincipled retailer who waters his milk in the barefaced manner so prevalent in London and other towns a few years ago. The honest dealer has nothing to fear from having the milk which he supplies examined; and a wholesome check upon milk adulteration is put by the infliction of a penalty, still more by the publicity which is given to cases in which persons have been convicted of having sold adulterated milk. Nevertheless, the Food Adulteration Act requires to be carefully scrutinized, and to be revised in not a few of its details, if it is not to defeat, in a great measure, the very object for which it was passed. In carrying out legislative measures of the nature of the Food Adulteration Act great care should be taken to make provisions which shall render it impossible to inflict undeserved injury upon the honest trader. Unfortunately purveyors of milk, in not a few instances, are placed at the mercy of men whose want of practical knowledge of the various circumstances which affect the quality of milk is well matched by their inexperience and want of skill in conducting chemical operations. Numerous recent trials afford convincing proofs of the fact that the presiding magistrate at times knows as little about milk as a new-born babe, and that the greater the ignorance of the analyst the more positive he is generally in making wanton statements. No wonder, then, that the honest dealer is alarmed by the reckless operations of medical inspectors and the reports of food analysts, in consequence of which occasionally the innocent has to share the fate of the guilty. It is somewhat surprising that nothing has been done as yet, either by the dairy farmers in the country or by the proprietors of town dairies, or by the milk trade generally, to expose the arbitrary decisions which have been given in milk prosecutions during the last twelve months on the strength of analytical reports, which bear internal evidence of gross ignorance of a practical acquaintance with milk and its chemical constitution. I shall have to enter more fully upon the subject of milk adulteration, and find opportunity to show that several of the assertions which have been made by milk analysts are based on gross ignorance, and that in the interest of the fair and upright dealers, no less than in the interest of the consumer, it is desirable at once to relieve analysts who display such a degree of practical unacquaintance from their functions of food analysts. With regard to the supply of milk, we have to consider—(1), the country supply; (2), the town produce; (3), the supply of preserved or condensed milk. The question frequently asked is, Should milk be supplied exclusively from the country, or may it not be supplied equally well from town-fed cows? Another question is, Is country milk better than town produce, or *vice versâ?* And a third question is, What is the best food for milk-cows?

1. *Country Milk.*—Cows kept on nutritious grass and hay, and abundantly and exclusively supplied therewith, as a rule produce richer milk and of a finer flavour than town-fed cows. An example of such extremely rich country milk brought under my notice, produced from cows kept on very good pasture land, contained in 100 parts:—

Water	83·90
Fatty matters (pure butter)	7·62
Caseine (curd)	3·31
Milk-sugar	4·46
Mineral matter (ash)	·71
	100·00
Percentage of solid matters	16·10

Such rich country milk, however, seldom finds its way into the hands of milk dealers, nor does milk from cows fed exclusively upon grass often contain as much as 7½ per cent. of pure butter. On the contrary, if pastures are overstocked, and the herbage is naturally poor, and the food supply in consequence is insufficient to keep cows in a thriving condition, the deficiency of food tells immediately both upon the quantity and the quality of the milk. A striking instance in point came under my notice when I resided at the Royal Agricultural College, Cirencester. The cows (16 or 18) were out in September on grass, but the pasture was poor and overstocked, and hardly enough grass was grown to meet the demand for restoring the daily waste to which the animal body is subject, and the supply of food consequently was ill adapted to meet an extra demand of materials for the formation of milk. Under these circumstances I found both the morning and evening's milk very poor, as the following analyses made with average samples from the milk of all the cows will show:—

	Morning.	Evening.
Water	89·95	90·70
Fat (pure butter)	1·99	1·79
Caseine (curd)	2·94	2·81
Milk-sugar	4·48	4·04
Mineral matter (ash)	·64	·66
	100·00	100·00
Solid constituents	10 05	9·30

Here we have two practical illustrations showing how largely the quality of the milk is affected by the amount and richness of the natural pasture upon which the cows are kept. In the case of the cows kept in the rich pastures the milk contained, in round numbers, 7½ per cent. of butter; whilst the badly-fed cows, also out on grass, gave milk so poor as to yield in one instance barely 2 per cent., and in the other about 1¾ per cent. of butter. My analyses were not made with the milk-produce from a single cow, but with a fair average sample of the whole produce from some 16 or 18 cows which were milked in my presence. It thus appears that country milk may be either very rich or be very poor. Speaking generally, country milk from cows out on rather poor and overstocked pastures is poor, and compares very unfavourably with the milk from town-fed cows. According to careful records, 245,458 gallons of milk were produced in seven years by a herd, averaging 65 cows (shorthorns), or 535 gallons were produced by each cow per annum, the food being grass and hay, with roots and straw in winter. Putting 530 gallons of milk against 28 tons of this green food, we have 1lb. of milk to every 11 or 12lbs. of grass, or as nearly as possible 100 gallons of milk to every ton of hay. If the object of the dairy farmer is to produce milk for the town, it will not pay him to keep grazing dairy-stock on growing grass, and he will find it to his advantage to feed the cows in houses upon cut grass, supplemented by oil-cake meal, brewers' grains, and similar purchased food. As a matter of economy, milk can be produced as economically in or close to large towns as in the country, for any extra expense to which a town dairy-farmer may be

put is made good by the expense of carriage to the nearest railway station, and the railway charges. The advocates for the town producc of milk maintain that in warm weather a good deal of milk is spoiled during its transmission by railway. However, by observing the following simple rules country milk may be sent by rail on long journeys without spoiling even in very hot weather. 1. The milk should be drawn from the cow in the most cleanly manner, and strained through wire-cloth strainers. 2. The milk should be thoroughly cooled immediately after it is drawn from the cow. This may be done by a milk-cooling apparatus, specially constructed for rapidly cooling milk, or simply by placing the can in which it is contained in a vat of cold water, deep enough to come up to the height of the milk in the can containing it, and by using at least three times as much cold water as the milk to be cooled; the milk should be occasionally stirred until the animal heat is expelled. The milk should be cooled down as rapidly as possible to a temperature of about 55 degrees. 3. The evening's and morning's milk should be cooled down separately, and be sent in separate cans, and not mixed together if it can be avoided. 4. No milk should be kept over to deliver at a subsequcnt time. 5. The pails and strainers employed on the farm should be thoroughly cleaned, scalded in boiling water, and dried morning and night. 6. Immediately before the milk is placed in the cans they should be thoroughly rinsed with clean cold water, and great care be taken to keep the cans and milk free from dirt or impurities of any kind. When the cans are not in use they should be turned down on a rack, with the tops off. 7. Before the cans are returned to the country they should be thoroughly rinsed out with clean water and scalded with boiling water. 8. In very warm weather it is well to put the milk cooled in cans covered over with a coarse flannel casing, which may be kept wet for a considerable time.

2. *Town Produce.* As regards the quality of milk from town-fed cows, I would observe that I have had a very large experience in the examination, both of country and town-milk, and am bound to say that, as a rule, London milk, when undiluted, is considerably richer in cream than country milk. I ascribe this to the fact that cow-keepers in large towns mostly are men of business, who find it profitable not to stint their cows in food, and to supply them with a better and richer description of food than that which the ordinary run of dairy farmers provide for theirs.

3. *Preserved and Desiccated Milk.* When milk is evaporated at a low temperature, and a little sugar is added when the process of evaporation is nearly completed, the residue which is left on final evaporation on being reduced to powder constitutes a white powder with a yellow tinge, which dissolves for the greater part in boiling water. The solution resembles in appearance and taste milk, and answers pretty well as a substitute for milk for ship's use, or when fresh milk cannot be obtained. Desiccated milk, if well prepared and perfectly dried, may be kept in closed bottles for many months without undergoing any change, but it does not dissolve perfectly in water, and is deficient in the agreeable taste which characterizes good fresh milk. Usually a portion of the cream is removed before the evaporation of the milk; for if the whole milk is condensed by slow evaporation, the desiccated milk is very apt to assume, after a short time, a bad taste resembling rancid butter. The following are analyses which I made some time ago of two samples of desiccated milk:—

	No. 1.	No. 2.
Moisture	4·06	1·78
Fat (pure butter)	8·73	16·32
Caseine	20·25	20·37
(containing nitrogen)	(3·24)	(3·26)
Phosphate of lime and magnesia	2·34	2·33
Alkaline salts	2·48	2 91
(containing phosphoric acid)	(0·26)	(0·31)
Sugar	62·14	56·29
	100·00	100·00

The second sample, it will be seen, contains nearly twice as much fat (pure butter) as the first, which was evidently produced from skim-milk. The sample No. 1 had a nice taste, and, notwithstanding the deficiency of butter, was a superior preparation in comparison with the second sample, which had a disagreeable taste of rancid butter. A much better description of concentrated milk has been prepared for a good many years past in America, under Borden's patent, and a few years since an American Company—the Anglo-Swiss Condensed Milk Company—has established a factory at Cham, near Zug, in Switzerland, for the production of pure Swiss preserved milk. This company, with a capital of £12,000, employs about sixty operatives in the factory. The number of cows hired for the year is 1440, and the average amount of condensed milk prepared daily during each of the 365 days of the year is 110 cases, of four dozen each of 1lb. cans; these equal 1,927,200 cans as the product of the year. The price of the crude milk is about 2*d.* per quart; and the daily cost of the tins or cans made at this establishment amounts to £16 10*s.* About one-half of the product is sent direct to London, where one-half is consumed, while the remainder goes for ships' stores, is exported to the colonies, and sent to the provincial towns of England. One-half of the produce not sent to London is distributed over Germany, and there is some demand from France and Russia. The milk is evaporated down *in vacuo* at a uniform temperature of 160 deg. Fahr., with the addition of the best refined white sugar, until it reaches the consistency of thick syrup or honey. It takes about seven hours to condense the milk, 75 per cent. of its original bulk in water being driven off. The condensed milk thus prepared has been preserved in good condition for years. Mixed with three to four pints of water it readily dissolves, yielding a somewhat sweet but agreeably tasting fluid, having a flavour of boiled milk. It consists of nothing but cows' milk and the best white sugar, and is well adapted for use during long voyages and in all other situations where good cows' milk is not readily procurable. A sample of preserved milk prepared by the Anglo-Swiss Company on analysis yielded the following results in my laboratory:—

Water	24·89
Fat (pure butter)	8·36
Caseine (curd)	10·15
(containing nitrogen)	(1·624)
Milk and cane-sugar	54·18
Mineral matter (ash)	2·42
	100·00

About one-half of the solid substances of the condensed milk consists of sugar added in the process of condensation. The remainder consists of butter, caseine, milk, sugar, and ash constituents. It is but right to state that the analyses of other samples of preserved milk prepared by the Anglo-Swiss Company show about ten per cent. of butter and somewhat less water than I found in the sample analysed by me. Those who take a special interest in the manufacture of condensed milk will find a full account in a highly interesting paper, illustrated by many woodcuts giving a full description of the necessary apparatus and the processes of manipulation, by Mr. X. A. Willard, of Kerkimer, New York, published in vol. xv., new series, part 1, 1872, of the Journal of the Royal Agricultural Society of England. The success of the Anglo-Swiss Company naturally created competition. Condensed milk factories were established at Gruyères and half-a-dozen other places in Switzerland, in Bavaria, in Holstein, in Ireland, and in England; but failing to produce first quality preserved milk, and wanting in prestige and other causes, they have ceased to manufacture, with the exception of Mr. Newman's Irish condensed milk factory at Mallow, near Cork, and the English Condensed Milk Company, whose works are at Aylesbury, Buckinghamshire.

Food appropriate for producing much and good Milk.—

The influence of food on the quality of milk is very striking. A half-starved cow yields but little milk and poor milk. On the other hand, the liberal supply of peas or bean-meal, or oil-cake, and other food rich in nitrogenous and phosphatic elements of nutrition, tells directly, both on the quality and quantity of the milk. The finest flavoured milk and butter are produced by cows fed in summer entirely on grass and rich permanent pastures, and in winter on nothing else but hay, made of fine sweet grass. Turnips yield a watery milk, and are objectionable, on account of the turnipy flavour which they give to the milk. Mangolds are less objectionable, but should not be given to milk-cows without an allowance of 3 to 4lbs. of meal per head. Of all kinds of meal, none is equal in milk-producing properties to bean or pea-meal—a fact which finds a ready explanation in the circumstance that bean or pea-meal contains on an average from 25 to 28 per cent. of nitrogenous constituents, or the same class of compounds to which the curd of milk belongs, and that it is likewise rich in phosphates or bone-earths, in which milk abounds. Egyptian lentils answer equally well with bean-meal, for they resemble intimately in composition beans or peas. Linseed-cake produces much and rich milk, but unless it is pure and fresh cake of the finest description, it seriously injures the quality of the milk. Fine decorticated cotton-cake is both rich in fat and in nitrogenous constituents, and like all food rich in nitrogen it also contains a large proportion of phosphates, and is thus admirably well adapted for milk-cows. Rape-cake is likewise an excellent food for milk-cows, provided it is free from an undue admixture of wild-mustard seed, which frequently occurs in rape-cake made from Indian seed to an extent which renders it perilous to stock. The best rape-cake is green German rape or Rubsen cake, one of the cheapest and best concentrated kinds of food that can be given to milk-cows. Bran or pollard, as is well known, produces good and rich milk. Nothing can be better as an auxiliary winter food for milk-cows than 4lb. of bran made into a thin mash, to which about 3 to 4lb. of bean-meal is added. Along with this about 25lb. of mangolds, and a due proportion of hay or hay and straw chaff will supply a food-mixture which produces much and first-quality milk. Brewers' grains are the staple food in town-dairies, and they are much more nutritious than their appearance seems to warrant. Even in the wet condition in which they are obtained from the breweries, and holding from 75 to 77 per cent. of water, they contain a fair proportion of ready-made fat and flesh forming matters. Desiccated grains contain from 7 to 8 per cent. of oil, and about 18 per cent. of nitrogenous compounds. Dried brewers' grains make good milk, and are fully as valuable as a food for milk-cows as barley-meal. Another useful and, comparatively speaking, cheap food for milk-cows is palm-nut meal, but its quality and value differ greatly. The best palm-nut meal contains 19 to 20 per cent. of oil and fat, and is made from the partially-expressed kernels of the palm-nut; its value as a food for fattening stock or for milk-cows depends principally upon the proportion of fatty matter which is left in the meal. The fatty matter in palm kernels is a white, agreeably tasting fat, of almost the same consistency as butter.

A good deal has been said and written for and against feeding milk-cows upon sewage grass. One the one hand, sewage-grass has been praised as the most nutritious kind of grass for milk-cows; and, on the other, the adversaries to all schemes of applying sewage to land have endeavoured to prejudice the public mind by denouncing the produce from grass land irrigated by sewage as innutritious and a highly dangerous food for milk-cows. Like all very succulent produce, the grass from sewaged land is more watery, and, in consequence, not so nutritious as the produce from rich permanent pastures. It is, nevertheless, a most acceptable food to the dairy-farmer, who usually gives along with it to his cows some bean or other descriptions of meal or auxiliary concentrated food, and, under proper management, there is not the slightest ground for suspecting that sewage-grass when given to milk-cows will render the milk they yield unwholesome or dangerous to the youngest child. If sewage could not be usefully applied to Italian rye-grass to be turned into milk and butcher's meat, all sewage-irrigated schemes would long ago have fallen to the ground. Convinced as I am that the produce from a properly managed sewage-farm supplies an increased amount of good and wholesome food, the greater part of which is especially useful to cow-keepers, I can only express the hope that all town authorities, who at present allow large quantities of plant-food to run to waste, polluting our rivers and watercourses, will ere long set apart a portion of land, if such can be found appropriate for sewage irrigation, on which Italian rye-grass, cabbages, and mangolds can be raised in large quantities by means of sewage, for the special advantage of cow-keepers, and the benefit of the community at large.

Milk Adulteration.—Milk is a whitish liquid of an agreeable, sweetish taste, and faint but pleasant odour, depending in some measure upon the nature of the food upon which the cows are fed. It is essentially an emulsion of fatty particles in a solution of caseine and sugar of milk. The fatty matter is not contained in milk in a free state, but enclosed in little cells of caseine, which occurs also in milk in a state of solution, and is precipitated spontaneously as curd when milk gets sour. Viewed under the microscope, milk appears as a transparent fluid, full of small, round, or oval, and more or less angular bodies—the so-called milk globules. When milk is left undisturbed for some time, these milk globules rise to the surface, forming the cream of milk. Skim-milk has a bluer colour, and is more transparent than new milk, containing its full share of milk globules or cream or butter globules. The amount and quality of the food given to cows exercises a most remarkable influence on the quality and composition of milk. Besides this, the season of the year, distance from the time of calving, the breed and size of the cows, and several other circumstances which will suggest themselves to practical men, have a greater or less influence on the yield of milk and its quality. When residing at Cirencester College, with a view of ascertaining what may be the variations in the course of a year in the quality of milk on one and the same farm, I took samples of the milkings of all our milch cows, and analysed the morning's and evening's milk of the first or second day of each month. The milch cows were out at grass from May till the end of October, and as the herbage then became so scarce as not to afford sufficient nourishment, they were fed in the evening at the stall on roots and hay, &c. It will be seen by the appended analyses that both the morning's and evening's milk in September were extremely poor. The poverty of this milk was therefore evidently due to an insufficient supply of food. The milk produced on two other farms in the neighbourhood during the same month, on being analysed, was found to contain 12½ per cent. of solid matter, including 3½ per cent. of fat (pure butter), and the same percentage of curd; showing that on both farms where the cows were supplied with a sufficient amount of nutritious food, the milk was of good quality, whereas on the College farm the scanty supply of poor grass had the effect of producing poor milk, containing 90 per cent. of water, and only 2 per cent. of fat. The influence of food on the quality of milk was also clearly visible in the cows of the College farm. On account of the insufficiency of the grass, the cows were driven into the stall and there supplied with roots, hay, and meal. The milk became better at once, for the morning's yield then contained 12½ per cent. of solid matter, and in this nearly 4 per cent. of butter. The concentrated food which the cows received in the evening was evidently made into good rich milk during the night. At this time the cows were put on grass early in the morning and allowed to pick up what they could. This was not much, as their anxiety in the evening to be let into their stalls clearly showed. The influence of a stinted supply of grass

was noticed at once in the poverty of the evening's milk. The percentage of solid matter fell to $9\frac{2}{3}$ instead of $12\frac{1}{2}$ per cent., and the butter to 3 instead of 4 per cent. I would direct especial attention to the fact that these analyses were not made with milk of a single cow, but that of the whole herd, and as the milch cows were kept entirely for the use of the College, there can be no question as to the genuineness of the supply.

COMPOSITION OF MORNING AND EVENING'S MILK PRODUCED ON THE ROYAL AGRICULTURAL COLLEGE FARM, CIRENCESTER.

		Percentage of					
		Water.	Butter (pure fat).	Caseine and Albumen.	Milk-sugar.	Mineral Matters. (ash.)	Nitrogen.
January	Morning	87·70	2·60	2·94	5·82	·94	·47
	Evening	87·40	2·28	2·87	6·56	·89	·46
February	Morning	87·50	2·58	3·44	5·44	1·04	·55
	Evening	86·40	3·53	3·37	5·56	1·14	·54
March	Morning	88·60	2·71	2·43	5·35	·91	·39
	Evening	88·16	2·96	2·62	5·55	·77	·42
April	Morning	87·50	3·15	2·94	5·60	·81	·47
	Evening	89·00	2·47	2·69	5·08	·76	·43
May	Morning	88·20	2·42	3·12	5·49	·77	·50
	Evening	87·80	2·71	2·87	5·85	·77	·46
June	Morning	87·30	3·05	3·00	5·89	·76	·48
	Evening	87·30	2·94	2·87	6·05	·84	·46
July	Morning	88·70	2·22	2·94	5·38	·76	·47
	Evening	87·80	3·61	2·81	5·10	·68	·45
September	Morning	89·91	1·99	2·94	4·48	·64	·47
	Evening	90·70	1·79	2·81	4·04	·63	·45
October	Morning	87·60	3·90	2·87	4·84	·79	·47
	Evening	90·30	2·99	2·37	3·76	·58	·38
November	Morning	87·10	3·41	2·94	5·41	1·14	·47
	Evening	86·20	3·78	3·19	5·68	1·15	·51
December	Morning	86·70	3·74	2·87	5·92	·77	·46
	Evening	86·00	4·12	3·62	5·46	·80	·58

I have alluded specially to these variations in the quality of milk as influenced by food, because some statements have lately appeared in a little work on milk analysis written for the special benefit and instruction of food-analysts, "a new class of men," which has lately been "constituted to watch over the food of the country." I leave it to you to form your own opinions from the following extracts taken from this treatise. According to the author, country milk of average quality contains in 100 parts by weight:

Water	87·55
Fat	3·08
Caseine	4·04
Milk-sugar	4.62
Ash	·71
	100·00

Town-fed milk, according to his analysis, contains in 100 parts by weight:

Water	85·94
Fat	4·00
Caseine	5·02
Milk-sugar	4·31
Ash	·73
	100·00

It will be seen that the latter milk shows a difference of one-third more of fat and one-quarter more than the amount of caseine contained in the former, and a corresponding smaller amount of water. These differences are sufficiently striking to show, at all events, that milk has not a uniform composition. Nevertheless, our author says, "Milk exhibits great constancy of composition; the effect of variations in the diet of the cow showing itself in the amount of the secretion, rather than in its quality;" and again, "As will be readily comprehended, this constancy of composition is a cardinal fact in milk analysis. If milk were variable in strength, as urine is, chemical analysis would fail to detect the watering of milk. That milk is a secretion of constant, or only slightly varying, composition, lies at the very root of the subject of this treatise." In the face of the evident contradictions between the facts given and the opinions expressed by this same author, I think I need not detain you by criticizing other portions of the treatise, but leave you to draw your own conclusions as to the value of the frequent use he makes of what he calls "normal milk." One might as well talk of a "normal potato," or a "normal cabbage," or a "normal pig." On passing along on the top of an omnibus a short time ago, I was somewhat amused at seeing an advertisement of a wine merchant of his "standard sherry," and I am surprised that standard or "normal" milk is not advertised, as it might be with quite as much reason as "standard sherry." A great deal has been said and written about milk adulteration. Sheep's brains, starch, chalk, and pipe-clay are said—on what authority nobody has ever decided—to have been found in milk; but the basis for these statements exists only in the imagination of credulous or half-informed scientific men, who, in want of more profitable occupation, take to book-writing. It would be difficult to understand where all the sheep's brains should come from; nor is it probable that chalk or other insoluble substances not easily kept in suspension, should be employed in adulterating milk. I have never found myself, nor have I ever met any chemist who has found, any of the clumsy adulterations often referred to in popular treatises on food. Milk adulteration resolves itself into one of two things—either the addition of water, or the abstraction of cream; and the question which naturally arises is, Can we detect to a nicety how much water has been added or how much cream has been abstracted from a given sample? I have, perhaps, had as much experience in the examination of milk as anybody in England, and I fearlessly say that, owing to the natural variations in milk, it is utterly impossible in all cases to ascertain whether a small quantity of cream has been removed from milk, or an inconsiderable proportion of water has been added to it; and I further maintain that it is a reckless proceeding on the part of any analyst to assert that milk has been adulterated with exactly 8 per cent. of water, or with 13·75 per cent. of skimmed milk, as in one case, or with 16·25 per cent. as in another. Such assertions can only be made by young and inexperienced men, for whose special instruction such milk treatises as I have above referred to are compiled. No wonder that men who entertain such inconsistent views of "normal milk" should be led to give reports in which they positively assert that they have found 16·25 per cent. of skimmed milk, because the amount of fat did not come up to their standard by a few decimals. I may state, in passing, that in a recent case the milkman, who was accused of selling milk adulterated with 16·25 per cent. of skimmed milk, was fined in the "mitigated penalty of £5," with the alternative of ten days in gaol. In the course of the trial testimony was given by a worthy town councillor, who had carried on business as a temperance hotel-keeper, that the accused had been known to him for the last twenty years, and had during the whole of that time supplied him with milk. He further expressed his opinion that no better milk was to be obtained than that of the accused, against whom he had never known any complaint. A well-known chemist, moreover, was called for the defence, and, on the strength of the analysis, he pronounced the milk to be of the quality of good ordinary country milk, quoting, in support of his opinion, no less an authority than the late Professor Johnstone, but apparently to no purpose, because the amount of fat contained in the milk differed in a trifling extent from what the food analyst conceived to be the amount contained in "normal milk." A medical man, called in support of the prosecution, gravely stated that milk containing 16·25 per cent. of skimmed milk would be prejudicial to the health of the very young, although its effects would be hardly appreciable on an adult. Instances of this kind would be

very ludicrous but for the serious consequences involved, and the injustice which, no doubt, is frequently dealt to honest dealers. Let it, however, be clearly understood that I have no intention of throwing cold water upon the system of chemically examining milk. All I desire to show by these observations is, that milk analyses should be conducted by men upon whose practical experience and acquaintance with the subject reliance can be placed. Chemical analysis can do much in the way of revealing adulteration of food, and there is no difficulty in discovering whether milk has been skimmed or watered to any great extent. As the result of my own experience, I may state that milk may be considered rich when it contains from 12 to 12½ per cent. of solid matters, 3 or 3½ of which are pure butter. If it contains more than 12½ per cent. of solid matter and has 4 per cent. or more of fat, it is of extra rich quality. Such milk usually throws up from 11 to 12 per cent. of cream (by bulk) after standing for 12 hours at 62 degrees Fahr., and it has a specific gravity varying from 1·028 to 1·030. Good milk of fair average quality, as has been stated already, contains from 10½ to 11 per cent. of dry matter, including about 2½ per cent. of pure fat. It yields 9 to 10 per cent. of cream, and has a specific gravity of about 1·030. Poor milk contains 90 per cent. or more water, and has a lower specific gravity than 1·027. Such milk does not yield more than 6 to 8 per cent. of cream. Skimmed milk throws up still less cream, has a bluer colour, and is more transparent, and when undiluted with water has a slightly higher specific gravity than new milk. Good skimmed milk has a specific gravity of about 1·033, and poor skimmed milk 1·028 to 1·030. Milk purposely watered yields only 5 to 6 per cent. of cream, and invariably has a lower specific gravity than 1·025. If milk is both skimmed and watered, it yields less than 4 per cent. of cream, and possesses as low a specific gravity as 1·025 to 1·026. A great many experiments have led me to the conclusion that within certain limits the specific gravity is the most trustworthy indicator of quality. Some of the objections to the use of hydrometers or instruments for taking with accuracy the specific gravity of milk, are based on the mistaken opinion that cream is lighter than water. This, however, I have ascertained is not the case. Cream, I find, is lighter than milk, but denser than water, in the proportions of 1012, or even 1019 to 1000. The addition of cream, therefore, cannot depress the specific gravity of milk in the same degree as the addition of water. A low specific gravity thus always indicates a large proportion of water ; at all events, I find that milk rich in butter is of a specific gravity a good deal higher than milk adulterated with even a little water. Some years ago I made some accurate gravity determinations of pure milk before and after skimming, and of samples mixed purposely with 10 to 50 per cent. of water.

	Sp. gr. at 62° Fahr. Before Skimming.		Sp. gr. at 62° Fahr. After Skimming.
Pure milk	1·0314	.....	1·0337
With 10 per cent. water	1·0295	.....	1·0308
With 20 per cent. water	1·0257	.....	1·0265
With 30 per cent. water	1·0233	.....	1·0248
With 40 per cent. water	1·0190	.....	1·0208
With 50 per cent. water	1·0163	.....	1·0175

It appears from these results that good pure milk has a specific gravity of 1·030; skimmed milk being a little higher; and, further, that milk, having a specific gravity as low as 1·025, is either mixed with water or is naturally very poor. If the gravity should sink to 1·023 or less, it is unmistakably mixed with a considerable quantity of water. A useful instrument for approximately determining the percentage of cream is a graduated glass tube, at the top of which the cream may be allowed to collect, and its quantity may be read off. There can be no doubt about the fact that, before the late Adulteration Act, the milk of London was shockingly adulterated, and it was high time that a check should be placed upon the malpractices of milk-dealers. I am, however, anxious that the Act should not become ridiculous in the eyes of a discriminating public, for several recent milk-prosecutions have shown that the wisdom of the wise (food analysts) in more than one or two instances is truly foolishness, even in the sight of any ordinary dairyman. I should advise rigorous prosecution in every case of flagrant or unmistakable adulteration ; but whilst those entrusted with the enforcement of the Act draw the line so finely as they too frequently do at present, between pure milk and that which has been tampered with, serious mistakes must and will necessarily arise, to the discredit of all concerned in the matter, and sometimes, perhaps, to the irrecoverable loss of the reputation of an innocent man.

Parliamentary and Law Proceedings.

Poisoning by a Lotion.

Mr. F. Price, coroner, has held an inquest, at Salford, touching the death of Mary Cooper, 52 years of age. Deceased, who was the wife of an operative dyer, had been ailing for about 12 months, and had been attended by Dr. Cran. She had had several bottles of medicine, and on Friday morning previous to her death her son fetched her a bottle from Dr. Cran's surgery. After tasting the contents, deceased's husband said, "It's very hot ;" to which she replied, "Never mind, if it will do me good." The doctor did not say that he would send her a lotion to rub her legs with, and thinking the medicine was to be taken internally, the husband gave her a tablespoonful. This was about half-past 11 o'clock on Friday forenoon, and in about 10 minutes afterwards deceased complained of feeling very queer. Cooper then examined the bottle, and took it back to the surgery. Dr. Cran was out, but having told Mrs. Cran of what had happened, the doctor visited deceased as soon as he returned home, between 12 and 1 o'clock the same day. Deceased, who was at times insensible, died at 2 o'clock on Monday morning.

Dr. James Cran, Regent Road, said he had attended deceased since Christmas. She was suffering from general debility and rheumatic pains in her legs. He saw her on Thursday, and said he would send her a lotion to rub her legs with. He generally told his patients when he intended to send poison as a lotion, but did not recollect whether he took that precaution in this instance. He prepared a lotion for deceased containing liniment of belladonna and aconite in equal proportions. They were both strong poisons, and the bottle was labelled "poison." On learning that deceased had taken some of the lotion he visited her, and endeavoured to administer an emetic, but found she could not swallow it. He then sent for Dr. C. Clarke, and the emetic was administered by means of a stomach-pump. It had the effect of making deceased vomit, but she still suffered from the effects of the poison, two teaspoonfuls of which were more than sufficient to cause death.

The jury returned a verdict to the effect that deceased died from taking a poisonous lotion inadvertently administered by her husband.—*South London Press.*

Poisoning by Arsenic.

A remarkable case of poisoning is reported to have occurred at Thursley. A family named Coombes were seized with alarming symptoms of virulent poisoning, which were followed by the deaths of the father, mother, and three children. An inquest on these bodies was held on Monday afternoon, at the Half Moon Inn, Thursley, before Mr. George H. Hull, the coroner for West Surrey. Three other members of the family at the time of the visit of the jury were lying in a hopeless state, all suffering from poisoning symptoms. Since that date, however, the medical man in attendance has written to the *Times* stating

that he has hopes of their recovery. The coroner having taken evidence to identify the bodies, Sergeant Bundy, of the Surrey County Constabulary, stated that he had discovered that the father of the family had brought from the farm, on which he worked as a shepherd, a bucket holding about two gallons and a half, which had contained for a long period a composition for dressing sheep. This bucket he had washed out, and it had been used as a receptacle for containing the water drawn from the well for the use of the family. The bucket had been taken to Dr. Stevenson, the county analyst, who had found that it was impregnated with arsenic to such a degree as to make it dangerous for use as a receptacle for water. The coroner adjourned the inquest for a week.

Prosecutions under the Adulteration Act.

ADULTERATED BUTTER.

At the Axbridge Petty Sessions, held last week, Emma Ham was summoned for wilfully admixing with butter an injurious ingredient, viz., a large proportion of common fat and colouring matter.

Mr. Bailey appeared for the defendant, and pleaded not guilty.

A girl stated that on the 29th ult. she went to the defendant's premises for half a pound of butter. Whilst there she saw the defendant mixing up butter in a pan. In the pan was water and some white matter, but she did not know what. Mrs. Ham made her up the butter from the pan whilst waiting.

Cross-examined by Mr. Bailey: She saw some butter on the flats; it was made up into half pounds. There was white stuff in the pan; it might have been butter.

Mr. Bailey, prior to calling any witness, said, according to the Act, it must be proved that the defendant mixed and sold butter similar to that now produced, which had been analysed.

The case was briefly discussed by the magistrates, and ultimately the charge was withdrawn.

There was a second summons issued against defendant, charging her with selling adulterated butter. The deposition taken above was used as evidence in this case.

Superintendent Gillbanks informed their worships that he received the butter produced from Elizabeth Hembry, grandmother to the girl, on the 9th inst. He had sent it to Mr. Stoddart, county analyst, and received an answer to the effect that the butter sent him for analysis was the worst that had come under his notice, one-fourth of it being common fat and colouring which the analyst considered to be injurious.

Mr. Bailey contended that prior to conviction, it must be proved that the butter was adulterated to the knowledge of defendant.

The Bench overruled the point, adding, that if they took such meaning of the Act, there could be no stop put to adulteration.

For the defence, a sister of the defendant, who was in the house at the time of the butter being supplied to the girl Hembry, said she saw nothing mixed with the butter.

Mr. Bailey said the husband was a large butter dealer, and that if the butter sold was adulterated, it was so done prior to being brought to his house.

The Chairman thought it an extremely bad case. Defendant was liable to a heavy penalty, but the Bench would mitigate the fine to £5, and all costs.

ALLEGED ADULTERATION OF MILK.

At Wolverhampton, on the 27th February, Mr. John Rudler, appeared before Mr. J. Spooner, the Stipendiary Magistrate, charged with selling adulterated milk. Mr. Cartwright appeared for the prosecution, Mr. Dallow defended. Captain Segrave proved that he delivered a sample of milk obtained from the defendant to Mr. W. L. Scott for analysis. Mr. Scott, who said he was analyst for the northern division of Staffordshire, for the county of Derby, and for the borough of Hanley, deposed to receiving from Captain Segrave the bottle of milk produced. Witness analysed a portion of it, and gave his report to Mr. Dallow. Mr. Dallow produced the report. Mr. Spooner cautioned the witness that in any future case of this kind his report must be delivered to the court, and to no other living being. His worship read the clause of the Act bearing upon this point. Mr. Scott, continuing his evidence, said he examined the milk very particularly; and in the first instance he found it extremely sour. That would affect the analysis. In his opinion there was no adulteration whatever. Mr. Spooner: Did you test the milk as an independent analyst, or as acting on the part of the defendant? Witness: I treated the matter upon a perfectly independent basis, though acting upon the instructions, so to speak, of Mr. Dallow. My report was only given to Mr. Dallow a few minutes before we came into Court. Mr. Spooner: There seems to be no case where scientific men are employed, in which you can't get evidence on both sides. I suppose it is owing to the uncertainties of science. Mr. Scott then gave some details of the results of four examinations, the conclusion he came to being, that the milk in question was undoubtedly of excellent quality, and contained rather more than one per cent. of solids above the average of Staffordshire milk. Witness's standard for South Staffordshire milk was 9·50 of deoleolized solids, and for North Staffordshire 9·45. Mr. Jones was also examined. He said that, according to Mr. Scott, who adopted a higher standard than he did, the milk in question would be more adulterated than had been represented. Mr. Scott's figures showed 6·27 as the amount of extra water in the milk; whereas witness (Mr. Jones) put the quantity at 1½ per cent. only, because he adopted a lower standard.—Mr. Spooner: Who shall decide when doctors disagree?—Mr. Jones: This is only a matter of simple calculation. The character of the milk was not much changed since it was first examined.—Mr. Dallow thought Mr. Jones and Mr. Scott had better go through their figures together.—After some discussion between Mr. Jones and Mr. Scott with respect to their respective analyses, Mr. Jones, in reply to Mr. Dallow, said the milk was of average quality. One and a half per cent. of adulteration would be something less than a tablespoonful of water in a quart.—Mr. Spooner: But we don't want even the tablespoonful; if we desire to have water in our milk at all, we would rather water it ourselves. He was of opinion that the two scientific witnesses were in opinion as wide as the poles were asunder.—Mr. Dallow said the remark had been made in the course of the case that it was "very unfortunate" that he (Mr. Dallow) had communicated with Mr. Scott in this matter. All that he had done was to request Mr. Scott to call upon Captain Segrave for the sample of milk in his possession, for the purpose of making his analysis.—Mr. Spooner: And you, at the same time, intimated to him that you, or your client, would see him paid.—Mr. Dallow: Certainly, I did.—Mr. Spooner: You having done that, Mr. Scott does not come before this Court as the witness contemplated by the Act of Parliament. What I wanted was a witness totally unconnected with either one side or the other, but you having communicated with Mr. Scott, and given him to understand that he would be paid by you, makes him your witness.—After some further remarks, Mr. Dallow said that as there was a doubt in the case—the scientific witnesses being directly opposed to each other as to the results of their respective analyses—his client ought to have the benefit of the doubt by the case being dismissed.—Mr. Spooner said the question for his decision was really one that he was not competent to decide, viz., as to whether Mr. Jones was right, or whether he was wrong, and Mr. Scott was right? That was a question which he certainly would not take upon himself to decide. If, as the Act contemplated, the defendant being dissatisfied with the analysis made by Mr. Jones, a competent analyst had been appointed by the Court to make an independent analysis without any leaning to either one side or the other, then he (Mr.

Spooner) should have felt justified in accepting his evidence, and deciding thereon. But he could not regard Mr. Scott in any other light than a witness for the defence. If, however, both sides expressed a wish that he should do so, he would still appoint an independent analyst to make an analysis on the part of the Court.—Mr. Dallow agreed to this, and the names of several well-known analytical chemists were mentioned, but as the legal gentlemen engaged could not agree as to the appointment of any one of them, Mr. Spooner said he must decide the case himself. If the defendant chose to pay the costs he would not fine him; if, however, he declined to accept this offer, he should impose the nominal penalty of 1*s.* and costs.—Mr. Dallow, on behalf of the defendant, said the costs would be paid.—The costs were then paid, and the parties left the Court.—*Wolverhampton Chronicle.*

Review.

INTRODUCTION TO THE STUDY OF ORGANIC CHEMISTRY. The Chemistry of Carbon and its Compounds. By HENRY E. ARMSTRONG, Ph.D., F.C.S., Professor of Chemistry in the London Institution. London: Longmans. 1874. Pp. 349, small 8vo.

This is the new volume in Messrs. Longmans' series of cheap text-books for artizans and students in public and other schools. It appears in the same form, and nearly the same size, as the small text-book of Inorganic Chemistry written by the late Professor Miller, and of which a highly favourable opinion was expressed some time ago in these columns.

But Dr. Armstrong's is a work of totally different character, and although we have nothing to say of it except in the way of praise, it cannot be regarded as a sequel to little 'Miller.' No student, however perfectly he might have mastered the contents of the volume on Inorganic Chemistry, would be in a position to read the present work so as to understand it. This, however, must not be understood to convey a reproach to either of the books in question, but simply to indicate that another is yet wanting to bridge over the interval which at present unquestionably separates them.

The volumes in this series are in fact very unequal in scientific rank, some carrying the reader into tolerably elevated regions, whilst the pretensions of others are of a far humbler, though perhaps not less useful character.

Dr. Armstrong's treatment of his subject is somewhat original, certainly very different from that of other authors of existing text-books. Ignoring altogether those practical matters, interesting chiefly to the manufacturer, to the physiologist, and to the pharmaceutist, which have hitherto so largely occupied the pages of text-books of similar design, he devotes himself exclusively to the systematic study of series rather than of individual compounds.

The arrangement of the matter is almost precisely the same as that of the second volume of Naquet's well-known and admirable 'Principes de Chimie,' but the new work presents advantages over 'Naquet' in conciseness, in the adoption of a modernized and systematic nomenclature, and in the very free use of *general* formulæ.

"The first part deals with the methods employed in ascertaining the composition of carbon compounds; the representation of carbon compounds by empirical formulæ, and by formulæ which not only express their composition, but also to a certain extent picture their nature, is then briefly discussed. After a short description of the action of various re-agents on carbon compounds, the compounds of carbon with oxygen, with sulphur, and with nitrogen, are briefly considered. The great family of hydrocarbons are next described; and the remaining families of carbon compounds are then considered in the order of their relation to the hydrocarbons which are regarded as forming the parent series." (Preface.)

The families thus referred to are all comprised under seven heads, namely, alcohols, ethers, aldehyds, acids, ketones, amines, and organo-metallic compounds. The description of every family or sub-family of compounds commences with a short definition; an account is then given of general methods by which the compounds of the series have been obtained, and afterwards their behaviour under the influence of various general re-agents is described. Several tables are also given which exhibit all the known members of several homologous series and their isomerides, with their boiling points and other physical characters.

A glance through a book of this kind carries the mind back to the work of twenty years ago, and compels a tribute to the memory of Laurent and Gerhardt, to whom we are so largely indebted for our modern chemical system. Homology and the idea of types, somewhat modified and developed, it is true, are still the fundamental principles of our classification. Gerhardt considered that chemical formulæ were only capable of expressing relations and analogies, the best being those which render evident the greatest number of such analogies. What chemist of the present time can honestly declare that his formulæ do more than this?

We are very glad to observe that Dr. Armstrong, trained as he has been in the very newest of new schools, has not been led into extravagancies as to the significance of the formulæ which, in common with other chemists, he employs. On the contrary, referring (p. 27) to constitutional, or so-called structural formulæ, he says: "We possess no real knowledge as to the internal constitution of chemical compounds, or of the mode of arrangement of the atoms of which bodies are presumed to be made up, and although rational formulæ *may* represent the proximate constitution of chemical compounds, yet, in the present state of our knowledge, it is advisable to regard them simply as condensed symbolic expressions of the chemical nature and mode of formation of the compounds represented; they enable us, so to speak, to decipher at a glance the chemical history of compounds."

There is just one question which we think is deserving further consideration by the author, not because we have any objection to the hypothesis he puts forward, but because of the intrinsic importance of the subject itself. The fact is familiar to all students of chemistry that countless instances are known of two or more bodies exhibiting the same composition, but totally different properties. Such bodies are said to be isomeric, polymeric, or metameric with one another according to the nature and extent of the differences between them. The explanation of isomerism has occupied the minds of chemists, perhaps more than any other subject, during the last few years, and the hypothesis very generally received goes under the name of the "position theory." Briefly stated, this theory pretends to explain the differences observed in isomeric compounds by assuming that the atoms constituting the molecules of those compounds are arranged in different relative positions. Taking the example quoted by the author, nitroethane, $(C_2H_5)-NO_2$, may be supposed to have the nitrogen combined with the carbon, whilst in ethyl nitrite, $(C_2H_5)-O-NO$, the nitrogen is coupled to the carbon by an intervening atom of oxygen.

The author rejects this view, which, it may be here observed, has probably never been accepted *literally* by any but a few bigoted adherents of the old form of the atomic theory, and he proposes another which really appears to differ from it only verbally. He says (p. 31), "The phenomenon of isomerism and of metamerism is unquestionably intimately connected with the amount of heat evolved in the reactions, giving rise to the formation of isomerides. . . . The production of isomerides by different series of reactions is, then, probably to be accounted for by the circumstance that different amounts of heat are evolved in the several series of reactions, so that finally bodies possessing different energies are formed. This supposition, that isomeric (and metameric) compounds are bodies which, having the same composition, yet possess

different energies, would also serve to explain their different behaviour under the influence of reagents."

Now, although the author is quite justified in calling attention to the necessity for a closer study of the thermal phenomena which accompany chemical changes, we do not think that he has here got hold of an essentially new idea. We know that if we lift a body from a lower to a higher level, as from the floor to the ceiling, a certain expenditure of energy is involved. That energy, if we choose so to arrange it, may have its source in the heat of chemical action ; still it is not lost in lifting the body, but is simply stored up, and is capable of being reproduced without diminution, and in its original form of heat, whenever the body descends to its former level. Now, we may believe that a precisely similar process goes on in the change of a chemical compound into an isomeride. A certain amount of energy, originally in the form of heat, becomes potential by reason of the change of position which has been effected in some atomic group contained within the molecule. According to the old hypothesis, then, no less than according to the new, a certain amount of energy becomes, so to speak, latent ; the older view gives some sort of explanation of this, the new one nothing of the kind, and this seems to be the only essential difference between them.

Whether, as suggested by Dr. Armstrong, this transformation of actual into potential energy is really attended by exalted *chemical* activity is in some cases at least questionable. Hofmann's recent interesting transformation of methyl-aniline into an isomeric compound—toluidine—by protracted heating to a high temperature, furnishes a case in point which would be well worth discussion. The subject is, however, at present in great obscurity.

In conclusion, we willingly bear testimony to the accuracy and clearness of style which characterize every page of the book before us, and we believe that a careful study of its contents will enable a student more readily to acquire a comprehensive and philosophic view of the whole subject than perhaps any manual we have had brought under our notice.

Obituary.

NEIL ARNOTT, M.D., F.R.S.

On Monday, March 2nd, Dr. Neil Arnott died in the eighty-sixth year of his age. This distinguished physician was born in 1788 at Arbroath, in Scotland, and received part of his early education at the Aberdeen Grammar School, where he was a schoolfellow of Lord Byron. He gained in competition a bursary in Marischal College, and there studied natural philosophy under Professor Copeland. In 1806 he entered as a pupil of Sir Everard Home at St. George's Hospital, London; and after a visit to the East, in the East India Company's service, in 1811, he commenced as a medical practitioner in London. In 1827 he published his well-known work, "Elements of Physics, or Natural Philosophy," which has passed through several editions, and received the author's revision in 1864. Upon the foundation of the University of London, Dr. Arnott was nominated a member of the Senate, and in 1837 he was appointed one of the Physicians Extraordinary to the Queen. In 1838 he was elected a Fellow of the Royal Society. The same year he published his treatise on "Warming and Ventilating." Practically carrying out his theory, he afterwards constructed the stove which bears his name. This gained for him the Rumford medal of the Royal Society and, in conjunction with other inventions, the gold medal of the Paris (1855) Exhibition, as well as the Cross of the Legion of Honour. He was also the inventor of the well-known ventilating chimney valve and the water-bed ; but in no case did he seek to protect his inventions by a patent, being anxious that the public should benefit from a full and free use of them.

Besides his active labours towards the improvement of sanitary knowledge, Dr. Arnott was a munificent donor for educational purposes. To the four Scottish universities he gave one thousand pounds each for the endowment of Scholarships in Natural Philosophy, and to the Aberdeen Mechanics' Institute five hundred pounds. In 1859 he gave to the University of London two thousand pounds for a scholarship. For many years Dr. Arnott had given up medical practice in order to devote himself to scientific studies.

FORBES WINSLOW, M.D.

Another well-known member of the medical profession, Dr. Forbes Benignus Winslow, died at Brighton on the 3rd inst., of bronchitis and pneumonia, after a few days' illness. Dr. Winslow was the ninth and youngest son of Captain Winslow, of the 47th Regiment, and was born in 1810. He received his preliminary education at first in Scotland, and afterwards in Manchester and London. His professional studies were commenced in New York, but, returning to England, he pursued them at University College, and afterwards at the Middlesex Hospital, under Sir Charles Bell. He passed the College of Surgeons in 1835, graduated as M.D. at Aberdeen in 1849, and in the following year was elected a Fellow of the Royal College of Physicians, Edinburgh. Dr. Winslow was the author of numerous treatises, chiefly upon subjects relating to mental diseases. In the earlier period of his practice he held an appointment on the *Times* staff. He was also for sixteen years the editor of the 'Quarterly Journal of Psychological Medicine,' which he originated.

Dr. Winslow's name is familiar to the public from having been selected by the Crown on various occasions to give evidence in criminal cases relative to the state of mind of the accused.

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

On the 1st February, 1874, Mr. Henry Augustus Tanner, Chemist and Druggist, of Kingswood Hill, near Bristol.

On the 3rd March, 1874, Mr. Simon Matthews, Chemist and Druggist, of Lechlade.

On the 3rd March, 1874, Mr. Joseph Wrangham, Chemist and Druggist, of Wheelgate, Malton.

On the 5th March, 1874, Mr. John Tweddell, Chemist and Druggist, of 112, Camden Road, London.

On the 6th March, 1874, Mr. James A. Kellett, Chemist and Druggist, of Wigan.

Notes and Queries.

[385]. DARK BROWN HAIR DYE.—The following appeared in the Journal some time since, and is a good dye :—

No. 1.

℞	Acid. Pyrogallic.	gr. iv.
	Aq. Destill.	℥ij.

M.

No. 2.

℞	Arg. Nit. Cryst.	℥j.
	Gum. Acaciæ	℥j.
	Aq. Destill.	℥ij.

M. s. a.

NEMO.

[389]. HAIR RESTORER.—Can anyone give a recipe for a Hair Colour Restorer (not a dye) that is really successful, and does not contain lead, or any other injurious ingredient ?—P. T.

[390]. COMPOUND SYRUP OF CAMPHOR.—Can any correspondent favour me with a form for making "Compound Syrup of Camphor ?"—M. P. S.

Correspondence.

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

What is Sweet Spirit of Nitre?

Sir,—The answer to the question put by your correspondent, "A Drug Traveller," in the Journal of Saturday last, may have more than a passing interest to many members of the Society. "What is Sweet Spirit of Nitre?" and for the information of all whom it may interest I give the following from an ancient Dispensatory.

"Spiritus Nitri Dulcis."

"Take of Rectified Spirit of Wine one quart; *Glaubor's* Spirit of Nitre, half a pound. Mix them by pouring the Spirit of Wine on the other, and distil the Mixture with a gentle heat, as long as what comes off will not raise any Fermentation with a Lixivial Salt."

"In the *Pharmacopœia Reformata* we are told that the Direction of continuing the Distillation only till what comes over ferments with a Fixed Alcaline Salt, is sufficiently troublesome and unartful. If the Spirit of Wine be highly phlegmed, and six Parts instead of four be added, and the Spirit of Nitre be pure and strong, almost the whole Mixture will rise in the heat of a Water-Bath, be greatly odorous, and sufficiently dulcified, so as not to give any, or but very little, Marks of Acidity upon the Affusion of an Alcali. The Spirit of Nitre should be distilled from equal parts of strong Oil of Vitriol and well-dried Nitre, with a gentle Fire, and the Spirit of Wine should be drawn over from a thoroughly dried Fixed Alcaline Salt."

This being a specimen of pharmaceutical literature of a century and a half ago, I have given an exact copy, including capitals, etc. I will not obtrude myself on the attention of pharmacists by entering into a critical analysis of this formula, and an estimation of what would be the product. But the second paragraph, or appendix to the formula, states, "almost the whole of the mixture will rise in the heat of a water-bath, be greatly odorous, and sufficiently dulcified, so as not to give any, or but very little, Marks of Acidity upon the Affusion of an Alcali." But by a simple mental estimate of the quality of the product, there can be little doubt but the specific gravity would be that of the B. P., and the amount of hyponitrous ether quite as great or greater, seeing that half a pound of the strongest nitric acid is used for two pints of alcohol pure.

The author goes on to say that "it promotes Sweat, provokes Urine, allays Thirst, corrects fœtid breath, and has particular Virtues in Scurvy. It is conveniently taken upon an empty stomach, to twenty or thirty Drops or more in Wine, Mead, or Beer."

May I ask how much of the modern article might be taken to produce any of the benefits here enumerated? Let the wise ponder these things.

F. M. Rimmington.

Bradford, March 9th, 1874.

Re Cocculus Indicus.

Sir,—More than thirty years ago, soon after my apprenticeship to pharmacy commenced, I was often employed bruising Cocculus and doing it up in 1 lb. packets for a brewer in the city I lived in. He used to call for it himself late in the evening. After some time—I think about 1838—he ceased buying it, saying the excise had found a test for it which gave a green colour when it had been used! (What was that?) However, malt became cheaper, and it was not of so much importance. Since then I had never been asked for Cocculus, except in small quantities for fish poisoning; until being in business for myself in 1868 I had it regularly ordered with certain quantities of borax and sal ammoniac by a gas-fitter, who tells me it gives a peculiar and desirable tint to certain bronzes. Query—What can be its action on lacquers, and do any of the thousand bags find their way to Birmingham for that purpose?

I have often thought picrotoxine might prove a remedy of some power in neuralgic affections. Does it enter into any of the patents for their cure?

J. S. L.

March 7th, 1874

Sir,—Many "a young man from the country" could tell the dispensing chemists in large towns that powdered Cocculus Indicus is used extensively in rural districts as a dressing for lice in cattle, and that grains of paradise, the other mythical adulterant of beer, is in common use for horse powders among agriculturists.

M.P.S. (by examination).

Castle Donington, March 9th, 1874.

The Proposed Scholarships.

Sir,—I read with much interest in the Journal of Saturday the sensible remarks of "Amicus" with regard to the proposed scholarships. They would certainly be a great stimulus to country students, as the Bell Scholarships are now; but I certainly think that the hint thrown out by Professor Attfield in his concluding remarks at the meeting on Wednesday comes nearer the point. There should be at the Square a few scientific young men who would not be in haste to leave their studies in order to pursue the ordinary business of pharmacy. There are a few among our ranks—perhaps the number is very small, but still there are a few—who, if there were sufficient encouragement given them, would be scientific enough to relinquish the practical profession of pharmacy and pursue their chemical studies at the Square for several years, until they could fairly lay claim to some real knowledge of the science. It would be a pity to alter the age for the Bell Scholarships to twenty-two, as they should be intended for students who have just completed apprenticeship; but the additional scholarships might be open to students under twenty-two or twenty-three, and by this means I think a few scientific men might be retained at the laboratory. It was quite right to remove the Senior Bell and establish another Junior, as one was not sufficient; but now that extra scholarships are talked of, they should be as much as possible in place of the Senior Bell. In these of course there would be no need of classical subjects; in fact, almost the whole of the questions might advantageously be on chemistry. With apologies for this hastily written and "meandering" letter, I beg to remain, etc.,

Syrupus.

March 9th, 1874.

"*Quærens.*"—(1) A double decomposition takes place and the mass is reduced temporarily to a pasty consistence by the water of crystallization. (2) Because a small quantity of tannate of quinine is formed. (3) You must exercise your own judgment in accordance with circumstances.

"*Litmus.*"—(1) The ethereal extract is well suited for external application as a vesicatory or rubefacient (Pereira). (2) The presence of the seeds would interfere with the flavour. (3) The B.P. preparation is not pure sulphate of beberine, but probably a mixture of more than one principle. (4) Soften by heating it in a water-bath.

"*Peter Simple.*"—There is no exemption in favour of the persons mentioned.

"*Junket.*"—The exact nature of the action of rennet is not known.

"*Statim.*"—We believe that such a collection may be obtained from Messrs. Butler and McCulloch, King Street, Covent Garden.

"*Member.*"—Some formulæ are given in vol. iii. p. 443.

Crystallization of Carbolic Acid.—Mr. T. F. Abraham writes that the report of what he said at the Liverpool Chemists' Association about carbolic acid (Pharm. Journ., p. 725) is not quite correct. What he said was, that he had noticed in cold weather, when handling a mixture of pure carbolic acid with 5 per cent. of water, that the screwing round of the stopper would sometimes start the process of crystallization, which would then in a few seconds run from the stopper through the whole bottle, forming a solid mass.

"*Hampton.*"—You will find the information you ask for in Dr. Voelcker's paper on p. 742.

H. A. Howe.—Probably the best way would be to dissolve out the lime salts with hydrochloric acid, and precipitate the phosphate from the solution by means of chalk.

Communications, Letters, etc., have been received from Mr. J. H. Butler, Mr. J. M. Fairlie, Mr. Young, J. McNeile, "Hampton," M.P.S.

RICINUS COMMUNIS.—ANALYSIS OF THE LEAVES OF THE PLANT.*

BY E. S. WAYNE.

Having observed a crystalline deposit in the fluid extract of the leaves of the *Ricinus communis*, which preparation I have made for several years past from the leaves of the plants grown in this vicinity, and which has been used by several of our physicians as a galactopoietic agent with satisfactory effect, and having a desire to know what this substance was, I was induced to make the following analysis of it, and to extend my researches further.

The crystalline deposit above mentione dhad the appearance of a mass of colourless prismatic crystals, imbedded, more or less, in a mass of chlorophyll, which had also separated from the fluid extract. A portion of the deposit was removed for examination, and was treated with alcohol ; the crystals were left undissolved. Water was then tried as a solvent, in which they dissolved, and the solution upon concentrating deposited long prismatic crystals, which were found, upon examination, to be nitrate of potassium.

This fall, in making another quantity of the fluid extract, which required filtration to separate a quantity of chlorophyll deposited, I noticed that the greenish mass on the filter was glistening with crystals, and, upon treating some with water, obtained from it a large quantity of nitrate of potassium.

The presence of it in this mass was evidence that that the salt existed as such in the leaves of the plant, which was also shown to be the case during the combustion of leaves and stems, they burning with scintillation and decrepitation almost like nitre paper.

Becoming interested in the subject, I was tempted to extend my researches, and accordingly submitted the leaves to a careful analysis for the presence of a proximate principle, and the analysis of the ash of the plant. Analysis of the leaves failed to show the presence of any substance having the properties of an alkaloid, but proved that they did contain a proximate principle, crystallizing in square prisms and tables.

This substance was obtained by the following process :—The powdered leaves were exhausted by percolation with dilute alcohol, and the percolate evaporated in a water-bath to expel the alcohol and separate chlorophyll and resin ; these were separated by filtering. The filtrate was of a dark brown colour. To it was added moist hydrated oxide of lead, and the mixture repeatedly shaken during the day ; by this treatment the tannic acid present and a large portion of the colouring matter were removed. The solution filtered from the oxide of lead was of a pale amber colour ; this was then evaporated to a syrupy consistence. About one ounce of extract was left, which was exhausted with eight ounces of alcohol, and the alcoholic solution set aside for spontaneous evaporation. As the alcohol evaporated, a crystalline substance commenced to form, and from the extract above mentioned, from one pound avoirdupois of the leaves, about 60 grains of the substance was obtained of a pale yellow colour, which was dissolved in alcohol, and the solution treated with purified animal charcoal. The solution left to spontaneous evaporation deposited the substance in colourless crystals, prismatic and tabular in form.

The portion of the extract insoluble in alcohol was tested for glucose, but none found present.

The crystalline substance was then submitted to the following tests :—

Concentrated sulphuric acid: No change cold or by heating ; by heat it dissolves to a colourless solution, which, upon being diluted with water, deposited it again as a white pulverent mass.

Nitric acid : No change.

Hydrochloric acid : No change.

Sulphuric acid and bichromate of potassium : After standing some time, a green colour.

The hydrochloric acid solution, upon the addition of solution of chloride of mercury, formed a white precipitate.

Heated with potash, ammonia was given off.

Heated upon platina foil it fuses, and, upon further heating, it ignites and burns with a sooty flame.

Heated in a glass tube, it fuses, volatilizes, and condenses in a crystalline form in the cool portion of the tube.

The fused mass, upon cooling, forms a mass having a radiated crystalline appearance. It is soluble in alcohol and water.

Taste bitter, resembling that of wild cherry bark when chewed.

From the above behaviour with re-agents and its crystalline form, it is evident that the substance obtained from the leaves is identical with that obtained by Prof. Tuson from castor seeds, and named by him Ricinin.*

From experiments made with the substance from the leaves, it is evident that it has no claims to be called an alkaloid, as it has no action on litmus paper, and solution of iodohydrargyrate of potassium gives no precipitate with it. Yet it contains nitrogen, as proven by the production of ammonia when heated with potash.

All of the tests made with the substance from the leaves compare with those of Ricinin from seeds.

The analysis of the plant is an interesting one, showing that a peculiar proximate principle exists in all parts of it, the same as found in the seeds. Also that the leaves contain a large percentage of nitrate of potassium, and in this respect equal to that of tobacco.

An analysis of the ash of the leaves shows that they are very rich both in alkalies and phosphoric acid.

500 grains of the leaves were incinerated, which required some manipulation, as the ash was found to be readily fusible, and perfect combustion consequently impossible ; but by charring the mass only, and then dissolving out the soluble portion with water, combustion was accomplished. 120 grains of ash = 24 per cent., was obtained, the analysis of which gave the following results :—

Lime	33·40
Magnesia	6·20
Potash	27·15
Soda	2·12
Peroxide of Iron	·70
Phosphoric Acid	6·68
Sulphuric Acid	2·90
Chlorine	1·63
Carbonic Acid	16·20
Silica and Sand	2·41
Loss	·61
	100·00

From the above, when the size of the plant, its luxuriant growth, etc., are taken into consideration,

* From the *American Journal of Pharmacy* for March.

the culture of it must be a very exhausting one upon the soil, the fertility of which must be rapidly decreased by the drain of potash and phosphoric acid. Whether it is the custom to restore to it the stalks and leaves after the crop of seed has been gathered, I do not know ; but they should be, and thus by their decay restore these again to it: or they should be burnt and the ash scattered broadcast upon the land from which the plants have been taken.

ANALYTICAL NOTES ON OXIDE OF TIN.

BY G. WELLBORN.

This substance is commonly known as "putty powder," and is stated by Professor Redwood, in his Supplement to the Pharmacopœia, to be the peroxide. It is obtained by exposing melted tin in a reverberatory furnace, and calcining the dross (stannous oxide), which is raked from the surface of the metal, and subsequently calcining the dark grey stannous oxide, when it becomes converted into stannic oxide, which is a pale buff-coloured powder.

Having recently to analyse a powder containing three unknown metallic compounds, I was somewhat surprised to find a fourth metal appear in the course of the analysis. It is not necessary to describe in detail the operations performed for the detection of all the metals present in the powder. It was, however, ascertained to contain calomel, oxide of lead, oxide of tin, and acid tartrate of potash, and, knowing from the conditions under which the analysis was undertaken that one of the metals must occur as an impurity, or adulterant, it seemed probable that the oxide of lead was the compound which should not have been present, and that it was introduced with the oxide of tin.

Lead was readily found on treating the powder with cold dilute hydrochloric acid, filtering from the insoluble portion, and then passing sulphuretted hydrogen through the filtrate. There was an abundant black precipitate, which, after being washed, dissolved completely on being heated with dilute nitric acid. The solution was evaporated to dryness and re-dissolved in water. On adding chromate of potash and iodide of potassium to separate portions of this solution, precipitates were obtained characteristic of the presence of lead.

In order to ascertain whether the oxide of tin was mixed with oxide of lead, I procured a sample from the same source, and treated twenty grains of it with boiling dilute nitric acid until nothing further was dissolved. The acid solutions were then filtered and the residue, insoluble in nitric acid, washed: the washings were added to the filtrate, and the whole evaporated to dryness. A white crystalline powder was left, which decrepitated when heated, and evolved ruddy fumes: the residue was pale yellow: on heating it in the inner blowpipe flame with carbonate of soda on a charcoal support, small beads of soft, malleable metal were obtained.

Another portion of the above crystalline powder was dissolved in water, and a little of the solution treated with chromate of potash, gave a pale yellow precipitate. Iodide of potassium added to a fresh portion also gave a yellow precipitate solution in boiling water, and deposited again on cooling in shining yellow scales.

Dilute sulphuric acid gave a fine, heavy, white crystalline precipitate. These reactions showed unmistakably the presence of lead.

The residue, insoluble in nitric acid, after being washed and dried at a low temperature, was nearly white, and weighed 7 gr.: after ignition it weighed 5 gr., and became a pale buff colour.

Conceiving that oxide of lead might be a common adulterant of oxide of tin, I obtained samples from two other sources, and submitted 20 gr. of each to similar treatment. The quantity of oxide of tin was the same in the three samples, viz., 5 gr., the remaining 15 gr. being made up with oxide of lead.

The nitrate of lead obtained from 20 gr. of impure oxide of tin weighed 21 gr., which is equivalent to 14·148 gr. of oxide of lead. The molecular weight of the nitrate being 331, and that of the oxide 223. The weight of oxide which may be obtained from 21 gr. of nitrate is found by the following equation:—

$$\text{As } 331 : 21 : 223 : x = 14{\cdot}148.$$

The residue, insoluble in nitric acid, was proved to be oxide of lead by fusing it in a covered porcelain crucible with cyanide of potassium ; washing away the soluble portion and heating the finely divided metal thus obtained with concentrated hydrochloric acid, it dissolved with effervescence. On adding this solution to a solution of mercuric chloride it caused a white precipitate. On the addition of more of the hydrochloric acid solution the precipitate became black, owing to the reduction of the mercuric chloride.

Twenty grains of the impure oxide of tin was moistened with concentrated nitric acid ; in a few seconds it swelled considerably, cracked, and fell into a light, amorphous powder, with evolution of great heat. It appeared to undergo hydration in a similar manner to lime when it is moistened with water.

I had not, previously to undertaking the above analysis, the least suspicion that oxide of tin was an article liable to sophistication: but oxide of lead at 6*d.* per lb. and oxide of tin at 3*s.* 6*d.* explains in a forcible manner why we should find the two keeping company in "putty powder."

THE ALKALOIDS OF THE CINCHONA BARKS.*

BY O. HESSE.

(*Continued from p.* 731.)

VI.—Aricine.

Aricine was discovered in 1829 by Pelletier and Caventou, and almost at the same time by Leverköhn, in a bark described as a false calisaya bark. According to Delondre and Bouchardat, the tree which yields this bark grows in the forests of Santa Anna, and according to Weddell it is the *Cinchona pubescens,* Vahl. The former authors stated further that the bark of this tree was only of small value, as it contained barely 0·06 per cent. of alkaloid, which after sufficient purification perfectly agreed with quinine. In another bark, nearly related to it, the "china cusco fusca," which was collected in the forests of Cusco, scarcely 0·03 per cent. of an alkaloid was found, the sulphate of which also resembled the sulphate of quinine. Aricine was not referred to this bark.

On the contrary, Wiggers† stated that Delondre and Bouchardat did not operate upon the same bark as that examined by Pelletier and Coriol ; he also declared, on the ground of physiological examination of authentic barks, that the yellow Cusco bark and the brown Cusco bark were not essentially different from one another. Wiggers therefore named the true aricine-yielding Cusco bark "Cusco vera." On account of its complete uselessness,

* Translated from the 'Vierteljahresschrift für praktische Pharmacie,' vol. xxii. p. 366.

† 'Pharmakognosie,' p. 413.

this bark, which according to Winckler contained 1·4 per cent. of aricine, has completely disappeared from commerce. At a later date Manzini examined the pale "tenchina," said to be yielded by the *C. ovata*. But as in most of these cases one and the same description of bark is said to be derived from several species of *Cinchona*, so this happens on a large scale in the present case, since the following species have been named as yielding this "tenchina" bark,—*C. ovata*, Pav., in Peru; *C. lutea*, Pav., and *C. decurrentifolia*, Pav. (*C. purpureseens*, Wedd.), in Ecuador; and the doubtful *C. viridiflora*, which latter, according to Weddell, should be classed with *C. Pelletierana*, whilst Howard derives the yellow Cusco bark from *C. Pelletierana*. Not thereby lessening the confusion, Weddell divides the species *C. ovata* into four varieties, namely, *C. ovata genuina*, which according to Howard contains 1·06 per cent. of aricine and 0·08 per cent. of cinchonine, but, notwithstanding, does not give Grahe's reaction;* *C. ovata vulgaris*, with 2 to 2½ per cent. of quinidine (cinchonidine?); *C. ovata pallescens* and *C. ovata palalba*.

Manzini named the alkaloid obtained from his bark "cinchovatine." For its preparation, he treated the bark with acidulated water, precipitated the filtered liquid with excess of lime, and withdrew the alkaloid from this precipitate by means of alcohol. Upon the cooling of the brown solution beautiful crystals of cinchovatine were formed. The mother liquor was freed from the greater part of the spirit; the dark residue was dissolved in hydrochloric acid and treated with common salt, whereby the colouring matter (? quinoidine) was thrown down. The cinchovatine, on the contrary, remained in solution, from which it could be precipitated by ammonia. This purification was repeated until the cinchovatine appeared of a straw colour, which was only removed by repeated crystallizations from boiling alcohol.

In 1839 Bouchardat† examined this same bark, and not only confirmed the discovery of Manzini, but declared also that the pretended new alkaloid was perfectly identical with the aricine of Pelletier and Coriol. Winckler, too, arrived at the same result, and also considered that the green colouration which Pelletier's aricine presented was not due to the pure alkaloid, but to an admixture of some other substance unknown to him. Consequently—after that Bouchardat and Winckler, independently of each other, had agreed in recognising the identity of cinchovatine, cusconine, and aricine—the result which A. Delondre obtained in operating upon a large quantity of the bark examined by Bouchardat was surprising, since, instead of the expected aricine, he obtained cinchonine and quinine. The confusion becomes still greater since Howard says that the results of his experiments upon aricine are identical with those which Delondre indicates in his 'Quinologie' (pp. 38 and 39), where the before mentioned description of the Cusco bark occurs. After this, Howard would have generally obtained no aricine in his experiments, and consequently esteemed aricine to be identical with quinine.

Finally, it may be mentioned that Kerner‡ met with a preparation in commerce under the name of aricine, but this was essentially a mixture of cinchonidine and his quinidine (see before). Moreover, Kerner has not been able to obtain any aricine, and is therefore not yet convinced of the existence of this alkaloid.

As Delondre stated that the bark examined by Manzini contained cinchonine, and Manzini did not mention that he eliminated this alkaloid, it appears impossible that a preparation actually free from cinchonine could have been obtained in accordance with the indications of Manzini; so that we may be allowed to speak of this cinchovatine as principally impure cinchonine, and this the more justly, since cinchonine, being asserted to be more difficultly soluble than aricine, must have been contained in the first crystallization. Whether the quinine present in the bark may have any influence upon the formation of cinchovatine I know not; but this I know, that when quinine, containing some of the as yet little understood colouring matter of the bark, is dissolved in dilute sulphuric acid, and the solution, while hot, neutralized with ammonia, upon its cooling a transparent jelly-like mass is deposited, in which gradually small white points are formed, which become the centres of the crystallization of the neutral sulphate. Also, it has been observed that if sulphate of quinine not yet completely purified, be strongly pressed and then placed in cold water, it swells up.

My attempts to prepare the alkaloid in question from cinchona barks have under these conditions remained unsuccessful. One bark, which was said to contain "cusconine" entirely, gave a considerable quantity of cinchonine, but no alkaloid the properties of which recalled those of aricine. Another bark, which was considered identical with the "Quinquina Jaën," plate vi. of Delondre and Bouchardat's "Quinologie," gave me, besides traces of amorphous base, 2·6 per cent. of sulphate of quinine, 1·4 per cent. of cinchonine, and about 8 per cent. of conchinine, but no aricine.

I must therefore consider the question of the existence of aricine an open one.

VII. Paricine.

Paricine, which in 1845 was found by Winckler* in a false cinchona bark imported from Pará, and represented as the bark of *Buena hexandra*, Pohl, and also later in the bark of a true cinchona,†—*C. lutea*, the "lengua de vacca" of the Huanuko district,—occurs not unfrequently, according to my observations, in the East India cultivated *C. succirubra*. As the salts of paricine are precipitated from solutions by nitric acid, similarly to beberine, Winckler thought that both these alkaloids might be identical, and Flückiger‡ sought to base this opinion upon certainty. Following them, I published a paper§ upon this subject, in which I sought to point out what they had previously ascertained respecting the identity of these two alkaloids. My further experiments have finally demonstrated the peculiarities of this uncommon alkaloid.

If the alkaloids are extracted from the bark of *C. succirubra* in the usual manner, and a neutral aqueous solution of the sulphate mixed with moderately concentrated nitric acid, the paricine nitrate will be immediately precipitated in yellow flocks. But if the solution be previously mixed with tartrate of soda and potash, to precipitate the quinine and cinchonidine, it may happen that all the paricine is removed with the precipitate, because the tartrate of paricine is rather difficultly soluble in a solution containing other salts. It depends, therefore, upon the quantity of Rochelle salt used whether the paricine will be found still in the solution, or partly or wholly in the precipitate.

Having thrown down the alkaloid with moderately concentrated nitric acid, and worked up the resinous precipitate with the same acid, alcohol is poured over the mass, ammonia is added to decompose the nitrate, and the solution is treated with hot petroleum ether, which removes the alkaloid with the alcoholic solution. The last solvent, after separating it from the alcoholic solution, is evaporated, and the residue taken up in dilute hydrochloric acid and purified by means of a little animal-black. Upon the addition now of an excess of ammonia, the solution gives a yellowish-white flocculent precipitate of pure paricine. Comparative experiments which I made

* *Berichte der deutschen chemisches Gesellschaft*, iv. 818.
† Quinologie, p. 29.
‡ Archiv für Physiologie, ii. 200.

* Repertorium für Pharmacie, xci. 145.
† Neues Repertorium für Pharmacie, xiv. 337.
‡ Archiv für Pharmacie, cxii. 97.
§ Brichte der deutschen chemischen Gesellschaft, iii. 232. Through an oversight it is erroneously stated there that Winckler's Pará bark was collected from *C. lutea*; it should be referred to the grey bark which Winckler examined in 1865.

with paricine so obtained, and paricine prepared by Winckler, but still further purified by me, demonstrated the complete identity of the two preparations.

Paricine dissolves readily in petroleum ether and ligroin, whilst the purified beberine is nearly insoluble in them, so that in this manner the two alkaloids can be easily separated. It also dissolves readily in water and alcohol, with difficulty in water and ammonia, contracts somewhat at about 100°C., and finally melts at 116°C into a dark-brown liquid, solidifying upon cooling into an amorphous mass. Beberine, on the other hand, melts first somewhere about 200°C., and even then its fusion is not complete. The melting-points of these two alkaloids, therefore, present a difference of at least 80 degrees, so that under this aspect they cannot be considered identical, although in many other characters paricine has a great resemblance to beberine.

Paricine dissolves in concentrated sulphuric acid with a greenish-yellow coloration, which is changed by heat to a dark-brown. Concentrated nitric acid converts the alkaloid immediately to a dark green resin, which is dissolved by heat, taking a dusky yellow colour. Paricine in acetic acid solution gives, with both nitric acid and nitrate of soda, a flocculent, yellowish-white precipitate of nitrate of paricine, which is more difficultly soluble in water acidulated with nitric acid than in pure water. Chloride of sodium induces in a similar acetic solution of the alkaloid a milky turbidity, and afterwards a yellowish-white precipitate, which is difficultly soluble in a solution of common salt, but easily soluble in water. The alkaloid in acetic solution has also a reaction similar to the foregoing with iodide of potassium. Solutions of the chlorides of platinum, gold, and mercury all produce flocculent precipitates in hydrochloric solution of this alkaloid.

The small quantity of perfectly pure alkaloid which up to the present time I have been able to prepare from bark of *C. succirubra* has hindered me from undertaking an analysis of this base, though I am indebted to the firm of Friedrich Jobst, at Stuttgart, for such a suitable quantity of raw material that I hope soon to be able to make known the composition of this interesting vegetable alkaloid.

(*To be continued.*)

THE VARIOUS PREPARATIONS OF KOUMISS, AND THEIR USE IN MEDICINE.

BY V. A. JAGIELSKI, M.D. Berlin,
Late Physician in the Prussian Army, etc.

(*Continued from p.* 695.)

The two following analyses, one of mare's-milk koumiss, made by Hartier, a chemist of Moscow, and the other of E. Chapman's medium cow's koumiss in London, made by Wanklyn, may be compared :—

	Mare's Koumiss.	Medium Cow's Koumiss.
Alcohol	1·65 per cent.	1·60 per cent.
Fat	2·05 „	0·30 „
Milk-Sugar . . .	2·20 „	4·85 „
Lactic Acid . . .	1·15 „	1·08 „
Casein and Albumen	1·12 „	1·07 „
Ashes or Salts . .	0·28 „	0·75 „
Carbonic Acid . .	0·785 „	1·50 „

Thus we see that the casein in both kinds of koumiss is the same to a fraction; much less is the butter or fat in the medium koumiss, for the simple reason that it is not advisable to send out the koumiss *à longue course* with all the fat contained in the milk, as it decomposes too quickly into butyric acid, which is deleterious to the digestive organs. Further, the lactic acid and alcohol show no difference worth considering; but the lactose in the medium koumiss is twice as much as in mare's koumiss, if Hartier's analysis deserve full credit for correctness, as Wanklyn's does, whose reputation as an analytical chemist is undeniable.

The *Whey Koumiss* (C) is derived from cow's milk completely freed from its butter and casein, so that it merely contains some albumen, lactose, lactic acid, alcohol and the salts. It affords the best proof of showing how wrong all the theories were which proclaimed the casein or even the butter as being indispensable for koumiss-making, and may prove useful as a beverage in disease with even a strong febrile reaction, with copious or excessive expectoration, perspiration, or diarrhœa, either in plethoric or in strong constitutions, which do not require an increase of weight, or in patients with inflammation or fever. We must, however, not forget that in the latter case the treatment becomes more difficult and complicated; and we have to use all our skill to abate the fever by antipyretics, to calm the pain by sedatives and narcotics, and to prevent local inflammations from spreading, etc., according to the nature of the localized disease. According to the more recent school of medicine, whey is only of limited value, as it supplies the body with slight nourishment; and it is obvious that, on this account, whey can never take the place of highly nutritious milk, and therefore can never be applied to the purpose of a proper plastic treatment. The whey koumiss, however, promotes decidedly the appetite and digestion, and as a cooling and refreshing dietetic remedy, calming irritation. The "sparkling bland," a diluted and still more pleasant form of whey koumiss, may, in febrile disease, be used as a refreshing drink, and prove more convenient, as bland will keep for a long time, and is agreeably flavoured with ginger, lemon, or orange, etc.

The *Diabetic Koumiss* (D) contains, according to Wanklyn's analysis, 1·6 per cent. of alcohol, 1·1 per cent. of lactic acid, and not more than 1·0 per cent. of lactose. It is particularly suitable for the treatment of that disorder, to increase weight, to allay thirst, to excite the action of the skin, and to check the loss of sugar and the abundant flow of urine, although it appears to me less important how much urine and sugar are excreted, as long as the patient's weight and strength are increasing; and the confidence created in the remedy is also of much consequence in such a distressing condition. According to Stahlberg, koumiss is, in the treatment of diabetes, of greater value than even Vichy or Carlsbad water; and we need not restrict the diet in the usual severe way. If the skimmed-milk treatment, the buttermilk cure, or Professor Cantani's lactic acid treatment, has given such good results, I do believe that koumiss is of still more value, as it acts as a ferment in decomposing within the body all saccharine matter, and as an easily absorbable and strength-giving plastic nourishment; otherwise I cannot explain its beneficial effects on this disease, even as *ultima ratio*, when the tongue appears parched, and the patient seems skin and bone, and thoroughly exhausted. The complication with lung disease appears a forcible indication for its immediate use, as the life will be prolonged under this treatment.

Muscular exercise in open air, regularly continued every day, is of the greatest importance in the treatment with koumiss generally, but especially during the use of diabetic koumiss, which ought to be about a week old, sour, and well sparkling. It contains fermenting casein in the most favourable condition for digestion and nutrition, and a larger amount of lactic acid than even buttermilk, of which Dr. L. Brunton has spoken highly as a remedy in diabetes in this Journal. Further, the carbonic acid and alcohol in this diabetic koumiss must not be disregarded as powerful remedial agents in the treatment of diabetes. In fact, diabetic koumiss is buttermilk in the state of alcoholic fermentation. It ought to be made the principal or exclusive beverage of a diabetic patient, as soon as he has acquired a taste for it. He may also take it with his meals, chiefly consisting of meat diet. Why Dr. Brunton has so entirely excluded koumiss from his experiments and observations, I do not know; and I sincerely regret it, because his lectures on the subject of diabetes appear to me a *chef-d'œuvre de science*. If glycerine be of

any value in this disease, as recommended by Schultzen, it may more advantageously be given with koumiss instead of with water (four pints per day); and as glycerine is fermentable, according to Berthelot, it may be prescribed as an addition to koumiss, or better in koumiss, in order to prevent nausea and diarrhœa from glycerine. When given at the dose of about an ounce and a-half, I feel sure that the combination of glycerine and lactic acid in koumiss, along with the proper diet, will yield the most satisfactory results.

As to my own experience in the general use of koumiss, I have observed that it exerts a striking remedial power, in chronic gastro-catarrh arising from any cause, but especially from the abuse of alcoholic drinks, the use of tonic astringents, styptics, and sialagogues, or the habitual taking of opium. It stimulates digestion without affecting the head—a fact noticed and expressed to me by patients with the utmost satisfaction and joy. Some extolled its peculiar influence on the brain, it leaving the head clear for brain-work, and generally strengthening memory and intellectual power. In many of the secondary symptoms of diseases, such as dyspnœa, cough, weakness, emaciation, etc., even where they are so strong as not to correspond with the topical process of the malady, koumiss is a prompt and powerful check to development of the morbid process; and many other cases of debility, in consequence of excessive or protracted copious secretion of muco-purulent matter or severe hæmorrhages from any organs, or after operations, childbed, and lactation, find a comforting restorative.

In lung-consumption (chronic form), the first stages are most benefited by koumiss. Through an improvement of the digestive functions, the regulation of the nutrition, and its particular healing effect on all relaxed mucous membranes, the cough subsides, shortness of breath improves, night-sweats disappear, and sleep is induced, and coincidently weight and strength and plumpness of the body augment. But I must repeat, in this connection, that full koumiss, like other nourishing diet, is contra-indicated in the febrile phases of phthisis, and should be replaced by whey koumiss, bland, salines, etc. On the other hand, so long as the bodily temperature is still above normal, or so long as a high temperature may fluctuate several degrees between morning and evening, there is reason to use the koumiss, and expect good effects from it. If in eight or ten days the body do not begin to gain weight, the temperature do not show a declining tendency, the tongue do not clear, the appetite do not improve, then the koumiss will be of as much, or as little, use as any other treatment or medicine, because the prognosis will have turned out *pessima*.

Koumiss is an admirable succedaneum for purely drug substances, and even for cod-liver oil, in cases where the stomach has assumed an aversion to such medicines. At the same time, there are critical phases of disease in which a judicious association of drug-treatment is indispensable; and of this the attending physician will be best able to give proper directions. In all cases of koumiss-treatment, the dinner hour should be about 1 o'clock, and, after dinner, a repose of two hours before recommencing to take the koumiss. The doses should also be discontinued about 7 or 8 o'clock p.m. The presence of albumen in the urine is no indication that the koumiss-treatment should be interfered with by any drug-treatment for that symptom till the general health of the patient has improved; but, as long as the patient has to keep to his bed, the total consumption ought never to exceed two or three pints *per diem*. When the patient becomes able to take active exercise without fatigue, he may increase his doses advantageously according to his appetite.

In chronic pharyngitis, laryngitis, bronchitis, No. 2 or No. 3 koumiss will be found to act beneficially, even when relaxation and general weakness are great; but in ulceration, No. 1 or fresh No. 2 is more advisable. I have found it far superior even to Ems water in those complaints, when accompanied by copious expectoration and emaciation, and in large vomicas; and this corroborates Stahlberg's dictum that "koumiss has the properties of Ems water *plus* a great nutritious power." As to diseases of the mucous membranes of the urinary system, I can say, from my own experience, that its use proved successful in cases of renal colic with sandy deposit in the urine, and also with hæmaturia, but principally in catarrh of the bladder with copious mucous, or even muco-purulent sediment. For vaginal and urethral discharges, Nos. 2 and 3 will be found very useful. It is a physiological property of koumiss to lessen all discharges, but to stimulate the secretion of the urine, and to render it clear; often a kind of pressure or contraction of the bladder is produced, especially at the beginning, which, however, ceases in a few days, when, also, all cloudy, turbid, or dark appearances of the urine give way to a heavy limpid state; during the warmer season, diaphoresis takes the place of diuresis.

When the koumiss is taken only in small quantities, the appetite is always keen, but larger quantities are more satisfying, and preclude the necessity of solid food. For general use, the No. 2 state of the koumiss is to be preferred, as it is neither astringent nor aperient. In relaxation of the mucous membranes, and more particularly in chronic diarrhœa, No. 3 koumiss is indicated. On the other hand, when the secretory functions are impaired, as is often the case in constipation, No. 1 full koumiss must be employed, because of its mild aperient effect. I must note here, however, that this aperient effect can be imparted to the other properties of both Nos. 2 and 3 koumiss by mixing them with one-fourth or one-half of fresh milk at the moment of drinking. The use of bran-bread with salt will also sometimes neutralize the astringent effect of No. 3 koumiss, and counteract nausea. In warm weather, koumiss runs through all the changes very rapidly, and No. 3 koumiss spoils then sooner. As a general rule, fresh koumiss retains its No. 1 condition for two or three days in summer when kept cool immediately after it is bottled; from this time to the eighth day, it is No. 2 koumiss; beyond that period it is No. 3 koumiss, and retains its soundness for several months if kept cold. In the treatment of chronic cases, the use of koumiss should extend from six to eight weeks, *à peu près*. If there should be a recurrence of any of the symptoms, they may be checked at once by a repetition of a shorter course, or even a few bottles only. Previously to commencing the koumiss treatment, the patient should be carefully weighed. A patient on two quart bottles a day, appropriates so much nourishing matter, that his increase of flesh and weight cannot fail to be perfectly perceptible. Of course, there is an increase of weight corresponding to the more or less emaciated state of the patient, even if the koumiss be administered in very small doses; but the most surprising effect can always be observed when emaciation and prostration have been greatest (without fever). Even when the patient remains in bed, a pint bottle a day has shown a rapid increase of strength. The average increase of weight during a course I can state at six pounds, more or less; although, in some cases, twenty pounds and more are on record in eight weeks, or eight to eighteen ounces per day during the first ten days. In cases, however, where the increase of weight has been less marked, a great improvement in the patient's strength, spirits, and appearance will be noticed. Thus, we perceive that where the process of digestion and nutrition has been improved, the consequences are very soon apparent upon the system of circulation by an improved heart's action, better pulse, and freer capillary circulation, especially noticeable in the peripheral parts of the body. Here it produces a pleasant feeling of warmth all over, a healthy action of the skin, when the pores open, the vessels expand, and a healthy moisture and colour reappear. As a general rule, all other drinks, oily, pickled, salted, and smoked food, and all strong condiments, should be avoided during its use.

In conclusion, koumiss, though not a specific for any disease, is a benign agent in medicine, which merits serious consideration and study in both private and hospital practice. By its use the digestive organs are roused into activity, fat is deposited in the subcutaneous cellular tissue, the flesh becomes plump, and the complexion assumes freshness and colour, the dull eye assumes expression, and the depression of spirits gives way to animation; the respiration acquires more depth and regularity, as has been determined by the spirometer. Large doses have the effect of promoting a feeling of laziness and even sleep; but this sleep is of a most refreshing kind.

To give a list of diseases for which the koumiss treatment is applicable, appears to me quite irrational, as I should otherwise be compelled to name almost all diseases, because, generally speaking, nearly every disease may reduce, more or less, nutrition, and in such a condition koumiss is indicated; and more than this, it would even sound quite paradoxical to prescribe koumiss in a fracture of the thigh, although this is quite possible when such a fracture is accompanied or followed by anæmia, loss of flesh, or has become complicated by catarrh of lungs, stomach, etc.

These hints may suffice to show that koumiss is neither a specific nor a panacea, although rationally or logically, and practically or empirically, its use is a very extended and general one.

In order to prepare koumiss in an uniform state of excellence, the place of its manufacture must be quite to itself, so that the tendency of milk to absorb foreign odours and emanations may be free from the least encouragement. Moreover, the operative manager of the process should be a man of experience in the work, and always on the spot, to insure its proper progress. It is, therefore, not possible for a dispensing druggist to make its manufacture a branch of his pharmaceutical business. At the same time, there is no reason why hospitals, requiring large and fresh supplies daily, should not have a special apartment for its preparation, under the constant supervision of a duly qualified *employé*.

THE PRESERVATION OF PLANTS FOR HERBARIA.

In a very interesting series of articles which have appeared in the *Gardeners' Chronicle*, under the title of "Refuge for the Destitute," the following instructions are given for the preservation of botanical specimens and the construction of a *hortus siccus*. If we may judge by the numerous queries that reach us, many of our younger readers will be glad of the information contained in them. We therefore take the opportunity of reproducing them in our pages :—

1. *Method of Preserving.*—Specimens intended to be dried should be gathered on a fine day; if wet with rain they are liable to lose their colour, the great enemy to the preservation of which is *damp*. In readiness there should be at home half-a-dozen pieces of stout millboard, about 20 inches long by 15 in breadth, and a good stock of old newspapers, folded to about the same average dimensions; also a few quires of Bentall's "botanical drying paper," a few sheets of ordinary blotting paper, a few pieces of common tissue paper, cut to the size of one's hand, and half-a-dozen squares of cotton wadding, cut to the same length and breadth as the boards. No elaborate "press" is needed, with screws and pillars, and as for the lattice work ventilators sometimes prescribed they are nothing more than incumbrances. Using a board as a foundation, place upon it a couple of the folded newspapers; then dispose the plant in the middle, letting it fall naturally, but keeping the leaves and other parts as little crumpled as possible; cover it in turn with other newspapers, and thus go on with the specimens till all are safely deposited. The extra boards are to interpose if needful, the tissue paper is to lay, when necessary, over flowers of particular delicacy; the cotton wadding is to employ when the stem of the specimen is inordinately thick, so that a vacuum would be caused if the wadding were not there. A board at the top completes the preparations. Next put the pile in some convenient corner, and on the top of it a weight of several pounds. Folio volumes, a box of fossils, or three or four bricks, separately and neatly tied up as parcels, will serve the purpose. After twenty-four hours' pressing, the specimens will be found quite flat, but limp and full of moisture. Now shift them into the Bentall's paper, interposing blotting-paper or tissue-paper when the parts are very tender; newspapers also as intermediates between the Bentall, and press again. In a day or so the specimens should have a second shift. This time the Bentall, and everything else employed, should be made perfectly dry and warm before the fire, or by placing for a few minutes in the kitchen oven. A third and fourth shift, at intervals of twenty-four hours, again with warm dry Bentall (not moist warm, but dry warm), will ordinarily suffice, and now the specimens will be dry, and their colours perfectly fixed. It is of no advantage to employ Bentall for the commencing process, this being one simply of compression. Drying rarely commences for at least two days. The critical time is from the third day till the end of the week. A good plan, at the end of the week, is to expose the plant for several hours to a warm, dry atmosphere. To lie in damp papers is utter ruin to them. Repeated change into dry and warm ones is the secret of success. When travelling, the requisite pressure (should the house not furnish weights) is obtained by tight tying up with whipcord, across and twice athwart, after the manner of a tradesman's package.

2. *Preservation when Dried.*—When perfectly dry, the specimens should be laid out upon half-sheets of tolerably stiff white paper, and the half-sheets be placed within a whole sheet. The measure of the white paper should be about 22 inches by 16. This is larger than the regulation size adopted at Kew, but scarcely more expensive, and preferable for a reason that I shall have to mention presently. If the specimens are likely to be often handled and examined, or, at all events, by careless persons, it is desirable that they should be mounted. Some people employ horrible transverse straps of gum-paper, and even postage-stamp edgings; others smear and smudge with thin gum arabic; others resort to paste or to gum tragacanth, which is worst of all; some employ carpenter's glue, a cement unobjectionable except for the petals of flowers, and incomparable for thick stems, but very inconvenient on account of so soon becoming cold. The best cement yet devised is Marian's solution of india-rubber in naphtha. It is admirably adhesive, most easily applied, wants no warming before use, and should any be spilled or squeezed out beyond the margin of a leaf, when dry it can be rubbed off and leaves no trace. For cleanliness this cement is the most perfect yet discovered. Sometimes it is preferable to keep the specimens loose. Inferior ones can then be superseded by better; the venation of the leaves can be scrutinized when there is need, and a prodigious amount of labour is saved. At Kew, as soon as mounted, it is customary to wash the specimens with a solution of corrosive sublimate in spirits of wine, with a view to prevent attack by insects. Without offering any opinion as to the necessity of poisoning, I may say that in my own herbarium, scarcely anything in which is poisoned, I have not seen a hurtful insect for twenty-five years. In certain polyandrous flowers, the clematis, magnolia, hypericum, cistus, tulip tree, and a few crucifers, little things that I take to be "thrips" sometimes appear, hatched, I imagine, from eggs left among the stamens, but they soon die out of the way, and give no trouble. I attribute this absence of insects to the original thorough drying by means of hot paper. Unhappily the poisoning often extracts a yellow dye, so that if not performed till after the specimen is mounted, a bruise-like stain is communicated to the paper. This, of course, may be obviated by poisoning before mounting. When mounted, the name, date, and locality where gathered, should be written on the containing paper; if kept loose, the same particulars should be

stated on a ticket, and the ticket be attached to the specimen. As soon as fifty or a hundred are got together, they should be sorted according to their natural orders, a sheet being devoted to every order, with its name in bold writing on the outside. When the orders themselves become well illustrated, the genera should be isolated in similar manner; and when a genus becomes well illustrated, the particular species should have separate sheets. By this means continual expansion is provided for: there is a place for everything, and everything is kept in its place. The nomenclature and arrangement should be according to some published catalogue, the newer the better: a system, of course, is impossible. Finally, the sheets of specimens should be deposited in a suitable cabinet, or if a cabinet be not possessed, they may be wrapped in brown paper, marked outside as to the contents. This preserves them from the ingress of dust, which is often a sad blemish to a *hortus siccus*, where cleanliness ranks next to order and accuracy.

3. *What Plants to Preserve.*—Everything that is interesting in economic botany, useful in medicine, employed in art or science, curious and instructive in relation to structure and physiology, or in any way identified with floriculture. The object of the *hortus siccus* is to illustrate the plant in the most perfect manner possible. Such plants, accordingly, as grasses and ferns, should be procured in every stage, from youngest to oldest. Cotyledons, root-leaves, sprays showing plumules, others showing stipules, autumnal foliage, leaves bearing parasitic fungi, should all be treated as though they were flowers—specimens adequately exemplifying the various structures being laid alongside. Seed-pods likewise, and even berries, the latter dried in wadding, should be introduced, and packets of the ripe seed should be kept in envelopes. Tendril-bearing plants, such as the purple-tufted vetch, and twiners, such as the hop, should be got while clinging to their prop, and the two be dried together. Then we see the mode of life as well as the organs. Series such as indicated illustrate the whole biography of a plant, and this, no matter how common it is, is sure to be interesting. Be not led away by any foolish desire for "rarities," thanking God rather for the world's "common things." A good series of illustrations of a few hundreds of curious common plants is better than an herbarium distinguished only for quantity, and for the damage it has done to the botanical features of a district. Here let me enter my protest against the offering of prizes for collections of rare plants. If the societies who award premiums for diligence in extirpation—for that is what rare plant collecting comes to practically—would foster the preparation of good scientific sets or conspectuses, with dissections of every part, limiting the requisition to some extensive and important natural order, they would do some real service to the cause of botany, instead of simply abetting the selfish and covetous. Products also should be introduced, such as lace bark and the bark of the paper birch, with rice-paper, Broussonetia cloth, Böhmeria cloth, and anything else that lies flat and helps to interpret the plant. To a certain extent the well-prepared *hortus siccus* thus tells its tale, not only of structure and beauty, but of the serviceableness of the plant to mankind. Never be content, except where unavoidable, with a fragment. Every specimen should be large and handsome, and the greater portion of the *hortus siccus* co-extensive with the room given by the paper. Fragments, of course, are better than nothing, but they should be regarded as only specimens *pro tem.*

4. *Introduction of Drawings.*—When the *hortus siccus* has acquired value from the number and merit of its dried specimens, the time has arrived to incorporate drawings. Drawings are absolutely needful to the illustration of certain classes of plants, orchids, for example, irids, amaryllids, cactuses, and even roses and utricularias. In these cases they show the flower, its form, and size, and colour, while the specimen shows the habit, whereas neither is sufficient while standing alone. Yuccas, cycads, etc., likewise require drawings for their proper illustration, and a wonderful charm is given at the same time to one's sprays of oak and beech, walnut and ash, by portraits of the full-grown trees. Of course it is easy to refer to books containing plates, when we wish to interrogate a picture or a portrait, but when laid side by side the whole idea is presented at once. Additional interest is given by the introduction of drawings of great antiquity, those, for example, published by Fuchsius, in 1542. This enables us to see at a glance what is the history of the plant, especially when the oldest are supplemented by the newest—a process not always favourable to the latter, not even when the plates have come from the last edition of the 'English Botany.'

As I am not fashioning the theory or hypothesis of a *hortus siccus*, making believe what *should* be, but describing one that stands only a dozen yards from where I write, I may say, for the encouragement of any who feel disposed to construct a similar one, that a few years' steady work has resulted in the bringing together of some seven or eight thousand different species of plants, many of them exemplified by a dozen different specimens, and that the number of drawings is about the same. The *hortus siccus* I have before me contains illustrations, more or less perfect, of everything botanical that has ever held a place in human interest. It is in the presence of the drawings that the desirableness of a large paper now finds reason, since it holds, without need of clipping them, the folio plates of the 'Flora Londinensis;' those also of the splendid volumes of Ledebour, Pallas, and Jacquin. Even Roxburgh's Coromandel plants require only a single fold.

Such, then, is the refuge I recommend to dwellers in towns, who love flowers, and plants, and trees, but to whom the sweet pastime of their culture is denied. Begin soon enough, and the *hortus siccus* is a life-long exercise in everything implied in order and neatness, accuracy of scientific observation and discrimination, and in exact and logical mental work. It is an unfailing amusement; it is profoundly educational alike to one's-self and to others; it is a commentary on one's tastes, and a history of one's experience.

PRELIMINARY ACCOUNT OF AN INVESTIGATION ON THE TRANSMISSION OF SOUND BY THE ATMOSPHERE.*

BY JOHN TYNDALL, D.C.L., LL.D., F.R.S.

(*Concluded from p.* 734.)

On the 24th, when observations were made afloat in the steam-tug Palmerston, the syren exhibited a clear mastery over gun and horns. The maximum range was $7\frac{3}{4}$ miles. The wind had changed from W.S.W. to S.E., then to E. As a consequence of this, the syren was heard loudly in the streets of Dover. On the 27th the wind was E.N.E.; and the syren-sound penetrated everywhere through Dover, rising over the moaning of the wind and all other noises. It was heard at a distance of 6 miles from the Foreland on the road to Folkestone, and would probably have been heard all the way to Folkestone had not the experiments ceased. Afloat and in the axis, with a high wind and sea, the syren, and it only, reached to a distance of 6 miles; at 5 miles it was heard through the paddle noises. On the 28th, further experiments were made on the influence of pitch, the syren when generating 480 waves a second being found more effective than when generating 300 waves a second. The maximum range in the axis on this day was $7\frac{1}{2}$ miles.

The 29th of October was a day of extraordinary optical transparency, but by no means transparent acoustically. The gun was the greatest sufferer. At first it was barely heard at 5 miles; but afterwards it was tried at $5\frac{1}{2}$, $4\frac{1}{2}$, and $2\frac{1}{2}$ miles, and was heard at none of these distances. The syren at the same time was distinctly heard. The sun was shining strongly; and to its augmenting power the enfeeblement of the gun-sound was doubtless due. At

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* Communicated to the Royal Society, January 15th, 1874. (Proceedings, vol. xxii. p. 58.)

3½ miles, subsequently, dead to windward, the syren was faintly heard; the gun was unheard at 2¾ miles. On land the syren and horn sounds were heard to windward at 2 to 2½ miles, to leeward at 7 miles; while in the rear of the instruments they were heard at a distance of 5 miles, or five times as far as they had been heard on October 23.

The 30th of October furnished another illustration of the fallacy of the notion which considers optical and acoustic transparency to go hand in hand. The day was very hazy, the white cliffs of the Foreland at the greater distances being quite hidden; still the gun- and syren-sounds reached on the bearing of the Varne light-vessel to a distance of 11½ miles. The syren was heard through the paddle noises at 9¼ miles, while at 8½ miles it became efficient as a signal with the paddles going. The horns were heard at 6¼ miles. This was during calm. Subsequently, with a wind from the N.N.W., no sounds were heard at 6½ miles. On land, the wind being across the direction of the sound, the syren was heard only to a distance of 3 miles N.E. of the Foreland; in the other direction it was heard plainly on Folkestone Pier, 8 miles distant. Both gun and horns failed to reach Folkestone.

Wind, rain, a rough sea, and great acoustic opacity characterized October 31st. Both gun and horns were unheard 3 miles away, the syren at the same time being clearly heard. It afterwards forced its sound with great power through a violent rain-squall. Wishing the same individual judgment to be brought to bear upon the sounds on both sides of the Foreland, in the absence of our steamer, which had quitted us for safety, I committed the observations to Mr. Douglass. He heard them at 2 miles on the Dover side, and on the Sandwich side, with the same intensity, at 6 miles.

A gap (employed by the engineers in making arrangements for pointing the syren in any required direction) here occurred in our observations. They were resumed, however, on November 21st, when comparative experiments were made upon the gun and syren. Both sources of sound, when employed as fog signals, will not unfrequently have to cover an arc of 180°; and it was desirable to know with greater precision how the sound is affected by the direction in which the gun or syren is pointed.

The gun, therefore, was in the first instance pointed on us and fired, then turned and fired along a line perpendicular to that joining us and it. There was a sensible, though small, difference between the sounds which reached us in the two cases. A similar experiment was made with the syren; and here the falling off when the instrument was pointed perpendicular to the line joining us and it was very considerable. This is what is to be expected; for the trumpet associated with the syren is expressly intended to gather up the sound and project it in a certain direction, while no such object is in view in the construction of the gun. The experiments here referred to were amply corroborated by others made on November 22nd and 23rd.

On both of these days the Galatea's guns were fired to windward and to leeward. The aërial echoes in the latter case were distinctly louder and longer than in the former. The experiment has been repeated many times, and always with the same result.

In front of the Cornhill Coastguard Station, and only 1¼ mile from the Foreland, the syren, on the 21st, though pointed towards us, fell suddenly and considerably in power. Before reaching Dover Pier it had ceased to be heard. The wind was here against the sound; but this, though it contributed to the effect, could not account for it, nor could the proximity of the shadow account for it. To these two causes must have been added an acoustically flocculent though optically transparent atmosphere. The experiment demonstrates conclusively that there are atmospheric and local conditions which, when combined, prevent our most powerful instruments from making more than a distant approach to the performance which writers on fog signals have demanded of them.

On November 24th the sound of the syren pointed to windward was compared at equal distances in front of and behind the instrument. It was louder to leeward in the rear than at equal distances to windward in front. Hence, in a wind, the desirability of pointing the instrument to windward. The whistles were tested this day in comparison with the syren deprived of its trumpet. The Canadian and the 8-inch whistles proved the most effective; but the naked syren was as well heard as either of them. As regards opacity, the 25th of November almost rivalled the 3rd of July. The gun failed to be heard at a distance of 2·8 miles, and it yielded only a faint crack at 2½ miles.

Meanwhile this investigation has given us a knowledge of the atmosphere in its relation to sound, of which no notion had been previously entertained. While the *velocity* of sound has been the subject of refined and repeated experiments, I am not aware that since the publication of a celebrated paper by Dr. Derham, in the 'Philosophical Transactions' for 1708, any systematic inquiry has been made into the causes which affect the *intensity* of sound in the atmosphere. Derham's results, though obtained at a time when the means of investigation were very defective, have apparently been accepted with unquestioning trust by all subsequent writers—a fact which is, I think, in some part to be ascribed to the *à priori* probability of his conclusions.

Thus Dr. Robinson, relying apparently upon Derham, says, "Fog is a powerful damper of sound," and he gives us physical reason why it must be so. "It is a mixture of air and globules of water, and at each of the innumerable surfaces where these two touch, a portion of the vibration is reflected and lost." And he adds further on, "The remarkable power of fogs to deaden the report of guns has been often noticed."

Assuming it, moreover, as probable that the measure of "a fog's power in stopping sound" bears some simple relation to its opacity for light, Dr. Robinson, adopting a suggestion of Mr. Alexander Cunningham, states that "the distance at which a given object, say a flag or pole, disappears, may be taken as a measure of the fog's power" to obstruct the sound. This is quite in accordance with prevalent notions; and granting that the sound is dissipated, as assumed, by reflection from the particles of fog, the conclusion follows that the greater the number of the reflecting particles, the greater will be the waste of sound. But the number of particles, or, in other words, the density of the fog, is declared by its action upon light; hence the optical opacity will be a measure of the acoustic opacity.

This, I say, expresses the opinion generally entertained, "clear still air" being regarded as the best vehicle for sound. We have not, as stated above, experimented in really dense fogs; but the experiments actually made entirely destroy the notion that clear weather is necessarily better for the transmission of sound than thick weather. Some of our days of densest acoustic opacity have been marvellously clear optically, while some of our days of thick haze have shown themselves highly favourable to the transmission of sound. Were the physical cause of the sound-waste that above assigned, did that waste arise in any material degree from reflection at the limiting surfaces of the particles of haze, this result would be inexplicable.

Again, Derham, as quoted by Sir John Herschel, says that "falling rain tends powerfully to obstruct sound." We have had repeated reversals of this conclusion. Some of our observations have been made on days when rain and hail descended with a perfectly tropical fury; and in no single case did the rain deaden the sound; in every case, indeed, it had precisely the opposite effect.

But falling snow, according to Derham, offers a more serious obstacle than any other meteorological agent to the transmission of sound. We have not extended our observations at the South Foreland into snowy weather; but an observation of my own made on December 29th, in

the Alps, during a heavy snow-storm, distinctly negatives the statement of Derham.

Reverting to the case of fog, I am unable in modern observations to discover anything conclusive as to its alleged power of deadening sound. I had the pleasure of listening to a very interesting lecture on fog-signals delivered by Mr. Beazeley before the United Service Institution; and I have carefully perused the printed report of that lecture, and of a paper previously communicated by Mr. Beazeley to the Institution of Civil Engineers. But in neither of these painstaking compilations can I find any adequate evidence of the alleged power of fogs to deaden sound.

Indeed, during the discussion which followed the reading of Mr. Beazeley's paper, an important observation in an opposite sense was mentioned by Mr. Douglass, to whose ability and accuracy as an observer I am able to bear the strongest testimony. Mr. Douglass stated that he had found in his experience but little difference in the travelling of sound in foggy or in clear weather. He had distinctly heard in a fog, at the Smalls Rock, in the Bristol Channel, guns fired at Milford Haven, 25 miles away. Mr. Beazeley, moreover, has heard the Lundy Island gun "at Hartland Point," a distance of 10 miles, during dense fog. Mr. Beazeley's conclusion, indeed, accurately expresses the state of our knowledge when he wrote. In winding up his paper, he admitted "that the subject appeared to be very little known, and that the more it was looked into the more apparent became the fact that the evidence as to the effect of fog upon sou d is extremely conflicting." When, therefore, it is alleged, as it is so often alleged, that the power of fogs to deaden sound is well known, the disjunctive *not* is to be inserted before the predicate.

The real enemy to the transmission of sound through the atmosphere has, I think, been clearly revealed by the foregoing inquiry. That enemy has been proved to be, not rain, nor hail, nor haze, nor fog, nor snow—not water, in fact, in either a liquid or a solid form, but water in a vaporous form, mingled with air so as to render it acoustically turbid and flocculent. This acoustic turbidity often occurs on days of surprising optical transparency. Any system of measures, therefore, founded on the assumption that the optic and acoustic transparency of the atmosphere go hand in hand must prove delusive.

There is but one solution of this difficulty: it is to make the source of sound so powerful as to be able to endure loss by partial reflection, and still retain a sufficient residue for transmission. Of all the instruments hitherto examined by us the syren comes nearest to the fulfilment of this condition; and its establishment upon our coasts will, in my opinion, prove an incalculable boon to the mariner.

An account of the observations made during the recent fog will be included in the paper shortly to be presented to the Society. These observations add the force of demonstration to others recorded in the paper, that fogs possess no such power of stifling sound as that hitherto ascribed to them. Indeed, the melting away of fog on December 13th was accompanied by an acoustic darkening of the atmosphere, so great that, at a point midway between the eastern end of the Serpentine, where a whistle was sounded; and the bridge, the sound possessed less than one-fourth of the intensity which it possessed on the day of densest fog.

Thus, I think, has been removed the last of a congeries of errors which for more than a century and a half have been associated with the transmission of sound by the atmosphere.

THE ESTIMATION OF SUGAR BY MEANS OF IRON.*

BY E. RIFFARD.

It is known that tartaric, citric, and malic acids, albumen and sugar, possess the property of preventing the precipitation of salts of iron in alkaline solutions. Peroxide of iron in solution in an acid liquid not containing sugar is precipitated directly that the liquid is neutralized by ammonia; but if the iron and the sugar be present in certain proportions, or if the sugar be in excess, there is obtained, after saturation with ammonia, a sucro-ferric ammoniacal compound of a fine red colour, which remains in solution, provided that the liquid contains none of the alkaline earth metals. Having studied the method based on those principles of estimating tartaric acid indicated by M. Juette, the author sought to apply it to the estimation of sugar.

It is, however, necessary to vary the process according to the state of the peroxide of iron in the solution. If it be in the, as yet, imperfectly understood state known as modified peroxide, which is produced by adding a few drops of hydrochloric acid to a solution of crystallized perchloride of iron, 100 milligrams of iron require, to remain in solution in the presence of ammonia 3·71 grams of sugar. If, on the contrary, the solution is prepared by simply dissolving crystallized perchloride of iron in pure water without any addition of acid, 100 milligrams of iron only require 2·587 grams of sugar to remain in solution. If the solution contain this or a larger quantity of sugar, upon adding ammonia, so as to render the liquid clearly alkaline, after agitating freely, a red solution is obtained which is perfectly and permanently limpid. But if a smaller quantity of sugar be present, then, upon the addition of ammonia in excess, the solution, at first milky, quickly throws down the characteristic precipitate of peroxide of iron.

The soluble compound which is formed when an equivalent or more of sugar is present is permanent in the presence of alcohol and of ether; but it is decomposed by heat or by lime salts, and its precipitation is induced by ammoniacal salts, added in excess. Experiments, however, have shown that the error that might result from precipitation produced by hydrochlorate of ammonia formed in the solution may be neglected. In operating, 25·87 grams, or 37·10 grams, according to the state of the ferric solution, of the sugar to be tested are dissolved, and a few drops of oxalate of ammonia added to precipitate the lime; the solution is then filtered, and completed to a volume of 250 cubic centimetres; 25 cubic centimetres are taken first, and for n per cent. of pure sugar present in the specimen, n per cent. of the 100 milligrams of iron may be added, and will remain in solution. Thus the following results will be obtained:—

With n milligrams of iron . .	Clear solution.
With $n+1$,, ,, . . .	Precipitate.

n being the percentage of sugar which the specimen contains.

The action of inverted sugar is more powerful than that of crystallizable sugar, 0·357 gram of crystallizable sugar inverted by hydrochloric acid being sufficient to retain in solution 100 milligrams of iron in the state of modified peroxide. As certain sugars, principally exotic, contain inverted sugar, which might falsify the results, the author avoids this cause of error by shaking the sugar with cold 95° alcohol and filtering the liquor. The inverted sugar and some organic acid substances pass into solution, whilst the sugar remains undissolved. In numerous experiments the author has found this process to give results identical with those given by the saccharometer.

AMOUNT OF AMMONIA IN THE ATMOSPHERE AT DIFFERENT HEIGHTS.

M. Truchot has recently presented to the French Academy of Sciences a series of determinations on this point. By means of a peculiar aspirator the air was made to pass through acidulated water in quantities of from 5 to 10 cubic metres, and the quantity of ammonia then determined. At Clermont-Ferraud, 395 metres above the sea level one cubic metre of air was found to contain,

* Abstracted from the *Moniteur Scientifique* [3], iv. 831.

August 28th, 1·12 milligrams of ammonia; at the summit of the Puy-de-Dôme, 1446 metres elevation, on August 27th, 3·18 milligrams; and on the summit of the Pic-de-Sancy, 1884 metres high, 5·55 milligrams, on August 29th. At the time when this last determination was made the weather was very cloudy and misty, and another was therefore made on October 6th, when the air was clear, and nearly the same result obtained, viz., 5·27 milligrams in the cubic metre. The general result of the observations was, therefore, that the atmosphere contains a larger proportion of ammonia in the neighbourhood of the clouds than nearer the surface of the earth. In Clermont itself the proportion varied between 0·93 and 2·79 milligrams; the proportion was larger with gentle rain, and especially during mist, than when the air is clear, a result obtained previously by M. Boussingault. The proportion of ammonia appears to vary inversely as that of carbonic acid, the amount of this latter being, at the three elevations named, 0·632, 0·405, and 0·342 milligrams in the litre.

PERIODIC MOTIONS OF LEAVES AND PETALS.

These phenomena, on which much has recently been written in both England and Germany, have been the subject of a fresh series of observations by the German botanist Batalin. He divides the various instances of motion into three groups, viz.: (1) Rapid automatic motions caused by a special motile organ, the pulvinus, at the base of the leaf-stalk; (2) Diurnal motions, not so rapid, but also resulting from a special motile organ; and (3) Diurnal motions belonging to the whole of the leaf-stalk, and partially also to the surface of the leaf, but not connected with the presence of a pulvinus. The third of these classes, to which belong the motions of petals which cause the opening and closing of flowers, were the special subject of Batalin's observations. The ordinary explanation of the phenomenon has been the different degree of tension in the two sides of the leaf caused by a difference in the amount of water contained in them, which explanation has, however, already been shown by Pfeffer not to meet all the cases. Batalin agrees with Pfeffer's conclusions, and considers the main cause of the motion to be unequal growth of the two sides caused by alternating differences in the light, temperature, and turgescence. He believes that the same cause is also one of the most efficient in the other classes of periodic motion connected with special motile organs.

THE PROPOSED PHARMACY BILL FOR IRELAND

On Friday, the 20th February, an influential deputation, representing the apothecaries of Dublin and Belfast, waited by appointment upon the Governor and Directors of the Apothecaries' Hall of Ireland to state their views regarding the proposed Pharmacy Bill. The deputation at some length stated their strong objection to any measure by which the present standard of pharmaceutical knowledge should be lowered; pointed out that in England for years past strenuous efforts had been made by the Pharmaceutical Society to compel those engaged in compounding medicines to be properly educated for that purpose; showed the difference between the two kingdoms in that respect, that while in Ireland for nearly 100 years every person who practised pharmacy was compelled by law to attend a prolonged course of study and undergo a strict examination prior to his doing so, in England and Scotland any person, no matter how unqualified, might keep open shop for that purpose.

It was pointed out that very few apothecaries practised as physicians upon their licence only, they having almost invariably (if practitioners) some other qualification. The Apothecaries' Hall had in itself power to do away with the medical and surgical classes and examinations, and in that case it would become what many of the deputation wished—a strictly pharmaceutical body. They thought that while exceptions might fairly, at first, be made in cases where a person showed sufficient cause, that in general an apprenticeship of not less duration than three years, together with attendance at a course of lectures on chemistry, materia medica, and botany should be enforced. The druggists in Ireland had no reason to complain; no one wished to deprive them of any right or privilege they had heretofore possessed; while the apothecaries who had passed through an extensive and expensive course of study (many of them merely to keep open shop) might fairly do so, were their privileges taken from them. The change was for the advantage of the public or it was not; if the latter, it should not be made; if the former, the apothecaries ought not to suffer.

A member of the deputation called attention to the number of unqualified persons in Dublin who compounded prescriptions, and gave an instance which had occurred a few days previously, in which an ordinary prescription had been compounded by a so-called druggist in a grossly incorrect manner.

Dr. Leet replied to the remarks that had been made, and stated that the Apothecaries' Hall had no wish and no intention to lower the standard of knowledge required for compounding medicines, except in so far as related to medical and surgical subjects. He could not allow the deputation to forget that the apothecaries were by Act of Parliament registered practitioners of medicine, and therefore no change such as that suggested by the deputation could be entertained by the Governor and Directors of the Hall; they were, however, willing and ready to consider any reasonable amendments to the proposed bill, and were anxious to act fairly in the matter. They did not wish to continue the present arrangements, by which, as he believed, many towns in Ireland were deprived of the service of pharmaceutists.

Dr. Collins followed, and objected to the stand taken by the deputation. He strongly supported Dr. Leet, and would not be in favour of lowering the standard of professional attainment at present required by the Apothecaries' Hall. Some change as regards the compounding of medicines in this country should be made, and he thought that the proposed bill, which might be modified, would be a useful measure.

Drs. Wise, Holmes and Ryan (Governor) also took part in the discussion.

The following resolutions, approved of by the deputation, were then read:—

1. That the matriculation examination for the Pharmaceutical Society should be as extensive as that of any Medical licensing bodies.
2. That an apprenticeship of not less than three years should be demanded.
3. That every candidate for the final examination should produce his matriculation certificate, his indenture of apprenticeship, together with certificate of attendance on a course of lectures on each of the following subjects: Chemistry, Botany, Materia Medica and Pharmacy.
4. That a direct and fair representation of apothecaries on the board should be granted.

Some of the deputation objected to a clause in the bill by which for six months after the passing thereof the Governor and Directors of the Hall would have unlimited control over the proposed Pharmaceutical Society, and suggested that six gentlemen chosen by the apothecaries who registered themselves as Pharmaceutical Chemists, with six others to be appointed by the Apothecaries' Hall, should have the management *ab initio* of the new Society.

The deputation having been informed that their views would be carefully considered, thanked the Court for the courtesy shown them and retired.

The Pharmaceutical Journal.

SATURDAY, MARCH 21, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PUBLICITY OR PELF?

THE land of the setting sun has long had attributed to it more than a fair share of shams, from wooden nutmegs down to bogus diplomas. But no reader of American newspapers can deny that if the shams do exist the gentlemen of the fourth estate are not sparing in words of indignation against them, at least when their concoctors do not happen to be advertisers. An attempt to curb this license of language has been recently made under circumstances that will present points of interest to many of our readers. A maker of "articles of merchandise, generally and publicly known as Dr. RICHAU'S Golden Remedies," took umbrage that he should have been included in a common paragraph, which appeared in the *American Agriculturist*, under the heading "Sundry Humbugs," with the whole tribe of those who advertise "marriage guides," "female medicines," "eye-doctors," "consumption curers," as well as other "quacks and impostors;" and that, further, some inquiring correspondents should have been roundly informed that the "Golden Remedies" were "nonsensical quackery."

Twenty-five thousand dollars was the estimate of the amount of damage done by this mud-throwing, and Mr. DAVID RICHARDS, the proprietor and manufacturer of Dr. RICHAU'S Golden Remedies went into a law court with a claim for that amount against the delinquent *American Agriculturist*. But, like another claimant, he appears to have ignored the possible results of an artful cross-examination. A "Golden Elixir de Amour [*sic* in two reports], or Elixir of Love," had been advertised as being composed of the most "powerful ingredients of the vegetable kingdom; harmless, but speedy in restoring healthy action." Further, it was described as being "the fountain of youth to old age, the rejuvenator of pristine vigour to the young; to the barren woman of our land it is a special blessing," and so on, *usque ad nauseam*.

Mr. RICHARDS was invited to inform the Court —and the public—as to the names of these "most powerful ingredients," in order to assist in coming to a judgment on the amount of wrong done. But he was evidently of the same opinion as King SOLOMON, that "a prudent man concealeth knowledge," and so he recoiled from becoming a public benefactor, except under the cloak of secrecy and the auspices of the medicine stamp. Nevertheless, his modest diffidence lost him his cause; for upon his refusing to give any other answer than that it was a "secret compound of various ingredients, which possess great medicinal properties," the Court ordered that the complaint should be dismissed with costs. Defeated, but dissatisfied, the plaintiff appealed to the Supreme Court, where he was told that to bring an action of libel for injury alleged to be done to his trade in his medicines by denouncing them as arrant quackery, and at the same time to protect himself against exposure by claiming them to be valuable secrets, was a proposition that could not be maintained.

Probably most of our readers, if they had to pronounce upon this case, would return a verdict of "Served him right," and in our opinion they would not be very wrong. But it should not be forgotten that the question has another aspect. The device of asking the manufacturer of a proprietary article to disclose his secret is not a new one, and it requires no great effort of the imagination to conceive that a remedy entitled to a considerable amount of eulogium might be attacked in a similar manner, and yet that the proprietors might shrink from the publicity that would rob them of a source of revenue. Nevertheless, from failure of even a just cause in a law court, unfavourable conclusions would be sometimes drawn, and it might prove better to—

> "Bear those ills we have,
> Than fly to others that we know not of.
> Thus conscience does make cowards of us all."

ADDITIONS TO THE PHARMACOPŒIA.

WE are glad to be able to state that the long-expected Additions to the British Pharmacopœia of 1867 are now announced. They are thirty-four in number, and are mainly those which have been indicated by Dr. REDWOOD at the Evening Meetings of the Pharmaceutical Society. For the convenience of persons already possessing copies of the British Pharmacopœia, the Additions are published separately at a low price. We hope to have an opportunity to notice these additions in detail in our next number.

AN AFRICAN VESICANT.

IN his new work, 'The Heart of Africa,' Dr. SCHWEINFURTH says that the most remarkable plant found in the islands of the Meshera is the *Adenia venenate*, a climbing passion flower. The plant is remarkable for the large development of its stem, which grows half under the soil, and throws out a protuberance some cubic feet in extent. At the end of this protuberance the stem breaks out into a number of long climbing stalks, which mount up to a considerable height. The leaves are bright green, and are applied by the natives of Central Africa for vesicating purposes. They are, however, poisonous,

and are said to have proved fatal to camels, and thus been an obstacle to the acclimatization of those animals in the country.

POISONING BY CROTON SEEDS.

The Medical Times and Gazette reports that twenty-four persons have been poisoned in the south of Ireland, through eating some seeds of *Croton Tiglium*, which had washed ashore in Tramore Bay, it is supposed from a Dutch vessel that had foundered a few days before. The "nuts" were found by the country people and eaten accordingly: the consequences may be guessed, but fortunately no death is known to have resulted.

HUNTER *v.* FREELAND.

In our "Correspondence" columns will be found an appeal for subscriptions towards assisting the defendant to the above suit, which was reported at p. 565, in liquidating the heavy legal expenses incurred. Although it must be owned that there was a certain amount of carelessness or ignorance exhibited by the servant of the defendant, yet the penalty appears greatly disproportioned to the offence, and some amount of sympathy is due to a man who was avowedly specially punished as "an example to chemists."

INTERNATIONAL BOTANICAL CONGRESS AT FLORENCE.

In connection with the International Exposition to be held this year in Florence, the Tuscan Royal Society of Horticulture has arranged for the assembly of an International Botanical Congress. We are informed that the most illustrous botanists of Europe have already intimated their intention to take part in this Congress.

PRIZE FOR THE DETECTION OF ALCOHOL.

A proposition has been made in the French National Assembly by M. Léon Say to institute a prize of 50,000 francs, for the benefit of the person who shall discover a practical method of determining immediately the presence of alcohol in mixtures. The proposition was ordered to be printed and circulated.

SPECIES OF EUCALYPTUS AT KEW.

The *Gardeners' Chronicle* calls attention to two species of the genus *Eucalyptus* which are now represented in the temperate house at Kew. One, *E. cornuta*, is remarkable for its curious horn-like calyx; the other, *E. citriodora*, is worth cultivating, even as a small pot plant, for its delightful fragrance, which is described as being as powerful as that of the Aloysia, but more delicate.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

March 11th, 12th, 13th, and 18th, 1874.

Present (on the 11th)—Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Taylor, and Umney.

(12th and 13th)—Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

(18th)—Messrs. Allchin, Barnes, Carteighe, Corder, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Taylor, and Umney.

Dr. Greenhow was present on the 11th on behalf of the Privy Council.

MAJOR EXAMINATION.

Four candidates were examined, and declared qualified to be registered as Pharmaceutical Chemists:—

*Pickard, William.....Yeovil.
*Hetherington, Martin Luther Highbury.
Kemble, James .....St. Austell.
Thompson, Lawrence Joseph ...Thirsk.

MINOR EXAMINATION.

Ninety-three candidates were examined. *Sixty-one* failed. The following *thirty-two* passed, and were declared qualified to be registered as Chemists and Druggists:—

*Coleman, Alfred .....Southampton.
*Gilders, George Pollard .....St. Leonard's.
*Blake, Charles Alexander .....London.
*Whyte, Alexander .....London.
Geldart, William .....Seacombe.
Locke, George .....Aylesbury.
Piper, Walter George .....Norwich.
Equal. Allis, William .....Alford.
Equal. Gostling, William Ayton.....Diss.
Cattell, Thomas Bellamy.....Coventry.
Black, William Jones .....Bangor.
Equal. Howard, Robert .....Clitheroe.
Equal. Morgan, Augustus Kinsey .....Nash, Mon.
Palmer, William Joseph .....King's Lynn.
Equal. Coles, William .....Great Missenden.
Equal. Geldart, John .....Whitehaven.
Equal. Stevens, Richard .....Leeds.
Gibbs, Joseph .....Tunbridge Wells.
Ordish, Thomas.....Manchester.
Equal. Miller, Cecil Bradley .....Wellingborough.
Equal. Wise, James .....High Wycombe.
Evans, Daniel William.....Carmarthen.
Lambert, William Henry.....Hull.
Snow, Arthur Legge.....Ross.
Ness, Thomas Henry.....Boston.
Baxter, Thomas Moore.....Wisbeach.
Smith, Richard Henry .....Leeds.
Stiling, John Edward .....Exeter.
Whewell, William Edmund.....Birmingham.
Booth, William Grounds .....Manchester.
Mitton, Richard .....Embsay.
Crossley, Newbold.....Bury.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's examination:—

Certificates of the University of Cambridge.

Ekins, Thomas George.....Huntingdon.
Hobson, Charles, jun. .....Windsor.
Lumby, Fred. .....Nottingham.

Certificate of the University of London.

Jones, George Henry .....Hanley.

Certificates of the College of Preceptors.

Churchouse, W. J. Franklin ...Chard.
Marshall, Frank .....Ely.

* Passed with Honours.

Provincial Transactions.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

On February 3rd, a special meeting of the above Society was held to hear a paper on Yeast, which had been sent by Mr. Stott, of Leeds. The paper first traced the derivation of the words barm and yeast, beer and ale, and then described the production, mode of growth, and characters of the *Torula*. The labours of Priestley in the study of fermentation were touched upon, and the various stages in the conversion of saccharine into spirituous and the spirituous into acidulous liquids explained.

On March 16th the monthly meeting was held, Mr. H. J. Masters in the chair. Mr. G. C. Druce having read the minutes and correspondence, it was decided to purchase a copy of 'Hooker's Flora,' so that the apprentices competing for the Herbarium prize might have their choice of floras. As several apprentices had only recently come to Northampton, it was resolved that they should be admitted for the summer session without payment, on condition of their joining as members in October.

Mr. Campling read a paper on Pyroxylin, dwelling more particularly on the explosive form (trinitro-cellulose), showing its superiority over gunpowder in the non-production of smoke and the freedom from "fouling." Having described its preparation and its value in blasting, through its possessing much greater explosive power than gunpowder, Mr. Campling instanced its employment in torpedo warfare. He then referred to the difference between the explosive characters of gun-cotton and gunpowder; the former, if ignited in the open air in an uncompressed state, would simply burn, whilst the latter, treated in a similar manner, would explode.

Mr. H. Kemp then read a paper on the Source of Vegetable Matter. The production of charcoal was first explained, and the average amount of carbon in the vegetable kingdom was stated to be 45 per cent. When the immense extent of the forests in different parts of the world was considered, and particularly in South America, where, according to Humboldt, monkeys might travel hundreds of miles on the tops of the trees, some idea of the gigantic quantity of carbon stored up could be conceived. It might be asked, Did that carbon occur in the soil, and, if not, where else could the 1734 lb. of carbon —contained in 4800 lb. of wheat, the average yield of an acre—come from? Mr. Kemp then referred to the numerous experiments which have been made, the results of which all tend to show that the carbon is derived from the atmosphere, which is again replenished from the animals who live upon the vegetation, and by the direct decomposition of vegetation itself.

The following statistics were given as the treatment for seventeen years of the same piece of land on which wheat was grown:—

	Gross Produce.	Organic Matter.	Carbon.
1. Unmanured land	2434	1963	880
2. Land treated with mineral salts	2912	2347	1052
3. Ditto with ammonia	6394	5149	2308
4. Ditto with farm-yard manure .	6059	4883	2183

Votes of thanks having been passed, after a brief discussion the proceedings terminated.

LIVERPOOL CHEMISTS' ASSOCIATION.

The tenth general meeting of this Association was held at the Royal Institution, on Thursday, February 26th. There was a very good attendance.

After the reading of the minutes of the previous meeting, the announcement of some donations, and the opening of the question-box, the first paper was read by Mr. Edward Davies, F.C.S., on "Ozone." He said it was only a short communication with regard to ozone, supplementary to a paper read before the Association some time since. He stated that the existence of ozone in the atmosphere, though very probable, was not absolutely proved, and that the starch papers used for its detection and estimation were useless for both purposes. The papers used by M. Houzeau, prepared by dipping red litmus paper into a 1 per cent. solution of iodide of potassium, were advocated as much more to be relied on. M. Houzeau only finds $\frac{1}{700000}$th part of ozone in the atmosphere as a maximum. Allusion was also made to the supposed connection of deficiency of ozone with epidemic disease, especially cholera; and from statements made in a recent work by Dr. Fox on ozone, it was found that no such connection has been proved, as out of eighteen observations in different places, by various observers, nine tended to show that there was such a connection, and nine were adverse to the opinion. Before endeavouring to prove that the healthiness of a place is due to the large amount of ozone in its atmosphere, it should be shown that ozone is conducive to health. Some experiments by Mr. Dewar and Dr. McKendrick, in which frogs and mice were exposed to the action of ozonized air, were described, and special attention called to the fact that the animals when dead had their blood in a venous state, and that the action was a depressing, instead of a stimulating one, as would have been expected from the oxidizing action of ozone. The conclusions drawn were, that more certain means of detecting and estimating ozone were necessary before any opinions could be of value with regard to its importance as a constituent of the atmosphere, and that all statements with regard to its connection or otherwise with disease were thus rendered perfectly useless. Also, that until experiments had been made with artificially prepared ozone on animal life, using very small proportions of ozone, all statements with regard to it must be regarded as pure assumptions.

The paper resulted in a very animated discussion.

Mr. Alfred H. Mason, F.C.S., then exhibited and made some very interesting communications on "Bergamotte Fruit," which gave rise to some discussion.

Mr. James T. Armstrong, F.C.S., hon. Sec., then read a paper on "The Use of Phosphate of Alumina in Sugar-Refining."

He said that it was acknowledged by those who knew anything of refining sugar, that while there are many advantages, there are also many disadvantages arising from the use of blood in that process, and he thought, therefore, it was well worth the trouble and a little of the time of any practical sugar refiner to give his attention to the following questions:—

1. Whether the use of blood pays for the injurious effects that it produces?

2. If there is anything that will answer the same purpose with less injury?

Starting with the supposition that blood is of use in refining sugars (although not quite clear upon this point), the author said there is no doubt that it is coagulated by heat, and by these means throws down some small particles of mud, which are trapped (in a greater quantity than if blood were not used) in the filter bags, and therefore not allowed to deposit upon the char. It had also a great affinity for the colouring matter in the sugar, and thus produced brighter liquor. But after many experiments he had not yet been able to come to a proper comparison between the good effects and the bad ones produced by the impurities from the blood introduced into the syrup in the process of refining. He believed that phosphate of alumina would produce far better results, with none or very few of the injuries produced by the use of blood. He had found that when blood was used there is always a quantity of salts and much uncoagulated animal matter left in the sugar after it has passed the bag filters, which substances render the sugar solutions much inferior to what they would be if blood were not used. But none or very little of these effects are produced when the phos-

phate of alumina is used. Experiments on this point have shown that, even supposing that the phosphate of alumina and blood are alike in their effects, there is a considerable difference in the weight required of each to produce the desired results. The quantity of phosphate of alumina required for an average sugar would be about 14 or 15 oz. to the ton of sugar at the most; whilst, on the other hand, there would be 17 lb. of blood required. Another great objection to the use of blood is the bad smell that it produces in the low sugars and treacle. This could never occur through the use of phosphate of alumina. Often, too, putrid blood is used, causing the injurious substances contained in it to increase greatly in quantity.

The washings from the char would be much better were phosphate of alumina used instead of blood, for the reason that the blood leaves in solution some albuminous matter which causes fermentation, turning the sugar solution very acid, and thus making a greater quantity of sour water.

In conclusion, the author said that he thought one of the reasons why in sugar refineries, where blood is used, the char lost so much of its power is, that when the sugars treated with blood are first run on the char, a portion of the dissolved albumen and blood salts are so extracted by it as to be beyond the power of either washing or burning to free it again.

BRIGHTON ASSOCIATION OF PHARMACY.

The monthly meeting of this Association was held at 150, North Street, on Friday evening, March 6th, Mr. W. D. Savage, President, in the chair; when Mr. John H. Mathews read a short paper on "Incompatible Mixtures."

In introducing this subject for discussion, Mr. Mathews said that he should confine himself to those forms of extemporaneous prescriptions which were prescribed in the liquid form, and were composed of substances either partially or entirely soluble in water; but which, when brought together in the form of a mixture, decomposed each other, forming new compounds differing entirely from those which the prescriber apparently intended to employ. He said that all precipitates thus formed were not necessarily inert, and he mentioned several cases in which it was intended that decomposition should take place at the time when the ingredients were mixed together, and he did not consider such to be "incompatible mixtures" in the sense in which he used the term; at the same time, he thought that when a prescriber ordered vegetable alkaloids in combination with astringent vegetable infusions, containing such ingredients as tannic acid, that they did not expect to have those alkaloids precipitated to the bottom of the bottle, forming not only an incompatible, but, in some cases, a dangerous mixture, inasmuch as the whole quantity of a poisonous alkaloid might be taken in the last dose. He thought, also, that very often when iron was ordered with these astringent infusions, the prescriber was not aware what a nice inky fluid he was exhibiting. Having shown a number of incompatible mixtures which it had fallen to his lot to dispense, he concluded by saying that he thought it was the duty of the pharmaceutist to assist the prescriber, and that whenever he had presented to dispense a prescription which he considered incompatible, he should, if possible, obtain an interview with the writer, and ascertain if he was aware of the decomposition that must take place, instead of carelessly preparing the medicine and leaving the prescriber to find out his mistake as best he could.

A good discussion followed the reading of the paper, in which Messrs. W. D. Savage, Griffin, Higham, and Haffenden took part.

A cordial vote of thanks having been given to Mr. Mathews for his interesting paper, and to Mr. Savage for presiding, the meeting separated.

LEEDS CHEMISTS' ASSOCIATION.

The fifth monthly meeting of this Association was held in the Library, at the Church Institute, on Wednesday, March 11th, 1874; the Vice-President, Mr. S. Taylor, in the chair. There was a very good attendance.

Mr. Taylor proceeded to explain the object of the last post-card that had been issued by the hon. Secretary. The Committee had thought it desirable to give to the members and associates of the Society the opportunity of bringing forward any subject for discussion which they thought might be of benefit or interest to the trade or the Association. Mr. Abbott had replied to the invitation, and had brought forward a subject for discussion, viz., "The Roots and Stems of the British Pharmacopœia."

The hon. Secretary (Mr. J. W. Longley) then read the minutes of the last meeting, which were duly confirmed. The following gentlemen were then elected members and associates of the Association:—Members: Mr. Thomas Child and Mr. J. C. Reinhardt. Associates: Arthur Wray, Thomas Banks, Tom Pearson, Charles Thomas Judson, Frederick William Kingsley, Alexander Speck, Lund Watson, Ernest Rutter Mewburn, Frederick Cowdery, — Harpham, George Walker, John Edward Parker, John Hallewell. The 'Year Book of Pharmacy' was presented to the library as a donation from the British Pharmaceutical Conference, and on the motion of Mr. Smeeton, seconded by Mr. Thompson, it was resolved that the Secretary write to Dr. Attfield, tendering their thanks for the same. The following books were also added to the library: Thorpe's 'Quantitative Analysis,' Armstrong's 'Organic Chemistry,' the latest edition of Bentley's 'Botany.'

Mr. Jas. Abbott then gave his paper on the subject named, at the close of which a discussion was entered into by several members of the Association.

A vote of thanks was given to Mr. Abbott, moved by Mr. Thompson, seconded by Mr. Brown.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

At the first of the meetings, on Friday, March 6th, of the special Chemical Section recently instituted by the Society of Arts, the chair was taken by Professor Odling. After an interesting address from the Chairman upon the important services rendered by chemistry to manufactures, a paper was read on—

The Paraffin Industry.

BY FREDERICK FIELD, F.R.S.

In pursuing his celebrated researches upon the tar obtained from the red beech, Reichenbach discovered in the ultimate portion of his distillates a white translucent substance, to which he gave the name paraffin (from *parum* and *affinis*), owing to the comparatively slight action exerted upon it by most chemical re-agents. The tar was submitted to repeated fractional distillations, and the portions passing over last were mixed with strong sulphuric acid and violently agitated. After standing in a warm place for some hours, the paraffin floated upon the carbonized residue in the form of a pale-coloured oil, which, after cooling, solidified, and was pressed between folds of bibulous paper. By frequent crystallizations from boiling ether, it was obtained as a brilliantly white body, highly plastic and somewhat unctuous to the touch, but not greasy. This interesting hydrocarbon for many years was regarded as simply a chemical curiosity, "and so it remained," wrote Reichenbach many years after its discovery, "a beautiful item in the collection of chemical preparations, but never escaping from the rooms of the scientific man." I remember distinctly having a few grains sent me by Professor Abel, carefully enclosed in a glass tube, to add to my collection of treasures when I was

in South America. It is now annually made, as will presently be shown, by thousands of tons.

Before entering into the immediate subject of the paper, viz., "The Paraffin Industry," it may be as well, in a very brief manner, to describe some of the properties of the substance itself. Paraffin is a pure hydrocarbon, having no oxygen whatever, and its analysis has given the following percentage composition:—

	Paraffin from Boghead Coal. Gelletly.	Paraffin from Boghead Coal. Anderson.	Paraffin from Grey Shale, Addiewell. MacIvor.
Carbon . . .	85·2	85·15	85·31
Hydrogen . .	14·4	15·40	14·50

Paraffin, when pure, is perfectly colourless and translucent; after slightly warming, it becomes highly plastic, and can be moulded with the greatest ease. Hence, it differs in some respects essentially from spermaceti, with which it has often been erroneously compared, as well as from stearic acid and other bodies used for the manufacture of candles. From this plasticity, in warm rooms, paraffin candles (if not of a very high melting point) are liable to bend, while on the other hand, those made of sperm or stearic acid, although of a lower melting point, remain erect. Of course, as has been observed, this very much depends upon the fusibility of the substance, and the harder descriptions of paraffin are always selected for candles which have to be subjected to much heat. Liquid paraffin is very mobile, and can be filtered through paper almost as readily as water itself. It is scarcely acted upon, even by fuming sulphuric acid, unless at very high temperatures, so that it can be purified by this means from many other organic substances with which it may have been associated, they being immediately charred by contact with sulphuric acid. When submitted for a length of time to the action of chlorine or bromine, chlorinated or brominated compounds are formed, with disengagement of torrents of hydrochloric or hydrobromic acids. Mr. MacIvor, who has devoted many years to the study of paraffin, says that after this body is acted upon by chlorine, it first becomes a gummy looking solid, afterwards a liquid colourless and transparent, and as the passage of the chlorine is continued, a hard brittle resin is the result. This substance consists of—

Carbon	29·55
Chlorine	66·82
Hydrogen	3·39
	99·76

This gentleman has also remarked that the paraffins having the highest melting point are those which are most easily acted upon by the gas. Iodine dissolves in paraffin, imparting to it a beautiful violet colour, which becomes brown as the paraffin solidifies; but the action of this element upon the hydrocarbon is very feeble, no apparent decomposition taking place after prolonged heating for many hours.

By the action of strong nitric or sulphuric acids, M. Campion discovered a new body, which he calls "paraffinic acid," and describes it as a bright, transparent liquid, of a very inflammable nature. Strong nitric acid yields a series of interesting compounds, lately studied by Schorlemmer and others. Mr. Fordred informed me some years ago that when paraffin is acted upon by sulphuric acid, to which a few crystals of permanganate of potash have been previously added, the action is so violent that light and heat are evolved, and even at times accompanied by explosion. The best way of trying the experiment is to heat up the acid and permanganate in a tube, and drop a small piece of paraffin in the warm liquid. When they are all three placed together in the tube and heated up, the action is not nearly so violent. Success does not always attend the experiment, but it can be tried. The decomposition convinces us that the word paraffin (little affinity) is slightly a misnomer.

Paraffin is insoluble in water, very sparingly soluble in alcohol, even when boiling, more so in ether, and exceedingly in naphtha, sulphide of carbon, and aniline. When heated with sulphur at a moderately high temperature it is decomposed, carbon separates, and abundance of sulphuretted hydrogen is evolved. This fact may be of interest to chemists, as affording a ready source of this indispensable reagent in the laboratory. The two substances, the paraffin being in large excess, are heated together in a flask, when a steady and copious flow of the gas is obtained. We have here a tube containing paraffin and sulphur, and the characteristic action of the gas upon lead salts will be seen by the experiment. With regard to the beautiful translucency of paraffin, which, in spite of certain drawbacks, has made this body such an unusual favourite as a means of light, Mr. MacIvor informs me that if, when melted, it is cooled very gradually, and subjected to a slight and steady pressure, it becomes actually transparent, like ice, but that a blow, or even a scratch, will alter its molecular structure, and cause it to re-assume its normal appearance. As this change is also produced upon re-melting it, however cautiously, that triumph of manufacture in this department of industry, namely, making a transparent candle, is yet in the distance.

The specific gravity of paraffin has been variously stated at ·870, ·852, and ·880, and these discrepancies appear to have arisen from the fact that the experimenters have used different substances in their investigations. Mr. Gelletly has shown that the specific gravity rises with the melting point of paraffin. Thus, paraffin melting at about 90° Fahr. has only a specific gravity of ·823; at 128° Fahr., which may be considered a very good average (rather high, perhaps), it has a specific gravity of ·911; and a specimen of an extraordinarily high melting point (176° Fahr.) was as high as ·940, more than 10 per cent. above that at 90° Fahr.

In attempting to give a sketch of the paraffin industry, which, in the space of time usually allotted must necessarily be brief and imperfect, I must be pardoned if many of the names of those who have done good service in this branch of manufacture are omitted, considering that there have been more than sixty patents taken out during the last few years for the treatment of solid and liquid hydrocarbons. To describe them all would be, it may be imagined, a weary task both for reader and listener.

Dr. Lyon Playfair, in the year 1847, called the attention of Mr. James Young to a dark, oily substance exuding from the cracks in the roof of a coal mine near Alfreton, in Derbyshire. This body was distilled, and yielded a pale yellow oil, which deposited, on cooling, small scaly particles, which proved to be the solid paraffin. An establishment was speedily erected on the spot, and the product from the mine somewhat extensively worked until it was exhausted, or nearly so. In the meantime, Mr. Reece obtained a patent (1849) for distilling paraffin from Irish peat, and works were erected near Ashby, in Ireland, for its production. It may be remembered by some amongst us, that at that time the natural resources of the sister island were the subject of much discussion, and the enormous amount of peat which is found in many localities was supposed to be, when properly treated, a source of unbounded wealth. It was stated that not only solid paraffin and illuminating oils could be obtained by its destructive distillation, but also acetate of ammonia and other valuable volatile products. The idea was very popular. A company was started, and although the promised compounds were produced, the expense of obtaining them, the quantity derived from the original peat being so small, led to a commercial disappointment. The following table may give some notion of the amount of materials obtained from the distillation of peat:—

Watery matters	30·614
Tar	2·392
Gases	62·392
Ashes	4·197
	99·595

The watery matters and tar yielding :—

Ammonia	0·287
Acetic Acid	0·207
Naphtha	0·140
Volatile products	1·059
Paraffin	0·125

So that 100,000lb. of peat would only yield 125lb. of paraffin. Peat from the kingdom of Hanover appears to yield more than that from Ireland, 100,000lb. yielding rather more than 300. Although in a monetary sense the Irish scheme was a failure, great credit must always be awarded to its promoters. It certainly led the way to other discoveries, and excited a wholesome interest in the hydrocarbon industry. The poverty of the original material operated upon appears to be the only cause of the non-success of the undertaking.

Mr. Young having been successful in his experiments at the Derbyshire mine, but finding his stock of available materials drawing to a close, experimented upon nearly every kind of coal which he considered likely to yield solid or liquid hydrocarbons. With his usual sagacity, he imagined that there could be obtained by heating coal gradually by artificial means, such as the application of a low red heat, a product similar to the one naturally produced which he had first experimented upon at Alfreton. A highly bituminous coal procured from Boghead, near Bathgate, in the county of Linlithgow, was found to yield large quantities of oil, and a patent was granted to Mr. Young in 1850, "for treating bituminous coal to obtain paraffin and oil containing paraffin." An establishment was erected, and he was joined in this undertaking by Messrs. Meldrum and Binney. This Boghead coal, or Torbane-hill mineral, proved to be by far the richest source of paraffin and paraffin oil yet discovered, as much as 135 gallons or 50 per cent. of oil having occasionally been obtained as a product of distillation. Previous to the expiring of Mr. Young's patent in 1864, many works were in operation in Scotland for distilling oil from shale. Dr. Steele, of Wisham, erected several stills at Broxburn, which were eventually sold to Mr. Fernie, who again sold the establishment to a company (the Glasgow Shale Oil Company). There were also the West Calder Works, the Uphall Company, the Oakbank, the Levenside Oil Works, a few names amongst many more, but sufficient to give an idea of the extent to which, in so short a time, the paraffin industry had been developed.

In Wales also, this manufacture was commenced about the year 1861, principally from three varieties of coal, namely, Curley cannel, which yields 30 per cent. crude oil, sp. gr. ·875 to ·890 ; Smooth cannel, which yields 16 per cent., sp. gr. ·925 to ·940 ; and Bastard or Common cannel, an inferior variety. At Leeswood, in Flintshire, the beds of cannel in some places were found to be six feet in thickness. Mr. Hussey Jones, of Leeswood, was, I believe, the originator of the paraffin industry in Wales. His works became the property of Messrs. Fernie and Company, who were defendants in the great suit of Young v. Fernie in 1864, lasting thirty-nine days, a trial still fresh in the memory of some of us, and which occasioned perhaps at the time as much excitement in the technical world as a certain great trial at Westminster has recently done among the public at large.

Although many chemists had announced the discovery that oils, etc., could be obtained by the distillation of shale and other minerals (see Christison, of Edinburgh, on "petroline" from Rangoon petroleum in 1831, Butler in 1833, Hompech in 1841, Du Bussey in 1845, &c., and many others even anterior to these), Mr. James Young, who was the first to make this industry a practical success and to establish it beyond doubt as a new means of benefiting mankind, must be regarded as the father of paraffin. "It is true," said Dr. Reichenbach, with the generosity that usually characterizes a great mind, "that the discovery of paraffin is mine, and I have announced it. To Mr. Young, however, belongs the merit of a second discovery, the merit of having elaborated a method which furnishes a comparatively large supply of this substance, and which is sufficiently remunerative to the manufacturer, a result which I have vainly endeavoured to realize." The professor speaks of a comparatively large supply. The table before you will show how enormous this has become ; the figures were given by Mr. Kennedy in his speech at the complimentary dinner to Mr. Hill, late manager of the extensive works at Bathgate :—

Shale used in Scotland	800,000 tons.
Crude oil produced	25,000,000 galls.
Paraffin	5,800 tons.
Lubricating oil	9,800 „
Sulphate of ammonia	2,350 „

To carry out this manufacture about 500,000 tons of fuel were required.

But yet it appears that the credit of first manufacturing solid paraffin on anything like an extensive scale is due to Messrs. William Brown and Co., of Glasgow, and I will read an extract from a letter addressed to the Secretary of Juries of the Universal Exhibition of 1862, by a very eminent London firm :—

May 20, 1862.

Sir,—In reply to your communication received last week, requesting to be informed whether there is any peculiarity in the manufacture we exhibit, to which we are desirous of calling the attention of the jury in Class 4, we beg to submit the following remarks : We have been using paraffin in the manufacture of candles since March, 1855. It was made by Messrs. William Brown and Co., of Glasgow, who were, to the best of our belief, the first makers of it in this country, and by whom we were regularly supplied ; but from the smallness of the quantity produced (only three to four cwt. weekly), and its imperfection, especially in hardness, we abstained from offering candles made entirely from it, and merely employed it as an ingredient with other materials in the manufacture of the better class of candles. So far back as 1851, we had assisted, in becoming shareholders to the Irish Peat Company, in the attempt to obtain paraffin from the bogs of Ireland. It was not until November, 1856, that they were in a position to deliver paraffin, at which time we received supplies; and from this source, and a quantity of Rangoon paraffin, we, in March, 1857, manufactured and put in the market for the first time paraffin candles of English make. The price at which they were introduced was 2s. 4d. per lb.

Mr. Butler has been mentioned as one of those chemists who had experimented upon oils obtained from coal, etc., previously to the patent obtained by Mr. Young, and there is no doubt he found also solid paraffin among his products, as will be seen from the following statement :—Extract from patent granted to Richard Butler, Jan. 29th, 1833 (40 years ago, it must be remembered), No. 6375 : "When the residue of No. 2 distillate is exposed to a low temperature, there will soon appear small flakes of a white, odourless, and light substance, which is a compound of carbon and hydrogen." There can be little doubt, I imagine, that this was paraffin. Nearly all the oil and solid paraffin in Scotland is now made from shale. The last of the Boghead coal was, at the commencement of the year 1872, stacked in a field near Bathgate to the amount of several thousand tons, the greater part of which was destroyed by an accidental fire a few months afterwards.

The following is an outline of the processes employed in Messrs. Young and Company's and other large works for the production of the hydrocarbons :—The shale is placed on the retort and heated, care being taken not to exceed low redness. This is of the utmost importance, as a higher temperature would inevitably produce gaseous products. When all the oil has ceased running the operation is stopped. This crude product, which is highly impure, is re-distilled, producing a certain amount of coke as residue, the distillate being technically known as "once run oil," a specimen of which is before you. This is agitated with strong sulphuric acid (in the original patent its own volume, but experience has shown that this quantity is not necessary), allowed to settle, treated with caustic soda, and re-distilled with steam, the products of distilla-

tion being fractioned. The first portion consists of naphtha, which is run in the general naphtha tank, to be ultimatcly distilled and fractioned to various specific gravities. The second contains the larger portion of burning oil. This is subject to two other treatments with acid and soda, and again distilled and fractioned; thc first portion is placed with No. 1 distillate, and the last portion with No. 3. The third, heavy oil, is cooled and pressed for paraffin scale, of which mention will be made presently, and the expressed liquid treated with sulphuric acid, soda, distilled and fractioned until the desired specific gravity is obtained; and for its ultimate purification is again acidified, allowed to settle, and finally treated with soda. You will see from this that the crude oil appears to consist of three oils, naphtha, burning, and lubricating oil, the heavy oil being the one that contains the valuable solid product, and that these are separated after treatment with acid by distillation. The paraffin scale, which has been pressed from the heavy oil, and still contains much adhering oil and a considerable amount of colour, is mixed with a portion of the naphtha obtained in the process, cooled, and subjected to severe pressure. The oil and softer portions, being more soluble than the solid paraffin, are dissolved, and a cake, diminished in bulk, is taken from the press. This is again subjected to a similar treatment, and if not sufficiently refined for its ultimate purification, undergoes another pressure with naphtha. The loss of this volatile hydrocarbon is somewhat heavy, and to obviate this, Mr. Edward Meldrum patented a process, dated 4th June, 1867, No. 1646, for reducing the impure solid paraffin to a powder, and then introducing or mixing naphtha therewith, after which the mass is subjected to pressure. To give the exact words of the patent, an extract may be quoted:—

"My said invention consists essentially in the purification of paraffin by treating it while in a cold, unmelted state with naphtha, instead, as heretofore, in a melted liquid state. In carrying out my said invention, I reduce the impure solid paraffin to a powder, and then introduce therein sufficient naphtha to make it into a paste or pulp, after which I subject the mass to pressure; or the solid impure paraffin and naphtha may be ground up together, and the mixture may be then subjected to pressure. By repeating three or four times the operation of re-grinding the paraffin to a paste or pulp with naphtha, and then squeezing it in a press, the paraffin can be freed from the heavy hydrocarbon oils with which it is contaminated in its impure state."

This must, it would be thought, save a loss in naphtha; but whether the process has been successful or not, I cannot say.

The cakes thus purified are melted in a still, through which free steam is violently passed, as well as confined steam in a worm at about 25lb. pressure, in order to raise the temperature, until every trace of spirit is evolved and the condensed water contains no trace of naphtha. The product from the still is mixed with from 3 to 5 per cent. of animal charcoal, heat is applied, and the charcoal allowed to settle. Some finely divided particles remain, however, suspended in the supernatant liquid, and these must be separated by filtration. The filter employed in the works of Messrs. Young consists essentially of a jacketed case, kept hot by steam, and lined with a cylinder of wire gauze, which is coated internally with flannel, and to make the filtration still more perfect, filtering paper is introduced, so that the paraffin flows through absolutely free from solid particles, and if pure, as colourless as distilled water. This is run into cakes of various forms and sizes, generally in shallow oblong tins. Messrs. Young, however, prefer the circular shape as more adapted for transport in casks.

In the rapid description of the production and refining of solid paraffin from the oils and impurities with which it is associated, it will have been observed that naphtha or other light spirit was employed in its purification, the object being to wash out the greater part of the colouring matter by means of these solvents, and to render the partially purified substance fit for its final passage through animal charcoal. No process can be more successful, as the beautiful results of many eminent houses abundantly testify. But there is an amount of danger attending the operation which many manufacturers have endeavoured to avoid, and some with considerable success. Two or three of the most important it may be as well to mention, first, the patent of Mr. John Fordred, No. 1858, A.D. 1871.

This gentleman, anxious if possible to avoid the use of naphtha or other inflammable liquid, imagined that by kneading, so to speak, crude paraffin scale in a slightly warm alkaline liquor, the alkali would probably form a species of emulsion with the oleaginous portions of the hydrocarbon, and, the heat rendering the solid part plastic, the oils and colouring matter could be separated by a rough filtration. The earliest experiments were kindly explained to me by the patentee; a little bag was filled with thc crude scale, and after being soaked in warm water for some minutes, was kneaded by the hand exactly as, in lecture experiments, the separation of starch from gluten is effected, in the proximate analysis of flour, the starch representing the oil, the gluten the solid paraffin which remains in the bag. After many experiments the apparatus was devised, which is thus described in the patent:—

"In carrying my invention into practice I proceed as follows:—I take say one ton of crude paraffin, having, for example, a melting-point of 120° Fahr., and melt it carefully in an iron tank, and allow the mechanical impurities, such as tar, sand, and the like, to fall to the bottom; after a few hours' repose I run off the clarified paraffin into a number of flat metal trays, in which it solidifies into cakes, weighing about ten pounds each; these cakes are then placed edge to edge in a long bag of peculiar construction, and submitted to heat in a warm room, or in a bath of warm water till brought into a plastic condition. When this object has been attained, the bag of paraffin is submitted to the action of the kneading machine, which is supplied with a solution of soft soap in water, made in the following proportions:—Soft soap 10 parts, water 10 parts, previously heated to about 100° Fahr. This I call the soap-bath. On the machine being set in motion, the oil and colouring matter contained in the crude paraffin will rapidly combine with the soapy liquor, and form a temporary emulsion. I find that any kind of soap soluble in water will answer for the above purpose, but I prefer to use the soft soap of commerce, and in the proportions named. I do not confine myself to the use of a bath of soap and water only, as I find that various other liquors will act upon the paraffin whilst in a warm and plastic condition, such as solutions of the carbonated and caustic alkalies, mixtures of these with solutions of soap, a solution of rosin in alkali, the residual acid or alkaline liquor deposited from acidified hydro-carbon oils after washing or neutralization, and, for some purposes, even warm water itself is sufficient."

(*To be continued.*)

Parliamentary and Law Proceedings.

Poisoning by a Liniment.

At Wigan, on March 12th, the borough coroner held an inquest on the body of Mary Elizabeth Southworth, a girl 16 years of age, granddaughter of Mr. Edward Carr Duff, the landlord of the Shakspere Inn, Wigan. On the previous Tuesday the deceased complained of great pain in her head. She went to bed and some hot gin was given her. As there was no improvement, Mr. Barnish, surgeon, was sent for, but the girl was dead on his arrival. A few days previously deceased had gone with Mr. Duff to a druggist's, and obtained a lotion for rheumatism, and this was labelled "poison" and kept in the "bar snug." It was feared that Miss Southworth had for some reason taken a small quantity of the preparation.—Mr. Barnish came to the conclusion that death had resulted from aconite, which was contained in the preparation in such a quantity that an ounce would cause death in a person of deceased's age in two hours. No witness called could assign any reason why deceased had taken the poison, or why any one should

have administered it to her, or how, if there had been a mistake, she came to make it.—The coroner said he could only imagine that the deceased had been wishful to taste the mixture in order to ascertain whether or not it was poison. It was not by any means the first time children and young persons had done this, and here the lotion was so deadly that a mouthful would be sufficient to cause death. The jury found that the deceased died from a dose of aconite liniment, but under what circumstances it was taken there was no evidence to show. The jury added that so deadly a poison should not be put in an ordinary drinking bottle, or kept in the house except under lock and key.—*Manchester Courier.*

Poisoning by Arsenic.

An inquest on the bodies of five of a family named Coombes, who died by poison, was held at Thursley, near Godalming, on Tuesday afternoon, before Mr. Hull, county coroner.—Sarah Edgeler deposed that she saw the tub produced in the possession of the deceased. She scrubbed it out, and she had never seen it used before she did so. This was on the Friday. The bucket was afterwards used for domestic purposes, and on Friday Mrs. Coombes was taken ill.—William Enlicknap, a blacksmith, stated that one day last month he put a nail to fix a handle on the bucket produced for Mrs. Coombes. He then observed that there was something like soap-suds sticking round the bottom. It came on his hand and made it smart.—Dr. Stevenson, the county analyst, deposed that, by order of the Home Secretary he had made an analysis of the viscera of Charlotte Coombes and Albert Coombes. He had also examined a spoon, a bucket, and farinaceous food. The report made by Dr. Stevenson stated that in the viscera he detected an irritant poison in small quantities. The appearances presented by the viscera of the woman were quite consistent with the assumption that she had died from the effects of arsenic. In the viscera of Albert Coombes he also detected arsenic. From the bottom of the bucket produced he picked off a brown substance largely charged with arsenic. The produced food was also impregnated with arsenic.—The jury returned a verdict of accidental death by poisoning, with a recommendation that tubs containing such poisonous substances should be labelled or destroyed after being used.

Prosecutions under the Adulteration Act.

adulteration of milk.

At the Wolverhampton Police Court, before I. Spooner, Esq., Charles Evans, a milk dealer, of Ettingshall, appeared in answer to a summons which had been issued at the instance of Mr. J. G. Horder (Inspector under the Adulteration Act), charging him with selling milk adulterated with water.—The purchase having been proved, the defendant stated that pure milk was not asked for.—Mr. Spooner : What an idiot you are. The man asked for milk, and that does not mean skim milk, nor milk and water. The analyst's certificate was to the effect that the sample of milk referred to showed, on analysis, adulteration of 22½ per cent. water.—Mr. Spooner: Twenty-two and a half per cent. ! Nearly one-fourth water.—Defendant : That was never my milk in the world.—Mr. Spooner : I daresay not. Of course you will say so now. But it has been proved, so far as human proof can go, that it was your milk, and I don't see any reason to disbelieve the evidence that has been put before me.—Defendant : I cannot believe that so much water was put in.—Mr. Spooner : But I have to decide the matter, and I believe there was. I am quite satisfied on that point, and a most abominable fraud it is. Here people go with good money to purchase good milk, and you, in order to put an extra profit into your pocket, give them instead, a mixture containing one-fourth water, which they can get for nothing, and put it in the milk, if they like, themselves. I fine you £10 and costs, and if you go on defrauding people in this way, and are brought before me again, I will impose the full penalty of £20, and also cause your name to be advertised, as I have power to do. —Defendant : Can you allow me a week to pay the money: I shall have to sell my cows to do so.—Mr. Spooner : No ; I will not show mercy to such as you. If you don't pay, a distress warrant will be issued ; and if there are not sufficient goods to satisfy the distress, you will have to go to prison for six weeks.—On hearing this, the defendant promptly paid the money, amounting altogether to £11 17s. 6d.—*Midland Counties Express.*

alleged adulteration of lozenges.

At the Southwark Police Court, on Thursday last, Mr. Bernard Duffey, manufacturing confectioner, Old Kent Road, was summoned before Mr. Benson, under the Adulteration of Food Act, for selling adulterated "conversation lozenges."

Dr. Bernays, of St. Thomas's Hospital, said he received the lozenges in January last for analysis. He found then to be manufactured of good sugar, but he found a small quantity of starch and some other ingredients. On using the microscope he discovered that it was blue starch and a small quantity of powdered glass—a ten-thousandth part of the latter and a tenth of starch.

Mr. Benson asked if the addition was injurious to health.

Dr. Bernays replied that it was not, unless eaten to a great extent. Children might suffer from over-eating the lozenges. He believed the blue starch was used with the sugar to improve the appearance of the lozenges.

Mr. Ody, on the part of the defendant, contended that there was nothing deleterious or injurious to health in the composition of the lozenges, and he thought it was paltry on the part of the vestry in taking these proceedings.

Mr. Mander, vestry clerk, informed his worship that the vestry had nothing to do with these proceedings. They were taken on the sole responsibility of the sanitary inspector, who had such authority under the act of parliament, without asking the sanction of the vestry.

Mr. Benson was aware of that, and he had not much respect for those vestries who prevented their officers from performing their duty. Inspectors were justified in bringing all cases of adulteration of food before the magistrates. He dismissed the summons in the present case, and recommended defendant not to use blue starch again.

Review.

Pharmacopœia of the Hospital for Diseases of the Throat. Edited by Morell Mackenzie, M.D., Lond., Hon. Medical Superintendent. Second Edition. London : John Churchill and Sons. 1873.

A second edition of this little work has appeared, in which the editor has made more explicit much of the matter contained in the first edition ; most of the errors have been corrected, and in accordance with our suggestion, in reviewing the previous edition,* a change in nomenclature has been made, the term *pigmentum* being substituted for *collyrium*, as applied to solutions for local application.

In the preface the Editor kindly acknowledges our services in pointing out defects in the previous edition, but we still find such grammatical errors as Syrupus Tolutan*i* and Oleum Origani Pallid*i*, and in the posology we think there is a too rigid adherence to the British Pharmacopœia ; for example, the dose of tincture of nux vomica is given as from 10 to 20 minims, that of the extract ½ to 2 grains, both of which are now viewed by therapeutists as excessive, whereas the dose of iodide of potassium is given as from 2 to 10 grains—the latter being much below the maximum dose met with in ordinary prescriptions. As a key to the somewhat mysterious prescriptions emanating from members of the staff of the Throat Hospital we commend the work to our readers.

* Pharm. Journal, 3rd series, vol. iii., p. 17.

Notes and Queries.

[390.] COMPOUND SYRUP OF CAMPHOR.—In the absence of any recognized formula, perhaps the following may prove useful to M. P. S.—

Tinct. Camph. Co. (double strength and without Ol. Anisi), 1 part.
Syr. Simp., 7 parts by measure.
Mix.

GEORGE BROWN.

[390]. COMPOUND SYRUP OF CAMPHOR.—In reply to M. P. S., March 14th, the above preparation is thus ordered to be prepared by the 'Pharmacopœia of the Bristol Royal Infirmary':—

"*Syrupus Camphoræ Compositus.*

℞	Syrupi Opii	℥j.
	Tincturæ Camphoræ Comp. . .	℥ij.
	Oxymellis Scillæ	℥vj.

Mix. One teaspoonful to be taken occasionally."

The formula for Syrupus Opii, the first ingredient in the above compound, is as follows:—

"*Syrupus Opii.*

℞	Opii	℥iv.
	Sacchari non purificati	lb. 112.
	Aquæ ad cong.	xij.

Dissolve the opium in one gallon of boiling water, and mix with the remainder when cold."—J. T. C.

[391]. LOTION FOR MANGE.—T. P. H. would be glad if any of the PHARMACEUTICAL JOURNAL readers will oblige with a good recipe (lotion) for mange on dogs.

[392]. PLATE POWDER.—Can any reader furnish me with a good recipe for "Non-Mercurial Plate Powder."
—ARGENTUM.

Correspondence.

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

DECOMPOSITION OF LOZENGES.

Sir,—I was very much interested by Mr. Greenish's "Note on a Decomposed Lozenge," read at the Pharmaceutical Meeting on the 4th inst., and beg to offer a short statement of my own experience, in support of the fungoid theory, the truth of which may be at once made evident to any who may have lozenges so affected, and may possess a microscope of tolerable power.

I have never, since my connection with the business (forty-five years) seen even a single lozenge affected with fungus until about six months since, when I discovered in six or seven different kinds of lozenges, peculiar damp spots that I at first attributed to the continued humidity of the season, and therefore exposed them for some time to a warm, dry atmosphere, expecting to see them restored to their normal condition. I was, however, disappointed, for the spots had not only sunk deeper into the lozenges, but had also become more numerous, and—in painters' phrase—tacky.

Finding I could do nothing to restore them, I sent them up to my lozenge makers, asking them to look to them. In about a fortnight's time they replied that they could do nothing with them, and there, for the time, the matter ended.

You may well suppose, then, that Mr. Greenish's note on the very subject was deeply interesting to me.

Altogether I had about 10 pounds of various lozenges so affected, consisting of digestive tablets, ipecacuanha, cayenne, musk, lavender, lettuce, and ginger lozenges; but peppermints were not in the least affected. I at once forwarded samples of all to Mr. Greenish, hoping that he would, with so large a field before him, be able to carry out his further investigations in this very important matter, with more certainty of result than appeared to have been the case on the evening of the 4th inst.

It would be well for the lozenge manufacturers to be communicated with, so that their experience might be made subservient to the continued inquiry. It is certainly a new form of mischief against the genus *homo*, that should be at once pursued up to its cause, and swept away. Should Mr. Greenish's hypothesis be correct, that dextrin is that cause, lozenge-makers will see the necessity of at once giving up its use. Is there indeed any defence for using it, excepting that its market value is much lower than that of Turkey gum of good quality? If such be the case, then certainly *first class* lozenges ought to be free from such an ingredient, and manufacturers will do well to look to it.

I hope Mr. Greenish's remarks on this subject will elicit very many communications, so that he may be furnished with the fullest evidence possible in his further inquiries.

THOMAS WITHERINGTON.

Worcester, March 17th, 1874.

A SUGGESTION.

Sir,—Antimonium tartaratum is a potent and useful medicine frequently given to children in Vinum antimoniale. But is it not generally allowed that this preparation varies considerably, both from the quality of the wine and from the length of time it has been made?

If not too late for the Supplement to the Pharmacopœia, would not a Pulv. antim. tart. co. be a useful addition, in which the Antim. tart. should be mixed with four or six times its weight of Potass. tart. acid., or, as they are frequently prescribed together, mixed with Potass. nit. Such a compound powder would be very convenient in weighing; the division would assist the solution, even if some of the Potass. tart. acid., if used, were not dissolved; and what is of far more consequence, there would be much more certainty in the dose given. Such a preparation would also be useful as a powder.

W. SYMONS.

26, *Jay Street, Barnstaple,*
Feb. 24th, 1874.

GLASGOWISMS.

Sir,—I used to hold it as an axiom that civilization travelled westward, and although I knew that pharmacy was leaden footed I risked the hope that, when it had wended thither, it would live a purer and freer life. This is apparently not to be the case. For to join those twain children of the mist, Mr. Pil. Philip and Miss Comp. there has arisen another unvenerable western portent, in the shape of "Pil. Albi." These pilular mysteries are carefully prepared and tastefully finished off in some opaque corner of a certain pharmaceutical chemist's establishment, not one mile from our New City Road. I also had a visit from another party, who carried what purported to be a prescription, written by one eagerly claiming respectability, for he drives his gig. But thinking that the worthy M.D. had been amusing an after-dinner hour in sipping his port and transcribing Assyrian hieroglyphics, I handed it back to the party, mildly hinting so. The party, however, declared that it was a real prescription, and that the Doctor had painfully impressed the necessity of having it dispensed at a chemist's near our Great Western Road.

Now, Sir, this state of protection is perfectly unjust, and plainly self-destructive. It allows no free life to pharmacy, but binds it, wholly and servilely, to the wheels of the medical chariot. If this kind of work continue, life will only be passable to those who are so mean as to lard well the medical men with a percentage; and at last, by a process of unbeautiful natural selection, the greatest rogue will have the greatest chance of succeeding in money-making. He only will prosper who can unblushingly rob the public to pay a large bonus to the doctor.

I am perfectly well aware of the unremunerativeness of the medical profession in many cases, and would gladly see their rewards increased. Yet most strongly do I contemn that principle of forming a conspiracy with some servile druggist to filch the patient in a round-about manner, to bleed profusely a purse that, too often, is suffering from extreme anæmia. If medical men want their fees increased, let them take means for that end in open daylight, and do not let them use druggists as tools for their deeds of darkness. No profession can ever be raised to esteem and nobleness when its members practise duplicity and hypocrisy. No wonder that quackery is rampant on the hem of the medical garment, and that medical men must blink like owls at it.

For the rest, it is simply disgraceful for any—especially a pharmaceutical—chemist to truckle so; because the possession of that title presupposes that he has the integrity of his profession at heart; that he will gallantly endeavour to lift it into a freer atmosphere; that he will make it a world-wide brotherhood, of which knowledge and skill are the only passports, and where aught else is free as the sunshine. It is debasing to the best interests of pharmacy when its members sell themselves to such greedy and narrowing practices, or when they encourage quackery in any form.

The chemists and druggists will never lift their profession to a splendidly worthy status till they make the medical men and the public unmistakably understand that they are not toadies, but men, who are doing their day's work in an honest, straightforward, and intelligent manner, for a remuneration sufficient to keep the soul comfortably within the body, and that they have nothing in common with those who desert the ranks of straightforwardness to wend, in a tortuous fashion, through the ooze of servility to an unlovely goal.

Glasgow. DOW.

Cocculus Indicus.

Sir,—I scarcely think the answer of your correspondent, M.P.S., can satisfactorily account for the utilization of the large quantities of Cocculus Indicus imported.

Although I have spent several years in one of the largest farming districts in the West of England, and in a business where there was more than the usual amount of cattle medicine supplied, yet—perhaps I ought to be ashamed to own it—my first sight of Cocculus Indicus was obtained in the museum of the Pharmaceutical Society. We never kept it, nor was it ever inquired for, either for cattle medicine or any other purpose. Amongst our customers were farmers from the North of England and from the Midland districts, who had settled in the West, one or two of these happening to be very much troubled with lice amongst their stock, and, moreover, being very experienced men, tried many things; but amongst them all, Cocculus Indicus never had a place.

I, for one, should conclude that the sale of this drug for use amongst cattle is limited to a few localities only—at any rate, it is extremely questionable whether that explanation is sufficient to account for the disappearance of even a tenth part of the drug imported.

A Young Man from the Country.

Wanted! Chloroform!

Sir,—At 4 a.m. this morning there was a violent ringing at the bell, and a violent customer wanted 1oz. chloroform for a medical man, and when asked the name of the said medical man, after some consideration, said, "Robinson." He threatened violent and continuous agitation of the bell if not supplied, and my assistant threatened police if he did not retire: this was too much for him, and he retired. I suppose this is the customer that was so troublesome to our West End friends; but it is evident he is getting down in social position, or he would not have come so far East as this. I write this, hoping to prevent any of our fraternity yielding to the boisterous importunity of a worthless scamp.

James Slipper.

87, *Leather Lane, March 18th*, 1874.

Hunter *v.* Freeland.

Referring to the report of this case, which appeared in the Pharmaceutical Journal of date 10th and 24th January last, a number of the trade are of opinion that Mr. Freeland should be reimbursed for the heavy expenses, amounting to £267, incurred by him in defending himself in the law-courts.

They consider the action to have been of a most vexatious character, and if druggists throughout the country were compelled to act according to the reasons given by the jury for their verdict, the consequence would be the shutting up of a great number of the druggists' shops in many of the smaller towns in Scotland. The statement by the foreman of the jury was to the following effect:—

"The jury unanimously found for the pursuer, and assessed the damages at £12. The foreman of the jury stated that they had not been guided in their decision so much by the injury sustained, as by the principle that more care should be taken in dispensing chemicals; and they intended it as a lesson to chemists to provide properly qualified assistants to take charge during their absence."

It will be seen from the Journal of date 24th January, that the young man in Mr. Freeland's employment has passed his Preliminary Examination very creditably.

The following gentlemen have kindly agreed to receive subscriptions, and Mr. Kinninmont to act as Secretary, to the fund:—Mr. McDonald, of the Glasgow Apothecaries' Co., 34, Virginia Street, Glasgow; Mr. Greig, Glassford Street, Glasgow; Mr. John Mackay, 119, George Street, Edinburgh; Mr. Kinninmont, 69, S. Portland Street, Glasgow, honorary Secretary.

The following subscriptions have been already intimated:—

	£	s	d
Glasgow Apothecaries' Co.	5	5	0
Messrs. Duncan Flockart and Co., Edinburgh	3	3	0
Mr. John Mackay, Edinburgh	2	2	0
,, Wm. Greig, Glasgow	2	2	0
,, Adam McGregor, Ayr	1	1	0
,, Alex. Kinninmont, Glasgow	1	1	0
,, Geo. Smith, ,,	0	10	6
,, R. C. Rait Parker	0	10	6

W. H.—Bentham's 'Handbook of the British Flora,' published by L. Reeve and Co.

C. L. M.—(1) What is required is, a practical knowledge rather than such as could be acquired from any number of pages in a given book. See Professor Huxley's remarks on p. 735. (2) We believe that specimens of all the drugs likely to be shown to a candidate may be seen in the museum, either in the drawers open to the students or upon application to the curator.

J. S. B.—See a formula given on p. 340 of the present volume.

J. B. S.—You will find the formula you ask for in vol. xi. 2nd series, p. 876.

"*Cerebrum.*"—We are unable to give you the information you require.

W. T. B.—As there appears now to be a disposition to apply the current income of the Fund in the manner you desire, we think it would be injudicious to publish your letter at present.

J. Leay.—The fact of a man being in business has no bearing upon his qualifications as an analyst. If the provisions of the Act were properly carried out, the analyst would be completely ignorant as to the source of the samples under examination.

J. Otley.—Only the Inland Revenue authorities could give a reason for the practice you mention.

"*Justitia.*"—We believe that the Deputy-Superintendents have been appointed upon the nomination of the Superintendents.

W. R. F.—(1) Saponification cannot be effected, but an emulsion may be made. (2) Apply to the Secretary for a copy of the Regulations of the Board of Examiners.

A. Archer.—The result of an analysis of the so-called "Corassa Compound" will be found in vol. ii. p. 309, of the present series of this Journal.

Koumiss.—We do not know of any recognized formula, but a method of producing it was described in vol. ii. p. 981.

A. Mitchell.—Can you mention any place where such a test is referred to?

"*Apprentice.*"—The substance does not appear to be what it is stated to be. You are also referred to the regulation respecting anonymous communications.

J. M. Broad, jun.—We are indebted to you for directing our attention to the quotation from Cooley's Cyclopædia on the subject of Cocculus Indicus. Our object, however, is, if possible, to obtain trustworthy evidence as to what actually becomes of the considerable quantity of the drug *now* brought into the market. An assertion made in a book published nearly twenty years ago contributes but little towards the elucidation of the question, especially when such an assertion is unsupported in the experience of officials whose special business it would be to detect and expose such an adulteration.

C. E. Owles.—We know of no such provision as you refer to, and judging from our experience of the opinions of "plucked candidates," we do not think such provisions would be justified or requisite.

Communications, Letters, etc., have been received from Messrs. Wilkinson, W. Griffiths, R. C. Payne, Archer, M. Burden, W. A. Powell, "Student," "Lamma," "Pharmacist since 1842," Z. Y. X.

VEGETABLE POISONS AND THEIR ANTIDOTES.

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

A knowledge of the action of poisons in the human frame, and of the means by which their fatal effects upon the system may be prevented, may perhaps appear to belong rather to the medical practitioner than to the pharmacist. There are, however, occasionally times when he is not at hand, and the prompt application of remedies being the only chance of saving life, as in poisoning by prussic acid or nicotine, the nearest chemist is called upon in the emergency. A knowledge, therefore, of the most reliable antidotes to use in cases of emergency cannot fail to be valuable to the pharmacist, and rightly forms a branch of his education.

For many poisons, more particularly those belonging to the vegetable kingdom, there are no real antidotes known, and it is therefore a subject which demands the attention of the pharmacist as well as of the physiologist. The derivation or substitution compounds of the vegetable poisons have not been investigated to any extent, and the discovery of the different properties of methyl-strychnia* to those of strychnia, show that there is here a wide field open to chemical discovery. This branch of science may, indeed, be said to have been culpably neglected, seeing that it has not kept pace either with chemical discovery or with the progress of medical science.

No amount of care on the part of the chemist can prevent the occasional occurrence of poisoning, nor can any Act of Parliament hinder the employment of substances in common use for the purposes of suicide or murder. Even if the sale of mineral poisons were entirely forbidden, there are many poisonous plants to be found in our gardens, fields, and hedges.

As an instance of the extent to which poisoning was carried in the 16th and 17th centuries, and therefore could again be carried, unless our knowledge of antidotes is improved, it is said that the manufacturer of the celebrated "acqua tofana" confessed to having been instrumental in the death of no less than 600 persons, and this in spite of the severest measures taken by the Government. It is obvious, therefore, that the best way to render poisoning less frequent as a crime, is to know how to counteract its effects.

The employment of antidotes appears to be of as ancient a date as the use of poisons. Thus we find that from very early times endeavours were made to discover an universal antidote. We read of Mithridates, King of Pontus, taking every morning a dose of an electuary, which was supposed to be an antidote for every kind of poison. It is possible that the opium which it contained may have proved an antidote to such poisons as dilate the pupil of the eye, and it may be owing to this, that it retained a place in medicine for so long a period.

The researches of the ancients, however, like those of the alchemists for the elixir of life and the philosopher's stone, must have sadly disappointed their expectations. To find an antidote for even one poison is a matter of considerable difficulty, for the same drug will, under different circumstances and in different people, produce quite opposite effects. Thus in some persons opium will produce sleep, in others wakefulness, and in some cases it has caused diarrhœa, delirium, or even lock-jaw.* Hemlock also in some instances has produced insensibility and convulsions, while in most cases consciousness is retained and the power of the muscles is paralysed. These results may be owing to difference of temperament, or condition of health at the time. Thus, in tetanus large quantities of opium may be taken without producing any effect. From these facts it would appear that *the symptoms produced are the best guide in the administration of antidotes.*

Many antidotes have, at different times, been brought into notice, some of which remove the poison from the stomach, others render it inert by chemical means, and others again produce a reaction by neutralizing the physiological effects of the poison. It is to the latter class that I would more particularly direct attention, for, although it is necessary to render inert, or to remove the bulk of the poison from the intestines, to prevent its absorption, yet it is only the small portion that is absorbed into the blood which causes death, and the effects of which it is necessary to combat by antidotes. In order to find what will best answer this purpose, it is necessary to investigate the way in which poisons are absorbed into the system; their action when absorbed; the way in which they cause death, and the manner in which they are eliminated by nature in cases which do not prove fatal.

But before investigating these points it is necessary to define what vegetable poisons are. This is, perhaps, not so easy a matter as might at first appear. Plants which are poisonous to some animals are not so to others. Strychnia has no effect upon invertebrate animals, and is said not to poison monkeys. Many of the poisons which destroy the life of man and other carnivora are eaten with impunity by graminivorous animals. Thus, opium does not poison pigeons; tobacco and hemlock do not injure goats; and stramonium, henbane, and belladonna are eaten by rabbits.† Whether this is owing to the difference of digestive apparatus or to the knowledge of an antidote, as is said to be the case with the mungoose, must be at present a matter of speculation. Again several umbelliferous plants, namely, *Cicuta virosa*, *Œnanthe crocata* and *Conium maculatum* are said to be without poisonous effect in Scotland, while in England, Wales, and Ireland they cause death as rapidly and almost as surely as arsenic. It is well known that the roots of hemlock are eaten as food by the Russian peasants. It is possible that coldness of climate may cause this difference, as it is a well ascertained fact that hemp will only yield its intoxicating resin in hot climates. A vegetable poison will therefore be best defined by saying that it is a vegetable production which, in the majority of cases, is capable of destroying human life when administered in small quantities. As poisons of this class are exceedingly numerous, it will only be possible to notice a few of them. Those which are in frequent use in medicine or commerce, and those by which death is most frequently caused, either accidentally or intentionally, more particularly demand our attention; many of the vegetable poisons being only known to, and obtainable by, the few.

On perusing the statistics of poisoning‡ it will be found that in cases of *accidental* poisoning, the root of aconite, the tempting berries of belladonna, the

* PHARM. JOURN. (2), vol. i., p. 561.

* Taylor on "Poisons," p. 805.

† PHARM. JOURN. (2), vol. xi., p. 871.

‡ Taylor on "Poisons," p. 237.

peculiar capsules of stramonium, and the tuberous and somewhat agreeable roots of the poisonous umbelliferæ are those which have generally proved fatally attractive to human beings; and the leaves of the yew tree to animals, more especially in the winter season.

In cases of *intentional* poisoning, opium, strychnia, prussic acid, and tobacco have been the drugs generally resorted to; while the ignorant medicinal use of savin, digitalis, lobelia, and black hellebore has often led to unexpected and fatal results. Of the above-mentioned poisons more deaths have been occasioned by opium and its preparations than any other. Strychnia, prussic acid, aconite, and belladonna come next in order, cases of poisoning by the others being comparatively rare. To find antidotes for these poisons in particular is therefore of the greatest importance.

(*To be continued.*)

PANCREATIC EMULSIONS OF SOLID FATS.*

BY RICHARD V. MATTISON.

Emulsions may be divided into those of solid and liquid fats. Since the publication of my former papers upon the subject of pancreatin,† and indeed before they were written, I have spent much time in endeavouring to prepare a perfect emulsion of solid fat which would keep without becoming oxidized, and at the same time form a preparation which would not offend the most delicate palate. This I think is accomplished in the preparation here described.

The great superiority of solid fat over cod-liver oil consists principally in the fact that the former is a body rich in stearin, while cod-liver oil is chiefly olein. In the normal diet a person partakes principally of food rich in the former, hence it is that a similar body must be presented for assimilation. Cod-liver oil usually assimilates more rapidly than other fats, and if it can be continued in any case for some time, rapid improvement generally takes place. To this there is the objection that olein cannot replace stearin in the animal system, and the work is not thorough. Again, fats containing much olein are certainly partially assimilated through venous absorption, and this is the reason why patients so soon tire of the oil. The portal system becomes choked up, cathartics are necessary, and even the good effect produced is frequently lost by the course rendered necessary by these circumstances. This becomes of interest to pharmacists, first, from it being to their interest, in a pecuniary way, to devise something better than cod-liver oil, and, second, as an aid to the physician, pharmacy should select such agents as a clear, sound theory suggests, and, by scientific manipulation, so combine them and mould them that they may be of the most potent remedies in the hand of her sister Medicine.

Thus pharmacy, to prevent the loss of fat which is frequently occasioned by the choking up of the portal system through the administration of too much olein, selects a solid fat which is only absorbed by the lacteals, and thus the amount of fat necessary for perfect nutrition can be administered in the natural manner. The fat formed by the assimilation of this emulsion is of a firmness not readily attainable by the administration of cod-liver oil or other similar elements of nutrition. The administration of cod-liver oil in connection with the emulsion of solid fat, however, probably answers more efficiently than either alone.

The emulsion of solid fat is best prepared in the following manner:—

Take of the fresh pancreas of the pig, one hundred pounds; lard, purified, eighty pounds; water, six gallons.

Dissect off all the fat and other extraneous matter from the pancreas, and comminute finely. A sausage cutter, driven by steam, is one of the most complete pieces of machinery for this purpose. After coming from the cutter it is allowed to drop with the fat into a cylindrical hopper driven by the same power. Into this hopper the six gallons of water are allowed to trickle slowly until a perfect emulsion is formed. From the hopper the emulsion is transferred to the press, in which a strong twilled flannel bag is placed, which should be of two thicknesses of material, and the emulsion is thus rapidly separated from the membraneous areolar tissue of the pancreas.

To this emulsion ether is added, and the mixture allowed to remain at rest, with occasional agitation, for a period of about forty-eight hours. For the above quantity from two hundred and fifty to two hundred and seventy-five pounds of ether are required. At the end of this time the mixture separates into two layers or strata, viz., an ethereal solution of pancreatized fat at the top, and an aqueous solution of the impurities of the lard, etc., at the bottom. This mixture is allowed to stand in a large cedar vat, which has glass plates inserted in the side to allow the operator to observe the point of separation between the ethereal and the watery stratum. Into the side of this vat, which should be tall and narrow at the top, like a precipitation jar, a number of wooden spigots are inserted, through which the ethereal solution of pancreatized fat is drawn off into a filtering apparatus, so arranged as to prevent the escape of the ether. (If allowed to stand long enough, a considerable portion will need no filtration.) This filtered ethereal solution is transferred to a suitable still, and the ether distilled off with gentle heat. This is the most troublesome part of the process, as it requires a considerable length of time to free the fat from the last traces of ether unless the temperature is raised, which results in the decomposition of the emulsified fat.

The pancreatin seems to split up in some manner by heat, leaving the fat in the same condition as it was before, or at least its emulsifying power is very much impaired. At the same time there is a peculiar sulphurous odour developed, reminding one of the presence of onions or garlic, or a trace of allyl sulphide or sulphhydrate.

After the fat has been freed from ether with due regard to the temperature, it is removed from the still, and to every fifty parts of this fat seventy-five parts of distilled water and twenty-five parts of alcohol are added, both being added very carefully; when all the water and alcohol has been taken up, enough of oil of cloves is added to impart a pleasant flavour.

From my experiments made before the publication of my first article in December, 1873, I was led to

* Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Feb. 17th, 1874 (*Amer. Journ. Pharm.* [4] vol. iv., p. 105).

† PHARM. JOURN. [3], vol. iv., pp. 592 and 675.

suppose that, contrary to the views of eminent physiologists, pancreatin has no power of decomposing fat. These views were expressed at that time, and the following facts elucidated by the practical management of the above process will serve as further illustration of the facts there mentioned.

The first is that the pancreatized fat obtained by evaporation of the ethereal stratum before mentioned, when acted upon by plumbic oxide, yields lead, plaster, and glycerin. This certainly shows that the fatty acids are still held in combination with the oxide of glyceryl, although the fat be pancreatized and emulsified.

Second, the aqueous solution left after the decantation of the ethereal stratum contains no glycerin. This proves the absence of even partial saponification upon the mixing of the fat in the first instance with the pancreas.

A sample of the emulsion of solid fat, prepared as above, was presented to the late esteemed Professor Procter, who regarded it with much favour, and spoke at length upon it in connection with a sample of pancreatic emulsion of cod-liver oil, both of which samples were exhibited to the class upon the evening of his death.

The emulsion prepared by this process should have an acid reaction to litmus paper, and should not separate upon standing. Much care is necessary in the manipulation to prevent this.

When added to a small quantity of water, and stirred until complete mixture is effected, the whole has the appearance of milk, and any quantity of water may be added without disturbing in the least the appearance of the emulsion.

A superior method of administering the emulsion is to add it, little by little, to milk ; to those persons having an antipathy to milk it is easily given in a mixture of arrowroot and water. This proves an excellent method, as the pancreatic emulsion, as well as the pancreatin itself, has a decided action upon amylaceous matter, changing it to glucose ; hence it can be easily seen how important the administration of this in connection with arrowroot is in cases of marasmus and other infantile diseases arising from defective nutrition.

In this paper I intended to present a formula for pancreatic emulsion of cod-liver oil which *would not separate* upon standing, but remain perfectly emulsified. Want of time has prevented me, my experiments not having thus far proved perfectly satisfactory.

THE ALKALOIDS OF THE CINCHONA BARKS.*

BY O. HESSE.

(*Continued from p.* 752.)

VIII. Quinamine.

This alkaloid occurs not unfrequently, with paricine and several other alkaloids, in the *C. succirubra* bark sent from Darjeeling.† The quantity of it in this bark amounts generally to traces only, so that its preparation requires much skill in such work.

The whole of the alkaloids contained in the bark in question are first obtained in the ordinary way, dissolved out in dilute sulphuric acid, and the solution, warmed, neutralized with ammonia. Tartrate of soda and potash is added, when cinchonidine and quinine, if present, separate in the form of neutral tartrate. The solution, filtered from the precipitate, is shaken with some ether, after the alkaloids have been set free with ammonia, which takes up the quinamine and the amorphous substances, including the paricine, but the greater part of the cinchonine remains undissolved. Upon the careful, slow evaporation of the separated ethereal solution in a tall stoppered flask, there appear at first crystals of cinchonine, which are short prisms ; then follow delicate, very long, bent and twining hair-like crystals, which are quinamine ; and, finally, there remains a viscous amorphous mass, which while it is yet fluid is separated as much as possible by decantation. The neck of the vessel is broken off, and blotting-paper applied to the inside to remove yet more of the amorphous portion. The more completely the removal of this amorphous mass is effected, the more easy will be the farther manipulation. The crystalline substance so prepared is next washed with dilute alcohol, the residue afterwards dissolved in dilute hydrochloric acid, and platinum solution is added to this weak acid solution until it no longer produces a precipitate. This precipitate being removed by filtration, the quinamine can now be immediately thrown down by ammonia ; nevertheless, it is preferable first to remove the platinum by means of sulphuretted hydrogen, and then after driving off excess of this re-agent, to precipitate the alkaloid by means of ammonia. By a single re-crystallization of the alkaloid from boiling dilute alcohol it will finally be obtained perfectly pure.

The yield of quinamine from the before-mentioned bark amounts generally only to traces—in rare cases to about 0·1 per cent. I once received a specimen bark which yielded nearly 0·3 per cent. of pure quinamine ; sometimes, however, this East Indian bark gave not the least trace of the new alkaloid.

Quinamine forms long white delicate prisms, extremely similar to those of sulphate of quinine, which do not change when exposed to the air ; neither do they lose weight at 120° C., and therefore they contain no water of crystallization. But if this substance be exposed to 120° C. for some time it is coloured yellowish, and dissolves then in acid with a yellow colour. With an increasing temperature, the decomposition becomes more and more apparent through the colour, until, finally, the substance melts into a dark brown mass. But if it be placed in a capillary tube and the heat rapidly applied, it melts at 172° C. to a nearly colourless liquid, which crystallizes upon cooling. Nevertheless, here also decomposition soon commences in the product, which finally becomes brown and amorphous.

Only traces of quinamine are dissolved in cold water, 1 part of alkaloid requiring 1516 parts of water at 16° C. for its solution, but it is much more soluble in boiling water. Strong alcohol dissolves quinamine very readily, especially when boiling ; but dilution with water lessens its solvent power. Thus 1 part of the alkaloid is dissolved in 105 parts of 80 per cent. alcohol at 20° C., and in 32 parts of ether at the same temperature. It dissolves very readily in boiling ether, and crystallizes out on cooling. Petroleum, ether, ligroin and benzine also dissolve at their boiling temperatures considerable quantities of quinamine, the greater part of which is deposited again in crystals on cooling. Solution of potash and of ammonia do not dissolve it more than water, and consequently precipitate it from solutions of its salts. The precipitation is at first milky, but afterwards forms small colourless prisms. Concentrated sulphuric acid dissolves quinamine in the cold without colouration, but the application of heat gives it a yellow to a brown colour. On the contrary, strong nitric acid added to the base without heat gives at once a yellowish colour, which becomes afterwards an orange-red, and finally a bright yellow. Perchloride of iron has no reaction on quinamine.

Although quinamine alone has scarcely any bitter taste, it gives with acids a markedly bitter solution. In alcoholic solution it colours red litmus paper blue,

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* Translated from the 'Vierteljahresschrift für praktische Pharmacie,' vol. xxii. p. 366.

† *Berichte der deutschen chemischen Gesellschaft*, v. 265.

and neutralizes acids completely. When an excess of acid is present, the solution does not, like other cinchona alkaloids, present any fluorescence. Its hydrochloric solution is coloured yellow upon the addition of solution of chloride of lime; and if now an excess of ammonia be added, a yellowish amorphous precipitate of the changed alkaloid is produced, but no green colour, as with quinine and its isomers under similar circumstances. In acid solution, quinamine decomposes very readily, and then gives rise to an amorphous alkaloid, that probably has the same composition as quinamine itself, for which the formula of $C_{20}H_{26}N_2O_2$ has been constructed.

Experiment gave with—

I. 0·2032 gram dried at 100° C., 0·5487 CO_2 and 0·1525 H_2O.

0·1452 gram dried at 100° C., 0·011847 N.

II. 0·2018 gram dried in an exsiccator, 0·5425 CO_2 and 0·1505 H_2O.

	Calculated for $C_{20}H_{26}N_2O_2$		Experiment. I.	Experiment. II.
C_{20}	240	73·62	73·64	73·31.
H_{26}	26	7·97	8·33	8·28.
N_2	28	8·59	8·16	—
O_2	32	9·82	—	—
	326	100·00		

The result of the estimation of nitrogen differs, however, considerably from the relative calculations, though, I believe, that this difference is purely conditional, because during the heating of the alkaloid with soda-lime, a volatile oily substance was formed, a small portion of which escaped from the combustion, although it had to pass through a long layer of soda-lime. Moreover, the equivalent number of 326 was confirmed by an analysis of the hydriodate of quinamine.

This salt was first prepared by saturating the base with hydriodic acid, and recrystallizing the crystals obtained from a little boiling water (Analysis I.); a gently warmed acetic aqueous solution was mixed with solution of iodide of potash, from which the new hydriodate crystallized upon cooling, and was in this case also recrystallized from a little boiling water (Analysis II.).

It gave with—

I. 0·3355 gram dried at 100° C., 0·173 AgI.

II. 0·2795 gram dried at 100° C., 0·145 AgI.

	Calculated for $C_{20}H_{26}N_2O_2$.	Experiment. I.	Experiment. II.
I.	27·96	27·85	28·03

The hydriodate contains no water of crystallization. It forms small colourless prisms, which are easily soluble in boiling water, difficultly soluble in cold water, and very slightly in solution of iodide of potassium.

The *hydrochlorate* of quinamine is a neutral salt, extremely soluble in water and alcohol, which is left in an amorphous residue on the evaporation of its solution. After a long time, however, it will crystallize out.

The neutral sulphate crystallizes, but with much difficulty, in hexagonal scales and short prisms; it also dissolves very readily in water.

Acetate of Quinamine.—When the base is dissolved in a slight excess of acetic acid, and the solution evaporated by a gentle heat, there remains finally a semi-crystalline mass, which is a mixture of free base in crystals and the easily soluble amorphous acetate.

Neutral tartrate of quinamine is obtained by saturating an alcoholic solution of the base with tartaric acid. This solution upon concentration gives an amorphous residue of the salt, which is neutral in reaction and dissolves easily in water. The *acid tartrate* is likewise amorphous, readily soluble in water and in alcohol, but insoluble in ether.

Hydrochlorate of Quinamine and Mercury.—Solution of corrosive sublimate added to a concentrated aqueous solution of quininamine produces a white amorphous precipitate of the above-named double salt, which is entirely soluble in a small quantity of water, so that in a moderately dilute solution no precipitation takes place. This property of quinamine I have sometimes made use of to free this alkaloid from the greater part of the other alkaloids accompanying it, which give with solution of sublimate a precipitate rather difficultly soluble in water.

Hydriodate of Quinamine and Mercury is a yellow amorphous precipitate, which a solution of iodide of mercury in iodide of potassium produces in an aqueous solution of hydrochlorate of quinamine. It dissolves with difficulty in cold water, freely in alcohol, and melts at about 90°C. to a yellow liquid, without any loss of weight. 0·505 gram of the substance dried at 100°C. gave 0·1174 gram, HgS and 0·3625 gram AgI, or 20·04 per cent. Hg and 38·80 per cent. I. These figures do not allow of the deduction of any simple formula, so that this precipitate is probably a mixture.

Hydrochlorate of Quinamine and Platinum is distinguished from all the corresponding salts of the other cinchona alkaloids by its great solubility in water. Only in quite a concentrated solution of the hydrochlorate does the platinum solution produce a yellow flocculent precipitate, but this is again immediately dissolved upon the addition of a little water. As, moreover, the salt is easily decomposed upon the concentration of its solution, I have been compelled to abandon its preparation for the purpose of analysis.

Hydrochlorate of Quinamine and Gold is formed as a yellowish white precipitate when gold chloride is added to solution of the hydrochlorate. But this compound is decomposed immediately; it turns purple, and deposits metallic gold, whilst the supernatant fluid assumes a beautiful red colour.

With respect to the rotatory power of this alkaloid it may be mentioned that for $p = 0{\cdot}8378$ in alcoholic solution and $l = 200$, $\alpha = +1{\cdot}79°$ was obtained, whence is calculated $\alpha\, j = +106{\cdot}8$. It belongs, therefore, to the dextrogyrous class of cinchona alkaloids. Further, it accords in many respects with paytine and has also some similarity to physostigmatine.

IX. Paytine.

Paytine was discovered by me* in a white bark imported from Payta, which, as Flückiger has since shown, agrees entirely in anatomical structure with the cinchona barks. But the particulars of the derivation of this bark are not yet known, and therefore it is not yet certain whether it is from a true cinchona.

The composition of this alkaloid is represented by the formula $C_{21}H_{24}N_2O_2$. It reduces equally with quinamine the gold solution, and like it forms with hydriodic acid a difficulty soluble salt. The effect of paytine upon polarized light differs from that of quinamine, since in alcoholic solution, with $p = 0{\cdot}4542$ (anhydrous) and $l = 200$ it gave a rotation of $-0{\cdot}45°$, which is represented by $a\, j = -49{\cdot}5°$

Possibly paytine, as well as quinamine, is derived from conchinine, the paytine, through an addition of an atom of carbon, but the quinamine through an addition of two atoms of hydrogen. Should this conjecture be confirmed, we might venture to conclude that through the introduction of two atoms of hydrogen, the optical rotatory power is reduced about 154°, but double that amount by the addition of one atom of carbon. This difference in the optical power would consequently represent the value of the above-mentioned alkaloids.

(To be continued.)

PYROGALLIC ACID AS A REAGENT.†

BY M. SCHLAGDENHAUFFEN.

The action of pyrogallic acid upon the alkalies and the alkaline earths is well known. It forms, with the caustic

* *Annalen der Chemie und der Pharmacie*, vol. cliv., p. 287.

† *L'Union Pharmaceutique*, vol. xv., p. 5.

alkalies, dark-brown coloured compounds, and with lime water a splendid violet solution, which finally deposits a black product by a decomposition not yet investigated. With the carbonates and bicarbonates analogous results are obtained. A few drops of a ten per cent. solution of pyrogallic acid, added to bicarbonate of magnesia or bicarbonate of lime in sufficiently dilute solution to remain at first uncoloured, gives, after six hours, an abundant black deposit. This reaction the author has made use of in the examination of alkaline mineral waters, a yellow colouration being produced at once in the waters most impregnated with carbonates, followed, after ten or twelve hours, by a plentiful black precipitate, whilst a negative result, amounting to only a yellow or feeble brown colour, has been found to indicate the absence of soluble carbonates. The presence of calcareous carbonates in potable waters may be detected by adding a small quantity of pyrogallic acid in aqueous or alcoholic solution to a few cubic centimetres of the water to be examined.

The alkaloids have also the property of colouring pyrogallol brown, or at least a deep orange yellow, but the reaction is not manifest in less than a dozen hours. This character distinguishes the organic bases from neutral crystallizable bodies and the glucosides, the latter remaining perfectly inactive in the presence of pyrogallic acid; the heat of a water bath increases the depth of colour. Alcoholic solution of mercuric chloride, added to the coloured liquid containing the alkaloid, causes immediately a black deposit, but a pyrogallic solution containing a glucoside or neutral crystalline body is not coloured by the addition of the bichloride.

Some experiments, based upon this reaction, were made to define the relative alkalinity of the alkaloids. A gram of pyrogallic acid dissolved in 10 c.c. of alcohol, added to 2 c.c. of a saturated alcoholic solution of mercuric chloride, was used as the reagent. Two or three drops were placed in a porcelain capsule, and a few crystals of the substance to be examined added. In some cases the crystals were blackened immediately upon contact; others at first took a light tinge, and became more coloured after a few minutes; whilst some alkaloids only became coloured after a slight elevation of temperature. The following represents the results of the experiments:—

	In the cold.	With heat.
Atropine	Black, immediately	Black.
Veratrine	,, ,,	,,
Codeine	Brown, immediately	,,
Quinidine	,, ,,	,,
Cinchonidine	,, ,,	,,
Thebaine	Pale yellow; brown after ¼ of an hour	,,
Narcotine	Ditto ditto ditto	,,
Papaverine	,, ,, ,,	,,
Brucine	No change at first; brown after ¼ of an hour	,,
Strychnine	Ditto ditto ditto	,,
Delphinine	,, ,, ,,	,,
Morphine	,, ,, ,,	,,
Quinine	,, ,, ,,	,,
Cinchonine	,, ,, ,,	,,

In operating with neutral crystallizable bodies and glucosides, and heating the mixture, the black coloration was never obtained, and even the residue never presented a colour darker than that produced by a mixture of the body with the bichloride or pyrogallol used separately.

Picrotoxin, phlorizin, salicin, santonin, esculin, coumarin, amygdalin, meconin, and digitalin, in no instance resembled the alkaloids in their behaviour. It would therefore appear that the pyrogallo-mercuric, like the guaiaco-mercuric test, can be used to distinguish the glucosides and neutral crystallizable bodies from organic bases, and thus facilitate analytical research.

In replacing the mercuric chloride by ferric chloride analogous results are obtained. The solution of pyrogallate of iron used by the author in his experiments contained only a minimum quantity of metallic salt, the addition of a trace of ammonia or caustic alkali to which gives rise to a deep-blue violet colour. This very delicate reaction of the salts of peroxide of iron, recently indicated by M. Jacquemin, can also be used to recognize the presence of alkalies. The solution which gave the author the best results was composed of—

Pyrogallic Acid	0·50 gram.
Water	5 c.c.
Alcohol	5 c.c.
Perchloride of Iron	0·0001 gram.

The pyrogallate of iron so prepared colours blue crystals of strychnine, brucine, morphine, codeine, and all the other alkaloids. Crystals of narcotine are coloured difficultly, and those of narceine acquire only a scarcely appreciable violet tint, but upon heating them in a water-bath they both yield a very deep bluish violet residue. The glucosides and neutral bodies give no coloration in the cold, and in the heat no deeper tint than pyrogallate of iron heated separately. A solution of cupric chloride added to pyrogallic acid gives analogous results, the coloration in that case being a nearly black brown.

The author considers that all these reactions are explained by the oxidation of the pyrogallic acid under the influence of various metallic oxides. The addition of an alkali, alkaline salt, or free alkaloid to one or other of the foregoing solutions, produces, in the presence of a metallic chloride, a double decomposition; there is formed an alkaline chloride or an hydrochlorate of an alkaloid, and a more or less decided coloration, resulting from the oxidation of the pyrogallic acid by the metallic oxide at the moment when the double decomposition takes place.

NOTES ON SOME NORTH AMERICAN DRUGS.*

BY JOHN M. MAISCH.

Cranesbill appears to be used very extensively in some sections of the United States, while in others it is comparatively unknown—at least as a domestic remedy. In July, 1872, I received a plant from the region of the Blue Ridge, in the State of Virginia, which proved to be *Geranium maculatum*, Lin. The letter accompanying it stated that *it* (whether the rhizome alone or the entire plant was not mentioned) has a great celebrity there as a cure for dysentery, diarrhœa, and all kinds of bowel complaints. It seems probable, however, that the herbaceous portion of the plant is not employed for the purposes mentioned, since it has merely a faintly bitter taste and is nearly devoid of astringency.

Antidote to Snake Poison.—In August last the root and radical leaves of a plant were received from Mr. T. D. Reed, of Meridian, Miss., which, the letter stated, "is said to be a specific for snake-bite, and, in fact, the country people use no other antidote in cases of snake-bite." Unfortunately, the letter gives no information whatever in regard to the part employed for the purposes stated, or to the manner in which it is used. The plants sent contain neither stem nor flowers, but from the black colour of the dried plants and the character of the leaves, were at once referred to the genus *Gerardia*, and by comparison with herbarium specimens were recognized as *Gerardia* (*Dasystoma*, Benth.) *quercifolia*, Pursh. It belongs to the sub-genus *Dasystoma*, which comprises perennial plants with rather large yellow flowers, with the leaves, particularly the lower ones, more or less pinnatifid or cut-toothed, and opposite, on the stem, the floral leaves being often alternate; it is very difficult to preserve the green colour of the plants, all the species readily turning black on drying. The genus belongs to the order of *Scrophulariaceæ*.

The species in question resembles and is closely allied to *G. flava*, Lin., and *G. integrifolia*, Gray, and is distinguished from both by the plant being smooth and glaucous

* *American Journal of Pharmacy* [4] vol. iv., p. 103.

the lower leaves being usually twice pinnatifid, and by the peduncles attaining about the length of the calyx, they being shorter in the other two species named.

Most probably the subterraneous portion is the part employed, and it is not unlikely that, like several other so-called snake roots, the black colour which it assumes on drying may have first attracted attention to it for the purpose named. It consists of a short and rather thin upright rhizome, sending off from eight to twelve rootlets, which are about six inches or more in length, nearly simple, when dry slightly furrowed longitudinally and readily breaking transversely. The fracture is even, somewhat granular, exhibits a thick cortical portion of a dark gray colour, surrounding a thin ligneous centre, of a yellowish colour and a rather irregular shape. As far as can be judged from the taste, the root probably contains a principle analogous to saponin.

Verbena bracteosa, Mich.—Branches of this plant were received last August from Mr. Buntin, of Terre Haute, Ind., who states that it is used there by physicians in the form of infusion, with marked success, in the treatment of scrofulous affections, particularly in scrofulous sore eyes, and that its alterative properties are claimed by some to be more potent than those of iodide of potassium. The plant is abundant in the neighbourhood of Terre Haute, and the specimen received agrees in every respect with the specimens in the College herbarium coming from Kentucky.

The plant is procumbent and widely spreading, with its stems branching to the length of from 12 to 18 inches. It is covered with spreading whitish hairs, the leaves are narrowed at the base into a short petiole, broadly lanceolate in outline, deeply cut-toothed, or the lower pinnatifid and the teeth rather acute. The small blue or purplish flowers are collected in dense spikes terminating the branches, the numerous bracts being longer than the flowers, lance-linear in shape or the lower deeply three-cleft. Its hoariness and its dense long bracted and squarrous spikes are quite characteristic for this species, which possesses a gradually developed but lasting bitterness.

I have not been informed of the strength or dose in which the infusion is given. The plant appears to merit some attention, particularly with the view of isolating the bitter principle and determining its value as an alterative.

California Opium.—I have received from Mr. J. H. Flint, of Marysville, Cal., a handsome specimen of opium, in regard to which the following information was given :

"The opium was raised in Sutter county, on the Sacramento River, about fifteen miles from this city. The expense attending the cultivation of poppy and the collection of opium does not warrant the outlay of sufficient capital to produce large quantities, although the soil and climate are admirably adapted to that purpose. I obtained 7¾ per cent. of morphia from a specimen *recently collected.* It yielded 52 per cent. of soluble matter to boiling water, and lost 17 per cent. of moisture after drying at 212° F. What I have used seems to answer quite as well as the imported article."

From this statement it appears that the opium was assayed in its crude undried state ; if an allowance is made for the 17 per cent. of moisture, Mr. Flint's assay would give (100—17) : 100 : : 7·75 : 9·34 per cent. morphia in dry opium, or nearly the strength of opium as directed by the pharmacopœia. The high price of labour in California, it may be supposed, renders the cultivation of the poppy solely for the production of opium, unprofitable ; but the seeds contain a large percentage of a bland fixed oil, and after its expression are valuable as feed for cattle ; poppy culture may, therefore, notwithstanding the drawback of high wages, not prove unprofitable.

The opium received was more homogeneous in texture than Smyrna opium, of a good strong narcotic odour, and unexceptionable in its physical properties.

Oregon Balsam of Fir.—Under this name an oleo-resin has appeared in our commerce during the last year, which is rather suspicious in appearance. As far as could be ascertained, it comes from New York, and the writer has not been able to trace it beyond that city. It is a thick liquid, perfectly transparent, of a bright brownish colour and a distinct terebinthinate and aromatic odour. On rubbing a little of it between the fingers, different odours become quite evident, the last one remaining being that of nutmegs. It has the appearance of being merely a solution of common resin in oil of turpentine, flavoured, perhaps, with a little of the oil of *Eucalyptus globulus* and a somewhat larger quantity of the volatile oil of nutmegs. Is such an article known on our Pacific coast, and if so, what is its source and how is it obtained ?

Adulterated Serpentaria.—Recently a rhizome with its rootlets was handed to me, with the statement that several bundles of it had been found in a bale of serpentaria obtained from a Western State. The adulteration was promptly recognized as the underground portion of *Cypripedium pubescens*, Lin. (not *C. parviflorum**). This differs so considerably from *Aristolochia serpentaria* and *reticulata*, that the former can never be mistaken for the latter, and the adulteration can therefore be practised successfully only when Virginia snake root is sold in bulk. The rhizome of the latter is quite thin, rarely exceeding one-tenth of an inch in diameter, the remnants of the over-ground stems are invariably projecting as short branches from the rhizome, which terminate by a scarcely concave scar. The rhizome of Cypripedium is much coarser, the stems die off to the rhizome, leaving large deeply cup-shaped scars, the older ones penetrating deeply into the rhizome. Cypripedium, moreover, is a monocotyledonous plant, while serpentaria is dicotyledonous, and the difference in the characteristic disposition of the ligneous bundles is quite evident.

CHEMICAL FOOD.

A correspondent of the New York *Druggists'* Circular, sends to that Journal the following formula, which he asserts will produce a more permanent compound syrup of phosphates than is afforded by the method recommended by the late Professor Parrish :—

Take—	
Freshly precipitated phosph. iron . .	128 grs.
Freshly precipitated phosph. lime . .	256 grs.
Phosphate of soda	128 grs.
Phosph. of ammonia	128 grs.
Syrupy phosphoric acid	12 fl. dr.
Water at 212° (boiling)	4 oz.
Syrup sufficient to complete	16 oz.

Dissolve the soda, lime, and ammonia phosphates, and six drachms of syrupy phosphoric acid in the boiling water. Mix the syrupy phosphoric acid with one ounce of syrup, and rub with the iron until it is dissolved ; add the solution of the lime, soda, and ammonia, and sufficient syrup to make a pint. The advantages of this method over the usual one is the use of pure tribasic phosphoric acid (which should always be made directly from phosphorus, that made from the glacial acid being unsatisfactory) instead of the monobasic acid now employed; the phosphate of ammonia is a better preserver of the solution of iron than the potassic phosphate, and possesses more remedial power over pulmonary diseases, and is inferior to it in no case that I can imagine. The great trouble with *Easton's syrup and chemical food*, as prepared in the United States, is the use of heat, monobasic acid, and too much atmospheric exposure in making those preparations. The best test with which I am acquainted of pure tribasic dilute phosphoric acid is, that it forms a perfectly permanent solution, without precipitate, when mixed with equal parts of the tincture of the ferric chloride. For this test I am indebted to the Messrs. Rosengarten of New York, as also for much valuable information on phosphoric acid and the phosphates. Whenever I have used phosphoric acid made

* For a description of these rhizomes refer to *American Journal of Pharmacy*, 1872, p. 297.

directly from phosphorus by nitric acid, I have found it would stand this test ; but every specimen made from the glacial acid gave more or less precipitate of the phosphate sesquioxide of iron. I think the difficulties heretofore encountered in phosphatic preparations are thus explained. The syrupy phosphoric acid, s. g. 1500, is decidedly superior to either the glacial or dilute solution, for all pharmaceutical puposes ; and if standing the tribasic test with the argentic nitrate, will produce quite permanent solutions of iron, manganese, lime, and zinc, when preserved with sufficient sugar.

THE NATURE AND PHYSIOLOGICAL ACTION OF SNAKE POISONS.*

BY DRS. BRUNTON AND FAYRER.

The terrible subject of poisonous snake bites appears to have always exercised a fascination over the human intellect, akin to that which the serpents themselves are said sometimes to exercise over their victims. Hardly is there a country in which it has not been studied ; the three kingdoms of nature have been ransacked for antidotes ; the homœopathic virtues of theriaca were vaunted a couple of millenniums since ; and the claims of innumerable other remedies have since been put forward down to ammonia and guaco in our own days. Nevertheless, the startling fact is vouched for by official documents that twenty thousand human lives are still lost annually from the bites of poisonous snakes in India alone !

With the hope of diminishing this mortality, Dr. Fayrer, in 1867, began a systematic investigation of the subject, and in a work entitled the "Thanatophidia of India," has recently published a description of the venomous snakes found in British India, with an account of a series of experiments upon the lower animals, conducted for the purpose of studying the nature of the poison, its *modus operandi*, and the value of the remedies that have been from time to time reputed as antidotes. Since then, he has in conjuction with Dr. T. Lauder Brunton communicated to the Royal Society two papers containing a report of further experiments expressly devoted to ascertaining the nature and physiological action of the virus on life and the application of such knowledge in the treatment of those poisoned. Of these papers it is intended here to give a a brief *résumé*.

Estimated by a rough classification of the deaths according to the snakes which inflicted the wound, the cobra (*Naja tripudians*) in India occupies the first place in order of destructiveness ; the Krait (*Bungarus cœruleus*) the second. There is apparently some analogy between the nature of the action of cobra virus and that of curara, death in both cases being induced by arrest of respiration through paralysis of the respiratory apparatus. It has been shown that in the case of curara this is due to paralysis of the peripheral distribution of the motor nerves, that if artificial respiration be kept up until the elimination of the poison from the system the patient may recover. The result implies that the integrity of the parts of the nervous system is not impaired, whilst under the influence of this poison. Recent experiments confirm the opinion that death from cobra poison is due to its action on the nerve centres, to which it is conveyed by the blood with terrible rapidity when the injection takes place into a large vein like the crural or jugular. But whether its action is localized in the nerve centres or is extended to other parts of the nerve apparatus, and whether its effect is permanent or transitory is not yet known. In some cases of cobra poisoning life has been prolonged by artificial respiration, and without committing themselves to any opinion the authors do not abandon the hope that it may, as in the case of curara, even save it altogether.

Passing by the secondary effects of the virus upon the blood, and dealing only with its immediate and deadly neurotic effects, the subject resolves itself into three points of inquiry : (1) Is the nature of the virus such that we may hope to find any agent capable of overtaking, neutralizing and rendering it harmless and inert ? (2) Does the virus exert only a temporarily pernicious action on the ultimate structure of the nerve apparatus ? or (3) Does it so modify the nerve elements as to render them permanently incapable of resuming their functions after the poison has been eliminated ?

With regard to the first proposition the authors have arrived at the conclusion that a complete and satisfactory means of resisting, antagonizing, or eliminating the poison and of saving life is still unknown. Much virtue has been recently attributed to one of the oldest and most trusted of all antidotes—ammonia ; but the authors point out that a century ago Fontana, after repeated experiments, came to the conclusion that its injection into the veins as well as its internal administration and external application, is powerless in this respect, and state that such has been the result also of all the experiments made with it in India.

Cobra poison, when fresh, in a transparent, almost colourless fluid, of a somewhat syrupy consistence, and not unlike glycerine in its appearance. When quickly dried it forms a transparent mass of a yellowish-brown colour, resembling some kinds of gum arabic. The poison may be kept for some months in a fluid state without undergoing any change, but after a certain time it decomposes, giving off carbonic anhydride, and acquiring a dark brown colour and disagreeable odour. The dried poison may be kept for a much longer time without undergoing any apparent change.

The chemical composition of the poison has been examined by Dr. Armstrong. He has not been able to separate from it any crystalline principle. It is partially coagulated by heat ; mineral acids produce in it a gelatinous precipitate ; absolute alcohol throws down a white gelatinous precipitate ; a drop of it evaporated with a little sulphate of copper solution, and then treated with caustic potash, gives a violet coloration. These reactions show that the chief constituent of the poison is an albumenoid body. In an ultimate analysis very little difference was found between the fresh poison, the alcoholic precipitate, and the alcoholic extract. The following are the results, the albumen being given for comparison.

	Crude Poison.	Alcoholic Precipitate.	Alcoholic Extract.	Albumen.
Carbon .	43·55	45·76	43·04	53·5
Nitrogen .	43·30	14·30	12·45	15·7
Hydrogen	.....	6·60	7·00	7·1
Sulphur .	.....	2·5	.....	.....
Ash . .	.....	Traces.	.....	.....

But although there is little difference between the composition of the alcoholic precipitate and extract, there is an immense difference between their physiological action, the extract being a virulent poison, the precipitate almost inert. This is notably different from what has been stated by Dr. Weir Mitchell respecting the poison of the rattlesnake, namely, that the alcoholic precipitate is active whilst the extract is inert.

Coagulation of the cobra poison by boiling, however, does not destroy the activity of the poison ; but a portion which was boiled for more than half an hour under pressure corresponding to a temperature of 102° C, had no effect when injected into the thigh of a lark. Dilution appears to have no effect in lessening the activity of the venom, except so far as it retards obsorption. Admixture with liquor ammoniæ and liquor potassæ does not alter the effects of the poison.

In experiments made with the coagulated poison, death seemed invariably to be caused by paralysis of the spinal cord, the motor nerves being little affected, while in those made with the dried venom, sometimes the action on the cord predominates sometimes that on the nerves. In this

* Abstract of two papers read before the Royal Society *Proceedings*, vol. xxi., p. 358, and vol. xxii., p. 68).

respect, as also in some of the symptoms it produces, cobra poison agrees very closely with conia. That alkaloid, as Drs. Crum-Brown and Fraser, have shown often contains a mixture of true conia and methyl conia. Conia alone paralyses the motor nerves without affecting the spinal cord; but when mixed with methyl conia, sometimes the one is affected first, sometimes the other. When the dose is small the motor nerves are usually paralysed before the reflex function of the cord; when it is large the cord is paralyzed before the nerves. Methyl conia also affects both; but a small dose of it paralyses the cord before the nerves, while a large paralyses the nerves first.

The local effects of the poison are partial paralysis of the bitten part, occasionally pain in it, ecchymosis around the spot where the poison has been introduced, and sometimes in other and distant parts, and if the animal survives for some hours, infiltration and, perhaps, incipient decomposition of the tissues and hæmorrhagic discharge. The general symptoms are depression, faintness, hurried respiration, exhaustion, lethargy, nausea, and vomiting. In guinea-pigs and rabbits peculiar twitching movements occur, which seem to represent vomiting in them, and occasionally, in fact, guinea-pigs do vomit. Dogs vomit, are salivated, and present an appearance as if the hair had been rubbed the wrong way. As the poison proceeds paralysis appears, sometimes affecting the hind legs first and seeming to creep up the body and sometimes affecting the whole animal nearly at the same time. Hæmorrhage, relaxation of the sphincters and involuntary evacuations, not unfrequently of a sanguineous or muco-sanguineous character, often precede death, which is generally accompanied by convulsions.

Snake poison is essentially a neurotic, acting by absorption, and when it takes full effect, it appears to kill by annihilating the source or distribution of nerve force. It is also an irritant, and to certain extent a septic, for if the bitten creature survive, the wound and parts about it are apt to slough and induce septicæmia. The blood itself is affected by the poison. It generally presents a dark colour, as if death were due to failure of the respiration and not of the circulation; but it readily assumes a florid colour when exposed to the air. Coagulation usually occurs in ths blood of animals killed by cobra poison, while it is frequently absent from the blood of those killed by *Daboia* venom. Just as the *Naja tripudians* (cobra) may be regarded as among the most virulent of the colubrine snakes, the *Daboia Russellii* is probably as venomous as any of the viperine snakes. Experiments on pigeons and guinea-pigs tended to show that the general symptoms produced by the *Daboia* venom are nearly the same as those of the *Naja*. The local symptoms are greater extravasation of blood and effusion into the areolar tissue.

The bite of venomous serpents, such as the cobra, *Daboia*, and *Bungarus*, has been found by the authors, in numerous experiments, to be generally fatal to the innocuous serpents, but not always so. The occasional escape of the latter, however, is thought to be probably due to the quantity of poison absorbed having been small either absolutely or relatively to the size of the bitten snake. On the other hand venomous snakes were not generally affected, either by their own poison or that of another kind of snake. Small venomous snakes have, however, occasionally been killed by large individuals belonging either to the same or to a different species. The authors think that in some of these cases death may possibly have been due to other causes, especially in the case of a *Daboia* bite, where the fangs are so large that the wound and internal hæmorrhage might cause death; but it was remarked that the symptoms preceding death were similar to those occurring in innocuous snakes. Possibly the immunity which poisonous snakes enjoy from the effects of their own poison or that of another species (an immunity not shared by small individuals of a venomous species poisoned by a large quantity of venom) may be due in some measure to a power of excreting the innoculated venom through their own poison glands, which are modified parotid glands.

One popular belief has been proved by the author's experiments to be unfounded. It has long been supposed that the mongoose (*Herpestes griseus*) is unaffected by the poison of venomous snakes, either on account of some peculiarity in the constitution of the animal, or, as the story used to run, on account of its knowledge of some herb which it eats as an antidote. If fairly bitten, however, the mongoose succumbs like any other creature, as proved by experiments in India. Its great activity and vigour enable it to elude the snake, and generally when it is wounded it is merely scratched, not pierced by the fangs. But if the fangs be thoroughly embedded the animal dies.

Usually there is a correspondence between the size of the animal and the intensity of the effects of a given quantity of the poison; but there are some exceptions to this rule, for a cat will resist the action of cobra poison, as much as, or more than, a dog five or six times its size.

Like rattlesnake poison, cobra poison does not prevent the germination of seeds, but appears to interfere with and retard it, especially when the poison is strong.

In studying the means of preventing death from the bites of venomous snakes, the manner of its excretion from the system is of great importance. From data afforded by their own experiments and observations of others, the authors consider that the poison is excreted by the kidneys and mammary glands, and probably also by the salivary glands and mucous membrane of the stomach. A case has been reported in which an infant, suckled by its mother after she had been bitten by a snake, but before any marked symptoms had shown themselves, died in two hours after it had partaken of the milk. Excretion of the venom from the kidneys appears to be shown by an experiment in which the urine of a dog poisoned by the bite of a sea-snake (*Enhydrina bengalensis*) killed a pigeon twenty-two hours after being hypodermically injected. Some saliva obtained from the submaxillary gland of a dog poisoned by cobra venom had no effect when injected under the skin of a lark's thigh; but one drachm of the greenish liquid which flowed from the mouth of a dog similarly poisoned killed a pigeon in two hours.

It is evident that the lethal action of any poison depends upon the relative rapidity with which it is absorbed and excreted. If absorption goes on more rapidly than excretion the poison accumulates in the blood, and exercises its deadly action; while the quantity in actual circulation may be reduced to an infinitesimal amount if the excretion can keep pace with or go on more rapidly than the absorption. In the case of curara all the bad effects usually following its introduction into a wound may be prevented by applying a ligature between the wound and the heart and only loosening the bandage occasionally for an instant or two at a time. In this way only a little of the poison is absorbed each time the ligature is slackened, and this is excreted by the kidneys before another quantity is absorbed. The same obtains in snake poison, but here much will depend upon whether the nerve tissue is decomposed or left in a condition to resume its functions upon the removal of the poison.

With regard to artificial respiration, which the authors had found in some cases to prolong life, the following experiment was performed under the superintendence of a committee appointed by Government to investigate the subject. A dog bitten by a sea-snake appeared to die two hours afterwards in convulsions. Artificial respiration was commenced, but four hours afterwards the application of a galvanic current caused no muscular contractions; the eyes were dry and glazed, and the body was cold. Next morning, about sixteen hours after the apparent death of the animal, reaction commenced: the galvanic current caused movements of the body and expulsion of urine, and the bowels acted spontaneously. In five hours more the animal seemed as if it would recover: the eyes lost their glazed appearance, tears were secreted, and a greenish fluid flowed from the mouth; reflex action became re-established, the eyelids closing when the cornea

was touched. Attempts to swallow were made, when water was poured into the mouth ; the body showed sensibility to pain, and the eyelids twitched when the finger was merely brought near to the eye. The heart, however, became weaker, and the animal died 24 hours and 35 minutes after its first apparent decease. Although from the symptoms hopes may be entertained that the poison does not act as a ferment in decomposing the tissue, it is evident that its excretion proceeds very slowly. It was at one time thought to quicken the excretion by the employment of diuretics and sialogogues, but this hope having been much lessened by the discovery that the poison paralyses the nerves of secretion, the authors are inclined to think that perhaps the readiest means of removing the poison from the body may be to allow it to flow out with the blood in which it is circulating, and to supply the place of the poisoned blood thus withdrawn by transfusion.

With regard to the mechanical methods of preventing the entry of the poison into the circulation after a bite, Drs. Brunton and Fayrer think that the speedy application of an elastic cord (such as is used in bloodless operations) round the limb, combined with the application of cups attached to an exhausting syringe or pump, may be of service.

INFLUENCE OF VEGETATION UPON MALARIA.*

BY C. A. GORDON, M.D., C.B.

In an interesting paper on the "Hygiene of Malaria," published in the *Medical Press and Circular*, the author has the following remarks upon the influence of vegetation upon the prevention or extension of malaria :—

The power exerted by forests and woods in preventing the extension of malaria deserves a special notice. The advantages of having a belt of forest between barracks and a malarious swamp have been acknowledged from ancient times. We learn that the Romans, whenever practicable, established their camps under the shelter of woods. In India it has from time immemorial been the custom of the natives of malarious districts to form villages in the denser parts of the jungles, where, according to recent observations, they are relatively exempt, not only from intermittent fever, but from cholera. In America, the Dismal Swamp, where ague is never met with among the inhabitants, is covered with evergreen trees of large and lofty stature ; whereas, on the other hand, there are numerous instances of districts having become unhealthy by the forests that had covered them being removed. Among such may be enumerated St. Stephano and Campo Salina in the Pontine Marshes. American writers observe that encampments on land, the wood of which had just been cut down, are, of all others, the most unhealthy, and add, "it is perhaps from this cause that new countries are generally fatal to the first settlers," a remark which I specially commend to the attention of those about to emigrate to the Far West. Dr. Cleghorn, writing of the Forests of Southern India, makes somewhat similar allusion to the influence of woods upon health, and expresses his belief that the greater degree of sickness at Wellington than at Coonoor, although only a couple of miles distant, is attributable to the scarcity of wood at the former place as compared with the latter. It seems almost unnecessary to observe, that in order that woods and forests may prove beneficial as guards against malaria, it is necessary that they are composed of trees which are themselves in a healthy state, and are not of the description known to produce injurious manations.

With regard to water as a vehicle for ague-producing malaria, not only that which is stagnant, but in some instances that of rivulets impregnated with vegetable matter, fresh or decaying, may convey the poison, and there are numerous instances recorded of streams in India having this property. That of stagnant pools and marshes has ever had a similar reputation, and in some instances it has been found that although health may not suffer in residents in such localities so long as they refrain from making use of the water, yet they become affected immediately they neglect this precaution, the ready explanation being, that although malaria may not be given off by soil so long as it remains submerged, the overlying water may itself become saturated with the poison.

If, however, there are plants the presence of which in water renders it deleterious, there are many others which act as purifiers, and render that which otherwise would be deleterious, wholesome ; among such are *Hydrocharis*, or frog-bit, *Stratiotes*, or water soldier, *Macrophyllum*, *Vallisneria*, and *Anacharis alsinastrum*, which, since 1834, when it is believed to have been introduced from North America, has flourished abundantly in marshes and canals in England. Among other plants which have a similar action are *Sagittaria*, or arrow-head, *Alisma plantago*, or water plantain, *Butomus umbellatus*, or flowering rush, *Lemna*, or duckweed, *Pistia*, or *gigantic* duckweed, *Montia*, *Potamogeton*, or brookweed, *Callitriche*, or starwort, *Hippuris*, or marestail, *Equisetum*, or horsetail, besides various rushes, carices, grasses, flags, and cresses ; while *Œnanthe*, although itself poisonous, purifies water in which it grows. Nor is the list complete with all these, and the enumeration shows, if any argument be necessary to do so, how essential is a measure of botanical knowledge on the part of the army medical officer, in order that he may efficiently fulfil the functions of his position in this as in many other respects. Notwithstanding the undoubted acrid properties of the natural order *Ranunculaceæ* generally, there are at least four genera whose presence in water is beneficial, namely, the *R. aquatilis*, *Nelumbium*, *Victoria*, and *Nymphæa*, as are also the members of the natural orders *Ceratophylleæ* and *Podostemaceæ*, and some of the *Algæ* among the cryptogamic plants. Some of these plants being provided with leaves which float upon the surface of the water, directly decompose the otherwise noxious vapours under the influence of the solar rays, and in their stead produce respirable air ; others, more submerged, themselves give out a supply of oxygen, thus purifying the water and rendering it fit for the support of life.

Vegetable matter, whether in the fresh or dried state, exerts various effects in the propagation, absorption, or destruction of malaria. According to Dr. Hammond, he contracted intermittent fever from inspecting musty hay, and symptoms of pyrexia from examining old books. Dr. Salisbury considers that measles and some other affections are readily conveyed by means of straw, and that epidemics may thus be propagated among troops in camp. Plants in a state of decay or decomposition give rise similarly to malaria, or at any rate produce in man the diseases usually attributed to such a cause. Old trees undergoing the process of *dry rot*, and some vegetables, more especially cruciferæ, and those generally of a succulent nature, have this effect. Dense vegetation, as low jungle, especially containing trailing plants and of a nature to interfere with free perflation of the locality, is conducive to the concentration of malaria.

Under other circumstances trees and growing plants are valuable as protectives against malaria. The existence of a belt of trees between a barrack and a pestiferous marsh is fully acknowledged, and the circumstance of planting a marsh with evergreen trees has, in many instances, converted a malarious into a healthy locality ; while, on the other hand, as in the case of St. Stephano and Campo Salina in the Pontine Marshes, places have become unhealthy by the forest upon them being cut down. The precise process by which these and some other plants exert their destructive effect upon the poison is as yet unascertained. Others, however, are known to cause a large increase of ozone during sunlight, and thus to purify the atmosphere. The toolsee plant, or *Thymus capitatus*, is in India held to exert this power to such a degree that it has become sacred to Vishnu, that is, the preserving principle. Other plants have more or less the same character, as the cherry laurel (*Cerasus lauro-cerasus*), although both its

* From a paper on the "Hygiene of Malaria," published in the *Medical Press and Circular*, March 4 and 11, 1874.

flowers and fruit contain, as is well known, a poisonous principle; so also with cloves, lavender, mint, lemon, heliotrope, hyacinth, and narcissus, although the odour from the latter is, under certain circumstances, capable of producing unpleasant effects. Certain prepared perfumes, similarly exposed to the sunshine, add further to the atmospheric stock of ozone—the well-known eau-de-Cologne, for instance, oil of bergamot, extract of mille-fleurs, essence of lavender, and some of the aromatic tinctures. The oxidation of certain essential oils obtained from plants and flowers, such as the oils of nutmeg, aniseed, thyme, and peppermint, is likewise indicated as a source of ozone, though the supply of this aërial condiment is, in the case of these, less considerable. Perhaps, indeed, the influence of such natural destroyers of malaria are less studied and willingly recognized at the present day than they were in former times. In past ages there appear to have been instances of a sort of instinctive resort to certain plants as disinfectants. Herodian relates that during a plague in Italy, in the second century, strangers crowding to Rome were directed by the physicians to retreat to Laurentum (now San Lorenzo), a place so-called from the abundance of *Laurus nobilis*, or sweet bay tree, which then grew there, and by inhaling the odour of which they would in a certain measure be guarded from infection. And long before the time alluded to the disciples of Empedocles had been accustomed to plant aromatic and balsamic herbs in the neighbourhood of their dwellings, in the confident belief that by so doing they were providing means of defence against fevers, etc. To this day we have the name of "feverfew" as the appellation of one of the strongest scented compositæ, with traditions of its abounding febrifugal powers; and it may be added, "if we are wise we shall imitate the citizens of Laurentum, and promote the growth of bay trees wherever the soil and climate will allow them to flourish." Besides all these, some resin-yielding and aromatic plants have the reputation of destroying malaria. There is reason to believe that several species of the natural order *Myrtaceæ* possess this property besides the *Eucalyptus globulus*. Of late years this plant has obtained a high reputation for its assigned power, and some writers have recommended its introduction with a similar object on the Gold Coast. Various examples of its success in Algeria are recorded. At Pandook, on the banks of the River Hamyze, fever was extremely prevalent. In 1867 several thousand plants of the eucalyptus were introduced, with the immediate result of rendering the locality healthy. A similar result was obtained at Ben Machydon and Gue de Constantine, in the island of Corsica, in Cuba, in the Australian Colonies, at the Cape of Good Hope, and other places. Probably other trees which yield aromatic gum resins would have a similar effect, and it is not known that malarious diseases prevail in places where trees of the natural order Coniferæ grow abundantly.

Various other plants have obtained a reputation as being capable of destroying "malaria," or at any rate rendering that influence innocuous. Thistles had rendered some parts of the campagna near Rome healthy, and on the plants being cut down, those districts became again "malarious." Sunflowers appear to have been first planted for a similar purpose in America, and in that country they are said to have been so successfully. Baron von Alsten, whose property was situated on the banks of the Scheldt, and liable to be flooded by that river, planted several patches of the sunflower (*Helianthus*) near his house, and with the result that for ten years his family continued exempt from fever, while in other properties, where no similar precaution was taken, this disease continued to prevail. The plant has of late years been sown in the Mauritius for a similar purpose, and in further recommendation of its good qualities, the observation has been made that it yields 40 per cent. of good oil; that the leaves from it are excellent fodder, and the stems being rich in saltpetre, make good fuel. Marshes may also be rendered healthy by the presence of other plants. Among those that conduce to this happy result is the *Pistia Stratiotes*. In India, the West Indies, and Africa, the power exerted by this plant in absorbing the deleterious gases of muddy marshes is well known, and probably it is on this account that in the latter country the plant is held sacred. The *Pistia* is believed to possess this power in a greater degree than any other plant, being capable in a few days of rendering stagnant water sufficiently pure for fish to live in; although it by no means follows that the water is thus rendered suitable for use by man. The contrary is indeed the case. In Jamaica, water in which this plant grows, acquires so acrid a character as to give rise to intestinal fluxes in those who use it.

Some trees and tree-like plants have, with greater or less reason, the reputation of themselves evolving malaria, and consequently the natives of the countries where they grow avoid sleeping or resting under them at night. Those that give off their branches at an inconsiderable distance from the ground, or the foliage of which is dense, have this reputation in the highest degree, and among them the tamarind and *neem* trees (*Melia azadarachta*). A similar influence is said to arise from the papaw tree (*Carica papaya*), and Dr. Livingstone states that in East Africa, near the Zambesi River, tracts are covered with the plant *Pœderia fœtida*, a member of the *Guettardæ* group of the Rubiaceæ. Many people suffer inconvenience in various ways from odours arising from certain plants, although the effects are not in the nature of disease of recognized malarial origin. In these cases the matter evolved, so far from being an invisible *aura*, is a substantial exhalation. Thus, besides the unknown effects of ipecacuanha in inducing sickness in certain persons, even when brought no nearer to them than an adjoining room, and flowering plants, in producing "hay-asthma," nausea, sickness, and even death, has been attributed to the odours of some, as the *Narcissus* and the *Cheiranthus*, or wallflower, not to mention the fraction of truth there no doubt is in the story of the upas tree (*Antiarus toxicaria*). The manchineel tree (*Hippomanæ mancinella*, N. O. *Euphorbiaceæ*) of the West Indies, and certain American and Chinese species of *Rhus* (N. O. *Anacardiaceæ*) not only produce severe irritant effects upon the skin, but affect very severely such persons as are predisposed to suffer from malaria. The flowers of the *Daphne Mezereum* also evolve odours which are more or less injurious to particular persons, and a similar property is attributed to the oleander (*Nerium Oleander*). The mangrove, or *Rhizophora*, has ever had an unenviable notoriety, on account of the malaria-producing properties assigned to it. As a rule, probably without exception, localities where this plant flourishes being for the most part marshes and low lying tracts, liable to inundation, are notoriously unhealthy, but in all probability this reputation arises altogether from paludal causes rather than from the plant itself.

ABSORPTION OF AMMONIA BY THE AËRIAL PARTS OF PLANTS.

A point of considerable practical importance to agriculturists has recently been investigated by M. Adolf Mayer, of Wiesbaden, viz., whether the aërial parts of plants have the power of absorbing ammonia or not. He carried out a series of experiments on plants, which were grown in such a manner that access of ammonia through the roots was prevented, while the leaves were subjected to the influence of this substance in either a gaseous or dissolved condition. The upshot of his experiments was that a variety of plants subjected to these conditions all had the power of absorbing carbonate of ammonia by their aërial parts, both in the gaseous and the dissolved state, and of employing it in the building up of their tissues. The plants, however, did not appear to thrive when all access of ammonia through the roots was prevented. The experiments did not indicate that plants belonging to the order Leguminosæ have any special aptitude for absorbing ammonia through their aërial organs, nor for assimilating the combined nitrogen of the atmosphere.

The Pharmaceutical Journal.

SATURDAY, MARCH 28, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

ADDITIONS TO THE BRITISH PHARMACOPŒIA OF 1867.

IN announcing last week the publication of a reprint of the British Pharmacopœia, together with the addendum to which reference has several times been made in this journal, we contemplated entering upon a critical discussion of the new additions to the Materia Medica as well as the preparations of the Pharmacopœia, but having in the meantime learnt that this matter was to be specially brought forward at the evening meeting of the Pharmaceutical Society next week, under conditions most likely to ensure a thorough discussion of the various features of interest, we shall at present confine our remark to a bare enumeration of the articles and preparations included in the "Additions to the Pharmacopœia." The subject is to be brought before the Pharmaceutical Society, next Wednesday, with the advantage of practical illustration by specimens of all the preparations, and it does not appear to be advisable to attempt to forestal in any way the free expression of opinion on that occasion by practical pharmacists upon a book in which they are so largely interested.

The first addition on the list is another ether, Æther Aceticus, as being one of the most agreeable compounds of its class. Then Ammoniæ Nitras, as a source of nitrous oxide; Amyl Nitris, and Aqua Chloroformi follow. The claims of Chloral Hydras are recognized by a place, and it is stipulated that it shall be in colourless crystals, a form in which it is now prepared in considerable quantities on the continent. There is also a Syrupus Chloral. There are as many as four phosphorus preparations; two hypophosphites, Calcis Hypophosphis; and Sodæ Hypophosphis, Oleum Phosphoratum, a solution of phosphorus in almond oil and Pilula phosphori, in which the excipients are balsam of tolu and yellow wax. A precipitated peroxide of mercury is added under the name Hydrargyri Oxidum Flavum; as well as oxide of bismuth, Bismuthi Oxidum, prepared by precipitating subnitrate of bismuth with caustic soda.

A solution for hypodermic injection now makes its first appearance among the official formulæ, in the shape of Injectio Morphiæ Hypodermica, containing one grain of the acetate in twelve minims of the injection. Three new suppositories bring the total number of these preparations up to seven; the new comers, are Suppositoria Acidi Carbolici cum Sapone, Suppositoria Morphiæ cum Sapone, and Suppositoria Acidi Tannici cum Sapone. The first of the three are entirely new to the Pharmacopœia, and are to be made with curd soap and starch; the latter two resemble those previously official, the vehicle of lard, wax, and theobroma butter being replaced by one of glycerine of starch, curd soap and starch, the introduction of soap being intended to obviate the inconvenience hitherto experienced by the soiling of linen by the melting of the fat. This has necessitated the introduction of another soap, Sapo Animalis, or curd soap, which is also ordered in a new pill, Pilula Scammonii Composita, that has been introduced to supply the want of an authorized formula for a purgative pill without aloes. Curd soap is also recommended in the place of hard soap in Linimentum Potassii Iodidi cum Sapone. A Charta Sinapis brings in its train Gutta-percha and Liquor Gutta-percha. There is an Extractum Glycyrrhizæ Liquidum, containing one-ninth of its volume of rectified spirit, and also a Pulvis Glycyrrhizæ Compositus, composed of powdered senna, liquorice, and sugar, differing from the analogous preparation in the German Pharmacopœia in the absence of fennel and sulphur. Another powder is Pulvis Elaterii Compositus, in which one part of elaterium is diluted by nine parts of sugar of milk. Two more juices are added, Succus Belladonnæ and Succus Hyoscyami, similar to the juice of hemlock, previously in the Pharmacopœia. The Liquor Magnesiæ Citratis is quite a novel feature, and contains 200 grains of citric acid with 100 grains of carbonate of magnesia and 40 grains of bicarbonate of potash to the half-pint.

There are three fresh additions to the vegetable Materia Medica—Areca, the seed of the betel-nut tree, which is introduced as a vermifuge; Aurantii Fructus, required in the preparation of Tinctura Aurantii Recentis; and Laricis Cortex, the bark of *Larix Europæa*, D.C., deprived of its outer layer, of which a Tinctura Laricis is to be made with rectified spirit. Another new tincture is Tinctura Quiniæ Ammoniata.

Finally, there is now an official formula for the preparation of Pepsin. It is described as a preparation of the mucous lining of a fresh and healthy stomach of the pig, sheep, or calf. It consists of the viscid pulp which is to be obtained by scraping the cleansed mucous membrane with a suitable instrument, then spread upon a glazed surface and dried at a temperature not exceeding 100° F.

In speaking of these additions to our national Pharmacopœia above enumerated, the *Lancet* expresses the tolerably safe opinion that they at least afford a promise of comprising some valuable matter. With equal discretion, it adds that if the practical knowledge and judgment displayed in preparing the previously published part of the work have also been exercised in this part of it, the profession will be

indebted to the Medical Council, and to the Pharmacopœia Committee for their labours in this direction.

The *Medical Press and Circular* does not think much of the additions, and is not impressed with their importance. As regards most of them it has nothing to say, but it condemns phosphoretted oil as being a bad mode of administration, and as to the phosphorus pill, it has doubts whether the formula will be liked, or whether prescribers will not prefer the products of those who have made these pills popular.

The comments are sufficiently meagre, and the other medical journals have as yet said nothing on the subject.

THE SHOP HOURS REGULATION BILL.

A HOBBY horse always appears to be an awkward steed to dismount from, and therefore it will not occasion much surprise to hear, thus early in the session, that Sir JOHN LUBBOCK is announced to be ready with a successor to the Shop Hours Regulation Bill, so ignominiously shelved last year without even a second reading. On this occasion, Sir JOHN is stated to have "taken counsel with some of the parties on whom the proposed law would operate, including a number of the retail tradesmen of the metropolis." If this be so, it would be interesting to know upon what principle of selection these representative tradesmen have been chosen, for, although the step itself might be a wise one—even if rather tardy—the alleged result is startling, namely, that with certain exceptions, "especially in reference to the provision trade," the Bill will require that all shops shall be closed at eight o'clock in the evening!

Whether the wisdom of the concoctors of this latest specimen of "harassing legislation" will include dispensers of medicines amongst the certain exceptions in the provision trade, or will give them a special exception of their own, we scarcely care to inquire, for the innate absurdity of such a system of special exceptions is obvious, in view of the composite nature of many businesses in country districts. Either an "excepted" shopkeeper will be able to sell any article in his shop after the hour at which his neighbour is compelled to close, and thus give rise to endless evasion of the law, or else he will require a legal adviser constantly at his elbow to caution him as to tabooed articles.

The object of the Bill—the shortening of the hours of labour—is one which has our hearty sympathy; and it is because we wish to see this movement go forward that we are anxious to see nipped in the bud compulsory legislation that would bear such disastrous fruit. Much has already been done, without compulsory legislation, towards earlier closing, and we believe that with a more confident reliance upon the good feeling of the public much more might be done in this respect. An appeal recently put forward by the Early Closing Association, based on the assumption that the people of this country have generous instincts, and would not consciously be guilty of cruelty, is sound in principle, and one that might be more generally asserted. At any rate, now that the country has pronounced so decisively against the professional promoters of this kind of legislation, it ought to be possible to deal summarily with all such amateur attempts.

AMONGST the bills which have been introduced into the new House of Commons, is one to consolidate and amend the law relating to Juries, brought in by Mr. LOPES, which is set down for second reading on Wednesday, April 22nd. Mr. NORWOOD has also again brought in a bill to provide for the registration of certain firms carrying on business in the United Kingdom.

A CORRESPONDENT informs us that a new kind of spurious sovereign, made of platinum and electroplated with gold, is being put into extensive circulation. This spurious coin bears the date of 1856. It is not deficient in weight, but gives a dull, heavy ring, by which it may be distinguished from the genuine sovereign.

REFERRING to a statement made at the commencement of Dr. WATT'S lecture on Ozone (reported at p. 723) we are informed by Dr. J. E. DE VRIJ that the Teyler Museum is not to be found at Geneva, but in Haarlem, a town in North Holland, celebrated to English tourists for its organ and a fine collection of pictures.

ON Saturday last a petition was presented in the House of Commons from Darlington, praying that restrictions might be placed on the production of Opium in India.

THE last Evening Meeting of the Pharmaceutical Society, during the present session, will be held on Wednesday next, April 1st. On that occasion specimens of preparations in the Additions to the British Pharmacopœia will be placed on the table by Mr. C. UMNEY, and discussion thereon will be invited. The following papers are also announced:—'Dispensing Note on Chloromercurate of Morphia,' by Mr. W. MARTINDALE; and 'Some Notes on Materia Medica,' by Mr. E. M. HOLMES, the Curator of the Society's Museums. Dr. J. E. DE VRIJ, who intends visiting London, will make some observations on Tincture of Perchloride of Iron. We think it matter for congratulation that the efforts of the President have resulted already in so great an improvement in the list of subjects announced previous to the meeting. The Chair will be taken as usual at half-past Eight o'clock.

NOTICE.—In consequence of the occurrence of Good Friday in the ensuing week, it is necessary that the next number of the PHARMACEUTICAL JOURNAL should be published on Thursday. As this will require our going to press on the previous day, it will not be possible to publish the reports of the meeting of the Council and the Evening Meeting until the following week.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

March 17th and 18th, 1874.

Present (17th): Messrs. Buchanan, Gilmour, Kemp, Noble, Tait, and Young.

(18th): Messrs. Ainslie, Buchanan, Gilmour, Kemp, Noble, Tait, and Young.

MAJOR EXAMINATION.

One candidate was examined, and declared qualified to be registered as a Pharmaceutical Chemist:—

*Graham, William Woodrow ...Dalbeattie.

MINOR EXAMINATION.

Twenty-three candidates were examined. *Fourteen* failed. The following *nine* passed, and were declared qualified to be registered as Chemists and Druggists :—

*Mackay, James Bunyan L. .....Edinburgh.
*Murray, Robert Dalzell .....Edinburgh.
Farquhar, James .....Aberdeen.
Wells, William .....Chorley.
Dunlop, Thomas Hall .....Newcastle-on-Tyne.
Macdonald, Alexander.....Edinburgh.
Keen, Nimrod .....Birmingham.
Allan, William ....Edinburgh.
Foster, John .....Crieff.

The above names are arranged in order of merit.

MODIFIED EXAMINATION.

Two candidates were examined. *One* failed. The following passed, and was declared qualified to be registered as a Chemist and Druggist :—

Little, Robert .....Carlisle.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

A conversazione of the members of the above Society and their friends was held in the Art Museum, Nottingham, on the evening of the 27th of February, by invitation of the President (Mr. Fitzhugh), and council.

The magnificent suite of rooms, containing rare and beautiful objects of art, partly local and partly from the South Kensington Museum, was well filled during the evening, upwards of 300 ladies and gentlemen being present, including a considerable number of the members of the medical profession.

A number of microscopes were kindly lent by members of the Society and others, which added much to the brilliancy of the scene and to the amusement and instruction of the guests.

Arranged on tables and cases in convenient places, in the rooms were some magnificent specimens of drugs, chemicals, and chemical and pharmaceutical apparatus kindly lent for the occasion by friends and well wishers to the Association.

The most attractive of the numerous specimens exhibited were a fine collection of rare chemicals, and rare specimens of Materia Medica, from the Museum of the Pharmaceutical Society, kindly lent by the Council.

A beautiful case of models of genus, by Dr. Attfield.

An album of photographs of eminent pharmacists in America, from Dr. Attfield on behalf of the Pharmaceutical Conference.

Some fine specimens of drugs, from Messrs. Barron, Harvey, and Messrs. Hearon, Squire and Francis, London. In the collection of the latter firm were fine specimens of true and false pareira root.

Beautifully mounted chemicals, and a set of Chinese pictures, illustrating the career of an opium smoker, by Messrs. Morson and Son.

Chemical and Pharmaceutical preparations, from Messrs. Hopkin and Williams.

Beautifully mounted specimens of the Platino-cyanides and other rare chemicals.

Collection of platinum vessels and instruments, by Messrs. Johnson, Matthey and Co.,

Fine collection of true and false cinchona barks and alkaloids, with a number of bottles of sulphate of cinchonidine for distribution amongst medical men.

Also beautiful crystals of borax, citric and tartaric acid, by Messrs. Howard and Son.

(These specimens have been kindly presented to the Museum of the Association, by Messrs. Howard and Son.)

A large number of medical and pharmaceutical appliances, by Messrs. Maw, Son and Thompson, and Lynch and Co., London.

A rotary pill machine, Mr. Robert Jackson.

Model of Goodall's grinding and sifting apparatus, Mr. H. Goodall.

Chemical apparatus, Messrs. Mottershead and Co.

Many fine specimens of drugs and chemicals from the Museum of the Nottingham and Notts Chemists' Association.

Besides the objects provided for the intellectual amusement and instruction the more material interests of the guests were not neglected. Mr. Lomas, excelled himself in his admirable supply and conduct of the refreshment room.

A fine band added to the delight of the largest assembly of chemists and their friends ever held in Nottingham.

* Passed with Honours.

Proceedings of Scientific Societies.

NEW YORK COLLEGE OF PHARMACY.

At the meeting of the New York College of Pharmacy, on February 12, 1874, a lecture was delivered on—

The Application of the Microscope in Pharmacy and the Drug Trade.

BY FREDERICK HOFFMANN, PH.D.

I have been invited to address you this evening on the usefulness of the microscope in pharmacy and the drug trade. As so vast a subject cannot be treated in a single lecture, to any satisfactory extent, I have concluded to confine myself to the most important application of the microscope in our profession, viz., to its use in the examination of crude drugs, and to illustrate this less by a lecture than by the exhibition of specimens of a number of microscopical preparations. Before doing so, I deem it proper to offer a few remarks on the causes which have brought the microscope more and more into use in the drug trade.

It is a well-known fact that the achievements of the physical sciences, and their practical application to the pursuits of industry and commerce, have caused remarkable changes in many branches of the arts and trades, and that they also have exerted a considerable influence upon the scope and drift of the drug trade and of pharmacy. The pharmaceutical laboratory of yore has gradually passed away, and in its stead the establishments of the manufacturing chemist have risen to supply the medicinal chemicals and most of the pharmaceutical preparations; the pharmaceutist is not any more a manufacturer but mainly a dispenser, the responsibility only for everything that he dispenses is left to his share, and consequently the duty of critical scrutiny and discrimination of the preparations of the chemical manufacturer, and of the products of nature as supplied by the commerce in drugs.

These gradual changes in the sphere of his occupation have naturally exercised a correspondent alteration in the practical and scientific requirements of the pharmaceutist. Although one of the most interesting parts of his former practice has been taken out of his hands, the pharmaceu-

tist has not lost ground in the compass of his attainments; it is the critical exercise of knowledge and skill in the direction of scrutiny and discrimination which forms the pre-eminent requisite of the modern pharmaceutist, and which extends his professional qualification and efficiency; or, in other words, it is nowadays of less importance to the pharmaceutist to acquire a practical skill of manufacturing medicinal chemicals, or to know exactly the therapeutical action of drugs, than to have a precise knowledge of their characteristic properties and the ability of ascertaining their identity and qualities.

This change in the pursuit of the pharmaceutist is also evident in pharmaceutical literature. The number of treatises on chemical, as well as on pharmacognostical and microscopical examinations, increase from year to year; while those treating of the methods of manufacture lose in ratio and pre-eminence. Moreover, the most advanced pharmacopœias of the present day have ceased to describe or to prescribe the methods of preparing medicinal chemicals, and confine themselves to concise descriptions of the characteristics of medicinal substances, and of the modes of establishing their identity and ascertaining by approved tests their quality and purity.

The consequence of these changes in the province and drift of pharmacy is the obvious fact that analytical chemistry and pharmacognosy, and the application of the microscope, have taken a foremost rank among the necessary attainments of the pharmaceutist, and have also largely engaged the interests of the druggist, so that the test-tube and the microscope are becoming more and more indispensable implements in every well-conducted pharmacy and druggist's establishment.

While chemical analysis is particularly adapted to the examination of the products of chemical industry, and to the estimation of the value of the drugs, the microscope renders great service in the investigation and identification of all organized substances. We ascertain by chemical tests the value of cinchona barks, of opium, of nux vomica; they furnish a sure evidence of the presence and the proportion of the alkaloids in those drugs, and of organic acids, of sugar and the various vegetable principles in other drugs, but they fail to disclose their nature and structure. Now it is precisely in this branch of investigation that the microscope affords much aid, and the advantage of prompt application and speedy results; it discloses at once the anatomical structure of a drug, the peculiarity of any kind of starch, and thereby the plant from which it was derived; it indicates directly if the bark which is offered to the manufacturer of quinine is really cinchona bark, and, consequently, if it is worth the trouble of a chemical assay for the percentage of alkaloids. It decides promptly the derivation and genuineness of sarsaparilla, of ipecac, of jalap, and of most barks, roots, and vegetable drugs, and the quality of all those powdered substances which are liable to adulteration with starchy flours. The microscope, therefore, is an invaluable aid in their examination and in the discovery of adulterations, and, as indicated with the cinchona barks, it may also frequently be made to serve as an auxiliary to chemical researches. While chemicals are always uniform and the same in composition and properties, many of the crude drugs greatly vary, not only in appearance and form, but also in their qualities, resulting from their derivation, from the conditions of growth or cultivation, from the modes of their gathering and preparation for preservation, and other natural or incidental causes.

These few remarks will be sufficient to introduce to you the true significance and the value of the microscope; they will at the same time indicate the important influence which this instrument has exercised upon the progress of pharmaceutical materia medica, and to what an extent it has contributed to a better knowledge of crude drugs, and to correcter methods in their discrimination. The more or less vague, empirical criteria of mere external appearances, in their recognition and estimation, have lost ground by the microscopical methods of investigation, and in their stead the nature and relation of the internal structure and constitution have furnished a rational and scientific foundation for the classification of drugs and for the science of pharmacognosy, which stands to materia medica about in the same relation that chemical analysis bears to general chemistry.

It will be my aim to endeavour to demonstrate these facts, as far as possible, by illustrations of a selection of microscopical preparations; they will best explain the nature and the character of this mode of examination of drugs. In order, however, to understand these illustrations, and to avoid explanation in each particular instance, I had better describe, at the outset, in few words, what and how we observe through the microscope, as applied to our purposes. It is principally the anatomical structure of plants, and those parts of plants which furnish drugs, that now engage our interest and investigation, inasmuch as it affords the general as well as the special criteria for the discrimination and determination of the vegetable drugs.

Although vegetable architecture, in regard to its elementary organs, is the same in all plants, yet it shows in the nature and order of its structure differences so great that they are the ultimate causes of the almost infinite varieties in size, form, and appearance which we observe in the vegetable world; they also afford the basis and the principal features for the science of structural botany, and for the classification of plants.

Plants, as is well known, are built up by minute elementary organs called cells; they consist of an outer transparent and colourless membrane, or wall, composed of a substance called cellulose, which envelops the cell contents, mostly semi-liquid or liquid fluids that contain in suspension various substances formed by the physiological processes going on in the living plant—for instance, chlorophyll, oil-drops, starch, crystals, etc. Although the cell walls have no pores which admit the circulation of the alimentary saps, yet in obedience to a physical law, the sap permeates the cell walls, and insures in this way the vital circulation and the assimilation of the nourishing fluid throughout the cellular tissue and the body of the entire plant.

In the processes of growth and accumulation the cells experience different changes and transformations; they propagate by multiplication or partition, and are not only accumulated to build up the cellular tissue, but also frequently enlarged and transformed into tubes, fibres, and vessels, forming vascular and woody tissue. The primitive as well as such modified cells and vessels continue during the vital processes to increase and to thicken the substance of their membranes by inward deposits of cellulose, either in a continuous lining or in interrupted layers around the cell walls. In the first instance the cell walls in older parts of plants become more or less substantial and harder. Such cellular or woody tissue appears, upon a cross-section, under the microscope, as a uniform, often almost solid, skeleton; in the second instance the section, especially in a longitudinal direction through the body of the plant, shows the cells or vessels with markings of different appearances, in the shape of annular or spiral rings or bands, or of dots or apparent pores; they arise from the unequal distribution of these secondary deposits, and are portions of the cell walls which are either thinner or thicker than the rest, and which lay often apart from the cell wall, and protrude when this is broken.

As the life phenomena of the plant are the sum of the physiological processes of the cells and vessels which compose it, so is the strength and substantiality of the cellulose skeleton the cause of the different degrees of cohesion and density, of tenderness and hardness, of elasticity and brittleness, which we meet in infinite variety in vegetable structures. Although all these differences of organization and construction are more or less manifest to the unaided eye, yet their minute structure becomes in a far higher degree visible when observed through the microscope.

Since, however, only transparent objects admit a distinct observation by transmitted light, only thin, flat sections of the substance or body of specimens can be submitted to microscopical examination. These cuttings may be made in different directions, either perpendicular or parallel to the axis of the plant, or parts thereof. In the first instance we obtain transverse, in the latter longitudinal (radial and tangential), sections.

Such microscopical objects are best observed when immersed in a drop of water upon a glass slide; by using glycerine or other antiseptic fluids, instead of water, such preparations may be preserved as standard objects for future reference or comparative observation; they are in that case covered with thin glass covers, the edges of which are cemented upon the slides with varnish.

In this way the specimens are mounted. They are in their natural condition, and are thus best adapted to scientific observation and study. The appearance and contour of such specimens can, however, readily be made more conspicuous by the application of dyestuffs, such as aniline dyes, tincture of fernambuc or of iodine, ammoniacal solution of carmine, oxalic acid, solution of Prussian blue, etc.

The lecturer now demonstrated the structure of the fruit (carpels) of the parsley family (Umbelliferæ) and exhibited upon a screen by the aid of an oxyhydrogen microscope illustrations of transverse sections of a number of fruits of that family, and explained the characteristics which furnish the criteria for discriminating these fruits from each other, and of ascertaining at once the species from which they are obtained; among them were cross-sections of the fruits of fennel, anise, caraway, parsley, water hemlock, spotted poison hemlock, etc.

The transverse sections of a number of medicinal seeds were exhibited and explained; among them seeds of almonds, flax, mustard, poppy, colchicum, nutmeg, coffee, nux vomica, etc. In several of them, as for instance with mustard, the lecturer called attention to the absence of starch granules in their cellular tissue, which fact furnishes prompt evidence of the purity of their powder from any adulteration with starchy flours.

These were followed by the seeds of the grass family, which are not only the principal supply of vegetable food for men and the domestic animals, but whose flour and starch have, to the pharmaceutist and druggist, the additional interest of being occasionally met with as adulterants of powdered drugs. The lecturer illustrated and explained the general structure of the fruit (caryopsis) of the grass family, and the special characteristics in the anatomical structure of their seeds, and in the shape and size of the starch granules of the most important cereals; beside transverse sections of all the grains most used in domestic economy, he exhibited microscopical illustrations of their flour and starch. The epidermis of most of the grains of the cereals is coated with an exceedingly thin silicious cuticle, which protects the grain greatly against the access of air and humidity, and to which coating the fact must be attributed that unbroken grains of wheat, rye, barley, and other cereals withstand the action of the gastric juices in the processes of digestion, and that wheat grains are said to have been found in the dry air of Egyptian tombs, undecomposed, after the lapse of thousands of years.

Transverse sections of the seeds of beans, peas, and lentils were also illustrated, and microscopical specimens of their flour. These were followed by illustrations of the different starches which furnish arrowroot, as well as of those which have been found as substitutes or adulterants. The magnifying power of the stereopticon, however, was insufficient to bring out the starches with enough distinctness, and failed to disclose the nucleus or fissure, and still less the delicate concentric layers or markings which in many starches surround them, and are peculiar and characteristic to the starch granules of various plants, and which indicate the mode of their formation, and, in common with the shape and size of the granules, furnish the criteria for their distinction and derivation.

In connection with starches, the sporules of the club moss (*Lycopodium clavatum*, L.) and another adulterant of the same, *Pinus* pollen, were exhibited and briefly described, and subsequently the glands of the strobiles of hops and of the capsules of kameela.

In passing to microscopical specimens of medicinal roots, woods, barks, and parts of the central axis of plants, the lecturer gave a concise and lucid exposition of the anatomical and structural organization, and of the growth of the phanerogamous plants, and of the fundamental differences which form the principal characteristics for their division into two great classes, the inside growers or Endogens (Monocotyledons), and the outside growers, or Exogens (Dicotyledons). The descriptions were illustrated by transverse sections of an endogenous and exogenous stem.

Subsequently a number of medicinal roots and their substitutes and adulterants were exhibited and explained in transverse, radial, and tangential sections; among them liquorice, burdock, belladonna, seneka, dandelion, chicory, rhatany, valerian, several of the snake roots, ipecac, and the root of *Psychotria emetica*, the tubers of *Aconitum napellus* and *Aconitum stoerkianum*, and Russian or Turkey rhubarb, and Chinese or East India rhubarb.

During the illustration of the microscopical specimens of the roots, the protector, and subsequently one of the lenses of the stereopticon, broke, by the continuous and intense heat of the calcium light, and in consequence the lecturer confined the further portion of his lecture to a brief statement of the subjects which composed the remainder, and which he had prepared and arranged for illustration and description, namely, ten specimens of sarsaparilla roots as met with in American and European commerce; specimens of a number of medicinal barks, and of a series of twenty-one cinchona barks, all in transverse, radial, and tangential sections.

The lecturer then said that he had confined the subject matter of his lecture to the application of the microscope in the examination of crude drugs only, but that in concluding he would not pass by without referring briefly to another important use of the microscope within the sphere of the pharmaceutist, namely, to its application, in urinary and similar pathological examinations, as well as in forensic investigations, and the discovery of trichinæ spiralis in animal muscular tissue, especially that of pork.

He continued—I stated in my introductory remarks that the microscope has added an important method of scrutiny and research, and thereby greatly extended our knowledge of crude drugs, and that it is destined to have an increased usefulness in pharmacy, and still more in the drug trade. I trust that these few illustrations, however inadequate my explanations have been, have sustained the truth of that assertion, and that they have demonstrated to you the nature and the value of microscopical investigation, and at the same time the fact that this instrument, which has so largely contributed to the extent of human knowledge, and to a fairer conception of the constitution of the organic world, has lost to the pharmaceutist and the druggist the mere capacity of occasional usefulness and interest, and that in the examination of drugs, and many articles of commerce and domestic economy, it is an indispensable implement, and is second in importance only to the test-tube, the burette, and the balance.

I hope these illustrations may tend to secure a greater appreciation of the value and usefulness of microscopical examinations, and to invite your interest to a closer study of the most interesting branch of materia medica, to pharmacognosy, which now is the fundamental science of the druggist. The time is not far off when the more general application of the microscope in the service of pharmacognosy will place the principles and methods of the wholesale drug trade of our country upon a more scientific basis, and raise it beyond the level of a mere empiric

business of routine. In consideration of this fact it is, therefore, with a sense of appreciation and good-will that I avail myself of this opportunity to urge, upon druggists in particular, a practical application of the subject-matter of my lecture. Notwithstanding all its commercial interests and relations, the wholesale drug trade participates also largely in the results of science, and has derived during the last decades a beneficial impulse from the progress and the achievements of chemistry and the microscope. It cannot have a better guide in the problems which it has constantly to meet in the contingencies and fluctuations of commerce and industrial competition. Moreover, as the resources of knowledge widen, and facilitate the means of deception and imposition of every kind, they afford, on the other hand, the certain safeguard to protect the purity and the character of the drug market, and to secure and maintain its high standard.

It is, therefore, a growing necessity of our time that the drug trade should more and more raise the requirements and the range of its pursuit, and embrace and utilize the resources and the power which science abundantly offers. Even those who feel but little interest for science, and encounter it with the commonplace questions, "Of what good is it?" "Does it pay?" cannot but admit that scientific attainments are a profitable investment nowadays.

The tendency of our time is largely in favour of science and knowledge, as the most rational foundation for all pursuits of human labour and enterprise. They will, in our calling likewise, maintain their undisputed prerogative, as the certain guide to ascendency and victory over empiricism.

CHEMICAL SOCIETY.

Thursday, 19th March, 1874. Professor Odling, F.R.S., president, in the chair. After the ordinary business of the Society was completed, the President called on Professor Dewar to deliver his lecture on Dissociation. The lecturer premised that as he had but little that was new to tell, he must content himself with condensing and epitomizing the results of others. After briefly referring to the theories of Priestley and Hutton, he described the famous experiments of Sir James Hall, who obtained a substance identical with marble, by fusing carbonate of lime, under pressure. He next noticed Grove's discovery that water was decomposed at a lower temperature than that produced by the union of oxygen and hydrogen, and then explained the masterly researches of Deville on the effect of heat in causing the dissociation of carbonic anhydride, carbonic oxide, water, etc. After this, the lecturer showed that in dissociation the tension of the vapour evolved is constant for a given temperature, and independent of the mass, illustrating it by Debray's experiments, on the decomposition of carbonate of lime at a regulated heat, and the evolution of water from certain hydrated salts. The lecture, which was illustrated with diagrams of various curves of tension, concluded with some remarks on the dissociation of the compound of hydrogen and palladium, and with a description of an apparatus devised by the speaker for ascertaining the temperatures produced by the explosion of a mixture of oxygen and hydrogen under various pressures. The meeting then adjourned until Monday, 30th March, the Anniversary Meeting. The next General Meeting will be on Thursday, 2nd April, when the following papers will be read:—1, "On Sulphocyanide of Ammonium and Sulphocyanogen," by Dr. T. L. Phipson; 2, "Note on a Reaction of Gallic Acid," by Mr. H. R. Procter; 3, "On the Cobalt Bromides and Iodides," by Mr. W. N. Hartley; 4, "On the Distillation of Sodium Ricinoleate," by Mr. E. Neison; 5, "On the Solubility of Plumbic Chloride in Glycerine," by Mr. H. Piesse; 6, "On Ozone, as a Concomitant of the Oxidation of Essential Oils," by Mr. C. T. Kingset; and three papers by Dr. D. Tommasi, on the Action of Benzyl Chloride on Camphor, and on the Alcohols, and on the Preparation of Organo-metallic Bodies of the Olefine Series.

SOCIETY OF ARTS.

The Paraffin Industry.

BY FREDERIC FIELD, F.R.S.

(*Concluded from page* 765.)

A second patent granted to R. M. Letchford and W. B. Nation, No. 890, A.D. 1872, comprises, say the patentees, two objects, first, economy in the materials and labour employed, and secondly, the freedom from danger arising from the use of paraffin oil in the usual methods of refining.

The process is conducted in the following manner:—

"We provide a tank, say about 12 ft. by 6 ft. and 2½ ft. deep, divided by cross partitions into V form cells 2½ inches wide at the top and 2 inches at the bottom. The cells are open at the bottom, as the partitions stop short at 2 inches from the bottom of the tank; their upper ends are 9 inches from the top of tank; there is a space of about 1 inch between cell and cell; there is a perforated lid or grating to fit into the tank resting on the top of the partitions. A grating with bars 1½ inches apart is suitable. We fit steam pipes (free or closed) into the tank below the partitions. In using this apparatus we run water into the tank to the depth of 6 inches and fill crude paraffin into the cells of the tank, and then secure the lid or grating to prevent the paraffin floating. We run more water into the tank to within 2 inches of the top, and turn on steam until the temperature of the water is within about 10° Fah. of the setting point of the paraffin under manipulation; then we shut off the steam to allow the heat time to permeate the material. In about one hour we increase the temperature, raising it gradually for about four hours to within 2° of the setting point of the paraffin that was put into the tank; then we shut off the steam and take off the soft portions which have floated to the surface of the water. This being done, we run the water off to the top of the divisions, then melt the remaining paraffin in its cells, and let it stand to cool all night. In the morning the steam may be turned on again to repeat the operation, which is done as often as necessary to obtain the purity and hardness required. It is rarely necessary to do so more than four times; or the process may be conducted by first melting the paraffin in the cells and then cooling to 2° below the setting point of the material. We then secure the lid, add more water, and float out the soft portions. In either way we finally remove the lid and take out the paraffin from which the low melting portions have been extracted; the low melting portions which have been removed are to be again treated like the crude.

"For obtaining fine degrees of whiteness, when the foregoing operations have been carried far enough, we remove the clean paraffin to a steam-jacketed pan, adding thereto about 7 per cent. of commercial ivory black in powder, and keep it melted for four or five hours, until the whole of the ivory black is precipitated. We then cast into cakes in the usual way; the ivory black may afterwards be used advantageously in making blacking."

There is one more patent which may be mentioned among a host of others (No. 3241, A.D. 1871, granted to Mr. Hodges):—

"The crude paraffin having, if desired, been first separated from rough impurities, is cast into cakes and allowed to cool slowly, so as to form into well-developed crystals. The cakes are then placed on a bed of absorbent or porous material, and are while thus placed exposed to a warm temperature, sufficient to render fluid the more easily melted portions with which the crystallized paraffin is mixed, but insufficient to melt the paraffin. The fluid and more easily melted portions then flow out from between the crystals of paraffin, and into, or into and through, the absorbent or absorbent and porous materials on which the cake rests. The cake—thus freed from the fluid, or fluid and more easily melted portions—may then be treated in any usual method to render it white, or as much lighter in colour as may be practicable; or the process may be repeated until the separation of the harder from the softer portions has been effected as completely as is desired, and then any requisite process for whitening the product may be adopted if needed."

It will be seen that all these processes have for their object the removal of the liquid from the solid hydrocarbons. It would be out of place to give one the preference

over the the other. Each of the patentees considers, doubtless, that his idea is the best.

The partially purified paraffin is by no means colourless, and upon closer examination will be found still to possess considerable smell. One method for its further purification may be thus described. Let us take, for example, this material obtained according to the patent of Mr. Fordred. After being melted by free steam to separate any water or alkali which may be machanically retained, it is poured into a tank and agitated by means of air, with from five to ten per cent. of strong sulphuric acid, the sulphurous acid evolved resulting from decomposition, is conveyed away by a suitable apparatus. The agitation is carried on for some hours, very much depending upon the nature of the paraffin, and the experienced manufacturer can easily tell when the desired result is effected. Here are various specimens before us of acidified cake, as it is termed, both before the tarry mass has subsided and after remaining at rest for some hours. It will be observed that that which is immediately drawn off is darker in appearance than that which has been allowed to rest, containing as it does a large quantity of black specks, an aggregate of which is seen in the sample of tar in this dish. The best of these products is still, however, far from white, and the acidified paraffin has yet to undergo a further treatment. Animal charcoal, the substance previously mentioned as a bleaching agent, is generally employed. The paraffin is warmed and digested with the charcoal for some hours ; the latter is allowed to subside, and the liquid, if not quite bright, is passed through a filter kept warm by a steam jacket. But lately, other bleaching agents have been used which are deserving of notice.

A patent was granted to Messrs. Fordred, Lambe, and Sterry, in A.D. 1868, No. 610, for the use of fuller's earth as a decolourizer of paraffin and other bodies, an extract of which may be quoted—

"Fuller's earth we also use for finishing the bleaching of paraffin in lieu of animal charcoal, whatever the previous process of purification may have been. In that case about twelve per cent. powdered Fuller's earth is added to the melted paraffin, which is manufactured at a temperature of about 230° Fah., and well agitated, and after subsidence the clear paraffin is run off. We find that in all our processes, where we have mentioned Fuller's earth as the agent to be employed, we can replace that substance in great part or wholly by marl clay, or other readily-attainable natural substance of like character. The Fuller's earth or analogous substances used in place thereof in any of the ways stated above, may be re-used, and the paraffin remaining adhered may finally be recovered from it by washing with agitation or by other suitable means."

This process is so simple and expeditious that it may be shown as a lecture experiment, and while the earth is being added, and the paraffin brought to the required temperature, and the particles allowed to settle, I will proceed to notice another method of bleaching lately patented by Mr. Arthur Smith and myself, which in many respects obviates certain disadvantages that accrue from the use of Fuller's earth. Fuller's earth and many other natural silicates are undecomposible even by strong acids, although certain silicates of lime or magnesia on both these bodies are decomposed when the acids are concentrated, forming a gelatinous residue of silica and solutions of the basis. It occurred to us that, by forming artificial silicates and employing them, instead of the natural, as proposed in the previous patents mentioned, these compounds might be employed, and the paraffin or other hydrocarbons separated by the addition of very weak acidulated matter. We experimented with the silicates of lime, magnesia, manganese, iron, and some others, and although all answered admirably, we came to the conclusion that the magnesia salt was the best, a less amount being required to ensure the full bleaching action required. At the first glance, any of these substances, even the lime salt, seems too costly to admit of practical application, but this is not the case.

It is very important to mention that the success of this process depends upon the purity of the salt and the manner in which it is dried. If the gelatinous mass in that beaker were simply desiccated without previous washing, and the soluble saline body (in this case sulphate of soda) retained the porous structure, or whatever it may be of the silicate, would be, so to speak, stopped up, and all bleaching action impeded. And if the washed product were heated to redness, its decolourizing power would also be destroyed. It must be dried at 212° and no higher, and thus the far cheaper and simpler operation of fusing silica with dolomite is inadmissible; the resulting silicates would be valueless. Fuller's earth, which is simply ground, contains naturally a large quantity of water, and this substance also, if heated to redness, is of no avail in paraffin refining. And yet a more singular fact is this, that although we must have a hydrated compound, no bleaching action takes place until the water is separated. Melted paraffin, as far as my own experience extends, may be agitated either with fuller's earth or artificial silicate for any length of time, without any perceptible action, at a temperature slightly higher than its melting point. The colour seems to disappear when the water is driven off, as if it took its place, and could not be dissolved from the hydrocarbon, however long the operation might be extended. By this time, it may be hoped, you will be enabled to see the bleaching action of the Fuller's earth in the experiment which was prepared a short time back, and is now awaiting completion.

It must not be supposed that the bleaching action of the two substances that have just been discussed is confined to solid hydrocarbons. Paraffin oil is rendered water-white by digesting it at a moderate temperature, with either Fuller's earth, or an artificially prepared silicate. In conclusion, a few of the applications of this beautiful substance may be briefly enumerated. Independently of its chief employment as a source of artificial light, through the medium of lamps and candles, it has been advantageously applied for other purposes. It has been proposed to saturate gunpowder with melted paraffin, in order to retard its explosive action, if required; it having been ascertained that a smaller sized grain might be substituted for a larger, when subjected to this treatment. The powder is digested with the paraffin, and the excess of the latter is removed by steam heat. It is a non-conductor of electricity, and has been used extensively as an insulator, in electro-telegraphic science. It has also been employed, when dissolved in naphtha, as a preservative of stone and brick-work permeating the interstices of the mass, and repelling the action of wind and rain. When melted with india-rubber, it produces a good water-proof compound, which can be applied to wearing apparel. It has been used advantageously for polishing cloths, giving them a fine and smooth surface. Dr. Lawson Tate has made use of paraffin in surgery, employing it as a covering for splints in fractured limbs, with very considerable success. The laundress has discovered that by rubbing a small piece of paraffin on a warm flat iron, a beautiful gloss is imparted to linen, and the humble manipulation is much lighted by the ease and celerity with which the iron travels over the clothes, at the same time leaving no greasy stain in its track. The horticulturist has also found that paraffin, when mixed with bees-wax, can be excellently applied in the budding of roses, or the grafting of fruit-trees. Mr. Veally has shown that it is most useful in the preservation of beer barrels, preventing them from becoming foul ; and it would be difficult, at the moment, to narrate its many applications, or to speculate upon its future. As paraffin will not dissolve the aniline colours, it may be asked how the beautiful tints are produced which serve to embellish the candles you see before you. The colours are dissolved in stearic acid, which is afterwards diluted with the paraffin, the colour remaining in a mechanically suspended state. If a candle, slightly tinted, is melted, and the liquid passed through bibulous paper, the filtrate is white, and the dye remains on the filter.

The insolubility of certain colouring matters, especially

those from aniline, may be employed successfully in determining the freedom of paraffin from stearic or other fatty acids.

Petroleum and the mineral ozokerit, both closely identified with the paraffin industry, would each demand a separate lecture, and however pleasant it would be for me to speak about these interesting bodies, I feel that I have exceeded the time allowed me, and that your kind attention has already been exercised too long.

Parliamentary and Law Proceedings.

The Charge of Manslaughter against a Chemist and Druggist.

At the Devon Lent Assizes, in his charge to the Grand Jury, Mr. Justice Quain referred to the case of Samuel Goss, who was charged with the manslaughter of a woman named Yeo (see before, p. 193). His Lordship said that this was a case that required very careful investigation at their hands. It seemed that the prisoner was a chemist, carrying on business at Braunton, and he presumed that he was not a properly qualified medical practitioner. The woman Yeo had been suffering from a cancerous wound on her breast, and on consulting the prisoner as to what she ought to do, he appeared to have prescribed for her some solution with which he instructed her to rub the wound. She continued to apply the preparation for a considerable time up to within a short period of her death, and it afterwards transpired that the solution was a strong preparation of sulphate of zinc. The medical evidence was the only evidence that he had got before him, that having been taken at the coroner's inquisition. As far as he knew the case had not come before the magistrates, and the only testimony, therefore, that would be placed before the Grand Jury, would be that contained in the dispositions taken at the coroner's inquest in August last. In order to prove that the prisoner was guilty, it was not sufficient to prove that he had no medical qualifications, but it must be established that he had been guilty of criminal negligence in recommending to this woman a preparation which was most unfit for her under the circumstances. They must be satisfied that the preparation was a grossly improper preparation to apply to a wound of this kind, and upon that subject the evidence before them was silent. There was no medical evidence that went to that extent. In addition to that they must come to the conclusion that there was gross negligence—criminal negligence, arising from gross ignorance in treating such a case; nothing short of that would justitfy them in returning a true bill. The Grand Jury ignored the bill.

Obituary.

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

On the 26th February, 1874, Mr. George William Sharples, Chemist and Druggist, of Central Beach, Blackpool. Mr. Sharples had been a member of the Phamceutical Society since 1870.

On the 26th January, 1874, Mr. John Carrick, Chemist and Druggist, of St. Mary's street, Edinburgh.

On the 8th February, 1874, Mr. William Wey, Chemist and Druggist, of Stonehouse, Devon.

On the 9th February, 1874, Mr. Michael Russel McLeod, Chemist and Druggist, of South College street, Edinburgh.

On the 6th March, 1874, Mr. Matthew Francis Jubb, Chemist and Druggist, of Chariot street, Hull.

On the 17th March, 1874, Mr. Edmund Temple, Chemist and Druggist, of Bristol.

On the 18th March, 1874, Mr. John Jackson, Chemist and Druggist, of Southampton Row, London.

On the 20th March, 1874, Mr. Frederick Pegler, Chemist and Druggist, of Lower Norwood, Surrey.

Review.

Adulterations of Food, with Short Processes for their Detection. By Rowland J. Atcherley, Ph.D., F.C.S. London: H. S. King. 1874.

There is still the want existing of a standard work which could be relied on by a chemist, who, conversant with ordinary mineral analysis, has undertaken the by no means facile task of the detection of food adulteration. The sorry scenes which have occurred of late between the analysts appointed under the Food Adulteration Act and their opponents are not to be wholly charged to want of capacity, but rather to the absence of an unanimity of opinion as to which methods of examination are best suited for adoption as standard tests. It is folly to disguise the fact, that this disagreement is mainly due to the small amount of attention that has hitherto been given by the majority of chemists to such investigations.

The small volume now under our notice is addressed to the consumer, the dealer, and to the professional analyst. But, although most of the adulterations in food are treated of, yet it is in a manner rather profound for the reader ignorant of chemical science, but scanty indeed for the analyst, to whom, also, Dr. Atcherley addresses himself. The analyst, we cannot help thinking, is regarded as ignorant of elementary chemistry, and the consumer and dealer must become acquainted with chemical technicalities to find the work of service to them.

The misconception as to the amount of knowledge that is essential to the analyst does not lie only with those in authority; here, in the preface, the author writes that "a carefully compiled description of volumetric solutions and their applications, specially bearing on the subject, has been added for the benefit of the professional chemist." It will suffice to show the scope of the volume if we give the list of these carefully described solutions: Standard oxalic acid; standard nitrate of silver and permanganate of potash with description of titration; the preparation of a copper solution, and estimation of sugar with the same. It would seem, then, that the author considers it necessary to instruct the professional chemist in the preparation and use of these simple reagents, of which a tyro in practical chemistry would blush to be ignorant. But little exception can be taken to most of the author's statements, however we may differ from him in a few particulars. Credence is given to the long ago exploded notions as to chalk and starch in milk and picric acid in beer. Dr. Atcherley evidently believes in the existence of the last as an adulterant to beer, for in his preface he states that he has adopted a new method for its detection by the conversion of the acid into "chloropicrine." On page 13 we are informed that 160 parts peroxide of iron are equal to 308 parts of the protosulphate, and on these data to base the quantity of sulphate of iron; on page 16 1 part of alumina is said to be equal to 9·027 parts crystallized alum; on page 3 we are told that 1 part sulphate of barium is equal to 0·5958 parts sulphuric acid, H_2SO_4; and on page 55, under the heading "Lard," there is this statement:—

"Salt is almost sure to be present, and is indicated by forming a precipitate when treated with a solution of nitrate of silver, but it must not be looked upon as an adulterant unless it be present in undue proportion. *Chloride of Calcium is likewise precipitated by nitrate of Silver and might be confounded with Salt.*"

We doubt not that the non-scientific readers addressed by our author will take this in its literal reading and to their confusion. The plan is to be condemned of attempting in the same work to satisfy totally distinct requirements, even if there be the desirability, which we do not counsel, of any other than the professional analyst occupying himself with that which at the best can only be unsatisfactorily done by the non-scientist. Although it might from this work appear that Dr. Atcherley has had

experience, and considers himself sufficiently authoritative to give expression to that opinion in a comprehensive book on the subject, we consider he has nevertheless yet to fulfil that task.

BOOKS RECEIVED.

THE BIRTH OF CHEMISTRY. By G. F. RODWELL, F.R.A.S., F.C.S. With numerous illustrations. (*Nature* Series.) London: Macmillan and Co. 1874. From the Publishers.

ANNUAL REPORT OF THE BOARD OF REGENTS OF THE SMITHSONIAN INSTITUTION, showing the Operations, Expenditure, and Condition of the Institution, for the Year 1871. Washington, 1873. From the Institution.

HANDBOOK OF NATURAL PHILOSOPHY. By DIONYSIUS LARDNER, D.C.L. Hydrostatics and Pneumatics. New Edition. Edited and the greater part Re-written by BENJAMIN LOEWY, F.R.A.S. With 236 Illustrations. London: Lockwood and Co. 1874. From the Publishers.

Notes and Queries.

[391]. LOTION FOR MANGE. — Replying to T. P. H., March 21st, I beg to offer him the following form for the above :—

℞.	Ol. Olivæ	Oj.
	Acid Carbol. (No. 2)	℥iiss.
	Ol. Petrol.	℥iiss.
	Sulph. Nig.	℥ss.

Mix.

MATTHEW CREWDSON.

[391]. LOTION FOR MANGE.—In reply to query of T. P. H., I beg to enclose recipe for mange in dogs, which after a large and varied experience amongst dogs of all breeds, I can with confidence commend to his notice :—

℞.	Hyd. Perchlor.	℈j.
	Spt. Vin. Meth.	℥iv.
	Sulphur Pur., P.B.	℥vj.
	Aq. Calcis ad	Oj.

Mix.

GEO. F. GUEST, A.P.S.

[392.] PLATE POWDER.—I know of nothing better than Prepared Silica. It produces a beautiful polish ; in fact, a burnish.—W. B. FITCH.

EXTERNAL APPLICATIONS OF CHLORAL HYDRATE.—In the *Bulletin Thérapeutique*, Dr. Dujardin Beaumetz, gives some formulæ of the application of chloral hydrate for external use. The simple aqueous solutions are of all strengths, those most commonly used being 1 part of chloral to 100 of water, and 1 part of chloral to 50 of water. M. Martineau, not finding these solutions to possess sufficient disinfecting power, combines the alcoholate of essence of eucalyptus as follows :—

Aqueous Solution of Chloral Hydrate (1 per cent.) . .	1000 grams.
Alcoholate of Essence of Eucalyptus	4 or 5 table spoonfuls

The formula for the above alcoholate is—

Essential Oil of Eucalyptus .	10 grams.
Alcohol	1000 „

Dr. Dujardin Beaumetz employs in certain cases the chloral hydrate dissolved in glycerine, applied as a topic for wounds or in injections. The following are the proportions :—

Chloral Hydrate	10 grams.
Glycerine	50 „

M. Martineau dresses the sloughs of the sacrum, in patients suffering from typhoid fever, with a 1 per cent. solution of chloral hydrate. He washes the wound with the liquid, then covers it with a pledget of charpie saturated with the solution.—*L'Union Pharmaceutique.*

Correspondence.

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

BENEVOLENT FUND.

Sir,—I have just received an urgent appeal from the Secretary of the Society to further assist in augmenting the Benevolent Fund which certainly (considering the number of persons in the trade) is very small and inadequate indeed, so much so as to be quite a scandal to the trade. As I have already given my usual subscription I think I am not called upon to give a second till I see the whole of the trade combining and doing something more than has yet been done. If only each member of the trade would give 10*s.* a year (about 2¼*d.* a week) it would produce an amount which would be of real service, and put a stop to these oft-repeated appeals which are anything but dignified.

It has been said over and over again by various members that they did not subscribe because the money was invested, and the interest only applied to the use of the fund, but if the Council would only at once apply the subscription to the current relief of applicants, then we should see money pour in as fast as we could desire. By the report I have just received I see the amount paid direct to the relief of members last year was only £350 15*s.*, which I take for granted is about the amount subscribed under these new arrangements, so that little has been done after all.

I think it would, however, be satisfactory to the old subscribers to know how many of the persons relieved by the fund were subscribers, and also of the large number admitted into the Society under the Act of Parliament, how many have been, and are at the present time, subscribers to the fund, the benefit of which they can now claim.

ROBERT PALMER.

Sir,—What is the principle on which the new scale of subscriptions is based? I find I can have one Vote for Five Shillings, but if I am now liberally inclined and extend to two or four votes, I have to be taxed with an additional amount to the extent of 5 per cent. The guineas also cease in regard to Legacies of £50 or £100.

Would it not be more uniform to drop the guinea in every case.

E. M. BURDEN.

38, *Duke Street, Grosvenor Square.*

DECOMPOSITION OF LOZENGES.

Sir,—I enter on the discussion of this subject with some diffidence, seeing that I have handed it over to Mr. Greenish; but finding from the letter of Mr. Witherington that this fungus disease is more common than I thought, the matter becomes of greater importance, and the desirableness of finding out the cause, so as to remedy it, is much to be wished. I trust therefore I may be permitted to make an observation or two respecting it.

That the cause of this peculiar decomposition is a fungus, there is no doubt. Where it originates is a more difficult question to answer. But what it feeds upon is more within the range of our knowledge. If a lozenge be made of sugar, starch and gum, or dextrin, what supplies the nitrogen, for the life and growth of the plant? This question, I think, suggests an answer: That there is most probably a nitrogenous substance added in small quantity, such as gelatine.

If the subject interests any of your readers, I shall be glad to furnish them with specimens.

F. M. RIMMINGTON.

Bradford, March 23.

In reference to the above subject, Mr. J. M. Cornish writes :—

Sir,—"If I remember rightly, ginger yields over 25 per cent. of a fine white starch, which may be obtained by the ordinary process of elutriation practised in preparing arrow-root. Query—Is it the acidulous extractive of the ginger, or a foreign acid, acting on the ginger starch, which has been observed by Mr. Greenish? I am further inclined to partially attribute the decomposition of the ipecac lozenge to its own starch, and extractive ipecacuanha (according to Pelletier, 1817) contains 42 per cent of starch and 16 per cent. *deliquescent* extract."

Dr. Voelcker's Lecture on Milk.

Sir,—There cannot be two opinions as to the interest and value of the lecture of Dr. Voelcker, of which a report appeared in the Pharmaceutical Journal for March 14th, but some of the statements contained in it are so misleading in their nature, that I think it right to point them out, lest, having been made by so high an authority as Dr. Voelcker, they should be assimilated and become part of the future faith of rising chemists.

It is with reference to Dr. Voelcker's observations on the detection of milk adulteration that I desire to write, and I may say here that he will have the sympathy of all respectable chemists in his denunciation of those gentlemen who profess to determine the proportion of water added to the second place of decimals.

Of course, no analyst of experience supposes that milk has great constancy of composition, but I think they must have been somewhat startled to learn, on Dr. Voelcker's authority, that the average milk from a whole herd of cows could be so poor. By half-starving the cows, it appears that they can be made to give milk as much as 2 per cent. poorer in solid matter than has ever been observed before, and Dr. Voelcker is careful to point out that "as the milch cows were kept entirely for the use of the college, there can be no question as to the genuineness of the supply." There is no doubt that Dr. Voelcker is best able to form an opinion as to the possibility of the college authorities having been systematically cheated by their dairyman; but he certainly ought to have been very sure that no tricks were played before he placed on record results which were obtained a good many years ago, and which, I believe I may say, are at variance with the experience of all other chemists.

But there are other statements contained in the report of Dr. Voelcker's lecture to which I am in a position to give an unqualified contradiction. Dr. Voelcker says that "milk purposely watered yields only 5 to 6 per cent. of cream, and has invariably a lower specific gravity than 1·025." Now, as a matter of fact, the gravity of adulterated milk as sold, frequently reaches 1·027 to 1·029, and has rarely a less density than 1·024 or 1·025. It may be asked how I know that such milk was adulterated. My answer is that the milkmen in many instances pleaded guilty, and submitted to the fine. This being so, what is the value of Dr. Voelcker's conclusion, that "within certain limits the specific gravity is the most trustworthy indicator of quality?"

Dr. Voelcker goes on to argue that the presence of an unusual quantity of cream cannot lower the density of milk to the same degree as the addition of water, and immediately below he gives a table of his own results, from which a diametrically opposite conclusion is deducible.

Taking the per-centage of cream on the milk as 10 per cent., which Dr. Voelcker says is about the average, it appears that the process of skimming raises the density from 1·0314 to 1·0337, so the addition of 10 per cent. of cream would lower the gravity to the same extent; that is, it would cause a diminution in the gravity of 0·0023, while Dr. Voelcker's table shows that the addition of 10 per cent. of water would only alter the gravity by 0·0019, which is less than the alteration produced by cream.

The table also shows that milk adulterated with 10 per cent. of water has an average density of 1·0295, which is lowered to 1·0257 when 20 per cent. of water has been added, unless part of the cream has also been removed, in which case still more water would be required to bring the gravity down to the same extent.

It appears, therefore, that Dr. Voelcker ignores all adulteration unless it exceeds 20 per cent., so as to bring the gravity below his limit of 1·025. As far as my experience goes, the proportion of water added to milk before the Adulteration Act came into active operation, was usually about 15 per cent., and was very rarely more than 25 per cent.—an adulteration which Dr. Voelcker would scarcely detect.

On the other hand, I think few analysts whose opinion is of value, would like to swear to 5 per cent. of water in milk, but there is no difficulty when the amount reaches 10 or 12 per cent.

I may mention that I am in the habit of taking the gravity of the whey (by a bottle), and I find the results obtained by this plan exceedingly useful, and far more trustworthy than estimations of the density of the original or the skimmed milk. I also estimate the cream (and sometimes the fat), the solids, and take the original gravity.

Sheffield, March 21. Alfred H. Allen, F.C.S.

Cocculus Indicus.

Sir,—In asking "What becomes of the Cocculus Indicus?" one touches somewhat delicate ground, which, for obvious reasons, is not likely to be approached otherwise than very gingerly by those who are really able to supply the required information.

Little light having been, as yet, thrown upon this obscure matter, I offer the result of a brief experience in the traffic of the drug. Some twelve years ago, I commenced my career of assistant in an important town of the Midlands, where, amongst divers other unwonted wares, we not unfrequently sold a pound or so of Cocculus. Coincident with this fact the town curiously enough enjoyed a repute for its strong ale! Every inn-keeper there, with few exceptions, brewed his own beer, which, for the most part I can vouch for it was exceptionally pleasant to the eye and palate, withal "sleepy stuff," and of unquestionable potency in muddling the brains of its votaries; but, having perhaps supplied some of the mystic berry shortly before, I might have judged the liquor in advance.

More I cannot say. I never broached the subject with my employer, for it always appeared to me invested with a halo of mystery not lightly to be disturbed; but I had small doubt in my own mind what became of the Cocculus Indicus,

Walter A. Powell,

5, *Castle Street, Swansea.*

Obscure Formulæ.

Sir,—Can you tell me where to find formulæ for the following articles:—

Sp. Calorific, and
Tinct. Calorific Co.

They are prescribed in prescriptions presented to me to-day, written by a physician residing in George Street, Hanover Square, and have been dispensed by a chemist and druggist residing at Notting Hill.

I suppose this is a near relative of Miss Comp.

P. T.

Bridgewater, March 16*th*, 1874.

F. C. Mumford.—A formula for syrup of lacto-phosphate of iron and lime was given in the Journal for January 31st last, p. 610.

"*A Pharmacist since* 1842."—Unfortunately the cases are not analogous. If the feeling described by you is generally prevalent, the better way would be to memorialize the Council. Meanwhile, it ought not to be presumed that that body has ignored the question.

"*Lamina.*"—Digest the leaves in rain-water placed in a sunny spot, until the parenchyma is sufficiently decomposed to allow of its removal with a soft brush; then bleach with chloride of lime or sulphurous acid.

H. Humphrey.—It is a proprietary preparation, the London agents of which are Messrs. Savory and Moore.

H. L. Brothwood.—Any sulphur present would be in suspension and could be separated by filtration and detected in the residue by the usual tests.

H. Butler.—Some information respecting the strength of the preparation mentioned will be found in the Pharm. Journ., 1st ser., vol. xii., p. 253. We do not think it would be justifiable to make the substitution suggested.

Z. Y. X.—The General Order of the Inland Revenue Board, dated 9th August, 1866, states that the use of methylated spirit, or any derivative thereof, in the manufacture or preparation of any article or substance "*capable of being used* as a beverage, or *internally as a medicine, is illegal.*"

Errata.—We are requested to make the following corrections in Mr. Wellborn's note on oxide of tin:—Page 750, col. i., line 6 from bottom, for "solution" *read* "soluble;" col. ii., line 19 from top, *for* "oxide of lead" *read* "oxide of tin."

In the Registrar's Report, p. 639, the number of Pharmaceutical Chemists on the Register at the end of last year should have been 2374, and the number of Chemists and Druggists 10,842, making a total of 13,216.

Communications, Letters, etc., have been received from Mr. Garside, Mr. F. Balkwill, Messrs. Cadbury Bros., R. C.

THE BRITISH PHARMACOPŒIA ADDENDUM.*

BY C. UMNEY.

Discussions upon the nomenclature, the weights and measures, the preparations, and other matters connected with the British Pharmacopœia, have on many occasions during the past three or four years, occupied the members of this society at their evening meetings.

Although the repeated invitations of the president, to have subjects of pharmaceutical interest brought forward for discussion, have not been as heartily responded to as he and other well-wishers to pharmacy could have desired, still, it is beyond dispute that when opportunities have occurred for the interchange of ideas upon such topics as have been presented at our evening meetings, good has invariably resulted.

During the past year pharmaceutical research has, it is to be regretted, flagged considerably; it can hardly have been caused by the announcement that the Supplement or Appendix to the British Pharmacopœia was to be published at an early date, for one would have imagined an announcement from Professor Redwood that such a publication might be expected, would have stimulated pharmacists to have brought forward all matters that deserved the attention of the Pharmacopœia Committee.

To those who have worked to amend the errors of the 1867 edition, as well as to those who have bestowed thought and labour upon the preparations now added to our national pharmacopœia, our thanks are due.

As you well know, after some considerable delay, the addendum has made its appearance, and it has the good fortune to be associated with a volume of which pharmacists are justly proud, and with which the medical profession is evidently satisfied, as was shown by the *Lancet* in a recent article upon the British Pharmacopœia, the closing paragraph of which might be here reproduced with advantage:—

"It will be seen that there is at least a promise of some valuable matter in these additions to our national Pharmacopœia, and if the practical knowledge and judgment displayed in preparing the previously published part of the work have been equally exercised in this, the profession will be indebted to the Medical Council and the Pharmacopœia Committee for their labours in this direction."—(*Lancet*, March 21, 1874.)

My object in addressing you this evening is not so much to bring my preparations (placed upon the table) specially under your notice, but rather to have them before us as illustrative of the 34 new remedies and substances used in the preparations of medicine contained in the supplement, while we discuss their relative merits.

I must acknowledge that I have had no special experience of many of the matters before us other than that I have gained, by way of experimenting, during the past few days; I ask, therefore, your indulgence for any errors of judgment that I may commit, in my haste to bring so important a matter before you.

Let us in this discussion, be mindful of the fact that the compilation of a work is a much more difficult task than a criticizm; also, on the other hand, that criticism fairly carried on must, in the end, be to the benefit of those criticized.

Let us turn then to the Supplement, and take the preparations *seriatim*.

Acetic Ether.—This body, although not new to the chemist, is a body with which pharmacists are but little familiar. All will remember the characteristic and pleasant odour so often noticed in preparations containing alcohol and acetic acid, and notably in the officinal tincture of acetate of iron, in which acetic ether is unmistakably formed, much to the detriment of the tincture, not so much from its presence as from the loss of acetic acid, and consequent deposit of a basic salt (which, by the way, may be obviated to a degree by having about 5 per cent. free acetic acid present in the tincture). This ether, we have been told, has more especially been introduced with a view to its use subsequently when the pharmacopœia is more generally altered.

The special objects in its introduction may have been for flavouring certain preparations, and also to have a more perfect solvent of cantharidin when making blistering fluid.

The Pharmacopœia does not pretend in all cases to give minute directions to manufacturers, but general remarks for their guidance, it therefore merely states that this ether may be made from dry acetate of soda, rectified spirit, and sulphuric acid. A better form could hardly have been given, as the more anhydrous the two liquids the more quickly and abundantly do they produce the compound ether.

Chloride of calcium is directed to be used to dry the ether when produced, by digestion with half its weight, and final rectification.

Here I cannot help noticing one omission of great importance, which may lead to confusion, viz., the non-rectification of the product from a solution of carbonated alkali, to remove free acetic acid of which considerable quantity will always be present.

Under "characters and tests" we have the specific gravity described as 0·910 and the boiling point 166°. In Gmelin's Chemistry, we find the specific gravity described as ·888, and the boiling point as 165° (74° C.)

Miller also very nearly corroborates this, for he names ·890 as the specific gravity, and 164° as the boiling point.

But upon reference to Watts' Dictionary of Chemistry, this ether is described as having a specific gravity at 0° C. of ·910 (Kopp) and a boiling point 74·3° (166 Fahr.).

In the face of this conflicting evidence by good authorities, it is difficult to decide at any rate the specific gravity of acetic ether, unless by actually working out the matter for oneself.

I had my suspicions, that if I could find a specimen in pharmacy that would answer to the pharmacopœia tests, I should in all probability find free acetic acid as an impurity, I also thought that some specimens might be contaminated with ordinary sulphuric ether.

Accordingly I examined three, with results as under:—

	Specific gravity.	Boiling point.	Free Acid.
a	·890	160°	none.
b	·889	158°	,,
c	·915	164°	16 per cent. of monohydrated acetic acid.

Washed with an equal volume of water while *a* lost 3·5 per cent. *c* lost 10 per cent.

* Read at the Evening Meeting of the Pharmaceutical Society, April 1, 1874.

I find that the acetic ether of the French Codex is directed to be rectified from a small quantity of potassic carbonate, but not from chloride of calcium.

The resulting ethereal liquid would not, although deprived of acid, be thoroughly desiccated, and would contain (probably 10 per cent.), of *either* water, alcohol, or sulphuric ether; even all might be present.

It would therefore appear that the text in the addendum, to be strictly accurate, must in some way be modified, and at least direct the rectification of the product over carbonated alkali, to ensure the absence of free acetic acid.

I should imagine that the French Codex preparation would be preferable; but this remark at the present time is premature, for I am not fully aware whether almost anhydrous acetic ether would not be required in some preparations.

I purpose further investigating certain points connected with this liquid as soon as possible.

Nitrate of Ammonia is so well known to us, as the source of laughing gas, that it seems almost unnecessary to bring it before you.

The tests of the Pharmacopœia have been framed with great caution, and anyone carefully following these cannot fail to select a good specimen of the salt now so largely used for the production of nitrous oxide for use by the surgeon dentist.

It would be well here to call attention to the presence of chlorides in some commercial specimens which must, upon being fused, produce a gas much contaminated with the irritating vapour of ammonium chloride.

Nitrite of Amyl.—This powerful medicine, although known since 1844, when it was discovered by Balard, has been but little used. We are indebted to Guthrie* for having first observed in 1858 the remarkable and powerful action of this liquid on man. Its physiological properties have been investigated by Drs. Richardson, Brunton, Talfourd-Jones, Anstie, and others, and have formed the subject of more than one paper for the meeting of the British Association. To those reports and to other journals† I must refer anyone desirous of becoming further acquainted with the medicinal properties of this liquid.

Pharmacists, here and in America, seem to have given some attention to the production of this remedy in a state of purity.

Maisch‡ prepares it by the action of nitric acid direct, upon amylic alcohol, and reserves that portion of the liquid for final purification which distils between 96° and 100° C.

Tanner§ takes advantage of Redwood's process for spirit of nitrous ether (the British pharmacopœia process), and prepares the amyl nitrite in this way. Other processes have also been suggested, which I should recommend to your notice.

The chief points in the production of this body in a state of either absolute or even medicinal purity, first and foremost hinge upon the thorough fractional distillation of the fousel oil, until the amylic alcohol selected for use has a constant boiling point of 132° C. The crude nitrite, prepared by either of the processes indicated, must be washed with caustic soda, to remove prussic acid formed during the process, and nitrous compounds, and finally rectified over potassic carbonate.

That portion only is reserved for use in medicine which distils between 96° and 100° C.

The boiling point, as given in the Pharmacopœia, is not, I presume, intended to be the boiling point of absolutely dry and pure amyl nitrite, indicated by Guthrie, as 99° (210° Fahr.), but rather an average boiling point of good medicinal nitrite, ranging through some eight or ten degrees of Fahrenheit's scale.

The specific gravity, as represented in the Pharmacopœia, is, I believe, for medicinal purposes, sufficiently accurate. Some three years since,* I found that some specimens I then examined were not amylic nitrite, but were contaminated with nitrites of radicals much higher in the series than amylic alcohol.

Chloroform Water is, perhaps, one of the best of the introductions into the Pharmacopœia. All, at some time or other, have been inconvenienced by the sparing solubility of chloric ether, when ordered in a mixture in such quantity as to be only partially dissolved, which difficulty has been considerably aggravated by the variable strength of chloric ethers as compared with the officinal spirit of chloroform.

The water, containing one-half per cent. (fluid) of chloroform, seems to be, as far as I have observed, a fully saturated solution.

Areca nuts, as they are termed in commerce, are introduced as a vermifuge.

It has been urged that this remedy to exert its maximum anthelmintic force, must be in a certain state of division, and not prepared as a fine powder.

My opinion is, that this is more imaginary than real, and that, in all probability, when a specimen has been pronounced inert, it was due either to partial destruction by an insect of the betel seed before powdering, or to the powder having been stored for a considerable period previous to administration.

Aurantii Fructus is introduced for the fresh peel, directed to be used in the preparation of Tinct. Aurantii Recentis. Fruit merchants consider the fruit in perfection in the months of February, March, and April; pharmacists should therefore prepare their stock of tincture for the ensuing year as soon as possible.

Bismuthi Oxidum is introduced with a view to its use in subsequent Pharmacopœias. Solution of citrate of bismuth and ammonia is the preparation for which it is, no doubt, intended by a manipulation very similar to that given by Wood (Pharmaceutical Journal, 16th September, 1871). A liquor thus prepared is free from the impurities common in the present officinal solution, which process is seldom if ever resorted to, by manufacturers. This oxide can be obtained by boiling basic nitrate with caustic soda solution, 80 parts being produced from 100 of the nitrate.

Calcis Hypophosphis and *Sodæ Hypophosphis* are already in considerable use in medicine; they may be said to have forced their way into the Pharmacopœia, from the fact that their medicinal value is acknowledged on all sides.

We shall doubtless in forthcoming editions hear more of these, in the form of syrup or other convenient modes of administration, and if not of these, probably of a ferruginous syrup with hypo-

* *Journal of Chemical Society*, vol. xi. 1859.

† Pharmaceutical Journal, Sept., 1870, p. 209. and Pharmaceutical Journal, Nov., 1871.

‡ Pharmaceutical Journal, April, 1871, p. 865.

§ Pharmaceutical Journal, Nov. 25, 1871, p. 421.

* Pharmaceutical Journal, Nov. 26, 1870, p. 422.

phosphorous acid (syrupus ferri hypophosphitis). This latter is now in demand, and may most rapidly and advantageously be prepared by Wood's process (PHARMACEUTICAL JOURNAL, vol. ix, p. 461).

While we are speaking of acids of phosphorous, I should like to draw attention to the advantages in using a phosphoric acid of greater strength than the 10 per cent. solution now officinal, for the manufacture of a certain class of preparations now in considerable demand, with a view of introducing it into the Pharmacopœia on a future occasion. I would employ a 50 per cent. solution at least (specific gravity, about 1·500) as described by Carteighe (PHARMACEUTICAL JOURNAL, 26th March, 1871).

I am tempted to again dwell upon a preparation containing the element phosphorus, which seems to be playing, you know, an important part in the medical treatment of the present "high pressure" days.

The preparation to which I would refer, perhaps, will be thought by some to savour of quackery, but still it is in enormous demand The public, who are generally keen observers of the value of such remedies, attach great importance to it, but whether their views are wholly corroborated by the medical profession, I am not prepared to say. It will be sufficient to remark that it is one of those compounds which are dubbed by our American cousins (the *Lancet* styles some of the addendum preparations in the same way) as "elegant pharmacy." The compound syrup of the phosphates, known popularly as Parrish's Syrup, is the preparation to which I refer, and my own view is, the sooner we have an official formula for it the better. Why not this, as well as citro-tartrate of soda, which was introduced to imitate a well-known preparation, and to keep pace with the public taste for physic?

Charta Sinapis.—Mustard leaves, as they are termed in trade, were made officinal in the last United States Pharmacopœia; our process is almost identical with the American, and both are imitations of Rigollot's mustard leaves, which have been in considerable demand.

It will require dexterity and practice before one can make the elegant leaves of the French manufacturer.

The American Pharmacopœia directs the spreading of the solution of gutta-percha and mustard with a brush, while the British Pharmacopœia, with the same viscidity of the gutta-percha solution, directs the passing of the paper on one side over the mixture.

Chloral Hydras.—Although known to the chemist from the earlier days of Liebig, still it was not until some four years since that it was brought forward as a remedial agent. It has been in large demand (not in the quantities the newspapers stated), and although perhaps less is used now than a year since, still my own observation convinces me that it is maintaining its ground. At first our market was wholly supplied from the Continent, but eventually, thanks to the enterprise of an English firm of manufacturing chemists,* it was produced at home.

Its import in considerable quantity was viewed with a jealous eye by the Customs, who attached a duty of fifteen pence per pound to it.

For a considerable period the chloral hydrate of pharmacy was wholly found in masses; now, however, detached crystals, ranging from the size of large crystals of sulphate of magnesia to those of chlorate of potash, are met with; but these are wholly of continental manufacture. I am informed that English makers, presuming that these are now required by the description given in the addendum of chloral hydrate, are quite prepared to undertake their manufacture.

The Pharmacopœia Committee does not undertake to be a manufacturer's encyclopædia, still it would, I think, have been advisable to state the particular liquid, from which chloral hydrate may be crystallized.

The characters and tests enumerated are ample to decide the purity of good chloral hydrate, the boiling point of 205° and Wood's quantitative chloroform test (PHARM. JOURN., March 4th, 1871) being those chiefly to be relied upon.

Extractum Glycyrrhizæ Liquidum is certainly a preparation of which both prescribers and dispensers stood in need.

When it was first introduced to our notice within these walls by Professor Redwood, who at the same time brought forward other United States' Pharmacopœia preparations, we were told that glycerine and proof spirit would be the liquids by which the fluid extract would be preserved, and that the starting point would be extract of liquorice, and not liquorice in powder as there directed. It appears, however, to have been decreed that we shall not be afflicted with "the glycerine mania" prevalent on the other side of the Atlantic, for the glycerine has been discarded, the extract of liquorice replaced by the root, and the spirit only retained, and that in very small quantity.

That a fluid extract shall be made from the root direct is certainly more like "artistic pharmacy" than dissolving the extract in water. That there will be no lamentation over the rejection of the glycerine few will question, but that the preservative action of 11 per cent. of rectified spirit will be sufficient to prevent acetous fermentation I much question. Time and observation only will decide this matter. Experiments I have made with this fluid extract give the following results from 100 parts:—

Dried Liquorice Root	100 parts.
Solid Extract (B. P.)	26 „
Extract Fluid (sp. gr. 1·160) . . .	56 „
Extract Glycyr. Liquid, B.P. . . .	61 „

This latter, when complete, has a specific gravity of 1·130, which information might have been appended with advantage to the Pharmacopœia description, thereby giving one an opportunity of determining what the density of the completed extract should be.

Gutta-percha is a body with which pharmacists hitherto have not had experience. I would call attention to the impurity of much of the gutta-percha of commerce, and the variation of 100 per cent. in price.

Hydrargyri Oxidum Flavum is a preparation with which we have been for some time familiar, not only for use in ointments, but as the mercuric oxide used in the preparation of the valuable oleates of mercury.

These latter, perhaps, may find favour on a future occasion, when they have been more extensively tried, and when the oleic acid of pharmacy is other than the rough oleic acid of the candle factories.

Injectio Morphiæ Hypodermica is a preparation of which various solutions have from time to time been used, the weakest being probably the officinal

* Foot, Barrett & Temple, Battersea.

solution, and the strongest one of ten grains to the fluid drachm. This latter is the one prescribed in Squire's work on hospital formulæ, and has perhaps been more generally used than any other. The preparation now officinal has a strength of five grains to the fluid drachm.

I confess I am an admirer of the method by which this solution is directed to be made ; it is practically and theoretically sound and likely to produce uniform results, provided always that its preparation by a good manipulator can be ensured.

I have, however, my misgivings on this point, and imagine that frequently such good results will not be obtained as might have been expected had the solution been directed to be prepared from acetate of morphia direct, even with all its faults, and more especially if required hurriedly, which will doubtless often be the case.

I had almost made up my mind that at any rate for all things new in medicine, we should count by ten and not twelve ; had we done so in this instance, we should have had a solution of one grain in ten minims, the continental pharmacist would then have been able to almost "run and read," as it were, and dispense easily his decigramme of morphia salt to his c.c. of solution when an English prescription was presented.

Laricis Cortex is ordered for the production of tincture of larch bark, not altogether unknown in pharmacy. At the present time two or three spurious larch barks are to be found in trade. I have not had an opportunity of comparing them, but Mr. Holmes, has kindly done so, and reports that the specimen (B) closely corresponds with that in the Society's Museum.

Liquor Gutta-percha.—This solution is introduced as a vehicle for the powder of black mustard in making the Charta Sinapis.

The formula is identical with that given in the recent edition of the United States Pharmacopœia. If gutta-percha is of good quality and thinly cut, as the Pharmacopœia directs, its solution is most easily effected.

The carbonate of lead acts as a mechanical purifier, and answers the purpose excellently well.

Had benzol been officinal, doubtless it would have replaced chloroform in this preparation.

Liquor Magnesiæ Citratis is introduced as a preparation containing true citrate of magnesia, and is made by a modification of the French Codex process for purgative lemonade. The carbonic acid is generated from acid carbonate of potassium ; the Codex directs the use of the corresponding soda salt. The water thereby charged with carbonic acid is under less pressure than in the ordinary lemonade of trade, which contains generally when filled from a machine 2·5 atmospheres of gas. This liquor would not contain more than 1·5 atmospheres in addition to the quantity dissolved by the water. There is just sufficient to make it grateful, and not too much to prevent it from being easily taken as a draught. I should have preferred to have seen half a fluid ounce of simple syrup with half a drachm of tincture of fresh lemon peel, ordered for each half-pint bottle, rather than syrup of lemon, which has, to my palate, a mawkish taste.

Oleum Phosphoratum is made with almond oil, which is first directed to be heated to 300° Fahr., and maintained at that temperature for fifteen minutes. Now, in some cases such treatment of the oil may be necessary, but I have not noticed either water or albuminous matter in the almond oil with which I have experimented. Almond oil readily takes up the phosphorus when the required temperature of 180° (Fahr.) is maintained. The oil now officinal differs in strength from the phosphorated oil of the Codex, which contains 2 per cent. Presuming the specific gravity of almond oil to be ·920, then ·74 will be the percentage of phosphorous. Surely a one per cent. solution would have been preferable. I do not consider the description of "colourless" as correct for this liquid. I should describe it as straw-coloured.

Pepsin.—At last this preparation is made officinal, and a standard published by which the value of medicinal pepsin can be determined.

How much of the pepsin of trade will come up to the officinal test, is a matter of speculation.

I have prepared pepsin from fresh rennets, but have not yet had an opportunity of experimenting upon pepsin, either from pigs' or sheeps' stomachs.

It is imperative that the directions of the pharmacopœia as to washing, be strictly adhered to ; and I should say, profiting by a failure I had on the first occasion, the scraping even of the stomach is a matter of importance, for a material point seems to be the sufficiently light scraping in order that the fatty matter be not removed with the viscid pulp, which is finally converted into a solid form by desiccation at a temperature of 100° Fahr. The powdering of the gelatinous-looking pellicles is a matter easily to be accomplished, the result being "a light yellowish-brown powder, having a faint, but not disagreeable odour, and a slightly saline taste, without any indication of putresence."

The determination of its value by its solvent action upon fifty times its weight of coagulated egg albumen aided by a minute quantity of hydrochloric acid is, I believe, in the main, correct. That the albumen will dissolve there can be no question ; the time mentioned, viz., four hours seems to me for, at any rate, pepsin from the stomach of the calf to be rather too short. The experiment I made took a longer time ; it is, however, just possible that pepsin made from a pig's stomach may have a more rapid action upon albumen.

Pilula Phosphori. Phosphorous is not one of the most manageable bodies to convert into a form suitable for administration and easy dispensing. We must not, therefore, be surprised if some complaints are made upon the practicability of the method for preparing this mass. My experience in making phosphorous preparations has been limited. I will therefore merely say that, as far as I can judge, the directions accompanied with considerable care and patience give a very satisfactory result. To make the wax thoroughly incorporate with the balsam of tolu and phosphorous is the part of the process that seems most tedious. Upon a quantitative experiment I have made I find when operating upon about half a pound of the ingredients that the weight is finally increased about 13 per cent. on account of the water absorbed by the mass during the immersion and manipulation. This hydration, therefore, will give an amount of phosphorous present in the completed product equal to about 1 per cent.

Pilula Scammonii Composita is the non-aloetic cathartic mass promised to be inserted in the Appendix. It is to be supposed that the curd soap here ordered will replace the olive oil soap in most preparations in which the latter is now prescribed in

all future editions of the Pharmacopœia. The use of spirit as a solvent, combined with strong tincture of ginger, leaves little to be desired as far as the production of an elegant mass is concerned; but the process is rather an expensive one, and the essence of ginger might have been replaced by the oleo-resin of ginger (or gingerine as it is called in trade), now officinal in the United States' Pharmacopœia, which would in this case have answered the purpose exceedingly well.

Pulvis Elaterii Compositus commends itself immediately as a safe and ready means of dispensing elaterium.

Pulvis Glycyrrhizæ Compositus is somewhat different to the compound liquorice powder we have been accustomed to see prescribed latterly, which was that of the Prussian Pharmacopœia, containing, in addition to the British Pharmacopœia ingredients, sulphur and fennel fruit; doubtless those in charge of the work have strong reasons for rejecting the sulphur.

Sapo Animalis.—The introduction of this soap into the Pharmacopœia is a wise step, even if only to authorize a practise common with manufacturers, who have been fully cognizant of the objections to the olive oil soap of the Pharmacopœia for some years. The remark, that "this soap may with advantage be substituted for the hard soap made with olive oil in preparing Linimentum Potasii Iodidi cum Sapone" is not in the least too strong, for it is absolutely necessary, if anything approaching a good liniment be required, that the officinal olive oil soap be discarded. How manifest is the disadvantage under which the compilers labour in having to publish an appendix only, without revision of the text of the old work; for a parallel can be found for this remark upon the soap over and over again in looking through the Pharmacopœia and comparing it with the work of pharmacists upon certain subjects to which they have given their attention since the 1867 edition was introduced, but which cannot appear because of material alteration that would be necessary in the text.

Succus Belladonnæ belongs to a class of preparations which have for years been in some demand; they are really valuable, and as a rule are much more to be relied upon than solid extracts. Of course a hard and fast rule cannot be laid down as to the relative equivalent value of this or other juices as compared with the original plant or with the extract, but the following, I think, will nearly express the average ratios:—

Belladonna Herb, fresh . . .	100 parts.
Expressed Juice	60 „
Solid Extract	4·7 „

Succus Hyoscyami, the same remarks apply as to the preceding juice, but, perhaps, here to a stronger degree upon the greater objection to evaporation, for I am of opinion that expressed juice of henbane suffers considerably in evaporation for the production of the solid extract.

The relative equivalent values of herb, juice, and extract, will probably be as under—

Henbane Herb, fresh . . .	100 parts.
Expressed Juice	70 „
Solid Extract	4·4 „

These expressed juices seem to have a specific gravity of about ·990 to ·997

Suppositories.—My experience in the manufacture of suppositories is very small. Martindale, Gerrard, and other practical men can speak more authoritatively upon the subject than I can; doubtless they will give us the benefit of their observations in manipulating the three soap suppositories.

The irritant nature of the soap upon surfaces with which it comes in contact, is purely a medical question, and does not concern us.

The *Carbolic Acid and Soap Suppository* does not work well, the quantity of moisture being alone derived from the carbolic acid seems to me insufficient, at any rate it will not admit of starch being used. To make these easily I should take equal parts of curd soap and curd soap in powder.

The *Suppository of Morphia and Soap* is easily manipulated, the quantity of starch added being sufficient to make the suppository finally weigh 16½ grains.

The *Suppository of Tannic Acid and Soap* is also easily made, the amount of starch added being sufficient to make the suppository weigh upwards of 23½ grains.

The two latter suppositories on exposure to damp air, might be expected to become slightly adhesive from the use of the hygroscopic body glycerine.

Syrupus Chloral.—The administration of hydrate of chloral in the form of a syrup has been general during the past two or three years. When it was first used in this form the variously flavoured syrups were numerous, amongst them might be enumerated orange-peel, orange flower, peppermint, tolu, ginger, chloroform water. It would have been well if at the evening meeting some two or three years since, when it was proposed to settle the question of the best vehicle for its administration that the matter had been decided; the syrup would not then have been sent through the country broadcast made from half a dozen different formulæ, but a recipe would have appeared in the Journal as having had the approval of the meeting, and would consequently have carried some weight with it. It would seem that this difficulty beset the Pharmacopœia Committee, for they have finally settled upon simple syrup, hoping by its adoption to prevent all chance of giving offence to one or other who have held that such and such a flavouring was the most elegant.

All this is very good, and under the circumstances is, perhaps, the best solution of the difficulty that, could have been devised, and I admire it. I cannot say as much for the elegance of the syrup itself, for to a pharmacist's eye, it is anything but a syrup.

The formula given contains too much water for the solution of the hydrate before the simple syrup is added, the resulting compound being thin and certainly unparalleled in density by any other officinal syrup. When prepared according to the Pharmacopœia formula the spec. grav. will be 1·218. I should certainly suggest that when an opportunity occurs for revision, we should be directed to dissolve the hydrate in about its own weight of water and then add simple syrup, thus—

Hydrate of Chloral . .	80 grains.
Water	1½ drachms.
Syrup to	1 fluid ounce.

The spec. grav. of such a syrup would be 1·320 and would be an improvement, at any rate pharmaceutically, upon the now officinal syrup. It may be that there are some who are so fastidious that they object to the taste of sugar—if that be the case let a solution in water only be made officinal—of an equivalent strength to 10 grains to the drachm.

Tinctura Aurantii Recentis is an old friend, for grey-haired pharmacists will remember that a tincture from the fresh peel, although not of equivalent strength to the present, was officinal in the 1824 pharmacopœia, and was discarded for reasons best known to the compilers of the 1836 edition. We are certain they did not then cherish the now popular notion of conservatism, or they would have retained the formula for the present race of pharmacists, who, perhaps, wish they had done so, rather than they themselves should be accused of retrograde pharmacy. The subject was revived before this Society at an evening meeting, by Haselden, as one worthy of attention. (PHARM. JOURNAL, Nov. 9th, 1872.) The discussion upon his paper, in which Bland, Brown, Greenish, Groves, Sandford and Umney took part (PHARM. JOURNAL, Nov. 9th, 1872) went to show as follows :—

Bland.—"*That tincture of dried peel was a bitter, while tincture of fresh was a flavour only.*"

Brown.—"*That upon no account would he use rectified spirit.*"

Greenish.—"*That Continental pharmacists used dried peel and double strength.*"

Groves.—"*That he had experimented upon all peels, and finally came back to the recently dried by preference.*"

Sandford.—"*That he used a tincture approximating to the* 1824 *tincture.*

Umney—"*The difficulty there would be at certain times in procuring fresh Seville orange peel.*"

The result of this discussion apparently would not have been the introduction of this tincture if these pharmacists had a voice in the matter. Symes (PHARM. JOURNAL, Nov. 9th, 1872, p. 381) also remarks upon this tincture, and suggests the addition of as much water as with the water in the peel, would bring the spirit to proof strength, but none of these experimenters seem to have fallen into the error the British Pharmacopœia has in the manipulation there directed.

We are told to macerate the 6 ozs. of orange peel in one pint of rectified spirit for a week with frequent agitation. Then press the dregs, mix the products, and make up the measure to one pint with rectified spirit.

The introduction of the word "pint" into the text is evidently an error, and seems to have crept in inadvertently, for we are directed only a few lines previously to take a "sufficiency" of spirit, which remark would have been unnecessary, or at any rate contrary to custom, if a pint had been intended. I have had an opportunity of making this tincture during the past fortnight, and have found rather than spirit being required to make up any deficiency resulting from loss, there is actually a gain of about 10 per cent. by volume. The formula should, therefore, be amended thus :—

Take of—

Bitter Orange .	A sufficiency.
Rectified Spirit	18 fluid ounces, or a sufficiency.

Carefully cut from the orange the coloured part of the rind in thin slices, and macerate six ounces of this in 18 fluid ounces, etc., etc, Finally, add sufficient spirit to make one pint.

I would remark that my observations confirm those of Haselden and Symes, that fresh peel is to dry peel as 100 : 33·3.

Tinctura Laricis has previously been but little used ; when it has, the tincture has generally been made with proof spirit. With the bark in a proper state of division, percolation is admirably adapted for the production of this tincture. The loss of spirit I have noted in making it by the officinal method is about 10 per cent. by volume.

Tinct. Quiniæ Ammoniata has been seldom heard of previously. The formula given is one that has appeared in the PHARM. JOURNAL, and has doubtless been adopted by those who have had occasion to prepare the solution. The specific gravity noted is ·936. One fluid ounce of this tincture, when evaporated to dryness over a water bath, re-dissolved in one fluid ounce of water, and ammonia cautiously added in slight excess, will give a precipitate, which, when dried until it ceases to lose weight, will weigh not less than 5·6 grains.

Two preparations are conspicuous by their absence. I refer to the acetum and oxymel of ipecacuanha. These were introduced to us by Dr. Duckworth, and working processes given by Carteighe, and over and over again they were said to be destined for the addendum.

What has become of them? Is it possible that they kept perfectly up to a certain time, and then suddenly went the way of all ipecacuanha preparations. I imagine that this must have been the case, for we heard of them at every meeting at which the additions to the Pharmacopœia came under discussion, and finally they are shut out.

I would submit that if these have been found unstable, an aceto-alcoholic fluid extract be prepared and investigated, with a view to its use in future editions, either as fluid extract, or more generally for a syrup, by dilution of the fluid extract with simple syrup.

In conclusion, I would now review the first page, entitled, "Corrections made in 1874 in the Reprint of the British Pharmacopœia of 1867."

The only important correction is the specific gravity of the strong solution of perchloride of iron, which was formerly stated to be 1·338, now to be 1·440, which is, I believe, nearly accurate.

The tincture made by diluting this liquor with rectified spirit, and for which a specific gravity was named in the previous print, has been deemed either accurate or unworthy of correction.

The list in the main consists of the proportions of active ingredients in various more or less potent preparations. Up to the present time I have not had an opportunity of checking these calculations.

I would, however, point out one anomaly in which ipecacuanha and opium, both of which are in the ratio of one in ten in Dover's powder, are said to be respectively as one in twenty-four and one in twenty-three and a half, nearly, in compound pill of ipecacuanha and squill.

While I sympathize with the compilers in the difficult task they have had in making corrections without disturbing the text of the old print, to which point I have previously alluded, still, I cannot refrain from expressing my humble opinion that as corrections, almost the whole of which are immaterial, have been made, while more important points have been allowed to remain unassailed, it would have been better had that list never been published.

When the novelty of this book has passed away, we shall look forward to a new edition of our National Pharmacopœia, which will doubtless bear a decennial revision. In the meantime, let it be not only the ambition, but the bounden duty of every pharmacist to make some research, no matter in what direction,

if it bears upon pharmacy, and give this Society the benefit of his observations; by this, and this only shall we be enabled to keep pace with pharmacists on the Continent and in the United States, and what is of more importance, show to the medical profession that we are fully alive to the responsibilities of our calling.

Laboratory, 40, *Aldersgate Street, E.C.*

THE ALKALOIDS OF THE CINCHONA BARKS.*

BY O. HESSE.

(*Concluded from p. 772.*)

X. The Amorphous Bases.

Cinchona barks contain more or less considerable quantities of amorphous basic substances, the quality of which depends upon the nature of the alkaloids which occur normally in the respective cinchona barks. We may therefore consider these substances to be decomposition products of the two cinchona alkaloids, and this the more so because they may be obtained from the latter artificially, and are often formed from them unintentionally during their preparation.

If the crystallizable alkaloid give no green colouration with chlorine and ammonia the accompanying amorphous alkaloids, as a rule, behave in a similar manner; but if the crystalline bodies give this green colouration, so does also the amorphous portion of the bases. It may, therefore, be conjectured that in the first case the amorphous substance arises from cinchonicine, in the latter from quinicine. But if the bark contain at the same time quinine and cinchonidine, or conchinine and cinchonine, it may be concluded that then the amorphous substance is a mixture, with which are associated in a few cases, as in the bark of *C. succirubra*, small quantities of paricine and amorphous quinamine. Upon the ground of this experience, therefore, I cannot share in the opinion of De Vrij, that in the above-mentioned bark, the amorphous substance contains a special alkaloid. Moreover, I have been able, by successive precipitations with ammonia and re-dissolving in ether, to separate the amorphous portion of the alkaloid of this bark into two parts, of which one gave no green colour with chlorine and ammonia, but the other gave that colour quite distinctly.

It has often been suggested that this amorphous modification of the cinchona alkaloid is formed through the influence of light. When crystallized sulphate of quinine is exposed to direct sunlight, it is in fact coloured yellow; but this operation, even if it last for a year, is confined to the surface of the mass. If the surface exposed to the sunlight be protected with black paper, which does not let the light pass through, the sulphate of quinine under this paper remains for a long time unaltered. The protecting cover, which is here represented by the black paper, is represented in nature by the chlorophyll coloured cellulose, so that the influence of the sun can only so far operate upon the quality of the alkaloids as the latter are directly struck by the sun's rays. This explains how it is that the bark, even in the form of the finest powder, when exposed for a long time to the sunlight suffers but little damage to the crystallizable alkaloid.

But quite a different result appears if the alkaloid in acid solution be exposed to the sunlight. In such cases not only the sunlight penetrates the solution, but through the unequal heating of it currents are engendered, and thus continually fresh particles are led to the spot where the influence of the sun is the strongest. This can be illustrated by an example. I have, for instance, divided a solution in water acidulated with sulphuric acid, of such alkaloids as are obtained from the best Calisaya bark, into two equal portions, and exposed one of these to the sunlight; but the other part I placed in a closet, and in addition, by pasting black paper over the vessel sought to protect it from the influence of light. After seventy-three days the latter solution had the original yellow colour, and exactly the same amount of alkaloid as before the experiment. On the other hand the solution exposed to the sunlight became brownish red and contained now a red substance which was amorphous, dissolved readily in ether, and did not neutralize sulphuric acid. Of the quinine only 0·54 per cent. was still present, whilst the amount of that alkaloid was originally 3·72 per cent. Instead of quinine a considerable quantity of an amorphous substance was obtained, which corresponded with quinicine. The small quantity of cinchonine and conchinine, which were originally in the solution, could afterwards no longer be detected.

Under the influence of light, therefore, a red substance is formed from quinine, which indeed is still an alkaloid, but is not capable of neutralizing an acid. As such a substance is not met with in the cinchona barks, it appears to me as if light generally has not so much influence upon the formation of the amorphous bases as there is at present a disposition to believe. Rather must an influence of quite a different sort operate in determining the quality of the cinchona alkaloids. We have to take into consideration that the cinchona alkaloids are only met with in the bark, and indeed in the cellular layer situated next to the sap wood, the so-called bast layer, but not in the wood* nor probably in the leaves, flowers, seed-capsules or seeds. Probably it would be right to consider them an excretion which, through imperfect nourishment or other vital process of the plant, becomes absorbed in the further development of the plant, and thereby undergoes an alteration in character.

The amorphous bases, moreover, are formed in the manufacturing preparation of sulphate of quinine, and remain dissolved in the mother liquor. From this mother liquor David Howard† obtained what he at first took to be a new alkaloid. If, therefore, quinicine be formed in the working up of barks containing quinine, it might well be expected that when barks containing cinchonine and cinchonidine are employed cinchonicine would be obtained.

Both substances dissolve easily in ammoniacal salts; but, nevertheless, the latter cannot be used to separate them from the crystallizable bases, because these are equally soluble therein. To this may be added, that when quinoidine is boiled in an aqueous solution of an ammoniacal salt—such as oxalate of ammonia—it readily adheres together, so that but small contact takes place between the solvent and that which is to be dissolved; hence it appears to me that the process of quinine purification given by De Vrij‡ is more suited to the lecture-desk than the laboratory.

When the crystallizable cinchona alkaloids are heated for a long time with acids, they are converted, as Pasteur first pointed out, into their amorphous modifications. Quinicine is thus formed from quinine, and cinchonicine from cinchonidine, by which the specific rotatory power is diminished. It may probably be assumed that the decomposition product which Zorne§ obtained from the sulphates of quinine and cinchonine, by heating them with hydrochloric acid, were not derived directly from the quinine and cinchonine, but from their amorphous modifications, quinicine and cinchonicine. These latter sub-

* Translated from the 'Vierteljahresschrift für praktische Pharmacie,' vol. xxii. p. 366.

* Broughton has noticed an extremely small trace of the cinchona alkaloids in the wood as well as in the leaves of *C. officinalis* and *C. succirubra*; De Vrij also believes that he has detected traces of the alkaloid in the leaves of *C. succirubra*. These traces may probably owe their existence to some accident that escaped observation. At all events, in a careful experiment with twenty pounds of leaves, Howard has not been able to meet with a trace of alkaloid. Also an experiment which I undertook with the wood of *C. succirubra* yielded no alkaloid.

† Pharmaceutical Journal, [3] vol. i. p. 845.

‡ Jahresbericht für Chemie, 1866, p. 472.

§ Journal für prakt. Chemie, [2] vol. iv. p. 44.

stances are, moreover, also formed without the addition of acids, if the bases be exposed with glycerine to a temperature of 180° C., or preferably, 210° C. The glycerine is then coloured red, a red substance, not neutralizing acids, being formed in it, and the amorphous modification of the respective base is produced besides.

Arrived at the conclusion of this memoir, I would yet remark that in the interest of the subject it is very desirable that some of the pretended aricine should be sent to me (at Fuerbach, in Stuttgart) for examination, since I assume that some may be met with in one collection or another. With respect to quinidine (p. 613) I hope to make a further communication, the results of which must be awaited. Consequently, of the cinchona alkaloids, if we leave out of consideration the modifications of them, and Schutzenberger's* two nameless alkaloids ($C_{21}H_{28}N_2O_2$ and $C_{18}H_{22}N_2O_2$), only the following can be safely named as discovered: quinine, cinchonidine, cinchonine, paricine, quinamine, paytine, and conchinine. The first three of these alkaloids are well known as commercial articles; but conchinine is mostly met with in commerce under the name of "quinidine." The latter three alkaloids—quinamine, paytine, and conchinine—appear to form a group together. They might probably, under the influence of cell-life in the respective plants, be transformed one into another, and this might be the reason why in the bark of *C. succirubra* no conchinine is met with, but quinamine is.

HYDRATE OF CHLORAL.†

Dr. Oscar Liebreich has recently published a paper in the *Berliner Klinische Wochenschrift*, in which he calls attention to the important subject of the purity of chloral hydrate, and the effect which its deterioration may produce on the patients to whom it is administered, and on its reputation as a remedy. The case, he says, is different from that of such a substance as quinine, the adulteration of which will only reduce, but will not pervert, the proper action of the drug. With chloral and other substances prepared by analogous chemical processes, the result of the manufacture may be the formation of compounds which, if administered, produce an altogether different result from that intended. The process of manufacture is one which requires great care; and it seems that it is at least difficult to ensure the purity of chloral, if made in large quantities. Liebig himself, who discovered it, never attempted to make more than a few grammes at once; and Dr. Liebreich was so convinced, when he brought it into notice as a medicinal agent, that purity was necessary for success, that the first supplies were made under his immediate superintendence. At present, it is manufactured in various places; and the result is that, in some parts of the continent, notably in Saxony and Switzerland, it has fallen into disrepute. Dr. Liebreich has made a collection of specimens of the drug used in cases where it has failed to produce its proper action, and possesses, he says, some horrible chemical compounds which he would not venture to give to a human being. He prefers the crystallized form of chloral hydrate as the most stable. It may contain hydrochloric acid; this is no disadvantage if the proportion remain the same; but, if it increase, it indicates that the formation of dangerous compounds may be going on. Sometimes the hypnotic action is increased; this he attributes to the production of chlorine compounds, which are more readily changed into chloroform than chloral itself is. An acid reaction, arising from the formation of trichloracetic acid, does not show that the chloral is unfit for use, though it weakens its action. In pure chloral, this action is limited; while impure chloral is liable to the constantly increasing productions of acid compounds—not trichloracetic acid—of a deleterious nature. Dr. Liebreich remarks that the German *Pharmacopœia* is in error in fixing the boiling point of chloral hydrate at 95 cent. (203 Fahr.). This, he says, is correct for anhydrous chloral; but the boiling point of chloral hydrate is not constant.

* Journal für prakt. Chemie, vol. lxxiv. pp. 76 and 229.
† From the *British Medical Journal*, March 21st.

JERVIA IN VERATRUM VIRIDE.*

BY CHAS. L. MITCHELL.

Since the discovery and isolation of two alkaloids in *Veratrum viride* by Mr. Charles Bullock in 1865, no additional researches seem to have been made. Simon obtained jervia from *Veratrum album* some ten or fifteen years ago, but notwithstanding the fact that *Veratrum viride* is so similar in almost every respect, up to this date, I can find no record of any attempt having been made to prove the presence of jervia in the latter root.

While recently preparing specimens of the *Veratrum viride* alkaloids according to the process given by Mr. Bullock, my attention was drawn to the circumstance, that when the precipitate produced in the acetic solution by sodium carbonate was treated with warm diluted sulphuric acid, a considerable amount of a granular, whitish powder separated on cooling. I at first supposed it was sulphate of calcium, but a closer examination revealed the fact that it was of organic composition, and after several different trials, I succeeded in proving it to be an alkaloid identical with the jervia of Simon. It may be obtained in its pure form by the following process:—

Veratrum viride finely powdered is thoroughly exhausted with stronger alcohol, the tincture distilled to a small bulk, acidulated with acetic acid and precipitated in water. The resin is then separated by filtration from aqueous solution of the alkaloids and the filtrate concentrated by evaporation and rendered strongly alkaline with solution of carbonate of sodium. The precipitate thus obtained is drained, dried, boiled with strong alcohol until nothing more is taken up, the alcoholic solution evaporated to dryness and digested in very dilute sulphuric acid.

The granular powder which deposits on cooling is sulphate of jervia. This is separated, well washed and drained, and then boiled for some time with a strong solution of carbonate of sodium. By this treatment the sulphate of jervia at first formed is decomposed, the jervia separating as a granular powder, which is washed until free from alkali, dissolved in acetic acid, precipitated with ammonia, well washed and dried.

Jervia thus obtained is a light, white powder, capable of crystallizing from an alcoholic solution, tasteless, inodorous, and of a feebly alkaline reaction. It is insoluble in water, but very soluble in boiling alcohol, from which it is almost entirely deposited, on cooling, in white flakes. It is freely soluble in chloroform, but is only slightly soluble in benzin. With acetic and phosphoric acids it forms very soluble salts; with sulphuric, hydrochloric, and nitric acids, it yields salts, sparingly, soluble in alcohol and water, and precipitated from the more soluble acetate and phosphate.

Potassa, soda, and ammonia, precipitate jervia from its solutions in white, rather gelatinous flakes, insoluble in an excess of the precipitant. With reagents it gives the following reactions: Perchloride of gold, curdy, yellow precipitate; sulphocyanide of potassium white precipitate; bichloride of platinum, granular, yellow precipitate; iodohydrargyrate of potassium, curdy, white precipitate.

The most characteristic test for jervia is its reaction with sulphuric acid. When a minute fragment of it is moistened on a glass slide with a drop of concentrated sulphuric acid it immediately changes, first to a straw yellow and then gradually to a green colour. This reaction is quite delicate.

Concentrated nitric and hydrochloric acids dissolve jervia to a colourless solution, which when boiled becomes of a

* *American Journal of Pharmacy* for March.

straw colour; when heated it melts to a clear oil; at a little above 400° Fahrenheit turns brown; and when the temperature is raised still higher, it burns with a smoky flame.

Thinking that it would be well to compare this alkaloid with the jervia from *Veratrum album*, I subjected some of the latter, which I had previously prepared, to the same tests, with precisely the same results. I do not feel as yet able to state exactly the proportion in which jervia exists in *Veratrum viride*, but am pursuing a series of investigations on both this and *Veratrum album*, the results of which I trust shortly to be able to make public.

LACTO-PHOSPHATE OF LIME AND COD LIVER OIL.*

BY C. G. POLK.

The cry of "Eureka," which has ascended so loudly over the new hobby, lacto-phosphate of lime and cod liver oil, it seems has almost led the enthusiastic members of the medical profession to hope that the great specific for all the ills to which flesh is heir had at last been found. The long high-sounding name seems to invest it with solemn import, and leads us to regard it with respect and confidence. It seemed to be the very thing for a proprietary medicine, and consequently it did not take very long to secure it a copyright.

The errors of the combination, outside of the quackery into which it has been run, however, immediately concerns us, and to point them out I am prompted to indite this.

In the first place, the syrup of lacto-phosphate of lime will not combine without the addition of adjuvants with cod liver oil and form a homogeneous mixture. To secure a perfect admixture, other substances must be introduced, and these usually are acacia, tragacanth, and alkalies. Against such a compound, when freshly made, there is, perhaps, no pharmaceutical objection. The relative amounts of cod liver oil and lacto-phosphate of lime are, however, not so uniformly required under the varying phases of disease, age, sex, and temperament, so as to enable the pharmaceutical chemist to prepare a preparation uniformly adapted to every case or one as well adapted to secure the best remedial effect of the agents as when proportioned by an intelligent physician to meet each individual case. This can be done by using an emulsion of cod liver oil; the one suggested by Mr. Rice is a good formula, to which the syrup of lacto-phosphate of lime may be added in whatever amount desired. Thus we should always get the article fresh, free from rancidity if good oil is used, and have an article preferable to much of that now dispensed. The more I have examined the syrup of the lacto-phosphate of lime and cod liver oil, the more I have become convinced that the preparation is an unfortunate one. Cod liver oil rapidly becomes rancid and unfit for administration in the presence of the phosphate, lacto-phosphate, and hypophosphite salts of lime. It seems to me that it would be a much better plan to use the oil and lacto-phosphate alternately, than to mix them together; I always do, and often find the result very gratifying. Lacto-phosphate of lime, it seems to me, is more especially adapted to the period of convalescence from acute diseases than chronic ones. As is well known, during the progress of fevers and inflammations, the waste of the phosphate of lime is great and requires a resupply, which is nicely afforded by the lacto-phosphate. But in such cases the cod liver oil is not by any means indicated. In scrofulous diseases of children, the class in which the syrup of the lacto-phosphate of lime and cod liver oil has been very extensively used, and in which no doubt it has given good results, a better preparation would be obtained by extemporaneous combination. As a rule, fixed medical formulas, combining several ingredients, are objectionable. Dover Powder is an established fact, and the combination of iron, quinia, and strychnia in Easton's syrup is a splendid preparation incapable of extemporaneous formation as required in the usual routine of pharmacy. A few more instances perhaps might be cited, but the rule still holds good. Lactic acid, it is well known, plays an important part in rheumatism; what result may then accrue from the continued use of the lacto-phosphate of lime in chronic diseases?

* *American Journal of Pharmacy* for March.

ON COPPICING CINCHONAS.

The following letter upon this subject, from Mr. John Eliot Howard, appears in the *Gardener's Chronicle* for March 28:—

As all information connected with the cultivation of the cinchona is important for those engaged in this branch of industry, I will ask space for a few remarks in reference to the plan of coppicing advocated in an extract from the *Agricultural Gazette of India*, and copied in a recent number.

It is well that the owners of the Sikkim plantations find the results of their cuttings "most satisfactory," but it is important to observe that this satisfaction does not extend to those who would desire from thence a supply of material for the extraction of quinine, and, consequently, that it would be a mistake to recommend this plan for general adoption.

The bark of coppiced oak is, I believe very abundant in tanning material. Certainly, I know that the corresponding bark of the cinchona, and especially of the *C. succirubra*, abounds in the astringent principles which are an annoyance to the chemist in the above manufacture. It is equally a matter of notoriety that the bark of small branches, such as would be supplied by this plan, is comparatively barren in quinine. In my 'Quinologia' (*sub voce C. magnifolia*, p. 8) will be found a table from the researches of Dr. de Vrij, showing that kinovic acid abounds in the inverse proportion to quinine, so that the bark of small branches (called *canutillos* in South America) may be very useful as a tonic, and very bitter, but useless for the extraction of quinine.

It is certain that the latter is never found in quantity till the bark has attained a certain thickness. The reason for this is, probably, that the alkaloids are not formed in the leaves and carried downward by the descending sap. A theory that such was the case used to be entertained, but is negatived by the examination of the leaves, such as I have communicated to the PHARMACEUTICAL JOURNAL, and by Mr. Broughton's researches in India. On the other hand I have sought to show that the alkaloids are formed in the cellular tissue of the bark, commencing more especially with the cambium (see 'Quinology of the East Indian Plantations,' p. 28). When the bark is renewed, after being stripped from the tree, the new portion presents a very unique appearance; such as I have represented in the last work, and which I call lax cellular tissue. This is specially rich in alkaloid (see plate iii.), and I have found the singularly radial appearance of this structure exactly reproduced in some renewed succirubra bark of good quality which I have recently examined.

I compare this in my own mind to the peculiar cellular tissue of the gall-nut, produced through the puncture of the cynips, and therefore in a similar abnormal manner. This tissue, as everyone knows, is very rich in the (chemically) characteristic product of the tree.

I am indebted to M. Moens, of Java, for the following confirmation of my opinion (which will not be without interest to your Ticehurst correspondent on grafting vines, p. 311). M. Moens says:—"Some years ago Mr. V. Gorkom had grafted two C. Calisayas upon two C. Pahudianas. The grafts succeeded very well, and I now took the bark for examination. This showed that the Calisaya, as well as the Pahudina, kept their alkaloids as if they had grown separately. I think this is an experiment of considerable interest, and we shall repeat it, if possible, with (C.) micrantha and Calisaya Ledgeriana. I think the result most agrees with your idea that the alkaloids are formed in the cellular tissue of the bark."

I wish it to be understood that I do not pledge myself to any particular mode of cultivation. I have grave doubts of the possibility of carrying out the plan of renewing the bark with commercial success. Let every plan have a fair trial and time will decide; but, as I think, the verdict will not be in favour of the coppicing system.

It may interest your readers to learn that the introduction of a new sort of Calisaya (called Ledgeriana) into Java, has greatly added to the value of the plantations, and the prospects of success are of a marked character.

In India, also, Mr. McIvor has found a new variety of great promise—the sample of its bark sent me having yielded not less than 11 per cent. of crystallized sulphates of the two alkaloids, quinine and cinchonidine. These kinds I have referred to in an article, now publishing by the Linnean Society, on the genus Cinchona.

This week has seen a large consignment of bark of C. officinalis from the Nilgherries of excellent quality for the extraction of quinine, of course fetching a high price.

ASCENT OF SAP IN THE BARK OF TREES.

M. Faivre has recently performed a series of experiments on the mulberry, hazel-nut, and cherry laurel, which he considers goes far to prove the fact that the substances which supply the food of plants have an ascending motion in the bark. For this purpose he made perfect or imperfect annular incisions through the bark, or detached pieces of the bark, to which buds were attached, or removed entire cylinders of bark from the trunk. The result of the experiments was that the buds always continued to develop when the communication remained uninterrupted with the lower portion of the trunk; while, when this communication was completely destroyed, the buds invariably withered away. If the bud was separated by a perfect annular incision, it withered the more slowly the greater its distance from the incision; and in these cases the starch disappeared entirely from the portions of the wood above the incision between it and the bud. When entire cylinders of bark with buds on them were removed, the buds continued to develop, and even produced branches bearing leaves.

FOURTH REPORT OF THE ROYAL COMMISSION ON SCIENTIFIC INSTRUCTION.

In the above report which has just been published, are contained some important recommendations with respect to the natural history and scientific collections belonging to the nation, and also with respect to the establishment of courses of scientific lectures in the great centres of population. The recommendations are thus summarized :—

With regard to *the Natural History collections of the British Museum*, it is recommended:—That the occasion of the removal of these collections to the new buildings now being erected at South Kensington for their reception be taken advantage of to effect a change in the governing authority and official administration of that division of the museum. That a director of the national collections should be appointed by the crown, and should have the entire administration of the establishment, under the control of a minister of State, to whom he should be immediately responsible; and that the keepers of collections, should be responsible to the director. That the appointments of keepers and other scientific officers should be made by the minister, after communication with the director and with the board of visitors (herein after referred to). And that the director should prepare the estimates, to be submitted, after consultation with the board of visitors, for the approval of the minister. That the present superintendent be the first director. That a board of visitors be constituted. That the board be nominated, in part by the crown, in part by the royal, and certain other scientific societies of the metropolis, and, in the first instance, in part also by the board of trustees; the members to be appointed for a limited period, but to be re-eligible; and that the board of visitors should make annual reports to the minister, to be laid before parliament, on the condition, management, and requirements of the museum, and should be empowered to give him advice, on any points affecting its administration.

With regard to *the Museum of the Royal College of Surgeons*, it is recommended :—That, should the fund at the disposal of the college, owing to changes in medical legislation, or from any other cause, prove inadequate for the efficient maintenance and continued extension of the museum, it should receive support from the State, as an institution intimately connected with the progress of biological science in this country.

With regard to *the National Botanical Collections and Gardens* it is recommended that the collections at the British Museum be maintained and arranged with special reference to the Geographical distribution of plants and to palæontology; and that the collections at Kew be maintained and arranged with special reference to systematic botany. That all collections of recent plants made by Government expeditions be, in the first instance, sent to Kew, to be there worked out and distributed, a set being reserved for the British Museum; and that all collections of fossil plants made by Government expeditions be sent to the British Museum. That opportunities for the pursuit of investigations in physiological botany should be afforded in the Royal gardens at Kew.

With regard to the *Scientific Collections of the South Kensington Museum*, the commissioners recommend the formation of a collection of physical and mechanical instruments; and they submit for consideration whether it may not be expedient that this collection, the collection of the patent museum, and that of the scientific and educational department of the South Kensington Museum, should be united and placed under the authority of a minister of State.

With regard to *Provincial Museums*, it is recommended that, in connexion with the science and art section of the education department, qualified naturalists be appointed to direct the collection of specimens in order to supply whatever deficiences exist in the more important Provincial museums; and, also, in order to organize typical museums, to be sent by the department of science and art into the provinces to such science schools as may be reported to be likely to make them efficient instruments of scientific instruction. That a system of inspection of provincial museums be organized with a view of reporting on their condition, and on the extent to which they are usefully employed, and whether the conditions of the loan or grant from the department of science and art have been fulfilled.

With regard to *Public Lectures*, it is recommended that courses of lectures be given in connexion with the collection of physical and mechanical instruments, the establishment of which we have proposed, the object of these lectures being to illustrate the progress of scientific and mechanical discovery and invention. That the establishment of lectures on science, accessible to all classes on the payment of a small fee, should be promoted by the Government in the centres of population. That, in the first instance, with the view of carrying out the preceding recommendation, the system of instruction of this kind, which has already been established by the government in the metropolis, should be developed by the institution of courses of lectures on the principal branches of experimental and natural science. That the proposed lectures be of two kinds. First: Lectures of an elementary character on the general principles and most important facts of science. Secondly: Lectures specially intended for the working classes on the application of science to the arts and industries ot the country.

The report and recommendations are signed by the Duke of Devonshire, Sir John Lubbock, Sir J. K. Shuttleworth, W. Sharpey, T. H. Huxley, G. G. Stokes, Henry J. S. Smith, and B. Samuelson.

The Pharmaceutical Journal.

SATURDAY, APRIL 4, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE REGISTER OF CHEMISTS AND DRUGGISTS AND THE CALENDAR OF THE PHARMACEUTICAL SOCIETY FOR 1874.

LAST year we took the opportunity afforded by the publication of the Register of Chemists and Druggists and the Pharmaceutical Society's Calendar to place before our readers some comparative statistics gathered from those official records which it was thought might have some interest as a contribution to the history of the progress of pharmacy in this country. As the Calendar and the Register for 1874 have now been published, we avail ourselves of an early copy placed at our disposal to continue the comparison.

The total number of Chemists and Druggists on the new Register is 13,216 against 12,757 in 1873, being an increase of 459. Of these 2374 are Pharmaceutical Chemists, or 17·96 per cent. on the whole number. This is an increase on the actual number of Pharmaceutical Chemists of 7; but it is a slight decrease on the relative percentage of 1873, which was 18·56. However, since the removals from the Register of Pharmaceutical Chemists include the names of both examined and unexamined persons, whilst the additions are the names of persons who have all passed the Major examination, it is interesting to note that the number of examined Pharmaceutical Chemists is now 1179, or 8·92 per cent. of the whole number of registered Chemists and Druggists, a percentage almost identical with that of last year.

The number of persons whose names are on the Register of 1874 by virtue of their having passed the minor examination is 1400, or 10·59 per cent. of the whole, this being an increase of 397, or 2·72 per cent. The foregoing figures may be compared thus :—

	1873.			1874.		
	Number.	Per cent.		Number.	Per cent.	
Pharmaceutical Chemists :—						
Non-examined	1229	9·63		1195	9·04	
Examined . .	1138	8·93		1179	8·92	
	2367	18·56		2374	17·96	
Chemists and Druggists who have passed the Minor . .	1003	7·87		1400	10·59	
Remainder, including those who have passed the Modified . .	9380	73·57		9442	71·45	
Total	12,750	100·00		13,216	100·00	

Next, as to the proportion which the number of names on the Calendar of the Pharmaceutical Society bears to the number of names on the Register of Chemists and Druggists. Of the 2374 Pharmaceutical Chemists on the Register, 2119 or 89·25 per cent. against 86 per cent. last year, are members of the Pharmaceutical Society. Of the remaining 10,842 Chemists and Druggists on the Register, 781 are connected with the Pharmaceutical Society as Chemist and Druggist Members, and 1193 as Associates. This gives a total of 4093, or 33·97 per cent. of the whole number of registered Chemists and Druggists who are connected with the Society, being a relative increase of more than one per cent. during the year. The Registered Apprentices of the Society have increased from 764 to 811. These figures may be tabulated thus :—

	1873.		1874.	
	No.	Per cent.	No.	Per cent.
Pharmaceutical Chemists, Members of the Society	2027	86	2119	89·25
Other Registered Chemists and Druggists connected with the Society . . .	1695	...	1974	...
Total number of Registered Chemists and Druggists connected with the Society	3772	29·77	4093	30·97
Registered Apprentices of the Society	764	...	811	...

For the information of those readers who are not acquainted with the Calendar of the Pharmaceutical Society it may be as well to mention that besides the lists of members associates, etc., the new Bye-Laws, the Pharmacy Acts, and the new Regulations of the Board of Examiners, it contains a full abstract of all the legislative enactments in which Chemists and Druggists are especially interested.

THE ADDITIONS TO THE PHARMACOPŒIA.

THE time occupied by the reading of Mr. UMNEY's paper on the additions to the Pharmacopœia did not admit of any discussion being entered upon, and it was consequently resolved, on the motion of Mr. BLAND, that the meeting should be adjourned until the first Wednesday in May.

The VICE-PRESIDENT, however, directed attention to the fact that there seemed to be two issues of this official publication, differing very much from one another, and although both bearing outside the same title and the date 1874, one of them was dated inside on the title-page 1873.

Professor REDWOOD, on being appealed to for information, declared himself unable to account for the circumstance.

It would almost seem as if, by some unaccountable accident, the proof sheets circulating among members of the Pharmacopœia Committee, while the additions were still under consideration, have been bound up in mistake for the perfected impressions of the work. This would certainly be a serious matter, and immediate steps will be necessary to ascertain the extent to which this has taken place.

THE SOCIETY OF CHEMISTS AND DRUGGISTS IN IRELAND.

It is with satisfaction that we note that notwithstanding the obstacles which the above Society appears to meet with in attaining the special object for which it was formed, namely, a Pharmacy Bill admitting the chemists and druggists in Ireland under certain conditions to the privileges of dispensing, it is turning its attention to the diffusion of useful scientific information amongst its members. A valuable course of popular scientific lectures, illustrated with diagrams and experiments, has been organized, to be held in Molesworth Hall, Molesworth Street, Dublin. The programme is as follows:—

March 30th—"The Secrets of Modern Pharmacy." Professor Charles R. C. Tichborne, Ph.D., etc.

April 13th—"Terrestrial Distribution of Heat." George Porte, Esq., M.R.I.A., etc.

April 27th—"Some Phenomena of Light, and their Relation to Practical Chemistry." Henry Draper, Esq., F.C.S.

May 11th—"Adaptations in Plants." Professor Robert M'Nab, M.D.

May 18th—"The Microscope." Joseph H. Woodworth, Esq.

May 25th—"Crystallization and Crystalline Forms of Pharmaceutical Products." Professor J. Emerson Reynolds, L.K. and Q.C.P.

June 8th—"Adulteration of Food and Drugs." Professor Charles Cameron, L.K. and Q.C.P., City Analyst.

The tickets are 6*d*. each; or 2*s*. 6*d*. for the course, and the members are admitted free.

CONVERSAZIONE OF THE FACULTY OF PHYSICIANS, AND SURGEONS OF GLASGOW.

This Corporation held a conversazione on the evening of Thursday, the 26th March. Between 300 and 400 medical practitioners from all parts of Scotland, including counties so wide apart as Inverness and Aberdeen on the one side and Peebles and Dumfries on the other. The company was received in the large hall by Dr. Ebenezer Watson, the President, who gave a short address of welcome, and briefly indicated the various objects of professional interest in the different apartments. Mr. John MacMillan, Glasgow, and Messrs. T. and H. Smith and Co., Edinburgh, exhibited, in one of the apartments, specimens of drugs, admirable both as to extent and arrangement, and including most of the new preparations. In addition to the display of pharmaceutical specimens, Mr. MacMillan exhibited a considerable number of instruments and apparatus connected with pharmacy. Messrs. Smith showed a complete series of opium principles, two of them, thebolactic acid and cryptopine, their own discoveries. The specimen of meconine was the product of 1000 lbs. of opium. They also showed large specimens of crystallized salts of morphia—including the meconate of this alkaloid, introduced by them for hypodermic treatment, and soluble in three or four parts of water,—cantharadin, caffeine, aloin, ergotin, jalapin, scammonin, etc. The exhibition attracted, as it deserved, much attention during the evening.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

The fifth meeting of the session was held in the Society's Rooms, St. Giles Street, Edinburgh, on Thursday evening, 26th March, at half-past eight o'clock. Mr. J. R. Young, President, in the chair.

There was a full attendance.

Dr. Stevenson Macadam read a paper on the quality of milk supplied to towns. This paper it is intended to publish next week.

After some remarks by the Chairman, Mr. Mackay, and Mr. Baildon, a very cordial vote of thanks was awarded to Dr. Macadam for his very interesting communication.

Mr. Baildon then read the following descriptive papers in reference to eight cases of specimens presented to the Pharmaceutical Society's Museum in Edinburgh, by Robert Jamie, Esq., of Singapore. Communicated by Mr. H. C. Baildon:—

Early in December of last year I received two letters from my friend Mr. Jamie, of Singapore, intimating that he had sent to my care eight cases of various specimens to be presented by me, in his name, on their arrival, to the North British Branch of the Pharmaceutical Society of Great Britain. They were consigned to the care of Messrs. Langton, Scott, and Edden, of London, with instructions for them to pass them through the Custom House, and to forward them, carriage paid, to my address. As mischief is frequently done by the rough usage of the Custom House officials, I requested Messrs. Langton to use their influence to have these cases passed unopened, as they contained nothing liable to duty. This they kindly succeeded in doing, and upon their being unpacked in our rooms, in Mr. John Mackay's and my presence, almost all the specimens were found perfect. I beg now to read from a private letter to myself from Mr. Jamie, of date 1st November, 1873, in reference to these specimens.

"Long ere this I hoped to have answered your kind favour of 5th and 11th Dec., 1872, conveying to me the thanks of the Pharmaceutical Society for what you read of my letter at the meeting, but, circumstances over which I had no control prevented me till now. The chief and principal cause being an attack of Dengue fever, which I got in the beginning of this year. Though only confined to my room by the fever for four days, yet the pains which accompany this fever were so excruciating and continued so long that it was months before I felt myself again. I never experienced so much pain from any of my previous attacks of fever (aguish) which I have occasionally had. The doctors said that it resembled rheumatic fever. Though treated properly with iodide. potass. etc., the pains were in no hurry to leave, so at last I left nature to work a cure. The fever was epidemic, and all classes suffered more or less severely. I could be at business daily, but to do the least thing, even writing, was exquisite agony. I had before my illness begun to make a collection of coral, etc., for the Museum, but it was only the other day that I got it completed. I shipped the whole (8 cases) to London in the 'Ivy' consigned to Langtons, Scott and Edden, who will get their agents to pass them through the custom house and forward on to you free of charges. I enclose a list of the various specimens sent, but before saying anything more about them, I shall go over the paragraphs in your letter requiring answering."

It will be recollected that Mr. Jamie had on a previous occasion taken great pains to prepare an essential oil from Champaka flowers and the following is in reference thereto:—

"The Champaka flowers of either kind could not be manipulated according to the French method, for the simple reason that there are so few trees, and they again are so far apart: the flowering is so very irregular and seasons uncertain. Steaming without doubt is the more preferable mode for extracting the oil. I have scarcely

seen a flower of the white kind for a year. The tree is not a rapid growing one or it might have been worth one's while to have planted a few acres for experiment.

"I am very sorry to hear that the orchids have made so little progress with you. The weather I hope has been more favourable this season for them, and that many have flowered. My own collection has suffered very much from the attacks of a small insect (a weevil), which burrows into the centre of the plants which kills them: it is really heartrending to look at the destruction they have made amongst my fine large plants—not a leaf on them—and it disheartens one from continuing increasing stock even though comparatively cheap here. Some few months ago I got over from Borneo 1000 plants of a kind (*new* Phalænopsis) and now there is not a single plant remaining. Fifty dollars gone besides the trouble of sticking and looking after them, and many thousands of other kinds I am not the only sufferer here; others who cultivate them have suffered also. In Burmah, one of the greatest fields for them, they are dying also from the same cause.

"We have had the most extraordinary season I ever remember since I came here; very hot, with little or no rain, sometimes a month would pass and not a single drop of rain fall. So long did that state continue that we consider the outbreak of cholera, which we had for some time, originated from this cause. It carried away daily some 20 or 30 natives; they in fact were the principal sufferers; very few Europeans died, and those who did were of intemperate habits. From the papers I observe, that cholera has been very general over the habitable globe; it certainly has not been carried from place to place at all these places mentioned in the papers, but in many must have been generated *de novo*, brought about by high temperatures, bad drainage, bad water, swampy ground, and, perhaps, though last not least, the state of the individuals' health, caused by low living and want of proper clothing; this latter applies more to Eastern than Western nations. In case I forget I may as well mention now, that in the No. 5 case you will find a long stick which I present to yourself to make a walking stick of. You will appreciate it the more when I tell you that it is a fine piece of the most rare and valuable wood *Aloexylon agallochum* — lign aloes—from Cochin-China, which, when of fine quality, is more precious than gold amongst the natives. I myself roughly polished and rubbed it with oil, to make it look well. I have enclosed £2 which will pay for washing the coral which the Society may keep, as I do not expect they will care for so much as I have sent or even any. The rest can be given to whom you think fit; it was collected before I took ill, and before I could again pay attention to it, got dirty, and as it is packed in sawdust will take some time to free it, and the best way in my opinion to do that will be to put it in a running stream of water, using a brush, at the same time putting out in the sun to dry, when it ought to look beautifully white. One washing and bleaching may not do, it ought to be done till perfectly white, when it will be ready for putting under glass.

"In reference to this I may mention that I have had great pleasure in presenting to the Museum of Science and Art, through my friend Professor Archer, a selection of specimens not already in the museum, and that we are indebted to Dr. Traqquairn for naming most of the kinds kept for our own cabinets.

"The three white ants' nests, they probably do not care for keeping them all, one might be given to Professor Archer with a queen ant if he cares to have them; and one to Dr. Macadam, to give you an analysis of for a lecture at one of your evening meetings. If any manufacturing chemist, such as T. and H. Smith or Macfarlane and Co., would like to try making the alkaloid of the *Menispermum crispum* I shall most willingly collect and forward them a cwt. or so of it. I have written you another letter with a sort of running commentary on the most of the different articles sent, which you can read as it is, or if you think necessary, supplement from your private letter any extract which I have omitted that bears on any of the subjects. Many of the Gamboge leaves, are tied with silver wire to the cardboard, as I found that with the least shaking, they fell from the twigs. I am not satisfied with my attempt at pressing; next lot I trust will be still better, which I hope to present to Herbarium at the Society's Rooms, London.

"Professor Christison or Professor Balfour will now, from the leaves, male and female flowers, and fruit, be able to definitely class, or rather name, the gamboge tree of Siam."

I will now read Mr. Jamie's letter, which is more especially connected with his presents:—

"Singapore,

"Nov. 3rd, 1873.

"At the first Pharmaceutical meeting you have the pleasure of attending, return my grateful acknowledgments for the cordial vote of thanks which you so kindly conveyed to me. And now, will you, in my name, present to the Society the botanical, mineral, and natural history specimens which I have forwarded to your care, and which are as per enclosed list.

"Four cases containing specimens of varieties of coral found here, among which are two pieces of red coral. Singapore has no limestone, and is consequently dependent on coral for making lime for building purposes, the burning of which, and of sea shells (for lime) is a large trade amongst the Chinese. Putrid coral—by that I mean the dead animal—is a great source of disease, and no one can doubt this if they only walk over a coral reef at low water under a tropical sun. Sailors frequently catch fever from having such in their sleeping bunks. In No. 5 case there is a fine specimen of the snout of the saw-fish (*Pristus cirratus*) which was caught off Malacca; the teeth are very perfect and in good condition. In No. 6 case there is a specimen of a coralline tree, from which the natives make ornaments. It is not brittle, but tough, and can be bent into any shape without breaking, by the aid of heat, and is capable of a fine polish. A small piece of a branch of the true Gamboge tree of Siam, polished roughly at the ends to show the hardness of the wood, a piece divided lengthways, a piece with a small branch with leaves, and showing the exudation of the gum resin. These were cut from the tree at a time when the ground was exceedingly dry, no rain having fallen for a month previous, which accounts for the very small quantity exuded; and a large skin of what the natives call 'Ikan pari-pari' with which they polish smooth wood, etc. In No. 7 case you have a large specimen of the galena from the mines at Patani on the east coast of the Malay Peninsula; it is rich in silver, running from 64oz. to 80oz. per ton; a bag with galena very poor in silver, if any, from near Freemantle, Australia; gold quartz, with arsenical silver pyrites, from the Clin-drap mines, near Malacca, yielding 4½oz. to 6oz. pure gold per ton; a piece of ironstone which has been under tidal influence, giving it a coppery appearance; and a piece of limestone rock with fossil shells from near Penang.

In the last case, No. 8, are three white ants' nests and their queens. None of the queens have arrived at maturity, though their nests are full-sized. Each queen is built in and cannot by any means get out again; her principal occupation is laying eggs, her food being brought to her. There must be some particular virtue in white ant's nests, as the Chinese pay high prices for them to mix in certain kinds of porcelain which they make. These ants' nests are found inside of a large hillock of similar earth, which is quite impervious to rain, however heavy the shower may be, and so hard that it is some time before a chunkel (literally a pricker), a large hoe, makes any impression on it. I think of all known insects the white ants are the most destructive, and a constant battle it is between man and them who shall be masters of the house, for if once in, thousands of dollars may not put them out. Those persons who wish to know

more about their habits and the benefits(!!) they confer directly or indirectly on those who do battle with them, I would refer to Kirby and Spence's 'Entomology.' A piece of *Menispermum crispum*, which, when freshly collected, is exceedingly bitter, and is used by the natives in place of quinine in cases of fever (see Lindley's 'Flora Medica.' The leaves I omitted to send, for which I am very sorry. My next contribution, I trust, will contain them. Two Bezoar stones, whether got from porcupine or deer I know not, a Parsee here gave them to me ; iron pyrites from Macassar, the same being very common all over the islands round about ; other minerals from Macassar and elsewhere ; a lump of very pure cinnabar ; also a piece of limestone rock, showing the cinnabar *in situ*, found in Borneo. There the Borneo Company (Limited) have erected large premises for its distillation. Copper ore, also from Borneo. Part of a petrified claw, found amongst the ironstone of this island, remarkable as being one of the very few fossils discovered; from the size of the claw, the bird must have been of some considerable size. A piece of mineral from the Pellew Islands. Rock crystals from Johore. A bottle with oxide of titanium with a trace of silver, which can be got in shiploads full near to Singapore. Two of these most wonderful and lovely *Euplectilla*, from Manilla. Mounted on a fine piece of white coral, and put under a glass shade, they will make a beautiful ornament for the Society's rooms. A copy of a colloquial Chinese dictionary used at Canton; a few pieces of the soldier ants' nurseries; when newly taken out of the ground they smell somewhat like rye bread. Specimens of coralline ornament —a bracelet and a mounting for a riding whip, roughly done. A few pens made from the common bracken as used by Parsees for writing. The same kind of bracken I have seen growing as high as twenty feet in certain favourable parts of the jungle. A small specimen of tin ore from the Carimons quite close to Singapore. A card with specimen of the young leaves of *Ficus lasiophylla*. A card with specimens of back and front view of the leaves of what I was told was a species of *Comarius*, with a packet containing a few of the seed pods, and probably seeds inside some of them. The beauty of the venation on the back of the leaves drew my attention, and I thought they were worthy of being included. Several cards with specimens of Gamboge leaves (back and front view of them) and fruit. A glass tube with small branches (twigs) with male flowers in spirit ; a glass tube with small twigs on which are the female flowers of the Gamboge tree ; a tube with male flowers *only* as cut off the twigs, preserved in spirit, and a tube with them also, but colour abstracted by repeated washings of spirit, showing the amount of colouring matter when the two are put side by side. The trees from which these specimens are taken are true gamboge trees, having been sent down by the King of Cambogia to Sir Joze de Almida, of Singapore, some thirty-three years ago. These and many other fruit trees are now in the possession of the writer. They are evidently slow growing trees, as now they are only 19½ feet high, one foot from the ground 38 inches round the girth, and the circumference of the lateral branches are as near as possible 76 feet. The trees are remarkable for the number of short branches which spring from the lower part of the trunks, and spread to some distance laterally, being in that respect different in their habits and appearance from other trees near them. The veins or ribs in the leaves are not very distinctly defined, and there are intermediate rudimentary ribs but faintly marked. Many of the leaves, and more especially those of the female trees, are indented at their apices, and the leaves from both trees vary very much in size and shape, as may be seen by looking at the specimens. I unfortunately omitted to send a specimen card of indented leaves. The flowers on the twigs of the male tree are pedicellate, and those of the female sessile. The ovary sits quite close on the twigs, style very short and of a pale green colour, stigma mammillated, or what will, perhaps, still better convey my meaning, looked like a bunch of beautiful white heath flowers, but solid instead of being hollow. To see the pistil in all its beauty, the thin membrane surrounding the style with stamen looking formations must be cut away. Dissections were made from the freshly expanded flowers, as well as from unexpanded, magnification, 20 diameters, colour of male and female flowers, like a lemon colour. The shape of the mature fruit is generally square, though different forms and in all stages of maturity may be seen on the same tree ; no pulp inside ; four seeded, though three seeded fruit are met, and very frequently one of the four is smaller than the other three. If eaten without removing the integuments, purgative, and if taken off, harmless, they are tough and horny between the teeth and astringent to the taste. On one of the cards I have laid open the testa of a seed, showing a beautiful deposit of the gum between it and the tegmen. The fruit on the cards have shrivelled up very much in drying, and are only now one-third their original size. The anthers of the male flowers are not peltate, but circumsessile ; when freshly cut and immediately examined under the microscope the circumsessile anthers are very distinctly seen, surrounding the stamens as a belt extending from near the base to the very apex. Examined after being kept in spirit their position is much altered, being more in the shape of a cord round the stamens, and the stamens being somewhat contracted. Would not glycerine be much better for such delicate organs ? It is just quite possible that very many of the anthers may have come off by the action of the spirit and motion together, which will alter their appearance under the microscope. I had hoped to have been able to have sent you the mode of collecting the gum, but I have been disappointed in obtaining the information in time."

Since then I have received another letter from Mr. Jamie, dated, 25th December, giving a full and most interesting account of the process, which I will now read :—

"Singapore,

"25th Dec., 1873.

"My dear Mr. Baildon,—

"I trust you have got all the cases per 'Ivy,' and found their contents in good order.

"I hope the flowers of the Gamboge tree reached you in perfect condition, and more especially the leaves, as I omitted to put in along with them a few bits of gum camphor, to prevent the insects attacking them. When I wrote you regarding their dispatch, I was not in a position to inform you how, when and where the gum resin was chiefly collected and prepared for the European market ; but now I am glad to say,—thanks to friends in Bangkok, who got a Chinaman, acquainted with the *modus operandi* of pipe or bamboo gamboge, to wait on me as he passed through to Malacca,—that I can give you the information which, as described by him, is considerably different from any account that I have seen in works on Materia Medica, etc. But first allow me to say a few words as to the locality of the gamboge tree, and time of collection of the gum. Neither Siam proper nor Cochin-China proper ever produced gamboge. The Siamese and Cochin-Chinese, at various times, wrested from the Cambogians portions of their territory ; and it is from those conquered portions of Cambogia (as well as Cambogia) that the gum resin is prepared for exportation, Saigon and Bangkok being the principal places now of export, though, in former years, the greater part of, if not all, came from some seaport of Cambogia. At present Kâmpoh is the only seaport left to the Cambogians, and what little they now export comes from it. Cambogia, then, is the native place of the gamboge tree, and there it may be said to be indigenous, for the trees there flourish most luxuriantly, without attention or cultivation, in the dense jungles ; they must be propagated by means of birds, monkeys, musangs, and such-like animals, for no trees are ever planted. The best time for collecting the gum resin is a little time after the wet season is over (that season is from about the

middle of June till the middle of October), say from February to the end of March, but it extends more frequently till after April, as March and April are very hot months, and the exudation from the trees is not so watery then. When the trees are fit for wounding,—and they are so when their trunks vary from the size of a man's thigh and upwards, the larger the better,—they are wounded by means of a parang, or chopping-knife, in various parts of the trunk and large branches, when prepared bamboos are inserted between the wood and the bark of the trees, to hold the juice as it flows from the wound. After tying the bamboo cylinders to the trees, for they are tied as well as inserted, they are left there and examined daily till filled, which generally takes from fifteen to thirty days, and sometimes longer, the length of time filling depending on the flow of juice and the size of the bamboo cylinder. When no more is seen exuding, the cylinder and its contents are removed, a fresh wound made in some other part of the tree, and the cylinder reinserted and tied as before; the same process is repeated till the bamboo cylinder is filled, when it is taken to a fire, over which it is gradually rotated till the whole of the water in the gum resin is evaporated, and it gets sufficiently hard to allow of the bamboo being torn off, when it is ready for the commercial world, and, as thus prepared, shows the striated appearance of the bamboo very distinctly. The present value of the gum in Singapore, at this mail's rate of exchange, is 1*s.* 10*d.* per lb., or say, 58 dollars per picul. The bamboo cylinders are made as follows:—Cutting the bamboo at its nodes makes a closed hollow cylinder, which will vary in length and thickness, accordingly as the bamboo is well-grown; but generally cylinders are made from an inch to three inches in diameter, and from four to eight inches and even more in length; then one of the nodes is entirely cut off at an angle of 45° or more, after which it is thinned all round by paring off the outside, leaving only a thin casing, thus completing the operation, and fitting it for insertion. The gamboge that comes from Siam is considered the best by our merchants here, being cleaner and freer from woody particles and bark. I hope these few remarks on the mode of preparing the gamboge gum will reach you in time to be read with what I have already communicated about the tree, leaves, etc., but should they not, then I hope you will kindly read them at the most convenient time for yourself, if you think them worth communicating to the Society.

"Yours very truly,

"R. JAMIE."

I now revert to Mr. Jamie's letter of the 3rd November:—

"I send for the museum specimens of Kayn Gharn from Cochin-China and from Sumatra. The latter piece you will observe is very much like one or two pieces of the Cochin-China, but amongst the Cochin-China lot there is one very fine piece, very dark, heavy, and full of resin, which is the odoriferous source, and according as it contains more or less resin, so is its value. The Chinese use it along with sandal wood to burn as incense, and make it into ornaments which are valued at fabulous prices. A sort of head ornament worn by mandarins, consisting of 108 beads, made for hanging round the neck, is valued at 100 to 1000 dollars (!!) according to the quality of the wood. The Parsees and Khugs burn it with gum benzoin. The kinds used for burning here are generally the common kinds. Make a match or two of the Sumatra kind, and ignite them at the gas, and if full of resin it will burn not unlike a pitch torch, giving off a very large amount of carbon, with a perfume *sui generis*. Asiatics are extremely fond of the smell of this wood. The Arabs hang their clothes over it when burning, to disguise the smell of their stinking garments, which they seldom or ever wash or change, wearing them as long as they will hold together. When smouldering, the aroma is of an acetous odour, certainly not much like benzoic acid. To give you some idea of the cost I shall mention what I paid for these pieces sent. The Sumatra kind cost 5 dollars and the Cochin-China 9 dollars. Also I give you the export and import values to and from Singapore for the year 1872:—

IMPORTS.

	Piculs.	Value.
China	9	1.710dols.
Malay Peninsular	49½	9.085
Nederlenno, India	522	3.262
Siam	7 74/100	2.104
		16·161

EXPORTS.

	Piculs.	Value.
China	212	9.021dols.
Arabia	4½	900
British India	16 70/100	800
Hong Kong	143	7.682
Jeddah	20½	3.792
		22·195

From the above it will be noticed the price varies much, just as the quality of the wood. Regarding the tree or trees which produce the Kayn Gharn (the common name by which all natives know it), for two or three different trees are said to produce it, not much for certain is known. It is thought to be the *Aloexylon agallochum*, producing the Aloes of Scripture, and I regret that I can add nothing to elucidate the subject. The Sumatra and Cochin-China samples, under the microscope, are identical in structure. In Kitto's Biblical Encyclopædia, under the article "Ahalim" the best description of its source is given. Its use in medicine is *nil*. One day polishing a very big piece for a walking stick with sand paper, the fine particles of the wood, floating in the air, being carried into my mouth, tasted as if I had taken the least bit of Barbadoes aloes. It has a very slight aloetic taste when taken in powder. Thinking it might be purgative, I, on two different occasions, swallowed thirty grains, but did not experience the slightest action on the bowels. It is only fit for masticatories, pastilles, cachou aromatise, and perfumery, for all of which it is admirably adapted. Though Europeans put no faith in it as a medicine, the natives again extol its virtues very high. Fearing that I have taken up too much of your valuable time reading my desultory letter, I shall finish by wishing success to your museum."

At the close of the descriptive papers the various specimens were viewed with much interest by the meeting.

The Chairman, in proposing a hearty vote of thanks to Mr. Jamie for his very valuable contributions to the museum of the Society, said he was glad to know that Mr. Jamie had been for some years engaged with Mr. Baildon as his principal assistant, and had left Edinburgh with an earnest desire not to forget its pharmaceutical interests. He understood that Mr. Jamie had passed his Minor examination a good many years ago, and evidently retained a strong desire that the rising generation of chemists and druggists should have every opportunity of benefiting by a good museum. He hoped that in the event of any of the young men now present going abroad, they would bear in remembrance the good example shown by Mr. Jamie, and if opportunity offered, enrich from time to time the cases of the museum belonging to the Society.

Mr. Tait seconded the vote of thanks, and stated that Mr. Jamie had also been in the employment of his firm, Duncan, Flockhart, and Co., and that he was proud to know Mr. Jamie had so handsomely and substantially remembered the Society.

The vote was passed with loud acclamations, and Mr. Baildon, in replying, agreed to convey to Mr. Jamie the thanks so warmly given, when writing to Singapore.

The Secretary then announced, in name of Mr. Baildon,

as a presentation to the library of the Society, the following volumes:—

'Dr. Copland's Dictionary of Practical Medicine,' parts 4, 5, 6, 10, 11, 12; 'Gout and Rheumatic Gout,' Dr. Garrod, second edition; 'The Science and Practice of Medicine,' Dr. Aitken, vols. i. and ii.; 'Constitutional and Local Diseases Medical Geography Essays, Political, Economical, and Philosophical,' vol. i.; 'Practical Observations on Diseases of the Lungs and Heart,' by Archibald Billing, M.D., A.M., F.R.S.; 'Principles of Medicine,' by Dr. Billing; 'A Treatise on the Diseases of Children, with Directions for the Management of Infants from the Birth,' by Dr. Underwood, vol. i., ii., iii.; 'Gibb, on the Throat and Windpipe;' 'Arbuthnot on Air;' 'On Scarlatina and its Successful Treatment by the Acidum Aceticum Dilutum of the Pharmacopœia,' by Isaac B. Brown; 'Dr. Yeoman on Consumption;' 'Dr. Yeoman on Cough, Influenza, Asthma, etc.;' 'Elliotson's Principles and Practice of Medicine;' 'Copland's Dictionary,' vols. i. and ii.;' 'The Diseases of Children.' J. M. Coley, M.D.; 'Observations in Medicine,' Dr. Marshall Hall; 'Yearsley on the Throat;' 'Hydropathy or Cold Water Cure;' 'Priestley on Air,' vols. i., ii., iii.; 'Rumford's Essays,' vols. ii. and iii.; 'Monk's Agricultural Dictionary,' vols. i., ii., iii.; 'Thomson's Conspectus of the Pharmacopœias, London, Edinburgh, and Dublin.'

Last month's number of *Pharmacist*, from Chicago, and No. 8 of the *Pharmaceutical Journal*, from Toronto, were also laid on the table as presentations to the library.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

At the Ordinary Meeting of this Society on Wednesday, March 11, 1874, the following paper was read on—

Cocoa and its Manufacture.*

BY JOHN HOLM, F.R.C.S., EDINBURGH.

The subject, the consideration of which will occupy our attention this evening, and which I have the honour of bringing before you, namely, "Cocoa and its Manufacture," is one of considerable importance, treating as it does of one of the most valuable foods which man derives from the vegetable kingdom.

The cacao or chocolate tree, which yields the cacao—cocoa—or chocolate-nut, belongs to the natural order *Byttneriaceæ*. Linnæus bestowed on it the name *Theobroma*, derived from the Greek words θεὸς (God) and βρῶμα (food); which is stated to have been given to the plant in consequence of that great botanist's delight in the food-drink prepared from its seeds, in which it is stated he largely indulged and somewhat ideally regarded as "food fit for the gods." Of the species of *Theobroma*, there are nine individuals mentioned by botanists, of which the *Theobroma cacao* is the most important, and yields the best and finest fruit.

Varieties of the Cacao Tree.

Name.	Country.
Theobroma Cacao (*Sativa*) (Linnæus)	West India Islands.
Theobroma ovalifolium (De Candolle)	Mexico (Soconuzco).
Theobroma angustifolium (De Candolle)	Mexico.
Theobroma Guyanense (Aublet)	Guiana.
Theobroma bicolor (Humboldt)	Brazil and New Granada.
Theobroma speciosum (Wildenow)	Brazil (Para).
Theobroma sylvestre (Martius)	Brazil and Jamaica.
Theobroma microcarpum (Martius)	South America (wild species).
Theobroma glaucum (Kusten)	

The cacao tree is indigenous to tropical America, and is there found in its wild state. The range of latitude in which it grows may be placed as between the seventeenth parallels, in which area it flourishes best; its cultivation has, however, been extended with success as far as the twenty-fifth parallels; its range of altitude extends from a few feet to 1760 feet above the level of the sea. Mexico appears to be the original home of this tree, from whence it gradually extended into South America and the West India Islands. At the time of the discovery of Mexico by the Spaniards, it was almost the only plant in the cultivation of which care was taken; it was grown in large quantities, and great pains were bestowed upon it, it being regarded by the natives as the most valuable product of their country. The tree was called by the Mexicans "Cacava quahuitl," and also "chocolatl;" while the preparation made from its seeds was named "chocolatl," a name said to be derived from the noise made by crushing the bean between two stones. It is from this native nomenclature that we derive the words cacao and chocolate, the former of which has been corrupted into the better-known word cocoa, applied generally both to the seeds of the plant and the preparation derived from them.

The cacao tree is an evergreen of very beautiful appearance, and has been likened in height and form to the cherry tree. It is taller in its wild than in its cultivated condition, in which the height is curtailed. The height of the adult tree ranges from fifteen to forty feet. The wood is porous and light, but capable of taking a high polish. The bark is of a cinnamon colour, becoming deeper as the age of the the tree advances. The foliage is profuse, the leaves being of a green colour, varying in shade according to the species and nature of soil. They are smooth and glossy, lanceolate in form, with plain edges. In size they vary from 7 to 10 inches in length, and from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches in breadth, growing principally at the top of the tree. The flowers are very plentiful; they are small and clustered, and spring directly from the larger branches and the trunk itself, and according to Humboldt, even from the roots of the tree if these are left uncovered. They are of a saffron and sometimes a pink colour, and are devoid of scent. The buds are similar to cherry stones in size and form, and of a whitish-pink or green colour. Large numbers of the flowers fall before attaining maturity, and thus the yield of the fruit is greatly less than the number of the blossoms put forth; not more than one pod being usually produced from each cluster of flowers.

The cacao fruit, or pod, is an elliptical ovoid shape, and pointed at the end; it varies considerably in form in the different species, and measures from 7 to 10 inches in length, and 3 to $4\frac{1}{2}$ inches in breadth. The surface is somewhat rough, with deep, longitudinal furrows. In colour the surface is green, but as it ripens it becomes of a bluish-red colour, gradually deepening to a decided purple; or else, in certain varieties, it becomes of a delicate yellow or lemon colour. The rind of the seed pod is about half an inch thick, is tough, and requires some force to break it. The pod is divided into five compartments, in each of which is ranged a row of five to ten seeds, lying in a gelatinous pulp. A single pod thus yields from twenty to forty seeds. It is these seeds which form the raw cacao, or cocoa of commerce, from which the various preparations of manufactured cocoa and chocolate are made. I shall now pass on to give a brief description of the general mode adopted in the cultivation of this valuable plant, merely premising that slight differences of method obtain in different countries and districts.

In the selection of ground on which to form a cacao

* Reprinted from the *Journal of the Society of Arts*.

plantation, it is necessary to choose a spot in which the soil is rich and loose to a considerable depth. It should also be near a stream, so that efficient means of irrigation may be ensured. The tree is found to flourish best on hilly slopes which face away from the quarter whence the cold winds which prevail may blow. The young plants should be reared in nursery grounds, where the seeds are sown in small mounds placed at short distances from each other. In each of these two seeds are placed, but when both germinate it is usual to destroy the weaker of the two plants. In ten or twelve weeks these should have attained a height of fifteen to eighteen inches, and are then fit for removal to the plantation. The ground has here been previously prepared, and as the cocoa tree requires protection from both the sun and wind, banana and coral-bean trees, the latter called "madre di cacao," are planted at intervals between the spaces allotted for the cocoa trees, which are placed in rows at regular intervals, varying according to the nature of the soil, from fifteen to thirty feet. When the tree has attained the age of two years, it puts forth several branches, and the flowers now shortly begin to appear, but are removed, that the strength of the tree may not be impaired. About the fifth year the tree is very rich in foliage and strong enough to bear, and the blossoms are now allowed to mature. It is not, however, until the eighth or tenth year that it yields a plentiful crop. It then continues prolific for thirty or forty years.

One of the peculiarities of this tree is that the leaves, flowers, and unripe and mature fruit may be seen growing plentifully at one and the same time. The fruit therefore has to be gathered when ripe throughout the year, but there are two periods at which the produce is most plentiful; these are the months of June and December, which are regarded as the harvest months of the cocoa plantations.

In gathering the cocoa crop the workman whose duty it is to select the pods (this requires great care and experience) is armed with a long, wooden fork, with which he disengages the fruit from the tree. He is followed by others, who collect the fruit into heaps and carry it into sheds, where the pods are opened and the seeds taken out. Each tree will yield from one pound and a quarter to eleven pounds per annum. The seeds have now to undergo a peculiar process, called "curing," before they are fit for use by the manufacturer. This process is one of great delicacy, and requires much experience and skill to conduct it successfully. Upon it depends in a very great degree not merely the preservation of the cocoa, but the development in it of a fine flavour. There are two modes of conducting it. The simpler one is merely to place the cocoa seeds, when taken from the pods, in heaps in the sun, and these are stirred at intervals. A sufficient quantity of the pulp in which the seeds are imbedded adheres to them to supply enough moisture to give rise to a moderate amount of fermentation, which ceases when the nuts are sufficiently dry to be packed. The other mode is by "claying;" that is, the nuts are placed into holes or trenches dug in the ground, and covered with clay or sand; they are stirred at intervals, and great care is taken to prevent the fermentation which arises from proceeding too violently. When it has reached its proper point, the nuts are spread upon a platform or upon mats until perfectly free from moisture, when they are placed in bags.

The use of cocoa as a food by the Mexicans, at the time of the discovery of that country by the Spaniards, is the first knowledge we have of it. With them it was esteemed the most valued product of the country, and Prescott informs us the Emperor Montezuma took no other beverage. The seeds were also used as coins, a fixed value being attached to them, and this custom Humboldt tells us was in existence in his time. The Spaniards did not at first appreciate the virtues of chocolate, and one of their earlier travellers describes it as a "drink fitter for a pig than a man;" but this feeling speedily changed, and their love of this beverage became almost a passion.

The method of the Indians was followed by the Spaniards, whose process is thus described by Simmonds:—

"The kernels are roasted in an iron pot pierced with holes; they are then pounded in a mortar, and afterwards ground between two stones, generally of marble, till they are brought to a paste, to which sugar is added, according to the taste of the manufacturer. From time to time, as the paste assumes consistency, they add long pepper, arnatto, and lastly, vanilla. Some manufacturers vary these ingredients, and substitute cinnamon, cloves, aniseed, and sometimes musk and ambergris."

The introduction of cocoa into Europe may be placed at 1520, when Columbus brought home samples of the nut. Spain, however, for some time depended on the colonies for the manufactured article, but when the art of preparing it was conveyed there, the raw material was also imported. The Spaniards, by jealously guarding as a secret the mode of manufacture, were able to retain the monopoly of all trade in chocolate for many years.

The value of chocolate was speedily appreciated by the physicians of Europe, and Hoffmann, wrote a monograph treating of it, entitled "Potus Chocolati," in which he recommends it in many diseases, and instances the case of Cardinal Richelieu, who, he states, was cured of general atrophy by its use.

It was probably more than a century after the introduction of cocoa into Europe before the English became acquainted with it. According to my late partner, Mr. Hewett, the earliest mention of its use appears in a newspaper called Needham's *Mercurius Politicus*, dated the 16th of June, 1659. For many years England continued to import all the chocolate she consumed in its manufactured state; but I believe about the commencement of last century several persons commenced the manufacture in this country. There is very strong reason to believe that a knowledge of the mode of preparation was brought into England by Sir Hans (then Dr.) Sloane.

Before considering the modes of manufacture which have been adopted in this country, it will be convenient to notice the characters and chemical composition of the cocoa beans. In shape these are something like an almond, but rather thicker; they vary both in size, shape, and quality, the various growths having distinct characteristics. Our principal supplies are drawn from Trinidad and the Spanish Main, which yield the best qualities, and from Ecuador and Peru, the Island of Grenada, and Guiana. The following is a list of the cocoa-growing countries:—

Country.	Commercial name of growth.
Trinidad	Trinidad.
Mexico	Soconuzco.
Spanish Main:—	
New Granada	Magdalena.
Venezuela	Maracaybo.
	Caraccas.
Guatemala	Central American.
Ecuador	Guayaquil.
Peru	
Grenada (Island of)	Grenada.
Guiana	Surinam.
	Berbice.
Cuba	The name of each island.
Guadeloupe	
Martinique	
St. Croix	
St. Lucia	
Dominica	The name of each island.
St. Vincent	
Jamaica	
Brazil	Para.
	Maranham.
	Bahia.

Guinea (Western Africa) .	African.
Bourbon	The name of country; yield quite unimportant.
Philippines	
Mauritius	
Madagascar	
Australia.	

I would now recall to your minds the manner in which the cocoa nuts or seeds are contained in the cocoa pod. If we examine the seed as imported we find that it is enveloped in a husk or shell of its own. When this is removed, the surface of the nut is seen to be marked by slight grooves, which divide it into irregular portions. These depressions mark the position of a fine membrane, which penetrates into the substance of the seed and divides the cotyledons from each other, and also each of these into several lobes. It is these irregular segments of the cotyledons which, when broken down, forms cocoa nibs.

(*To be continued.*)

Parliamentary and Law Proceedings.

The Unrestricted Sale of Poisons by Grocers' Boys.

At the last County Galway assizes a grocer's boy was indicted for manslaughter. It appeared that the prisoner obtained employment, only two days before the poisoning took place, as a shop-boy in the establishment of Mr. Harpur, who, amongst other matters, sold drugs. The deceased lived with her mother, and feeling ill, sent a little girl to Mr. Harpur's shop for a pennyworth of jalap. The prisoner went to a drawer which was not labelled, and gave her a yellow powder, which he believed was jalap. This was given to deceased, when in a few minutes she complained of a burning pain in her stomach, and her mother having gone back to the shop, it was found that the prisoner had given hellebore in mistake for jalap; she died in a few hours after. Dr. Emerson Reynolds proved that the drug which deceased had taken was white hellebore. The jury, being unable to agree, were discharged, and the prisoner bound over to stand his trial at next assizes.

The *Medical Press and Circular*, in reporting this case, remarks, "We venture to inquire why it is that the shopkeeper who keeps hellebore in an unlabelled drawer, and keeps a boy of two day's experience to retail it to little girls, does not stand in the dock in company with his poor ignorant servant?"

Prosecutions under the Adulteration Act.

ADULTERATED MUSTARD.

At Wolverhampton, G. Carter, a small shopkeeper, of Willenhall, was charged before Mr. Spooner with selling mustard which was adulterated. Mr. Cartwright appeared to prosecute, and Mr. H. B. Hill defended. Samuel Toye proved that on the 24th January he went into the defendant's shop, and purchased a certain quantity of mustard, stating at the time that he was going to have it analysed. He did not notice that there was a printed label on the can—"Warranted free from any injurious ingredient, but not pure mustard." A certificate from Mr. Jones, the analyst, was produced, stating that the sample delivered to him consisted of 39 per cent. of wheaten flour and turmeric, and 61 per cent. of mustard. Mr. Spooner (to Mr. Jones): Well, tumeric is a very simple and harmless ingredient.—Mr. Jones: Quite so, but it is an adulteration.—Mr. Hill: The public don't care about having pure mustard.—Mr. Spooner: I should think that the public are not such donkeys as to buy an adulterated mixture for the genuine article.—Mr. Hill: But they don't care about having the genuine article. This is Keen's London mustard, and it is sold as stated on the label, as a mixture, but it does not contain any ingredient that is at all injurious to health.—Mr. Jones said that a few years ago it was difficult to obtain pure mustard, but of late years the quantity of pure mustard sold had greatly increased, and the public had begun to appreciate the benefit of getting the real article.—Mr. Spooner: If the defendant would always state to his customers what there is printed on the label, viz., that it is not genuine mustard, he would be all right. It is certainly not a case in which a penalty should be imposed.—The learned Stipendiary then ordered the defendant to pay the costs, and advised him, in future, to tell his customers what was on the label.

At Marlborough Street, on Saturday last, Mr. Roberts, grocer, Cleveland street, was summoned before Mr. Knox for selling mustard as pure which was adulterated.—Dr. Whitmore, analyst to the parish, proved that the mustard was adulterated with tumeric and flour to the extent of one-third.—Mr. Berkeley urged on behalf of the defendant that it was an act of oppression not to take out a summons until three months after the alleged offence.—Mr. Knox, after remarking that three months was certainly a long time before a summons was taken out, added that he did not consider it a bad case—certainly not one for a fine of £20, or even £1, but he did for a fine of 5s. and costs.

ADULTERATION OF COFFEE.—A SERVANT FINED.

On Tuesday, March 31, at the Marylebone Court, Walter C. Barker, grocer, of Wigmore Street, Cavendish Square, was summoned for selling coffee which had been adulterated with chicory to the extent of 50 per cent. Mr. Beard, for the defendant, asserted that his assistants had orders to label each packet, stating that there was an admixture of chicory. The summons against Mr. Barker was dismissed, but his assistant was ordered to pay a fine of £1 and £2 9*s.* 6*d.* costs.

ADULTERATED BUTTER.

At the same court, Mr. George B. Cox, of Wigmore Street, Cavendish Square; Peter Keevil, Edgware Road; and John Gorman, of Carlisle Street, Portman Square, grocers and provision dealers, were summoned for selling adulterated butter. Each case was proved, and it was contended by the defendants that they sold the butter as they received it from the wholesale merchants; but it was proved in the case of Keevil that the butter sold was an admixture of lard and palm oil; in fact, there was hardly any butter in it at all. Mr. D'Eyncourt said he did not think the defendants Cox and Gorman intended to defraud the public, but they would each have to pay £2 and 10*s.* costs; and Keevil would have to pay, as it was a bad case, £10 and £3 3*s.* costs.

Review.

Elements of Chemistry, Theoretical and Practical. By W. A. Miller, M.D., L.L.D., revised by Herbert McLeod, F.C.S. Part II., Inorganic Chemistry. London: Longmans, Green, Reader, and Dyer. 1874.

If "teaching" a science be taken as meaning something more and better than merely stuffing the head of the student with verbal statements (more or less unintelligible to him) of facts or theories (more or less irrelevant in *themselves* to anybody outside the profession) then, of all sciences, chemistry, perhaps, is the one most difficult to teach. The first difficulty we encounter is, that the very things we have to speak about, and the order of phenomena we have to consider, are virtually new to the pupil and lie outside the sphere of daily experience and observation. It is not a refutation of our statement to object, that, say, air, water, charcoal, iron, quicklime, as *things*, and the calcining of chalk, the slacking of lime, the burning of charcoal, as *phenomena*, are as familiar in general, to the chemical, as, say, the falling of a stone, the motion of a pendulum, or the pressure of steam against the piston of

an engine, to the physical tyro. In every day life, it is true, we constantly meet with chemical substances and chemical processes like those referred to; but ordinary experience does *not* teach us to look upon the things as definite species, nor upon the phenomena as transmutations, of matter. Vide the history of the science of the process of combustion. Chemists had long been in possession of a most admirable theory to account for the evolution of heat and light, before they had the remotest notion, for instance, of carbonic acid! To say it again: the strangeness, to the mind of the pupil, of the fundamental notions of chemistry is the great difficulty which we must first of all clear away, before we can think of systematic teaching, and the only correct way of doing this, let us now add, according to our opinion, is the one recommended by *Arendt* (in his excellent book: 'Die Organisation des Chemischen Unterrichts;' Leipzig: Voss) who says that, in the school or college boy's *first course* of chemistry the subject should not be treated as a real science at all, but, mainly at least, like a branch of natural history. What he recommends is to begin by showing to the pupil a well selected and arranged series of such substances as ordinary metals, oxides, salts, and to acquaint him with their mechanical, physical, morphological and some of their chemical properties, especially such as are not accompanied by deep-going material changes; in case of the salts, for instance, their property of dissolving in water and, under certain circumstances, separating out again from the solutions in crystals, should come first, and be very fully illustrated by experiments, while of the chemical changes proper, only a few of the simplest, such as the elimination of the metal of a salt by another metal, should be taken in at all. On the occasion of the study of the behaviour of metals when heated in *air* the teacher will of course not miss the opportunity of telling the pupil, or rather extracting from him, something about the constitution of the atmosphere; but, on the whole, says *Arendt*, your chief aim should be to sharpen his powers of observation by familiarizing him with the *things* chemistry has to deal with, and, if the resources of the school admit, to teach him to use his hands.

After such a preliminary course the student is prepared for attending with real benefit to himself, an elementary series of *scientific* lectures on chemistry and reading an elementary book of the order, say, of *Roscoe's* excellent 'Lessons.' This second course being completed, what text book should one recommend to him, who, for one reason or other, wants to take a deeper dive into the subject? Well, ten or twelve years ago, *our* answer would have been: *Graham and Watt's* 'Elements' and speaking to an intelligent foreigner we should have added: learn English to be able to read that book. It really is a pity that Mr. Henry Watts has not, it seems, the time for re-editing this excellent work and bringing it up to the present state of the science. Perhaps he will do so one day, or another of the few men competent will do it for him. In the meantime *Mr. McLeod's* new edition of the second volume of *'Miller'* is, perhaps, the best available substitute, in English for the Graham of the future. Let us at once admit that the book is not an unworthy brother to the one we should have preferred. It is very carefully compiled, not from other books, but from original memoirs, and the editor has shown good tact in the selection of matter. Not the least merit of the book is that it duly places the facts and the methods of the science in the foreground, and does not give more of theories than is required for the summing up of the former, and as a basis for the latter. What we also feel bound to give Mr. McLeod special praise for is that he nowhere inflicts upon us exasperating graphic formulæ. On opening the book we were quite prepared for pictorial respresentations of the 'constitutions' of the Zircones, Garnets, of Meerschaum, etc., etc., and the sense of relief we enjoyed in *not* finding these, is more than we can express in words.

Another good feature in the book is that it not only calls itself on the titlepage, but *is*, as far as can reasonably be expected, really a handbook of *practical* chemistry. All the more important processes of manufacturing chemistry (including metallurgy) are fully described (some, perhaps, too fully); and so likewise are the laboratory methods for the preparation of the ordinary reagents and other practically important chemicals. Analysis, also, and its applications to practical "assaying," are not forgotten; in fact we almost feel inclined to say that the editor has devoted a little too much of his space to this branch of the subject. Those who take a special interest in the more purely scientific parts of chemistry will be glad to find in the book a *résumé* of the more important results of recent researches in thermo-chemistry—which *résumé*, however, we beg to submit, would have been all the better for the addition of an *aperçu* of the bearings of these results on the laws of chemical action.

What the appendix on *organic* chemistry—in vol. ii. of a book, of which vol. iii. is to be entirely devoted to this branch—is meant for, we are at a loss to make out.

Obituary.

JOHN WHEELEY LEA.

We regret to announce the death on Monday, March 23, of Mr. John Wheeley Lea, formerly of the firm of Lea and Perrens, Worcester, at the age of 83 years. Mr. Lea was a member of the Pharmaceutical Society from its foundation in 1841 until he retired from business in 1857. In 1850, 1851, 1855 and 1856, Mr. Lea was elected a member of the Council of the Society.

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

On the 23rd March, 1874, Mr. Henry Bannard, Pharmaceutical Chemist, of Epsom. Mr. Bannard was a member of the Pharmaceutical Society.

Correspondence.

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

Live and Let Live.

Sir,—The inquiry concerning Cocculus Indicus has engrossed the attention of chemists and druggists lately. One subject, however, obviously more important, seems to be entirely neglected.

The Pharmacy Act was passed in 1868 by the strenuous exertions of the Pharmaceutical Society. This Act, doubtless with the best intentions, was designed mainly for the protection of the public; it should have gone further, and by restricting the sale of drugs to chemists and druggists, afforded protection to those who have, by means of hard work and hard cash, succeeded in qualifying themselves by passing the examinations. Measures are freely passed for the protection of birds, animals, etc., but that unfortunate biped, the chemist, with his meagre returns and arduous labours has to contend against ceaseless and unfair competition; the country grocers sell all kinds of drugs except laudanum, corrosive sublimate, arsenic, and such things as, on account of the responsibility, druggists do not care to sell, and not only do they sell drugs, but undersell us whenever opportunity offers; stationers, too, vend patent medicines to any extent, and the co-operative stores, by having a qualified man to manage the drug department, add the last straw to break the camel's back.

One of the said stores has just been established in Exeter; it is supplied with drugs by a wholesale firm in Exeter, and by a well-known wholesale firm in London. I wonder that those who have a reputation like that of the houses I refer to, should, in this manner, forfeit the confidence of the whole retail trade. They neither deserve nor can expect to receive the support of chemists when they do their best to uphold a system of trading so totally foreign to our English ideas of fair play. Our small returns will not allow us to lower

our prices, so we must struggle on in anticipation of the good time coming.

I hope the Pharmaceutical Society will step in on our behalf, and as we are required to qualify ourselves for our calling, assist us to gain a living by it.

JOHN N. PLACE.

DECOMPOSITION OF LOZENGES.

Sir,—From the numerous communications I have received on this subject it is evident that the evil is of more general occurrence than I had previously anticipated. I am still pursuing my investigations, and hope to have the opportunity of resuming the subject at a future evening meeting. It would materially assist me in this inquiry if those who have observed similar changes in their lozenges would send me specimens, with full particulars as to age, condition of keeping, etc. In reply to Mr. Cornish's suggestions in last week's Journal, I may observe that the granules of ginger starch are so very different in their form to those of the potato or maranta that a practised eye would not be likely to err on this point. Again, the starch grains which exist in the cellular portion of the Minor Striated Ipecacuanha are so very characteristic that there could be little difficulty in determining their presence, and if these play any part in the decomposition it is not a primary one, and can only occur in ipecacuanha lozenges. I have little doubt but that the change is due to some substance common to most, if not all lozenges.

THOMAS GREENISH.

20, *New Street, Dorset Square, London.*

PHYTOLOGY: ON THE PROPERTY POSSESSED BY CERTAIN BULBOUS ROOTS OF ADAPTING THEMSELVES TO THEIR PROPER DEPTH IN THE EARTH.

My attention was first drawn to this, thirty years since. In a garden at Pontefract I made several alterations, one effect of which was to disperse and bury, twelve inches under the surface, a bunch of snowdrops (*Galanthus nivalis*). At their usual season several of them duly sent up their leaves and flowers. As soon as the foliage began to decay I took them up, with the view of planting them again in a cluster.

I was surprised at finding the old bulb at twelve inches deep in the ground, entirely *perished*, excepting the skin and stalk. Upon the latter a new bulb had formed, about four inches under the surface of the soil. This proved to be the case with all that I dug up. The circumstance had escaped my memory until last year, when (thinking I should leave my present house and garden) I dug up my tulip roots. I found that some of them had been raised above their proper depth in the earth, and some upon the surface. The latter bulbs showed a skin the size of the original, but contained merely a small offset, about the size of two wheat-corns. A sap-root had struck down, from which, at four to five inches below the surface of the earth, strong, healthy bulbs were thrown off.

I have nowhere seen or read of this phenomenon of self-arrangement, but I think it may be useful to the botanist and nurseryman, and also afford a field for amusement and instruction to many. It is desirable to ascertain what bulbs obey this law. I have tried the crocus, but the results were ambiguous.

THOMAS ARNALL.

44, *Franchise Street, Wednesbury.*

COCCULUS INDICUS.

Sir,—The letters recently appearing in the Journal anent Cocculus Indicus, remind me of one or two incidents, which may possibly interest some of your readers. Some 30 years ago, when a young man just commencing business, I was wont to experience, after my midday meal—when possibly I had done deglutition to some 10 or 15 ounces of the contents of the "9 gallon," which I got from a neighbouring brewer—a very unpleasant oppression across the forehead, and my brains certainly felt less clear *post* than *ante prandium*. One day when pouring out my usual beverage, I observed something pop from the jug into the glass; a glance at this sufficed for the unmistakable recognition of the half capsule of a *cocculus indicus* berry. It certainly was curious, that that solitary half capsule, should have escaped the meshes of the brewers sieve, got safely from the kin into my 9 gallon, from thence through the narrow passages of the tap, and again be brought to dry land in my little back room.

It might have got into almost anybody else's glass in the place—possibly even to that of the village surgeon, without the "illustrious stranger" being recognized.

The brewer's clerk passing my door *ter in die* to his meals, I put "the stranger" into a pill box, and posting the clerk up, as to the road by which he had arrived, begged him to inquire of his employer, with my respects, if he could tell me who he (or what it) was? I had to ask the clerk for the reply. "Oh, M——— thought it was only a hop leaf" (!) The clerk was loyal to the master whom he served. Years after he had left his employ on my making reference to the singular "hop leaf" he confessed that he never in his life, before or after, saw his master blush such crimson, or look so confused, or betray such extreme vexation as when he introduced my stranger to him. Had *he* known *what* the pill box contained, he would not have ventured to be the bearer of it.

Since the charge some years since made against the Burton brewers of bittering their ales with strychnine, and their indignant and emphatic denial of using anything beyond malt and hops, and their freely inviting inspection of their process, I was under the impression that all brewers of any note eschewed such vile malpractices as poisonous adulteration, but scepticism on this point is haunting me. Until very recently I had for some while been drinking a certain bitter ale, brewed in the neighbourhood of London, and I had suffered a good deal from giddiness, especially experienced when suddenly turning round. As the sensation was not felt at any particular time, I did not attribute it to diet, but since happening to change the bitter ale for London stout—the giddiness has apparently gone with the former: and I have since recollected that the giddiness became worse about the time that the price of every thing, including malt, hops, and labour so suddenly rose.

One more anecdote connected with beers and brewers and I have done. Some years since there resided in the town from which I write, a well-known "character," who kept "a public," one that is known as "a brewer's house;"—he was bound to sell beer only that his landlord brewed. One day he told the brewer he had something he wished particularly to show him. The publican brought out a locked casket, containing a packet which had as many envelopes, as that with which the late Wizard of the North was wont to amuse his audiences, at last the innermost one was reached, when, with the gravest of grave faces, he solicited the brewer's opinion as to the nature of the small object it contained. "Why," replied the brewer, "there can be no doubt as to what it is—it is a hop leaf." "Well," he rejoined, "I thought it was, but do you know I found it in *your* beer!"

R.C.

Southampton.

"*An Old Pharmacist.*"—There is nothing in the Pharmacy Act to prevent an unregistered person selling drugs which are not poisons within the meaning of the Pharmacy Act; but it does prohibit such person from assuming any style or title implying that he is a chemist and druggist. You are also referred to the rule respecting anonymous communications.

"*Syrupus.*"—Your questions 1, 2 and 3, indicate the need of a course of study in a chemical laboratory. You can learn the price of such a microscope as you require from the makers, who constantly advertise in the papers, etc.

A. Y.—(1) Apply to the Secretary for a copy of the pamphlet entitled 'Hints to Students.' (2) We are informed that there is no formula for a "Lotio Zinci Sulphocarbolatis" in the Pharmacopœia of King's College Hospital, but we have been kindly supplied with the following formula for an "Injectio Zinci Sulphocarbolatis," as being probably what you require:—

℞.	Zinci Sulphocarbolatis. . .	gr. xl.
	Aquæ	Oj.

M.

F. P. Balkwill.—Vanilla (cut small), 2 oz.; rectified spirit, 1 pint. Digest for a fortnight. See a paper by Mr. Moore in the second volume of the present series of the PHARMACEUTICAL JOURNAL, p. 748.

COMMUNICATIONS, LETTERS, etc., have been received from R. T. Gould, A. Stathers, J. M. Cornish, "Fructus," "Hampton," L.

DISPENSING NOTE ON THE CHLORO-MERCURATE OF MORPHIA.*

BY WILLIAM MARTINDALE, F.C.S.

The more definite and certain action produced by injecting medicinal agents hypodermically, and their more rapid therapeutic action upon the system, have led surgeons to administer perchloride of mercury in this manner in certain forms of syphilis. This salt, when given by the mouth in large doses, frequently disorders the stomach and causes diarrhœa without producing the requisite mercurialization. When injected hypodermically, as might be supposed, by its corrosive nature and chemical action on albumen, it causes great pain, a hard lump is formed, and rigidity of the part where applied. To lessen the pain in the case of a patient who was very sensitive and not readily influenced by mercury, Mr. Berkeley Hill thought a combination of it with morphia would be of service, and asked me to prepare for him the following solution :—

R Hydrarg. Bichlor.	gr. 8
Morphiæ Hydrochlor	gr. 4
Aquæ Destill..	℥j.

Make a solution for subcutaneous injection; six minims contain gr. $\frac{1}{10}$ Hydrarg. Bichlor. and gr. $\frac{1}{20}$ Morphia.

I added the two salts to a little water in a test tube, and dissolved them with the aid of heat. On filtering and cooling, although there was more than four times as much water ordered than was necessary to hold either salt in solution separately, I was surprised to find a large deposit of silky acicular crystals. This I at once perceived was due to the formation of a double salt of mercury and morphia, which, on reference to Watts,† I found was described as the choromercurate of morphia. It is prepared by mixing solutions of equivalents of the two salts, hydrochlorate of morphia and perchloride of mercury, and has the composition of $C_{17}H_{19}NO_3 \cdot HCl \cdot 2Hhg''Cl_2$. There are nearly corresponding iodo- and bromo-compounds of mercury and morphia. Double chlorides in combination with mercury are, as is well known, very numerous. *Liquor hydrargyri perchloridi*, as I have shown,‡ contains the double chloride of mercury and ammonium, in which case the mercury salt is rendered much more soluble; but, in the case before us, the peculiarity is that it is rendered much less soluble.

With the sanction of the prescriber, I temporarily got over the difficulty by using a mixture of seven parts of water and five of glycerine as a solvent; but even out of this it crystallized in a few days, and I was informed that it neither lessened the pain nor the inconvenience which an ordinary solution of perchloride of mercury would have caused.

I suggested and prepared for use in its place a solution of the alkaline chloro-albuminate of mercury, from the formula of M. Staub, given in the "Year Book of Pharmacy," for 1873, p. 293, but more concentrated. In this solution an excess of chloride of sodium and chloride of ammonium are dissolved together with the perchloride of mercury, and added to a mixture of white of egg and water. The alkaline chlorides, it is stated, prevent the combination of the mercury salt with albumen. This it did for a time, at any rate, but, probably, as mine was a more concentrated solution than M. Staub's, after a while it became curdy. Mr. Hill, therefore, left off using it, but he informed me that this solution caused less pain, and entered more readily into circulation than when the simple solution of perchloride of mercury was used. He has kindly given me the following notes of the case in which he used these solutions :—

Memorandum of Injections of W. C. R.

1874—March 9th, 10th, and 11th. Two daily of solution of $HgCl_2$ in distilled water = $\frac{1}{10}$ gr. in ℥ vj with ℥ j of solution of morphia = $\frac{1}{6}$ gr. The separate solutions were mixed in the syringe.

March 12th, 13th, and 14th. Two daily of solution containing morphia and $HgCl_2$ in glycerine and distilled water. The morphia and mercury crystallized out in a few days.

March 15th, 16th, and 17th. Two daily of Staub's albuminated solution. In a few days this solution became curdy.

March 18th, 19th, and 20th. Two daily of $HgCl_2$ gr. $\frac{1}{8}$ in distilled water ℥ vj.

The same bulk of fluid was used in all — ℥ vj.

The localities chosen were nearly always on the arms, and generally over the triceps. Four injections were made into the front of the thighs.

Effect 1. If the point was not well sharpened, pain, at the time and afterwards, was complained of a good deal. Latterly the point was sharpened almost daily on an agate hone, and the pain of the puncture was very slight.

2. The subsequent pain felt an hour or two after the injection varied much, even when the same solution was employed. Very little difference was felt with those having morphia and those having mercury without morphia. The least painful form was the albuminate. The most painful the solution of $\frac{1}{8}$ grain in ℥ vj.

3. Hard swellings formed round each of the punctures, which lasted two to three days, were very tender, and greatly impeded by their painfulness the movements of the limbs. For this reason the thighs were only used a few times, and the right arm less than the left arm.

On March 20th patient was so crippled by pain that the injections were discontinued. No abscess, however, resulted, and in four or five days the lumps had disappeared and the pain also.

4. Two signs only indicated the effect of the mercury.

(*a*) Improvement in the condition of the syphilitic sore. It grew smaller and less hard.

(*b*) The breath became mercurially fœtid about March 18th.

The gums, the bowels, and the patient's general condition showed no appreciable sign of the drug being absorbed. During the second week of injection the patient took a grain of calomel three times daily, or other mercurial pill.

March 28th. He does not yet betray any further sign of mercurialization than those detailed. He is the second case that Mr. Hill has observed which has been only very slightly influenced by subcutaneous injection. In all the rest mercurialization has been speedily produced. As a rule the gums are tender and swollen, and the syphilitic affection rapidly disappears when $\frac{2}{10}$ grain of bichloride have been introduced.

March 29th. Injections were recommenced; $\frac{1}{8}$ grain of $HgCl_2$ dissolved in ℥ xii of distilled water, at the rate of two per diem. The pain has not been appreciably less than was felt with the more concentrated injections, but the hard lump formed round the point of insertion has been smaller and less hard.

Diarrhœa began March 31st, consequently injections were discontined on April 1st.

10, *New Cavendish Street, W.*

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, Wednesday, April 1st, 1874.

† Dictionary of Chemistry, vol. iii. p. 1054.

‡ Pharm. Jour. 2nd series, vol xi. p. 544.

MATERIA MEDICA NOTES.*

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

Koegoed.

At the Brighton meeting of the British Pharmaceutical conference in August, 1872, a paper was read by Mr. Keyworth of Hastings, upon a drug called Koegoed, the botanical source of which was said to be unknown. Having had occasion lately to turn to Dr. Pappe's Medical Flora of the Cape of Good Hope, I found that the same name, although spelt in a slightly different manner, was applied by the Hottentots to the *Mesembryanthemum tortuosum* a plant belonging to the nat. ord. Ficoideæ. Not having been able to detect any leaves in a specimen given to me by Mr. J. Moss, I wrote for a further supply to Mr. Keyworth, who courteously complied with my request. In the parcel forwarded to me by that gentleman I found a few leaves of an oblong-ovate shape which exactly corresponded in appearance with those of a specimen of the *Mesembryanthemum tortuosum* in the British Museum. Dr. Shaw, who is well acquainted with the Flora of South Africa, happened to be in the British Museum while I was engaged in comparing the specimens, and immediately recognized the Koegoed as the form in which that plant is used by the Hottentots, remarking that he had seen it growing in Bushmanland, but considered it to be rather a rare plant. There can be no doubt, therefore, that the Koegoed is the produce of *M. tortuosum*, of which it is probably the root and procumbent stem.

Three other species of *Mesembryanthemum* are used medicinally by the Hottentots, but these have leaves of a different shape to those of the Koegoed, the leaves of the *M. edule* and *M. acinaciforme* being scimitar shaped, and those of *M. crystallinum*, which is well known in this country as the ice plant, being broadly ovate and amplexicaul. The expressed juice of the first two species above mentioned is extensively used in the South of Africa in dysentery, as a gargle in malignant sore throat, and in the form of a lotion for burns and scalds.

The Koegoed, besides being used as stated by Mr. Keyworth, as a sedative for cattle, is chewed by the Hottentots as an intoxicating agent, and appears to possess narcotic properties which deserve further investigation.

Some Adulterations of Crude Drugs.

Cascarilla.—Notwithstanding the great care which is exercised by most wholesale buyers in selecting good samples at the drug sales, and in the examination of all parcels which enter into stock in their warehouses, spurious drugs are occasionally overlooked and find their way into the retail trade. This spurious cascarilla (of which a sample is upon the table) presents an instance in point. It was imported from the port of Nassau, in the Bahama Islands. A lot of cascarilla, consisting of four serons selected from a fine sample, was purchased by one of the first London houses. Of these serons, three contained the true bark; but the fourth, which appeared to contain unusually fine specimens, and which were sent out as such, was afterwards found to consist almost entirely of the spurious bark.

At first sight this bark strongly resembles cascarilla in appearance, but may be distinguished thus:—The periderm or outer layer of bark does not readily peel off, and is of a fawn colour—not white. On the inner surface the bark is of a reddish tint and is furnished with a number of straight, closely packed, raised lines, which give it a striated appearance, the inner surface of cascarilla being smooth. The taste is not aromatic but astringent, and almost without bitterness. The colour of the bark is also of a more reddish tint than that of cascarilla. From the general appearance and microscopical structure of the bark it seems probable that it may belong to a plant of the same genus as the cascarilla.

Most of the species of croton occurring in the Bahamas appear to have aromatic barks, but in the excellent paper published in the Pharm. Journ. by Dr. Daniell upon the cascarillas of the Bahama Islands, one species described under the name of *Croton lucidum*, L. is said to have in the fresh state a slightly bitter and somewhat astringent bark. It further resembles the spurious bark in the "dull red colour of the cortical layers." It is said to be used by the negroes of New Providence to mix with the bark of the true cascarilla, under the idea that it improves the curative powers of the latter, and it is known by the name of the false sweetwood bark, sweetwood being the name applied by them to the true cascarilla. Hence this bark may have been mixed with the cascarilla, by those who collected it, for the above-mentioned purpose. From the fact of its occurring only in one seron, however, it appears more probable that it was an intentional adulteration. Unfortunately there are no specimens of the bark of *Croton lucidum* either at Kew or at the British Museum, so that I have not been able to ascertain with certainty (as might be done by the use of the microscope) the identity of this bark with that of the *Croton lucidum*, L. I trust, however, in the course of the year to receive further information concerning it from Jamaica.

With regard to its medicinal properties, the bark appears to cause sickness without produciug other disagreeable effects.

Mr. A. H. Squire, who first brought this bark under my notice, has examined its behaviour with various reagents, and finds that the infusion and tincture are darker in colour than those of cascarilla; that tincture of galls gives a scarcely perceptible cloudiness, and that tincture of perchloride of iron turns the tincture almost black, while the infusion is only slightly deepened in colour by it, and that acetate of lead gives an abundant precipitate with both tinctures. The tincture of cascarilla is not altered in appearance either by tincture of perchloride of iron or tincture of galls.

Arnica Root.—In a specimen of arnica root which was recently sent to me for examination (by Messrs. Wright, Sellers, and Layman), I found only 50 per cent. of the genuine root, and in a second sample only 1 per cent. of arnica. In both samples there were two or three different kinds of roots, but the chief adulterant in both cases was the same.

The physical characters of this spurious arnica are so strongly marked that it is not difficult to recognize it. For the sake of comparison, before giving the distinctive characters of the spurious drug it may be well to recall the description of arnica.

What is commonly known as arnica root consists of a slender rhizome or prostrate stem having a

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, Wednesday, April 1st, 1874.

number of rootlets arranged almost in a line along the under surface. In a transverse section the cortical portion is found to be hard, and of a yellowish white colour, while the central portion or meditullium is soft, and of a dirty greyish or brownish-white colour. The odour is distinctive, and the taste has a peculiar acridity and an after flavour which may be likened to the odour of rancid cocoa-nut oil.

The spurious drug may be at once recognized by the fact that it is not a rhizome, but a root which evidently descends vertically into the soil, as it is surrounded on all sides by rootlets. In size it varies from that of arnica to five or six times as large, in some pieces appearing præmorse, and in others suddenly narrowed and elongated. The cortical portion resembles that of arnica in colour, but the meditullium, or central portion, is of a purple tint, and presents a discoid appearance, two characters which I believe are met with in but few roots. When the root is soaked in water the purplish meditullium swells up and loses its discoid appearance. The taste is astringent and somewhat aromatic, faintly resembling that of cloves. Thinking it possible that the root might belong to some plant having leaves like those of arnica, and that it might have been gathered in mistake for arnica, I examined several species of *Hieracium* which grow in similar situations, and resemble arnica in having composite flowers and entire leaves, but in none of them had the meditullium a purple colour. The astringent taste of the spurious arnica then led me to suspect that it might be the root of a rosaceous plant, and the clove-like flavour seemed to indicate the root of *Geum urbanum*, an indigenous plant well-known to herbalists in this country, under the name of Avens, or Herb Bennet. Having procured specimens of the latter from Covent Garden, I found that the appearance, structure and taste were identical, and have therefore no hesitation in referring the spurious arnica root to that plant. The other kinds of root were present only in small quantity, and appear to have been accidental. One is a slender rhizome of a paler colour than that of arnica, and has a white discoid meditullium, and a bitter taste; another is evidently that of a species of *Vaccinium;* a third looks very like valerian, but is odourless; a fourth closely resembles bistort root.

From all the spurious roots the leaves have been carefully removed, while an unusual quantity of arnica leaves are mixed with the roots, evidently for the purpose of producing the impression that the root is genuine arnica. That the adulteration is an intentional one is also evident from the fact that the leaves, flowers, and general habit of the two plants are totally distinct; arnica having entire leaves, a simple stem, and composite flowers, while *Geum urbanum* has lyrate pinnate leaves, a branched stem, and simple flowers.

Belladonna Root.—A sample sent to me for examination contained 50 per cent. of a malvaceous root, which I believe to be that of *Malva sylvestris;* the remainder consisted of small pieces of belladonna root. Externally, the two are very much alike, especially when the belladonna is in small pieces; but internally the appearance and structure will be seen to be very different, belladonna having a very large meditullium and a small cortical portion, while in the mallow the two are nearly equal. The fracture of belladonna also is short, while in the mallow it is distinctly fibrous.

This adulteration, although easily detected, is of considerable importance, seeing that it would in this proportion reduce the strength of the preparations of belladonna by one-half. Both the arnica and belladonna were imported from Germany.

Whether these adulterations are to be taken as an indication that arnica and belladonna are becoming scarce in Germany, or whether they are the result of a demand for cheap drugs, is not very evident, but their occurrence does point to the necessity for a very careful examination by the pharmacist of all crude drugs which enter into stock, and to the importance attaching to a thorough acquaintance with the appearance and structure of all articles of materia medica. They show also that adulterations may occasionally occur where they would be least suspected.

[*The discussion on this paper is printed at p.* 821.]

THE QUALITY OF MILK SUPPLIED TO TOWNS.

BY DR. STEVENSON MACADAM, F.R.S.E.,
*Lecturer on Chemistry, etc., etc.**

The recent prosecutions in Edinburgh and other cities and towns, in reference to the adulteration of milk, have proved that there is great necessity for more full information regarding the chemical composition of genuine or normal milk. Consequently, having been professionally engaged in some of the cases of alleged adulteration, and having acquired a mass of results regarding the analyses of milk, I have thought it right to give publicity to these researches, in the hope that they may tend to afford greater certainty to future analyses of milk, and thus be of public service.

In carrying on the analysis of milk, the special points which may be determined are—

(1) Specific gravity of the milk.
(2) Percentage of cream by volume.
(3) „ „ solids by weight.
(4) „ „ solids not fat „
(5) „ „ fat or butter „
(6) „ „ ash in solids „

Where it is possible, all these points should be determined. Some chemists attempt to despise the specific gravity and cream tests, and stand by the solids and fat only; whilst others hold, and correctly so, that the specific gravity and cream determinations are excellent guides when they are properly carried out. Necessarily, when all the points are determined—the specific gravity as well as the solids, and the cream as well as the fat—both parties must be satisfied, as the one affords a check to the other, and double certainty and accuracy of results are obtained.

The *specific gravity* is best taken in the ordinary specific gravity bottle, holding 1,000 grains of water at 60° F. The milk should be agitated previously, so as to mix the fat or cream thoroughly throughout, but care must be taken that the agitation is not so violent as to incorporate air bells with the milk. The temperature of the milk at the time should be 60° F. if possible, but, if slightly above or below that temperature, then an allowance of two-tenths may be made for every degree above or below, being added to the weight when the temperature is above 60° F., and being abstracted from the weight when the temperature is below 60° F. The hydrometers which are supplied with the ordinary lactometers are seldom correct, and, moreover, there is greater uncertainty in reading off the exact figure on the stem indicative of the specific gravity. I always employ the specific gravity bottle. Taking genuine milk derived direct from the udders of the cows belonging to three large dairies in the

* Read before the Pharmaceutical Society (North British Branch) at the meeting on the 26th March, 1874.

neighbourhood of Edinburgh, I find the specific gravity to range from 1028·4 to 1035·7 ; the average of forty-four trials with different milks being 1032·20 (water=1000·00). The variations in the specific gravity of the milks ranging over 7 degrees undoubtedly indicate a difference in the composition of the milks and in the quantities of the respective components.

The *cream* is determined in an elongated vessel of uniform width, and graduated at the upper part so as to indicate accurately from 1 to 25 per cent. of the whole capacity. The precautions necessary for the uniform and accurate estimation of the proportion of cream obtainable from milk by this creamometer are (1) that the vessels should be of similar size, so as to admit of the fat globules rising to the surface with equal facility ; (2) that the milk should be taken as fresh from the cow as possible, or that, in contrasting the relative qualities of samples of milk, they should be taken about the same length of time from the cow ; (3) that the milk should be well agitated before being placed in the graduated vessel ; (4) that the temperature of the milk should be about 60° F. ; (5) that the temperature of the room be kept about 60° F. ; and (6) that the respective milks be allowed to remain in the creamometers for the same length of time, say twenty-four hours. Working in this manner, I find that genuine milk throws up a proportion of cream ranging from 5 to 11¼ per cent. by volume, whilst the average of forty-four trials gave 7·8 per cent.

The *total solids* in milk may be readily estimated by evaporating a given weight of the milk in platinum vessels heated on a water bath. A convenient and excellent bath may be constructed from a common iron pot, about eight inches wide and four inches deep, covered with a sheet of copper-plate about ten inches square, which can be kept in its place by a band being cut out at each side and bent down to embrace the pot. Four circular openings are cut in the copper cover, which admit of four flat platinum basins, about two inches in diameter, being set in the bath. The square corners of the copper cover form a hot plate when the bath is in working order. The milk to be tested having been agitated, a portion is poured into one of the platinum basins and weighed. The amount should run from 80 to 100 grains. The basin and contents are then placed on the water bath, and the water kept briskly boiling for at least two hours. Probably to ensure the thorough drying of the residue, three hours should be taken in all trials, so as to have uniformity in mode of working and greater accuracy in result. The basin and contents are then re-weighed, and the total solids from the given amount of milk are obtained. A calculation then gives the percentage of total solids by weight, and I find that genuine milk gives from 10·57 to 14·54 per cent., the average of forty-four trials being 12·04. There is thus a difference of 4 per cent. in the amount of solids obtainable from samples of genuine or normal milk.

The *solids not fat* are estimated by taking the total solids contained in the platinum basin, and extracting the fat by ether, at the same time heating gently over a vessel containing hot water. On settling for a minute, the ether may then be decanted off into a small weighed beaker. The ether treatment of the total solids should be repeated other three times, so that the solids are acted upon four times by the ether. On drying up the residue in the platinum basin, and re-weighing, the proportion of *solids not fat* in the amount of milk employed is obtained, and a calculation will give the percentage. Genuine milk gives from 8·74 to 11·23 per cent. of the solids not fat—the average of forty-four trials being 9·62 per cent.

The *fat* may be determined in two ways, either by the loss in weight of the total solids as compared with the solids not fat, or by the evaporation of the ethereal solution and weighing the fatty residue. I do not find the evaporation method so accurate as the estimation by loss. There is apparently some of the fatty matter which escapes over the side of the vessel even when the evaporation is conducted in glass beakers. The difference in weight between the total solids and the solids not fat gives always a higher result and one which I consider is more accurate. Taking, therefore, the loss in weight due to the extraction of the fat from the total solids by the ether, I find that genuine milk gives a percentage of fat ranging from 1·56 to 3·32, the average of forty-four trials being 2·44.

The *ash* in the solids is estimated by burning off the organic constituents and weighing the residue. In genuine milk the ash ranges from 0·62 to 0·76 per cent., the average being 0·69 per cent.

In carrying on these researches, genuine milk was obtained in every instance direct from the udder of the cow. My assistant, Mr. William Jack, went to three large dairies and personally took the samples. He inspected the pails before the milking was commenced, saw all the cows milked, and sampled every milk himself.

From dairy A there were altogether 16 samples taken from 14 cows, 12 of the samples were from the entire runnings of milk from 12 cows, whilst two of the samples were the first of the runnings and the remaining two samples were the last of the runnings from the remaining two cows. The first five and the last five of the 16 samples were fully analysed, and the results are given in the following table:—

No. of Cow.	Specific gravity of milk.	Cream per cent. by vol.	Total solids per cent. by wght.	Solids not fat, per cent. by wght.	Fat per cent. by wght.	Ash in solids per cent. by wght.
1*a* first of runnings	1032·9	7	11·57	9·32	2·25	0·71
1*b* last of runnings	1031·2	10	12·32	9·30	3·02	0·68
2 whole runnings	1033·4	5½	11·39	9·52	1·87	0·72
3*a* first of runnings	1034·1	5	11·25	9·28	1·97	0·69
3*b* last of runnings	1029·4	11¼	13·66	9·32	4·34	0·70
10 whole runnings	1030·4	6	10·57	8·74	1·83	0·67
11 ,,	1032·7	5	11·42	9·70	1·72	0·70
12 ,,	1031	6	11·51	9·55	1·96	0·69
13 ,,	1031·1	9	12·62	10·04	2·58	0·74
14 ,,	1028·4	10	11·96	9·18	2·78	0·70
Average of the 10 samples	1031·46	7½	11·827	9·395	2·432	0·70

From the above table it will be observed, that, taking the whole runnings, the specific gravity of the milk ranged from 1028·4 to 1033·4, the cream from 5 to 10, the total solids from 10·57 to 12·62, the solids not fat from 8·74 to 10·04, the fat from 1·72 to 2·78, and the ash from 0·67 to 0·74 ; whilst the average of the ten experiments gave specific gravity 1031·46, cream 7½, total solids, 11·827, solids not fat 9·395, fat 2·432, and ash 0·70.

The samples of first runnings were markedly inferior in quality, whilst the samples of last runnings were as markedly superior in quality ; in No. 1 cow the proportions of cream being 7 to 10 and fat 2·25 to 3·02, whilst in No. 3 cow the variation in cream was 5 to 11¼, and the percentage of fat 1·97 to 4·34. It may be stated that the cows, Nos. 1, 2, 10, 11, 12, 13, and 14, were of the "cross" breed, whilst No. 3 was an "Ayrshire" ; that Nos. 1 and 2 had calved in January, No. 3 in November, Nos. 10 and 11 in June, No. 12 in December, and Nos. 13 and 14 in July ; and that the cows were fed three times a day, viz., at 7 a.m. mash of draff, oilcake, and boiled turnips ; at 12 noon draff and raw potatoes, and at 7 p.m. mash, raw turnips and hay.

From dairy B there were 22 samples of milk taken, 18 of which were from the whole runnings of 18 cows, whilst two samples were the first runnings, and two samples were the last runnings of milk from other two cows. All of these samples were fully analysed and the following results were obtained :—

No. of Cow.	Specific gravity of milk.	Cream per cent. by vol.	Total solids per cent. by wght.	Solids not fat, per cent. by wght.	Fat per cent. by wght.	Ash in solids per cent. by wght.
1*a* first of runnings	1033·6	5	10·47	9·15	1·32	0·67
1*b* last of runnings	1030·5	12	12·94	9·17	3·77	0·73

2 whole runnings	1032·5	8	12·57	9·88	2·69	0·74
3 „	1033·7	7	11·75	10·19	1·56	0·71
4 „	1031·4	8	11·91	9·32	2·59	0·68
5 „	1031·8	10	12·18	9·24	2·94	0·65
6*a* first of runnings	1033·4	5	10·57	9·03	1·54	0.62
6*b* last of runnings	1029·0	14	14·09	8·99	5·10	0·59
7 whole runnings	1032·9	7½	12·17	9·93	2·24	0·65
8 „	1032·5	7½	11·97	9·70	2·27	0·67
9 „	1031·5	7½	11·52	9·23	2·29	0·62
10 „	1032·8	6	11·24	9·55	1·69	0·71
11 „	1032·8	7	11·84	9·73	2·11	0·72
12 „	1030·8	9½	11·66	8·94	2·72	0·64
13 „	1030·6	9	11·98	9·37	2·61	0·68
14 „	1033·5	8	12·33	9·95	2·38	0·72
15 „	1031	6	11·48	9·52	1·96	0·73
16 „	1033·4	6	11·37	9·73	1·64	0·70
17 „	1032·7	6	11·29	9·54	1·75	0·75
18 „	1029·6	8	11·41	8·85	2·56	0 69
19 „	1034·0	10	13·85	10·79	3·06	0·76
20 „	1031·3	11	12·48	9·16	3·32	0·68
Average of the 22 samples	1032·14	8	11·95	9·50	2·453	0·69

Taking the above analyses and leaving out the special experiments on the first and last of the runnings of the two cows, Nos. 1 and 6, it will be found that over the whole runnings given by each cow, the specific gravity ranged from 1029·6 to 1034·0, the cream from 6 to 11, the total solids from 11·24 to 13·85, the solids not fat from 8·85 to 10·79, the fat from 1·56 to 3·32, and the ash, from 0·62 to 0·76, whilst the average of the whole 22 analyses gave specific gravity 1032·14, cream 8·0, total solids 11·95, solids not fat 9·50, fat 2·453 and ash 0·69. The samples of first runnings were again much inferior in cream and fat to the last runnings, thus in cow No. 1 the difference was in cream 5 to 12 and fat 1·32 to 3·77, whilst in cow No. 6, the variation in cream was 5 to 14 and in fat 1·54 to 5·10. In this dairy the cows Nos. 1, 7, 8, 9, 10, 11 and 12 were English, Nos. 2, 3, 4, 5, 6, 13, 14, 15, 16, 17, 18, and 20, were Ayrshire, and No. 19 was a cross; and the calving of the cows had taken place in January for Nos. 1, 8 and 9; October for Nos. 2, 3, 4, 5 and 6; December for Nos. 7, 10, 11, 12 and 13; August for Nos. 14, 15 and 18; September for Nos. 16 and 17; June for No. 19, whose milk was nearly out, and February for No. 20, whose milk was only two weeks old. All the cows were fed three times a day on draff and raw turnips.

From dairy C, 12 samples of milk were taken from 12 different cows, and gave the following analytical results :—

No. of Cow.	Specific gravity of milk.	Cream per cent. by vol.	Total solids per cent. by wght.	Solids not fat, per cent. by wght.	Fat per cent. by wght.	Ash in solids per cent. by wght.
1. whole runnings	1031·5	9	12·92	9·94	2·98	0·72
2. „	1031·6	10	12·73	9·71	3·02	0·69
3. „	1032·6	9	12·94	10·15	2·79	0·73
4. „	1034·8	6	11·96	10·22	1·74	0 65
5. „	1034·4	6	11·88	10·04	1·84	0·68
6. „	1031·9	6	10·92	9·16	1·76	0·62
7. „	1032·9	6	11·04	9·34	1·70	0·64
8. „	1035·7	11	14·54	11·23	3·31	0·73
9. „	1030·4	8	11·93	9·37	2·56	0·69
10. „	1031·8	8	12·22	9·69	2·53	0·70
11. „	1034·4	10	13·33	10·02	3·31	0·71
12. „	1034·3	6	11·93	10·07	1·86	0·69
Average of the 12 samples	1033·0	8	12·36	9·91	2·45	0·69

The above results show that in Dairy C, the milk also varied much in all the testing qualities. Thus, the specific gravity ranged from 1030·4 to 1035·7, cream from 6 to 11; total solids from 10·92 to 14·54; solids not fat, from 9·16 to 11·23; fat, from 1·74 to 3·31, and ash from 0·62 to 0·73; whilst the average of the whole 12 samples gave specific gravity 10·33, cream 8, total solids 12·36, solids not fat, 9·91, fat 2·45, and ash 0·69. In this dairy, the cows, Nos. 1, 2 and 9 were Ayrshire; Nos. 3, 4, 5, 6, 7, 8 and 12 were cross; and Nos. 10 and 11 were English; and the food consisted of draff, turnips, and oilcake at 5.30 a.m.; draff and turnips at 12 noon, and draff, turnips, and oilcake at 6 p.m.

The average quality of the milk supplied to Edinburgh by the three dairies may be better observed by placing the averages side by side and then striking an average of the whole samples derived from the 40 different cows. This average of the whole trials may then be contrasted with the lowest and highest results obtained from the whole samples in specific gravity, cream, total solids, solids not fat, fat and ash. The following table exhibits these points :—

	Specific Gravity of Milk.	Crm. per cent. by vol.	Total Solids per cent. by wght.	Solids not fat per cent. by wght.	Fat per cent. by wght.	Ash in solids per cent. by wght.
Dairy A average	1031·46	7½	11·827	9·395	2·432	0·70
„ B „	1032·14	8	11·95	9·50	2·453	0·69
„ C „	1033·00	8	12·36	9·91	2·45	0·69
Average of three dairies, representing forty cows' milk . .	1032·2	7·8	12·04	9·60	2·44	0·69
In all trials—						
Lowest . . .	1028·4	5	10·57	8·74	1·56	0·62
Highest . . .	1035·7	11¼	14·54	11·23	3·32	0·76

These latter figures show that the specific gravity of milk of undoubted genuine quality may range from 1028·4 to 1035·7, or more than 7 degrees, the cream from 5 to 11¼, or more than double; the total solids from 10·57 to 14·54, or 4 per cent.; the solids not fat from 8·74 to 11·23, or 2½ per cent.; the fat from 1·56 to 3·32, or more than double, and the ash from 0·62 to 0·76.

These results prove conclusively that milk taken from different dairies varies in chemical composition, and that milk taken from different cows in the same dairy varies still more in chemical properties, notwithstanding that the cows are housed in the same way, fed at the same time and manner, and milked at the same hours. No doubt the quality of the milk must be influenced not only by the food but by the water in the food, the temperature of the byre, the season of the year, whether summer or winter, as well as probably the breed of cow, age, time of calving, and exact state of health of each cow at the time of milking.

The beneficial effects of improved feeding are apparent in several trials which I have made since the foregoing results were tabulated, on the milk of four of the cows belonging to dairy C. The milk was taken from the cows during the day when it is generally supposed that the milk is richer; but besides that, the dairy man stated that he had commenced to give his cows more nutritious food. The analytical results of the testing of these latter samples of milk were as follows :—

No. of Cow.	Specific gravity of milk.	Cream per cent. by vol.	Total solids per cent. by wght.	Solids not fat, per cent. by wght.	Fat per cent. by wght.	Ash in solids per cent. by wght
1. whole runnings	1032·5	12	14·41	10·47	3·94	0·73
2. „	1033·6	7½	12·64	10·41	2·23	0·71
3. „	1033·3	10	14·21	11·05	3·16	0·75
4. „	1030	10	12·91	9·70	3·21	0·74
Average of the 4 samples	1032·3	10	13·54	10·41	3·13	0·73

These results show a decided increase in the proportion of the several ingredients in the milk, due apparently to the better feeding of the Cows.

(*To be continued.*)

PREPARATION OF NITRATE OF SILVER FOR USE AS A CAUTERY.*

BY E. BOUILHON.

Although crayons of nitrate of silver are in such frequent use, they are far from consisting always of a definite salt, and are often met with of different colours and very varying composition. Sometimes they are black, containing oxide of copper ; sometimes grey, because the salt has been partly decomposed during the fusion, and metallic silver produced ; sometimes bluish, because ordinary nitric acid has been used to dissolve the silver, and there has been formed a small quantity of chloride of silver, which has been affected by the light. These crayons are frequently very brittle, which is a serious inconvenience when they are required for use in the throat or uterus. The white pencils are still more impure, as many makers, under the pretext of giving them solidity, and obtaining them less coloured, use nitrate of silver containing more or less nitrate of potash. This mixture, in fact, resists heat better and gives a less friable product, but the potash salt is an addition that ought not to be permitted ; for, putting aside all question of adulteration, the action of the crayons so obtained is weakened by an inert substance, whilst pure nitrate of silver itself is but a moderate caustic.

Treatises on chemistry and pharmacy are rather indefinite on this subject ; they simply direct melting of the nitrate of silver and the running of it into moulds, but they say nothing of the crystalline texture of the crayon. The Codex, losing sight of the fact that this salt is easily reduced by organic matters under the influence of heat, recommends the greasing of the moulds, in order probably that they may be emptied with more facility. It recommends also that the salt be kept a long time fused, a proceeding as illogical as its preservation in organic substances such as linseed.

In carefully studying the reactions that are produced during the preparation of the crayons, the author has noticed that fusion modifies not only the physical properties, but also the composition of the salt. Thus, the crystallized nitrate of silver is neutral, or even sometimes slightly acid ; but that which has been melted is basic, and as much more so in proportion to the time it has been kept in fusion. The problem, therefore is to melt the salt without rendering it basic, and the author states that he has attained this object by operating in the following manner :—

Twenty grams of pure nitrate of silver are put together with five or six grams of distilled water and one gram of pure nitric acid into a porcelain capsule of sufficient capacity ; this is placed upon a narrow fire, so as not to overheat the sides, which would cause the decomposition of a portion of the nitrate and the blackening of the mass. The water and acid evaporate, the salt becomes dry, and as soon as the fusing-point is reached begins to melt. At this point it is necessary to conduct the operation very carefully, to heat very moderately, and to detach from the sides of the vessel with a glass rod the crusts of dry salt which do not run into the liquid. When about three-fourths of the nitrate is melted it is to be run immediately into a perfectly clean copper mould, not containing any organic matter. Crayons are thus obtained which are of a dead-white colour, and of irreproachable solidity.

The scrapings and debris of any crayons that might be defective can be again placed in the capsule, either alone or with fresh nitrate, distilled water and pure nitric acid added, and the operation recommenced. The precaution must always be taken, however, only to melt a portion of the salt, in order not to go beyond the temperature of its fusing point, and thus to avoid rendering it basic.

* Abstract of paper in the *Répertoire de Pharmacie*, vol. ii., p. 134.

THE SPONGE TRADE OF RHODES.

According to a report on the trade of Rhodes, including the Islands of the Sporades, we learn that the chief exports to Great Britain are sponges and valonia. The sponge fishing industry is actively carried on. The apparatus is exclusively imported from England and France, and though there is no difference in the construction of the English and French machines, nor in the depth to which they can attain, nor the length of time a diver can remain under water—the two main conditions of success in regard to sponge fishing,—still it is said that the English made machines generally prove stronger than the French and that of this fact the islanders are thoroughly conscious. The air-tubes of the British apparatus have, however, hitherto laboured under the disadvantage of being heavier than the French, thus tending to impede the free movements of the diver, as the tubes are caught on rocks. In consequence of this their use has not been greatly in favour. Latterly, it is satisfactory to hear that a great improvement has been introduced into the English apparatus in this respect. The sponge fishery is the principal branch of industry in the Islands of the Sporades. It is estimated that the annual average crop of sponges amounts to £120,000, and of this quantity about £50,000 worth are sent to England. Formerly France used to absorb a large portion of the yield, the exports to that country being large ; but since the last war, Austria, Germany, Italy, and especially England have been the chief customers for these sponges, and have taken the yield almost entirely. With regard to the mode in which the business is conducted, it is interesting to note that the native speculators themselves generally take the sponges to England for sale, and having disposed of them satisfactorily invest the proceeds in articles of British manufacture, which they convey to their own country, and doubtless dispose of with an equally good profit to themselves. They certainly show no lack of enterprise in the management of the business.

It is anticipated that the depreciation in the value of sponges, caused by the large stocks existing in Europe through the more abundant crops consequent upon the introduction of diving apparatus, together with the increasing taxes imposed on the fisheries, will tend to restrict this industry in the Rhodes district, and will induce the divers to seek a more remunerative and less dangerous mode of earning their livlihood. The fishery, indeed, appears to be a very dangerous employment, and numerous accidents occur every season, mostly owing to the divers, in their anxiety to get a good haul, exceeding the prescribed depth. At the present time all sponges sent to England contain about 8lbs. or 10lbs. of sand to 1lb. of sponge—certainly a large proportion ; but it is mentioned that the English merchants, being accustomed to buy the article with as much sand as may be introduced into the sponge, decline to pay a proportionately higher price for those which contain a less quantity of sand. Formerly the same system was adopted in France, but there experience has shown that it is preferable to purchase the sponges just as they are fished. In order to provide for this, agents are sent to Rhodes, the centre of the trade, to purchase them from the divers or from owners of fishing apparatus. By this means they succeed in obtaining the sponges at first hand, and can rely on their not being weighted with sand. The same system, it is believed, will be shortly adopted in England, as an English firm in Rhodes comtemplates the experiment of sending a large number of unsanded sponges to the English market. The attempt at first may probably meet with some discouragement, but there is no reason why it should not be ultimately successful.

The Pharmaceutical Journal.

SATURDAY, APRIL 11, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

CO-OPERATION AND THE SHOPKEEPER.

To judge from the recent utterances of Professor GOLDWIN SMITH, who, we believe, aims rather at the position of a prophet, it might be supposed that the last days of the retail trader are near at hand, and that before long the co-operative system, of which he is so ardent an admirer, will have swept this class of the community out of existence. In his address to a meeting held last Saturday evening, at Heckmondwicke, in connection with the Co-operative Congress at Halifax, the learned Professor commenced by lamenting that some of those whom he held to be the best friends of the working classes, who had done most of late years to animate and guide the movement by which the working man's condition has been raised, had, as he expressed it, been "cast out of the councils of the nation" because they promoted the co-operative movement. Such a course, he held, would be destructive of Parliament, which would thus come to be a mere mass of mediocrities, without any opinions of their own, enjoying only the distinction of being either perfect cyphers or else a class of "sneaks," founding their opinions upon all public questions mainly on what they thought would bring them a vote.

It would appear that the learned Professor, in giving vent to this lamentation, had in his mind the notion that the "casting out" of the objects of his admiration had been in some way brought about by the agency of retail traders, who had a grudge against the promoters of the co-operative system; for, after having elicited the cheers of his audience by the remarks we have quoted, he straightway went on to repudiate any desire to speak with want of sympathy or feeling for the case of the retail trader. But however this may be the Professor had no doubts about what that case was; no contingency seemed to disturb his conviction that the retail trader will soon be classed with extinct species, and that he will in this respect become the next successor of the dodo. For, said the Professor, the world moves on; the old gives place to the new, and the imperfect to that which is more perfect, and though this progress often involves great hardship to classes, it is in his opinion quite evident that co-operation must come.

It may well be that the vigour of these assertions were properly adapted to the audience addressed by Professor GOLDWIN SMITH, and had he confined himself to that mode of treating the subject, we should have merely translated what he said into language suited for other circumstances and considerations which it was not the Professor's business to give much prominence to in his address.

But the Professor was not content with that, and he unfortunately went on to give reasons for what he announced to be his convictions. Those reasons are curious, and therefore we reproduce them here. They were to the effect that retail shops can only be kept open on three bad conditions. First, great waste of human labour, because each shopkeeper must be idling half his time; secondly, undue profits, for without undue profits no man could live upon a very small trade; and, thirdly, the credit system.

Now these are mere assumptions, and they tend to show that however ably the learned Professor may theorize about political economy he knows little of the facts of practical shop-keeping. The credit system, although wide-spread, is certainly not universal, nor is it an institution always favoured by the seller, whilst it will be news to the shopkeeper that the time not actually occupied with his customers is necessarily wasted in idleness. The fact is that there are other services involved besides the mere act of selling—such as buying, storing, dispatching, etc.—and, as has been pointed out, the buyer at a co-operative store attempts to economize by performing part of this work, especially the porter's share, for himself. Such attempts, however, must eventually be affected by the market value of the labour performed. The upper and even the middle class patrons of the co-operative stores will probably not always care to compete for the wage of the warehouseman and porter; and as to skilled services and professional work, they are commodities that will not very readily lend themselves to the necessities of co-operation.

For our own part we do not believe any good can result from one-sided denunciations of the evils, real or imaginary, of retail shops or of co-operative trading. Both are facts, the existence of which must be mutually recognized, and it is only by vigorous competition that we can hope for a solution of the problem which has now for some time perplexed tradesmen. Protective legislation cannot be hoped for, even if it were worth having, and although the trial will probably be severe and irritating, the sooner it is faced the better. As the *Times* points out, in a recent article, it was under the impression that prices were exorbitant and the quality of the goods inferior, that customers took refuge from the shops in "stores," precisely as customers of another class were driven from hotels to clubs half a century since, and precisely, we may add, as in the present day they are being driven from clubs back to hotels. But there can be little doubt that the majority of people will prefer to be supplied

by the shopkeeper to supplying themselves, and—in spite of Professor Goldwin Smith's philosophy—there is no reason why in the future the shop should not still be an institution advantageous to customer and shopkeeper alike.

THE ANNUAL DINNER.

Many of our readers will be glad to learn that arrangements are now being made for the Third Annual Dinner of the Members of the Pharmaceutical Society and their friends. It is proposed that it shall take place at the Crystal Palace, on Tuesday, May 19, the day before the Annual Meeting of the Society. As it is necessary that a list of the Stewards should be published forthwith, gentlemen who are desirous of acting in that capacity are requested to send their names at their earliest convenience to Mr. Richard Bremridge, 17, Bloomsbury Square, or to Mr. M. Carteighe, 172, New Bond Street.

THE SOCIETY'S MUSEUM.

With reference to the question of admitting visitors to the Museum of the Pharmaceutical Society at a later hour than hitherto, which has been the subject of correspondence in this Journal, it will be seen by our report that the Council, upon the recommendation of the Library, Museum, and Library Committee, has decided that the Museum shall in future be open during the same hours as the Library, namely, daily (except Saturdays) from 9 a.m. until 5 p.m., and from 7 p.m. until 10 p.m.; Saturdays, from 9 a.m. until 2 p.m.

ANALYSIS OF BREAD.

The *Medical Times and Gazette* states that in consequence of the unsatisfactory circumstances attending the evidence in some recent prosecutions for the adulteration of bread with alum, and especially those at the Greenwich Police Court, the master bakers of Deptford, acting in self defence, have made a request to the Greenwich District Board of Works that in all purchases of bread made for the purpose of analysis the inspectors may be allowed to leave a portion of such bread under seal with the vendors so as to permit of an independent analysis being made. Our contemporary remarks that this request, which the Board has refused to grant, is only a reasonable one after what has occurred. We fail, however, to see what guarantee such a regulation would give additional to that provided in 3rd section of the Act of 1860, namely, that the purchaser shall inform the seller of his intention of having the article analysed, and give the seller the opportunity of accompanying him to the analyst in whose presence samples are to be taken and sealed for future reference if necessary.

Mr. James Wick, who, in 1866, was elected an annuitant on the Benevolent Fund, died on Tuesday last, at the age of 72 years.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

Wednesday, April 1st, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Brown, Frazer, Greenish, Hampson, Owen, Radley, Robbins, Sandford, Savage, Stoddart, Sutton, Urwick, and Williams.

The minutes of the previous meeting were read and confirmed.

The North British Branch.

Mr. Williams drew attention, as a matter arising out of the minutes, to the removal of the North British Branch to new premises in Edinburgh, as announced at the last meeting. He was much astonished that such a step had been found necessary so soon after the new premises had been entered upon, and still more so that no intimation had been conveyed to the Council of the intention to take this step. He had no doubt that if Mr. Mackay were present he could explain the circumstances.

Mr. Frazer regretted he could not give the Council any definite information on this subject, not having been present at the meeting in Edinburgh when this course was decided on. He could only suppose that some practical obstacles had been found which rendered it desirable to change. Mr. Mackay had informed him that he should not be able to attend the present Council meeting, but hoped to attend that of next month.

After some remarks by Mr. Brown and Mr. Hampson, it was decided that the Secretary should write to the Secretary of the North British Branch, asking him to favour the Council with an account of the circumstances which had led to the recent change of premises.

The late Mr. Morson.

The President read a letter from Mr. Thomas Morson, acknowledging in very cordial terms the receipt of the letter of condolence from the Council respecting the death of his late father. Mr. Thomas Morson also begged to be allowed to present to the Society an oil portrait of his father, to be executed by an artist who had long enjoyed his intimate acquaintance.

The letter was ordered to be entered on the minutes, and on the motion of the President, seconded by the Vice-President, it was resolved that Mr. Morson's offer to present the Society with a portrait of his father be gratefully accepted.

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

Graham, William Woodrow.
Hetherington, Martin Luther.
Kemble, James.
Pickard, William.
Thompson, Lawrence Joseph.

An associate was restored to his former status in the Society, on payment of the subscription for the current year and a fine of five guineas.

Elections.

MEMBERS.

Joseph Cockshott, an associate of the Society from 1842, was elected a member of the Society,

Pharmaceutical Chemists.

Graham William Woodrow.....Dalbeattie.
Kemble, James.....Lostwithiel.
Pickard, William .....London.

Chemists and Druggists.

Cummock, John .....Troon
Fay, Cyrus.....Stockwell.
Morley, George..... .....Wainfleet.
Thacker, William .....Richmond, Surrey.

ASSOCIATES.

The following having passed their respective examinations, and being in business on their own account, were elected "Associates in Business" of the Society.

Minor.

Beach, Tom Clarke .....Gloucester.
Blackmore, Peter Ludgate .....Stratford.
Dunn, Frederick Edwin .....Sudbury.
Lee, William Walter .....Wandsworth.
Ransford, William ....Bristol.
Roberts, Joseph Elliott .....Harrow Road, W.
Stephens, Henry Isaac.....Liverpool
Storey, John Charles.....Hull.
Sutton, William .....Lavenham.
Watson, Joseph Henry.....Shipley.

Modified.

Fletcher, Francis Bagshaw .....East Retford.
Hudson, Thomas Frederick.....Mile End, E.
Jones, Joseph .....St. John's Wood, N.W.

The following having passed their respective examinations, were elected "Associates" of the Society.

Minor.

Bettle, Joseph Alfred .....Bedford.
Blake, Charles Alexander .....London.
Booth, William Grounds.....Manchester.
Brooks, Charles.....Wandsworth Road, S.W.
Coles, William ....Great Missenden.
Dampney, Richard Shepherd...Chard.
Dutchman, Walter .....London.
Geldart, John .....Whitehaven.
Gilders, George Pollard .....St. Leonards.
Gordelier, William Gibbs.....Sittingbourne.
Gostling, William Ayton.....Diss.
Heath, Frederick Devon.....High Wycombe.
James, Joseph .. ..Hanley.
Keen, Nimrod .....Birmingham.
Knights, James West .....St. Ives, Hunts.
Mackay, James Bunyan Lillie...Edinburgh.
Miller, Cecil Bradley .....Wellingborough.
Murray, Robert Dalziel .....Edinburgh.
New, Thomas Cheney .....Evesham.
Ordish, Thomas.....Manchester.
Owen, Samuel .....Leominster.
Palmer, William Joseph .....King's Lynn.
Scobie, James .....Perth.
Taylor, George .....Kendal.
Whyte, Alexander.....London.

Modified.

Althorp, Henry.....Chester.
Little, Robert..... .....Carlisle.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary Examination, were elected "Apprentices or Students" of the Society :—

Bennett, Isaac Booth .....Stockport.
Clark, Robinson Urwin .....Jarrow.
Josling, Alfred .....Chelmsford.
Priestley, Walter Herbert .....Barnstaple.
Rumsey, James Window .....Criekhowell.
Smith, George .....Sunderland.

HONORARY MEMBERS.

Mr. SANDFORD nominated Professor Robert Bentley, and, in the absence of Mr. Schaeht, Dr. Porter Smith, as Honorary Members of the Society. In accordance with the regulations, the names of these gentlemen will be suspended in the Library for a month, and be voted upon at the next meeting.

NOMINATIONS FOR COUNCIL AND AUDITORS.

The SECRETARY reported that there had been 42 nominations to fill the 14 vacant seats, and the following 26 gentlemen had signified their readiness to accept office if elected :—

Atkins, Samuel Ralph, Market Place, Salisbury.
Baildon, Henry C., 73, Princes Street, Edinburgh.
Baldock, John Henry, 3, High St., South Norwood, S.E.
Bottle, Alexander, 37, Townwall Street, Dover.
Bower, William, 96, Tottenham Court Road, London, W.
Broad, John, Rise House, Hornsey Rise, N.
Chipperfield, Robert, 50, Oxford Street, Southampton.
Fowler, Stanley, 36, Elgin Crescent, Notting Hill, W.
Frazer, Daniel, 113, Buchanan Street, Glasgow.
Freeman, Richard, 70, Kennington Park Road, S.E.
Hampson, Robert, 205, St. John Street Road, E.C.
Hills, Thomas Hyde, 338, Oxford Street, W.
Mackay, John, 119, George Street, Edinburgh.
Owen, John, 51, Holloway Road, N.
Preston, Joseph Classon, 88, Leadenhall Street, E.C.
Rimmington, Felix Marsh, 6, Ivegate, Bradford.
Robbins, John, 372, Oxford Street, W.
Sandford, George Webb, 47, Piccadilly, W.
Schaeht, George Frederick, 7, Regent's Place, Clifton.
Shaw, John, 24, Great George Place, Liverpool.
Stacey, Samuel Lloyd, 300, Holborn, W.C.
Stoddart, William Walter, 9, North Street, Bristol.
Sutton, Francis, Bank Plain, Norwich.
Thomas, Richard Wheeler, 10, Pall Mall, S.W.
Turner, Charles Ernest, 63, Great Russell Street, W.C.
Williams, John, 16, Cross Street, Hatton Garden, E.C.

The following sixteen members declined to accept office if elected :—

Andrews, Frederick, 23, Leinster Terrace, Hyde Park, W.
Bell, William Henderson, 96, Albany Street, Regent's Park, N.W.
Bland, John, 51, Penton Street, Pentonville, N.
Burden, Edward, 38, Duke Street, Grosvenor Square, W.
Constance, Edward, 37, Leadenhall Street, E.C.
Faulconer, Robert Stephen, 270, Walworth Road, S.E.
Gulliver, William, 6, Lower Belgrave Street, S.W.
Guyer, James Brett, 11, Strand, Torquay.
Hanbury, Cornelius, Plough Court, Lombard Street, E.C.
Hills, Walter, 338, Oxford Street, W.
Morson, Thomas, 124, Southampton Row, W.C.
Palmer, Robert, 35, Ovington Square, S.W.
Savory, Charles Harley, 143, New Bond Street, W.
Sharpe, George Young, 34, High Street, Notting Hill, W.
Urwick, William Walker, 60, St. George's Road, Pimlico, S.W.
Yarde, Giles, 60, Lambs Conduit Street, W.C.

Several members of the Council expressed their surprise and regret at Mr. Urwick's decision to withdraw his name.

Mr. URWICK desired to thank his colleagues for their kind expressions, but said he was unable at present to spare the time necessary for attending to the duties of the Council.

The Secretary reported that the following five members had been nominated for election as auditors in May next, and had declared their willingness to accept office if elected.

Andrews, Frederick, 23, Leinster Terrace, Hyde Park, W.
Barron, Frederick, 2, Bush Lane, Cannon Street, E.C.
Hodgkinson, William, 127, Aldersgate Street, E.C.
Horner, Edward, 20, Bucklersbury, E.C.
Squire, William, 5, Coleman Street, E.C.

FINANCE.

The report of this committee was read, and various accounts were ordered to be paid. The balance-sheet and departmental accounts were also presented, and the report of the auditors. The latter stated that they had not signed the departmental statement of accounts, because they were unable to vouch either the due allocation of receipts and expenses to the various accounts, or the estimated values of the copyright of the Journal, lease of premises, etc., which had been introduced.

Mr. STODDART inquired what the item of £1600 due to the Society represented.

The SECRETARY said it was the amount due by Messrs. Churchill on the Journal account.

After some further conversation the report of the committee was received and adopted, and the financial statement as audited was ordered to be published with the annual report.

BENEVOLENT FUND.

The report of the Benevolent Fund committee was read and adopted.

The PRESIDENT read a letter from Mr. Thomas H. Wyatt, architect, offering to present the Society with an old engraving, which had lately come into his possession, representing Bloomsbury Square in the year 1787, and showing the premises of the Society. The letter was ordered to be entered on the minutes, and it was resolved that the engraving be accepted, and that the thanks of the Council be conveyed to Mr. Wyatt.

LIBRARY, MUSEUM, AND LABORATORY.

The report of this committee recommended the purchase of the following books for the library :—

Tuson's 'Veterinary Pharmacopœia,' second edition ; Lockyer's 'Spectroscope and its Applications,' second edition ; Rodwell's 'Birth of Chemistry ;' Griffith's 'Universal Formulary,' third edition, by Maisch.

The librarian reported that during the month of February books had been supplied to 19 members in the provinces : the average attendance in the library had been 15·37 during the day and 5 in the evening, showing an improvement.

Professor Bentley reported that he had 30 students attending his second course of lectures, 13 of whom had also attended the first.

Professor Redwood reported that he had 32 students now attending, of whom 14 had attended his first course.

Professor Attfield stated that he had had 71 entries since the commencement of the session, 38 students being now at work.

Specimen sheets of a catalogue of the specimens in the museum were presented by the curator, one with explanatory notes and one without. The committee recommended that the former be adopted, and also that the English synonyms should be added where practicable. The curator also applied for a microscope to be used in the museum, and the committee recommended that one be provided at a cost of £10 to £15. With regard to the question of opening the museum in the evening, the committee recommended that a trial should be made, they being of opinion that no attendant other than the hall porter would be required.

Mr. ATHERTON asked what had become of the two microscopes which the Society already possessed.

Mr. WILLIAMS said the Society had two valuable microscopes, but they were in almost constant use by the professors, who he did not think could very well be asked to surrender them.

Mr. GREENISH said there could be no question in the mind of any one as to a microscope being a matter of necessity to the curator of a museum such as the Society's, and he ought to have one in constant use. Everyone engaged in the examination of different substances connected with materia medica must be aware that it is on the microscope he mainly depends for the identification of many articles, and for the detection of substitution or adulteration in others.

Mr. SANDFORD said the specimen sheets of the catalogue which had been submitted by the curator did him great credit, and would be most useful.

The report and recommendations of the committee were then received and adopted.

PARLIAMENTARY.

This committee had held one meeting, when it was determined to postpone the consideration of the objectionable parts of the Adulteration Act until the meeting in May, but if in the meantime any amendments or alterations were announced, the committee would meet to consider them.

The VICE-PRESIDENT said the Juries Bill was set down for the 22nd of April ; he should like to know if the attention of the committee had been called to it.

The SECRETARY said the Bill had not yet been printed. As soon as he could get copies he would send one to each member of the committee, and, if necessary, a meeting would be called.

SPECIAL COMMITTEE ON THE LETTER TO THE COUNCIL FROM THE BOARD OF EXAMINERS IN SCOTLAND.

The report of this committee stated that a deputation from the Board of Examiners in Scotland, consisting of Messrs. Tait and Gilmour, accompanied by Dr. Maclagan, the Government visitor, had attended the examination in the month of March. The questions for consideration had by this visit been very materially reduced, inasmuch as the practice of the London Board had shown the North British Examiners that certain regulations which they had objected to were not of the character they had supposed. These gentlemen having become conversant with the practice of the London Board were satisfied that the same arrangements might be carried out in Edinburgh, and the committee had, therefore, much pleasure in reporting that the divergence between the two boards was now removed, and that their practice would in future be identical. This was regarded as another proof of the necessity for more frequent interchange of personal communication between the two examining boards. Discussion had arisen as to the amount of time that should elapse before rejected candidates were allowed to present themselves again for examination. On account of the number of failures which had taken place it was unanimously resolved by the Committee of the Council, the London Board of Examiners, and the Deputation from the Scotch Board to recommend that after October next candidates who failed should not be admitted to subsequent examination until after an interval of three or six months at the discretion of the Board of Examiners. It was also recommended that the two boards should communicate to each other from time to time the names of unsuccessful candidates to insure this regulation being enforced.

Mr. BAYNES said there was a very important suggestion in the report, namely, that the term of three or six months interval should be at the will of the examining bodies. He would a great deal rather determine at once that a rejected candidate should not come up again for six months, or for any other term which might be decided upon if three months were too short, unless some special circumstance induced the examiners to make an exception in his favour ; but he objected to the proposed alteration, and also to a correspondence between the two bodies, as being mischievous and troublesome.

Mr. SANDFORD said the practice hitherto was that when a man failed he was sent back for three months ; but the examiners were of opinion that that time was not in all cases sufficient, and they therefore desired the power of referring some candidates to their studies for six months. The object of the communication between the two boards was that if A. B. failed at an examination in London he should not be allowed to present himself in Edinburgh before the expiration of the term fixed.

Mr. HAMPSON said there was an important principle involved here which he must object to. The examiners wished to have the power of restricting candidates from presenting themselves at the termination of three months. It was quite possible that many came up unprepared, but if they were rejected that was quite sufficient. He did not think the examiners should have the option of fixing an arbitrary period as to the time at which the candidates should present themselves again. Sometimes a candidate from some unforeseen circumstance utterly failed to pass, yet he might have resolution, talent, and opportunity sufficient to prepare himself in three months, and he should therefore have the right of representing himself if he thought proper.

Mr. BETTY agreed with Mr. Hampson. They ought to look at this matter in all its bearings, and though the number of failures for the minor examination had been very great recently, it was pretty well understood that that number was exceptional and arose from reasons which were generally known, and he objected to legislate for exceptional circumstances. He also demurred to the names of the rejected candidates being published in the way proposed. He did not believe such a practice was adopted by any similar body and should be sorry to see it introduced.

Mr. SANDFORD said the two boards were really the two boards of one Society—they were virtually the same.

Mr. BETTY remarked that if a young man failed to pass an examination at the London College of Surgeons he could go to Edinburgh and pass there. Practically the case was the same. He objected to the name of any one who had failed being sent out of the establishment.

Mr. GREENISH did not think the alteration ought to be made under present circumstances.

Mr. RADLEY said he knew of two cases, if not three, of young men who had come up for the first time, and being exceedingly nervous had failed, but in three months they had presented themselves again, and passed very creditably.

Mr. WILLIAMS said he was both astonished and pained that so much opposition should be made to this proposal, and thought the Council ought to have some consideration for the Board of Examiners. They were men who practically came in contact with the candidates, and their opinion, which was very strong upon this subject, ought to be taken. They believed that six months was in many cases quite short enough, considering the ignorance which many of the candidates displayed, and that therefore they ought to have the power of preventing those candidates from re-entering for examination at a shorter interval. Already the report that such a step was in contemplation had been noised abroad, and he understood that some of the gentlemen who undertook to prepare candidates for the examination at a certain fixed amount had made up their minds to double their fees. In fact, if this three months system were altered, he believed it would tend to break down the cramming system of which they had heard so much lately. With regard to sending the names of rejected candidates, it was agreed upon all sides that it was most essential that the young men who failed in London should not have the opportunity of going to Edinburgh and presenting themselves for examination, or *vice versâ*. The only way to check such a practice would be to insist upon the names of rejected candidates being communicated between the two boards. He hoped the report would be adopted.

Mr. SANDFORD then moved and Mr. WILLIAMS seconded a resolution that the report and recommendations of the special committee be received and adopted.

Mr. BROWN thereupon said he must move an amendment to the effect that the recommendation, whereby the term of three months prescribed before re-examination might at the discretion of the examiners be extended to six months, be not agreed to by the Council. That was the only part of the report which was objected to, and it appeared to him there was no evidence before them, and he had not heard any arguments from the previous speakers, to show why this power should be given. After full consideration the time of three months had been fixed upon as the interval that ought to elapse, and he did think it would be very injurious to invest the examiners with such a discretionary power. He did not see that what had been reported with respect to the cramming system had anything whatever to do with the question, and certainly it was beneath the dignity of the Council and the professors to talk so much about cramming as they had done. The examiners of the Society were either competent or incompetent to discriminate between those who came up to be examined and to decide who were proper to be entrusted with the responsibility of business. If they did not take sufficient time, or had not sufficient facilities afforded them to properly test the candidates, some alteration should be made in that respect. But in many cases it would be a serious injustice if the discretion were left to the examiners to remit a young man for six months to his studies, when perhaps he had only failed in one subject. He did not suppose that young men were so foolish as to present themselves a second time without having made something like proper preparation, and he did not believe it was the fact that candidates were constantly presenting themselves every three months without being prepared.

Mr. SAVAGE suggested that instead of a direct negative being given, the question should be postponed *sine die*. He wished also to say that he did not believe some of the gentlemen who had been alluded to by Mr. Williams, who prepared young men for the examinations, deserved all that was sometimes said about them. From what he could gather they paid a great deal of attention to their pupils, and insisted on their attending closely to their studies, not only during the lecture hours, but at home.

Mr. HAMPSON seconded the amendment, thinking it would be very unwise to accede to the proposition of the Board of Examiners.

Mr. GREENISH said it was within his own knowledge that a most able young man had failed to pass the first time, but came up in three months and passed with honours.

Mr. SUTTON observed, with regard to the "cramming" question, that if men were determined to cheat they would do it somehow, and he really did not think the proposed alteration would affect it, because if the candidates were sent back for six months, and wished to cram they would not cram the whole of the six months, but simply for a short time at the end of that period.

The PRESIDENT thought the examiners were treated rather more hardly than they deserved, for they had as much consideration for the young men that came up as any gentleman present. They did all they could to ascertain what knowledge the candidates possessed, and if it were possible to pass them with satisfaction to themselves and honour to the Society they would do so. He himself had frequently recommended young men not to come up again for six or even twelve months, and it was not proposed to prevent those coming up earlier who might reasonably expect to be prepared. He hoped that the Council would agree to the recommendation, feeling certain it would save a great deal of time to the examiners and money to the candidates. At any rate, if they did not agree to it they might refer the matter back to the committee.

Mr. BROWN thought it most important there should be one fixed rule. If three months were not long enough they might make it six, which he should much prefer to the plan now suggested; perhaps giving the examiners discretionary power to reduce the time.

The VICE-PRESIDENT said he had referred to the regulations for the examination of the College of Physicians, the College of Surgeons, and the Society of Apothecaries, and he found nothing indefinite there with reference to the period for which young men should be referred to their studies if they failed to pass the examinations. For the College of Physicians, if they failed in the first examination they were sent back for three months, but at the second examination they were sent back for six months, and the same applied to the other bodies he had mentioned. There was no discretionary power. It did occur to him that they might meet the matter by resolving that a candidate who failed in two subjects should be sent back for three months, while one who failed in three should be sent back for six months. He suggested that the amendment should be altered so as to refer the matter again to the committee.

Mr. BROWN said he could not do so. The more he thought about it the more was he convinced of the necessity for the amendment, and the more opposed was he to

granting a discretionary power. No one was prepared to pay greater respect than he to the efforts of the board, and to the fairness with which they carried out the examinations, or the consideration which they extended to candidates; for when he was vice-president he attended very frequently, and was very much satisfied with what he had learnt on those occasions. Nevertheless, he was decidedly of opinion that it would be a mistake to give the discretionary power now asked for.

On the amendment being put, the following voted :—

For—Messrs. Atherton, Baynes, Betty, Brown, Frazer, Greenish, Hampson, Owen, Radley, Robbins, Savage, Stoddart, Sutton, and Urwick.

Against—The President, Mr. Sandford, and Mr. Williams.

The Vice-President was present, but did not vote.

On the amendment being put as a substantive motion, Mr. Sandford suggested an amendment, that the matter should be again referred to the committee, but this was subsequently withdrawn, and the substantive motion was carried.

The report of the committee was then adopted with the exception of the portion referred to in the above amendment.

Additional Scholarships.

The committee appointed to consider this question reported that they had met, but as neither Mr. Schacht or Mr. Mackay were able to be present they decided to postpone the discussion.

Deputy-Superintendents of Examinations.

The following were appointed Deputy Superintendents of the Society's examinations :—

Rev. E. Hutchinson .....Darlington.
Mr. William Gethen .....Hereford.

Reports of Examinations.

March, 1874.

England and Wales.

Examinations.		Candidates. Examined.	Passed.	Failed.
Major		4	4	0
Minor	March 11th	23	11	12
,,	,, 12th	24	13	11
,,	,, 13th	27	3	24
,,	,, 18th	19	5	14
		— 93	— 32	— 61
		97	36	61

Preliminary certificates received in lieu of the Society's Examination :—

University of Cambridge	3
University of London	1
College of Preceptors	2
	6

Scotland.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	1	1	0
Minor	23	9	14
Modified	2	1	1
	26	11	15

Conversazione.

The Committee appointed to make arrangements for the forthcoming Conversazione reported certain arrangements which had been made and some which were still in progress. The report was adopted.

The Secretary stated that the new wing of the museum would be thrown open on the evening in question.

General Purposes.

This committee reported that they had held a meeting on that morning to receive the reports of Professors Redwood and Bentley respecting the examinations at the termination of the first course of their lectures. It appeared that the attendance had been very good and the examinations satisfactory. The committee recommended that in addition to the bronze medal which it had been announced would be given to the most successful candidate, two certificates should also be awarded to those who attained a certain proportion of marks.

Mr. Robbins said he believed it was considered by the committee that the professors had to a certain extent compromised the matter by leading the students to understand that these certificates would be given, and therefore, though several members objected to a departure from the regulations which had been already published, they ultimately consented to this recommendation.

Mr. Urwick said his feeling was that the matter was so strongly recommended by Professor Redwood that it would be better to err in the direction of generosity.

Mr. Frazer said his opinion was that they should give the bronze medal which had been announced, and nothing else.

Mr. Williams was of the same opinion, and thought giving so many certificates would only tend to reduce and degrade the honour which it was intended to convey.

Mr. Urwick said that it was generally known to the students before the examination took place who were likely to be successful in obtaining prizes, and others did not care about competing. It was to encourage the latter class that these certificates were desired.

Mr. Frazer said he objected to the certificates being given, if only out of justice to those who had not competed. Many might have done so if they had known that certificates would be awarded, but who, relying on the published regulations, had not come forward.

Mr. Urwick said he believed the students had been given to understand generally that there would be certificates.

Mr. Greenish had always advocated two certificates being given. It was quite true, as had been said, that the students were under the impression that these certificates would be awarded. His desire would be to induce all young men, as soon as they entered the business, to commence attendance on the lectures; but those who did so while still in business could not be expected to compete successfully with young men who were at work in the laboratory, devoting their whole time to study, and consequently they would not enter the competition. Therefore he thought it would be well to award two certificates to those who were not able to obtain the only bronze medal.

Mr. Sutton observed that these remarks applied almost exclusively to the case of Londoners, whereas young men in the country might be quite as deserving, but from not having an opportunity of attending the lectures they would not be able to obtain the certificates.

Mr. Betty said he recollected when the subject of the silver and bronze medals and certificates was thoroughly discussed, the professors being present. As he understood, the question was then decided, and it ought not to have been brought forward again. It was then settled according to the terms of the advertisement which had appeared since in the Journal, every word of which was most carefully considered both by the Council and by the professors. He did think, therefore, they were bound not to depart from the course which had been thus laid down. If their decision was a wrong one, let it be reconsidered at a future time, and fresh regulations made; but so long as they were in force they ought to be adhered to.

Mr. Sandford said at the time the discussion took place to which Mr. Betty had referred, it was arranged that a bronze medal should be given at the end of each five months' course, and a silver medal at the end of the ten months' session, when certificates would also be granted.

If they now agreed to give certificates at the end of five months there would be two at the end of each course and two or three others for the whole session, so that confusion would be likely to arise, and being so many, their value would be lessened. He was decidedly of opinion therefore that they should adhere to the rules already laid down, and he could not agree that the students had been led to expect any certificates would be awarded beyond the certificate of attendance given by the professors.

Mr. BAYNES thought the recommendation of the committee should be supported.

Mr. GREENISH said the matter was of great importance, not only with regard to this examination but to the number of young men entering in future. He thought they ought to endeavour to get at least half the young men attending the lectures to compete at the examinations. This would never be the case unless certificates were awarded in addition to the bronze medal.

Mr. WILLIAMS said he had suggested to the committee that a compromise might be effected by giving certificates of merit only, not certificates of honour.

The VICE-PRESIDENT could not believe it was the intention of the Council to depart from the published statement in the calendar of the prizes to be awarded; what was the use of printing a new calendar, with certain regulations and then adopting fresh ones?

Mr. FRAZER then moved an amendment—that the proposal to award certificates of merit at the end of each course be not agreed to. This was seconded by Mr. Williams, and, on a division, carried by 8 to 4.

With this exception the report was agreed to, and the Bronze Medals for the successful competitors in the examinations at the conclusion of the first lecture course of the present session were awarded to—

James Kemble, Chemistry and Pharmacy.

William Ayton Gostling, Botany and Materia Medica.

PHARMACEUTICAL MEETING.

Wednesday, April 1st, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting having been read and confirmed, the following donations were announced, and the thanks of the Society awarded to the donors:—

For the Library—'Throat Hospital Pharmacopœia,' from Dr. Morell Mackenzie; 'Ueber die Bukublätter,' from Professor Flückiger; 'Les Eaux Thermales de l'Ile de San Miguel (Açores),' from the Portuguese Legation; 'On the Geometrical Isomorphism of Crystals and the Derivation of all other Forms for those of the Cubical System,' by the Rev. W. Mitchell, M.A., from the Victoria Institute.

For the Museum—Specimen of congœ or kungee oil, pods, and seeds, from Mr. Thomas Buck. A specimen of *Arachis hypogœa*, for the herbarium; from Mr. George Nicholson.

The thanks of the Society were voted to the donors.

DISPENSING NOTE ON CHLORO-MERCURATE OF MORPHIA.

Mr. W. MARTINDALE then read a Dispensing Note on Chloro-Mercurate of Morphia, which will be found on p. 809.

MATERIA MEDICA.

Mr. E. M. HOLMES furnished some further information respecting Koegoed, a South African plant, which was brought under the notice of the British Pharmaceutical Conference at Brighton. He also gave details respecting some cases of admixture of other substances with cascarilla, arnica, and belladonna roots. The paper is printed on p. 810.

Mr. HANBURY asked if the spurious arnica was mixed with the other or whether it came in a separate state.

Mr. HOLMES said that one sample contained about one-half arnica and half *Geum* and other roots; another sample, however, had only 5 per cent. of real arnica.

Mr. HANBURY said that about two months ago he was shown a sample of a drug sold as arnica which did not contain any arnica at all, but consisted entirely of some other root which he could not identify. Such a thing could hardly be called adulteration, because it was a complete substitution.

TINCTURE OF PERCHLORIDE OF IRON.

Dr. J. E. DE VRIJ said that he had intended to bring the subject of Tincture of Perchloride of Iron before the meeting at some length, but having that day seen for the first time a paper read by Professor Attfield ten years since, he found that much of what he had to say had been anticipated. His attention had been called to the subject by a paper contributed by Mr. Hustwick to the Pharmaceutical Conference at Brighton in 1872, in which Mr. Hustwick favoured the substitution of the liquor for the tincture whenever the latter was ordered. Dr. De Vrij said that in his opinion such a step was not justifiable; for, notwithstanding all that had been objected, physicians still ordered the tincture, and probably would continue to do so. He thought that the principal point in the preparation of tinctura ferri perchloridi was to first obtain a really neutral solution of perchloride of iron. This could be prepared by passing chlorine gently through a solution of ferrous chloride as long as any was absorbed, and afterwards driving off excess of chlorine by exposure to a temperature not exceeding that of the water-bath. When the alcohol was added to such a solution, a tincture was produced, which, contrary to what was usually stated, remained bright and clear if exposed to the sunlight, but yielded a precipitate if kept in the dark. Dr. De Vrij exhibited two specimens illustrating this fact.

Professor ATTFIELD said this communication might be divided into two parts, that which related to a preparation of a neutral solution of perchloride of iron in water and that which related to the tincture. Dr. De Vrij made a clear addition to their knowledge when he said that a pure neutral solution of the perchloride, made by passing chlorine into a solution of ferrous chloride, might be quite freed from the excess of chlorine by exposing it over a water-bath. He there went beyond the point which he (Professor Attfield) had reached when he read the paper to which reference had been made. Since that time he had been accustomed in the laboratory to prepare a solution of perchloride of iron pretty much in the way mentioned by Dr. De Vrij; but they had made what he thought a little improvement by passing a steady current of air through the solution, thus enabling free chlorine to be driven off somewhat more rapidly, and so reducing the chance of the solution of perchloride of iron becoming altered. With regard to the tincture, he understood Dr. De Vrij to say that if it were made by the addition of the alcohol to that solution of neutral perchloride of iron and then exposed to the light, no deposition of precipitate occurred, but that a clear solution resulted. He could quite confirm that observation, but he could not agree that there was thereby produced a solution of perchloride of iron with spirit only. No doubt Dr. De Vrij was perfectly aware that while the tincture was exposed to the light a reaction was going on, and the ferric chloride was being reduced into ferrous chloride, and ethereal compounds containing chlorine were produced at the same time. If it were exposed for a sufficient length of time the tincture would become green, and was then no longer tincture of perchloride of iron at all, but ferrous chloride entirely with some ethereal bodies. It was quite obvious if the tincture of perchloride of iron were made according to directions, namely, by adding alcohol to the aqueous solution, that instead of preserving the compound, which was generally the reason for adding alcohol, it decomposed it, and therefore there could be no doubt that this addition was a great mistake, and that a simple aqueous solution of perchloride of iron was much to be preferred. His own idea was that the alcohol was simply wasted, but still there was no doubt that if conservative

physicians continued to order the tincture, as they doubtless would for a long time to come, pharmacists must continue to make it. It should, however, be understood by all that when this tincture was ordered that which was dispensed would be a tincture which might contain perchloride of iron, but it might also contain ferrous chloride and chlorinated ethereal bodies, and therefore was not a definite preparation. The aqueous solution could be kept for any length of time without spoiling.

Dr. De Vrij said the tincture Professor Attfield had alluded to was a tincture much used on the continent. It was made by the addition of alcohol to the perchloride of iron, and when exposed to the light became not only green, but, at length, quite white ; though very curiously, if kept in the dark, it turned a beautiful yellow colour, like gold, so that probably the ferrous chloride became ferric chloride again. From possessing this yellow colour it was generally described in the books as "golden drops." With regard to the practice of physicians in these matters he could only say that sometimes when you told a physician of the chemical action which took place in these compounds, the reply given was that the human body was not a retort.

Professor Attfield said he recognized quite plainly in the tincture which Dr. De Vrij had prepared, the presence of the chlorinated ethereal bodies he had referred to, and Mr. Groves (sitting next) also thought a considerable amount of decomposition had occurred in the specimen.

Additions to the Pharmacopœia.

Mr. C. Umney then read a paper on the 'British Pharmacopœia Addendum,' which was illustrated by specimens of the new preparations. The paper was printed at p. 789 of the Journal of last, and gave rise to the following discussion :—

The President, in offering Mr. Umney the best thanks of the meeting for his interesting and elaborate paper, regretted that there was so little time left to discuss it.

The Vice-President said Mr. Umney had called attention to the Addendum to the Pharmacopœia, which bore date January 24th, but as there were two versions of that Addendum, probably some gentlemen would refer to one and some to the other, which would very likely lead to confusion, as there were considerable variations between the two. Only last week he purchased a copy at Messrs. Churchills, but on examining it he found that the body of the work did not correspond with the Index, since the latter referred to page 24 for the Tincture of Ipecacuanha, but on turning to that page there was no such subject. On obtaining from the Library a copy of the Addendum which had been placed there, he found upon a very brief comparison that there were many variations between the two, and in the course of half an hour he had jotted down some of these discrepancies, which were as follows :—

December, 1873.	*January*, 1874.
Corrections—p. 166, *for* $16\frac{1}{2}$ *read* $23\frac{1}{2}$.	"*For* $16\frac{1}{2}$ *read* 24."
Index—Omitted.	"Areka."
,, Omitted.	"Laricis Cortex."
,, "Pilula Jalapæ Comp."	Omitted.
,, Omitted.	"Pilula Phosphori."
,, Omitted.	"Pilula Scammonii Comp."
,, Omitted.	"Pulvis Glycyrr. Comp."
,, "Tinct. Ipecac.," which does not appear in the book.	Omitted.
Index—Omitted.	"Tinctura Laricis."
,, Omitted.	"Tinctura Quiniæ Ammon."
Page 13 — Calcis Hypophosphis, dose 2 to 5 grs.	Dose 5 to 10 grains.
Page 14—Extm. Glycyr. Liquidum, made from hard extract.	Made from root.
Page 18—Ol. Phosphoratum.	Formula varied and dose altered.
	Pulvis Glycyrr. Comp., differing from Phar. Prus.
	Sodæ Hypophosphis, dose increased.
Page 23—"Syr. Chloral."	Syr. Chloral, formula varied.
,, Tinct. Aurantii Recentis.	Made up to the pint.
,, Omitted.	"Tinct. Laricis."
,, Omitted.	"Tinct. Quiniæ Ammon."

With these two varying books, both dated 1874 on the cover, but one bearing date December, 1873, inside, and the other January, 1874, they ought to know which they were discussing before they began. Perhaps Professor Redwood could explain how these discrepancies arose.

Mr. Bland suggested that the discussion should be adjourned, as it was already late, and the subject was of such importance.

Professor Redwood regretted he was unable to give any explanation how the different variations got into circulation, but it was evident some mistake had been made either by Mr. Bottle or by the bookseller who supplied him. There was no doubt the Addendum to the Pharmacopœia, proposed to be made by the committee of the Medical Council, was in print even in the early part of 1873, and was circulated amongst the members of the Council and their friends. It was also true that there were the differences which had been pointed out between it and the work which had just been published, but he entirely denied that there had been any publication of the work until very recently in the present year. Besides, as now published, the title was "Additions to the Pharmacopœia," whereas the copies which had been circulated amongst the Medical Council for something like twelve months were entitled "Addendum." Those had been circulated in order that members of the Medical Council might get all the information they could from their medical and pharmaceutical friends, and consequent upon such inquiries the corrections which Mr. Bottle had pointed out had been made in the revised edition. He could only account for one of the former having been published on the supposition that some of the sheets had got mixed at the printers, and by inadvertence had been sent to the bookbinders and issued with the revised edition. The Addendum had never been sent out at all except for private circulation. He should like to make some observations on the Additions, but should much prefer before doing so to hear the observations of practical men who had been engaged in making the various preparations, and should therefore be very glad if the discussion were adjourned.

It was then agreed to adjourn the discussion until the first Wednesday evening in May, and the proceedings terminated.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

The anniversary meeting of the Chemical Society was held on the 30th March, Dr. Odling, F.R.S., President, in the chair. The President, in his sketch of the history of the Society during the past year, stated that there had been an increase of 51 in the gross total of members. He read short biographical notices of the following who had died :—Baldwin Francis Duppa, Frederic Crace Calvert, Henry Bence Jones, William Husskisson, jun., Charles Davy, William John Hay, and Daniel Stone. The only foreign member the Society had lost was Justus von Liebig, to whose memory the President paid a graceful tribute. It was proposed that early next session Dr. Hofmann should deliver the third Faraday lecture, the subject being "A Discussion of the Early Work of Liebig." During the past year 51 papers had been read, besides four lectures, against 22 in 1872 and 58 in 1873.

Dr. Odling called attention to the fact, which did not appear to be generally known, that the Society made small grants to assist experimental chemists in the prosecution of original research.

After the reading of the Treasurer's report, which showed a satisfactory condition of the finances, the following officers and other members of the Council were elected for the ensuing year :—

President.—W. Odling, M.B., F.R.S.

Vice-Presidents who have filled the office of President.—Sir B. C. Brodie, F.R.S. ; Warren De la Rue, Ph.D., F.R.S. ; E. Frankland, D.C.L., F.R.S. ; A. W. Hofmann, D.C.L., F.R.S. ; Lyon Playfair, Ph.D., C.B., F.R.S. ; A. W. Williamson, Ph.D., F.R.S. ; Col. P. Yorke, F.R.S.

Vice-Presidents. — J. H. Gladstone, Ph.D., F.R.S. ; A. Vernon Harcourt, M.A., F.R.S. ; G. D. Longstaff, M.D. ; H. E. Roscoe, Ph.D., F.R.S. ; Maxwell Simpson, Ph.D., F.R.S. ; A. Voelcker, Ph.D., F.R.S.

Secretaries.—W. H. Perkin, F.R.S. ; W. J. Russell, Ph.D., F.R.S.

Foreign Secretary.—H. Müller, Ph.D., F.R.S.

Treasurer.—F. A. Abel, F.R.S.

Other Members of Council.—J. Attfield, Ph.D. ; H. E. Armstrong, Ph.D. ; Dugald Campbell ; J. Dewar, F.R.S.E. ; A. Dupré, Ph.D. ; G. C. Foster, F.R.S. ; M. Foster, M.D., F.R.S. ; Peter Spence ; Hermann Sprengel, Ph.D. ; Thomas Stevenson, M.D. ; R. Warington ; C. R. A. Wright, D.Sc.

Thursday, April 2nd, 1874 ; Professor Odling, F.R.S., in the chair. After the transaction of the usual business of the Society, papers "On Sulphocyanide of Ammonium and Sulphocyanogen," by Dr. T. L. Phipson ; and a "Note on a Reaction of Gallic Acid," by H. R. Procter, were read by the secretary. Mr. Procter finds that a mixture of gallic acid and potassium arsenate when exposed to the air acquires a beautiful green colour. Mr. W. Noel Hartley then read a memoir "On Cobalt Bromides and Iodides," in which he described the method of preparation and properties of these compounds. They closely resemble the corresponding chlorides. Fine specimens of the different salts were exhibited by the author. Mr. E. Neison read a paper on "The Distillation of of Sodium Ricinoleate," and Mr. C. H. Piesse a "Note on the Solubility of Plumbic Chloride in Glycerine;" Mr. Kinzett had a voluminous communication "On Ozone as a Concomitant of the Oxidation of the Essential Oils"—Part I.; and from his experiments he infers that the compound produced during the oxidation of oil of turpentine is neither ozone nor hydrogen peroxide, but a hydrated oxide of turpentine. The last paper was on the "Action of Chloride of Benzyl on Camphor"—Part II., by Dr. D. Tommasi.

The meeting then adjourned until Thursday, 16th April, when communications will be read "On Isomeric Terpenes and their Derivatives—Part IV.: Oil of Cajeput," by Dr. C. R. A. Wright ; and "On the Constitution of Urea," by Dr. D. Tommasi.

SOCIETY OF CHEMISTS AND DRUGGISTS OF IRELAND.

The first of a course of popular scientific lectures, in connection with this Society, was delivered on Monday evening, March 30th, in the Molesworth Hall, Dublin. The attendance was considerable.

On the motion of Mr. J. T. Holmes, the chair was taken by Mr. John Brooks.

The lecturer was Professor C. R. C. Tichborne, and the subject of his discourse, "The Secrets of Modern Pharmacy." He explained a difficult subject very lucidly, and elicited frequent applause. The topics treated of were the Decomposition of Water, illustrated by electricity and the lime-light ; fermentation ; and dissociation in connection with fluids, to the investigation of which he had himself devoted a great deal of attention. The lecture was illustrated by various chemical experiments of an instructive and interesting character, carried on by means of a well-constructed apparatus, which rendered the subjects most intelligible to the audience.

At the conclusion of the lecture, Mr. Esson, J.P., moved a vote of thanks to the chairman and Mr. Tichborne. Mr. W. Hayes, the honorary secretary, seconded the motion, and took occasion to express a hope that at the rest of the course the attendance of ladies might be greater than he observed it was at present. He was convinced that ladies would derive much profitable instruction from the lectures, which they could advantageously apply to domestic cookery and other domestic purposes.

Professor Tichborne, in responding, referred to the remarks made by Mr. Hayes on the subject of the attendance of ladies, and suggested that the profession of pharmacy was especially adapted to ladies, on account of their superior neatness of manipulation as compared with men. Probably it would be some years before such a result would be attained by ladies in this country, although on the Continent it was at present by no means a rare thing to find ladies engaged in the practice of pharmacy. At any rate pharmacy was much more suitable for ladies than surgery and anatomy.

The monthly meeting of the above Society was held at 44, Molesworth Street, on the 6th inst., the chair was taken by J. A. Ray, Esq. Being Easter Monday there was a limited attendance, and after transacting routine business the meeting adjourned.

Parliamentary and Law Proceedings.

Strange Case of Poisoning.

The *Liverpool Daily Albion*, of April 2nd, reports that on the previous Tuesday morning, Miss Elizabeth Chalmer, an elderly lady, who has kept a young ladies' boarding establishment at Hayman's Green, West Derby village, died from the effects of poison which she had taken by mistake. On Monday evening she was in good health when she retired to bed about eleven o'clock. Shortly after that hour she came to the room of her assistant, and, complaining of being unwell, said she had taken something which did not agree with her. On the assistant following her to her room, the deceased lady pointed to a bottle on the mantelpiece and said she had taken something out of it which had occasioned the pain from which she suffered. Dr. Parke, who lives close by, was immediately sent for, and on his arrival he examined the bottle from which the liquid had been taken, and found that several drops which remained were poisonous. Miss Chalmer, after suffering great agony, died, having exhibited the symptoms which accompany death from poisoning. It appears that the bottle from which the liquid was taken was a small one that had originally contained a draught prescribed for toothache, and the supposition is that for convenience deceased had transferred to it, from a larger bottle, a quantity of a poisonous liquid which was directed to be used outwardly for rheumatism and similar complaints. It is stated that she suffered from toothache on Monday evening, and, doubtless, had drunk the contents of the small bottle, imagining at the time that it contained the soothing draught. An inquest on the body was held yesterday before Mr. Driffield, county coroner, at the Sefton Arms, West Derby village, when the jury returned a verdict to the effect that the decease met her death by taking poison inadvertently and by mistake.

Prosecutions under the Adulteration Act.
Two Convictions for Selling Adulterated Scammony.

At the Central Police Court, Glasgow, on Friday,

April 3rd, Mr. Robert Martin, "Druggist,"* 14, London Road, was summoned before Bailie Walls, charged with having on the 18th of March sold to two of the Sanitary inspectors 3 drachms of powdered scammony, which was adulterated with flour or other substance.

He pleaded not guilty, and was defended by Mr. Stevenson.

Alex. Johnston Walker, sanitary inspector, deponed to having bought the article. It was not stated that it was adulterated. He paid 1*s.* 6*d.* for 3 drachms, which was at the rate of 4*s.* per ounce or £3 4*s.* per pound.

Dr. Thorpe, city analyst, found that the scammony in this case had been mixed with 23·6 per cent. of flour. The amount of the true resin contained in the sample was only 46·01. There was 26·73 per cent. of other substances—vegetable tissues, such as cellulose and other matters natural to the plant—and 3·66 per cent. of ash. The 3·66 per cent. and 26·73 per cent. were necessary ingredients in the gum. An author from which he quoted gave 80 or 90 per cent. as the proper proportion of the gum. This sample contained 46·01 per cent.

By the Court—There were very great differences in scammony as imported. It was, he believed imported in an impure as well as in a pure state. He had had samples passing through his hands which contained 80 to 90 per cent. of the resin.

By Mr. Stevenson—Only some three or four cases of scammony had passed through witness's hands. Two of these were pure and two impure. All the samples were in powder. Dr. Hassall said that he could tell whether the adulteration with starch took place in Smyrna or here by examination with the microscope. If the granules of starch adhered it was mixed in Smyrna, and if not it was adulterated in this country. The starch granules in this case did not adhere, but he did not on that account go the length of Dr. Hassall, and draw the inference.

James M'Donald, manager of the Glasgow Apothecaries' Company, Virginia Street, said that Dr. Martin had got scammony from them in August, 1872. It was what was usually sold as Aleppo scammony. There was no such thing as pure scammony to be had. It was usually mixed with starch. They did not mix it. Druggists almost invariably bought it in powder. As they knew that the ordinary article as sold in Smyrna was often adulterated they added some virgin scammony when grinding it. The only way in which a medical man could make the adulterated article effective was by increasing the dose.

Bailie Walls—Does not that make it a very difficult matter for a medical man when prescribing?

Witness—They know that it is adulterated.

The Fiscal—If a prescription is sent to you at the Apothecaries' Hall do you know whether it is the adulterated or pure article that is wanted?

Witness—We always dispense the pure article.

The decision in this case was adjourned till the evidence in that following was taken.

Robert Couper, chemist, 176, Castle Street, was accused of selling half an ounce of scammony which had been adulterated with flour and mineral matters.

The sanitary inspectors deponed to having bought the article and paid 2*s.* for the half ounce.

Dr. Thorpe had analysed the sample. It contained 29·5 per cent. of flour; 5 per cent. of mineral matter, consisting mainly of chalk (besides the normal 3 per cent. of ash); 47·96 per cent. of the gum or resin of scammony; 14·35 per cent. of vegetable tissues.

Hugh Dykes, town traveller to Hatrick and Co., wholesale chemists, shown invoice for half a pound of powdered scammony sold by their firm to accused for 32*s.*, deponed that was a fair price for Aleppo scammony.

Dr. Wallace, analytical chemist, had made a report on scammony, which he got from Mr. Couper. His analysis showed that it contained 45·6 of resinous matter, which dissolved in ether; 40·2 per cent. of other organic matters; 7·8 per cent. of ash or mineral matters, and 6·4 per cent. of water. An examination by the microscope showed the presence of a considerable quantity of wheaten starch. The sample was not pure scammony, but contained a considerable amount of adulteration. It did not, however, by any means follow that the vendor was responsible for any of the adulterants. It was not likely that he was. It was almost impossible to get the drug free from adulteration. Dr. Letheby, in his report before the committee of the House of Commons, said that there were many adulterations of this drug practised abroad. It was practised by the Jews at Smyrna, who prepared it for the English market. Chalk and starch were put in in the course of this preparation, to prevent it undergoing decomposition. Dr. Hassall, in a similar report, said that out of 13 samples as imported only one was genuine, yielding 79·6 per cent. of resin. The amount of adulteration varied from 8 to 75 per cent. of added substances. One sample was entirely factitious, containing no scammony at all. The adulterating ingredients were mostly carbonate of lime or chalk, wheat, flour, gum, and a considerable proportion of woody fibre. Of 17 samples of powdered scammony purchased from various druggists in London, one only was genuine, yielding 76·4 per cent. of resin. The adulterants varied from 18 to 65 per cent. The proportion of resin varied from 27·2 to 65·6 per cent. Wheat flour, frequently some chalk, and occasionally sand or some other substance were the adulterating ingredients. Couper's might be accepted as an average sample.

The Fiscal said he thought the evidence both for the prosecution and for the defence showed that it was a general practice to adulterate scammony—a practice which should be put down.

Mr. Stevenson for both of the accused, said that these drugs were purchased in the usual way of highly respectable druggists, and the article was that ordinarily sold in the town. He thought it was hardly a case to impose a fine.

The Assessor had no hesitation in saying that the charges must be found proven in the sense that the scammony was sold as unadulterated, and was found to be adulterated. If the adulterated article was to be sold, then intimation must be given to the purchaser.

Bailie Walls then fined each of the accused 20*s*, with 20*s.* expenses in each case.—*North British Daily Mail.*

* Although in various newspaper reports, Mr. Robert Martin is described as a "druggist," there is no person of that name residing in Glasgow who is a registered chemist and druggist. In the Medical Directory for 1874 is the following entry: — "Martin, Robert, 14, London-rd., Glasgow. — L.R.C.P. Edin. and L.M. 1872; L.F.P.S. Glasg.

Obituary.

HENRY DEANE, F.L.S.

It is with profound regret that we have to announce the death of Mr. Deane, of Clapham, which occurred on Saturday, the 4th inst., at Dover, where he had been detained for a day or two by stress of weather, on his way to visit his son in Hungary. Walking from his hotel to the boat he was arrested by a sudden pain in the region of the heart, and in a few minutes ceased to exist.

Thus suddenly passed away the noble spirit of one whose name must be familiar to all readers of the PHARMACEUTICAL JOURNAL; a name in the foremost rank of that band of enlightened pharmacists who felt the thick darkness surrounding them thirty years ago, and resolved to dispel it; a name honoured throughout the kingdom for the work he had done in the Pharmaceutical Society to advance pharmacy and pharmacists, and held in deep affection by those who had the privilege of his private friendship.

He was one of its earliest members, and in 1844 was appointed an Examiner. He was a member of the Council for many years, and served as Vice-President in 1851-2 and 1852-3, as well as President in 1853-4 and 1854-5. No man could be better qualified to perform the duties of an Examiner. Possessing, by nature, an inherent love of

science, and convinced by keen observation of the necessity of a scientific training for those who were to be entrusted with the responsible practice of dispensing, as well as of the wisdom of applying all energy in acquirement of the knowledge of things necessary for a man's daily avocation, he brought to his office the very spirit essential for the initiation of the Board, and it may be fairly said that he did much to advance the system of examination to the sound practical condition in which it now exists. To his latest days he took especial interest in the proceedings of the Examiners, and not a month ago, in a conversation we had with him on the progress of the work of which he had seen the commencement, he spoke warmly of his old colleagues for their untiring zeal in the cause, dwelling specially on the practical energy of Mr. Squire.

Mr. Deane was for nearly twenty years member of Council, and was President during a somewhat troubled and difficult period in the existence of the Society. His services on the Pharmacopœia Committee will be remembered by those associated with him at the time; and although the College of Physicians, at whose instigation the committee was formed, had not the opportunity of utilizing the practical information obtained thereby, the labour was not thrown away, for many preparations of the British Pharmacopœia, issued by the Medical Council, bear traces of it.

It should not be forgotten that Mr. Deane was the first President of the British Pharmaceutical Conference, and the fact of his being chosen for that office is testimony of the high estimation in which he was held by the leading pharmacists of the kingdom.

Simple in his habits, indomitable in pursuit of knowledge, thoroughly practical in matters of business, too high-minded to stoop to anything mean or dishonourable, Mr. Deane was possessed of that sound practical sense which teaches that a man should never shirk his duty, that it would never be the duty of a man to perform a dishonourable act, and that consequently there is never any excuse for neglecting duty.

Some three or four years ago the *Chemist and Druggist* published an autobiography of Mr. Deane, which, as a plain unvarnished story of his life so completely portrays his character, that we close our article with a reprint of it from our contemporary.

"I was born at Stratford, in the parish of West Ham, Essex, near London, on the 11th of August, 1807. My parents, Moses and Elizabeth Deane, being members of the Society of Friends, I was brought up in that persuasion, and continued a member thereof until my marriage in 1843. For nearly the first eleven years the only sound instruction I received was from my beloved parents. Although I was sent to what was considered a good day school, in the immediate neighbourhood, I have a most distinct recollection of its utter inefficiency as a place for communicating even the merest rudiments of knowledge, and it was not until my father sent me to a large Friends' school at Epping, conducted by Isaac Payne, that I had the slightest idea of what it was to be systematically taught, and to know the value and pleasure of learning. Unfortunately, my father's means were not such as to enable him to keep me long at school, and I was removed at Midsummer before I was fourteen years old, and just at a period when I began to like and understand my daily task. In after years I have felt how much was lost to me by this early removal from mental training. Nevertheless, during this time seed was sown and friendships formed which materially influenced my after life.

"Amongst my schoolfellows were Henry and Edwin Doubleday, who have since attained a world-wide notoriety as entomologists. Their father was fond of collecting birds and insects, and the sons happily followed his tastes; they in their turn communicated the same to many of their companions, myself amongst the number. Moreover, I was occasionally favoured with an invitation to go home with them to tea, occasions which were highly prized as affording opportunities for seeing their collections and illustrated books of natural history. From collecting insects, collecting plants and drying them—without regard to names, but for their intrinsic beauty—seemed naturally to follow. Thus habits of observing the beauties of creative wisdom were early fixed in my heart, and I often look back with thankfulness to that now far distant day when my friends the Doubledays sowed that seed which was to keep out many temptations to evil, and prove such a lasting source of pure enjoyment. I have ever since advised all my young friends to adopt a hobby calculated to improve the mind, and, by acting as a counterpoise to our natural tendency to indulge in sensuous pursuits, to keep the devil at a respectful distance.

"From the time I left school, in 1821, I was four years in a state of untraining. My father's business was neither suited to my taste nor physical constitution, and I did but little in it. This state promised to be ruinous to my best interests in life, and perhaps would have been so but for the close friendship my father held with John Gibson, one of the firm of Howard, Jewel, and Gibson (now Howards and Sons), whose eldest son and I were great friends and constant companions. I had the run of their laboratory and premises, and thus gained a predilection for manufacturing chemical pursuits. My investigations were a frequent source of annoyance to our maid servant, whose proper domain was invaded by experiments with explosive compounds and fetid gases.

"When I was about sixteen years old my kind friend, John Gibson, gave his son, myself, and another youth, who was our frequent companion, tickets for a series of lectures on Natural and Experimental Philosophy, which were delivered by a once assistant in the house of Allen and Hanbury's, at Plough Court, at the Mathematical and Philosophical Society's rooms, in Crispin street, Spitalfields. This course comprised the elements of physical science as then known, including mechanics. The latter I have ever since looked upon as the best foundation of all other knowledge, and I should like to see it form a part of our regular Pharmaceutical curriculum. The lectures were admirably delivered and illustrated, and sank so deeply into my mind that I can, at this distant day, recall most of the beautiful illustrations placed before us. This was one great saving and turning point in my life, which led to an increasing thirst for knowledge. Parkes's Chemical Catechism was placed in my hands, which I read through two or three times to my permanent advantage, as I soon practically discovered.

"At the age of eighteen I was apprenticed, for three years, to a chemist and druggist at Reading, Joseph Fardon, who had served his time to my uncle Shillitoe, of Tottenham, and who afterward lived three years with John Bell and Co., in Oxford Street. This well-known pharmacist was a kind, indulgent, considerate friend and master, and while with him I learned to powder alum, ginger, and nutgalls; to grind and mix paints; polish the shop scales, counter and bottles; open and shut shop, and many other things now, unfortunately considered *infra dignitatem* in this generation. I had to open shop, summer and winter, at six o'clock in the morning, a practice which I continued with my own hands for many years after I came to Clapham *without losing the respect or confidence of any one of my customers*. To me activity was a necessity, and I rather liked these tasks than otherwise, and I saw no indignity in performing duties required by my master, which were in their nature not only honest, but calculated to improve me in the knowledge of my business. For while grinding prussian blue or powdering roots and seeds, I pondered over their physical constitution, and afterwards read up their natural history in, my then incomparable book and best friend, Thomson's 'Dispensatory.' This habit of doing anything that was required of me was not only of immediate benefit to myself, but in after years probably rendered me more apt in teaching those placed under my care, and certainly gave me an idea of the nature and requirements of our trade in country places, such as London itself could not afford.

"From that time my motto has been—as I believe it ever was in practice—"There is nothing beneath the dignity of a man that is not dishonourable." Not unfrequently have I had to carry a dozen or two of soda water to a distance of one or two miles on a hot summer's day, and these occasions afforded opportunities for looking after plants. I shall never forget on one of these excursions finding a fine plant of henbane, a plant I had never seen before, but which I recognized at once from the description read in Thomson's 'Dispensatory.' I took it home and made some extract much to my own satisfaction, but my master would not have it used, it was so unlike the black stuff regularly dispensed; mine was of that pleasant green colour now well appreciated.

"In addition to the real love I had for my business, there was one strong inducement to stick unflinchingly to my duties, which was ever borne in mind. I knew I should have to get my living by an occupation deliberately chosen by myself, and paid for by my father, though with the humble fee he could but ill afford. Both parents would probably grow old, and the day might come when it would be my duty and privilege to provide for their declining years. An amount of honest pride was also a strong stimulant to exertion in acquiring knowledge. When I first entered on my duties behind the counter I was a tall fellow six feet high, and could look over the heads of my master and his assistant. Consequently, many of the customers presumed I knew more in proportion to my size, and asked me questions about things of which I had never heard, and which made me blush in utterest confusion. This state of ignorance was most distasteful, and I resolved to have an answer ready for the next inquiring customer. Thus I soon gained a reputation for more knowledge than I felt I deserved. My master's small library was soon exhausted, and my shilling a week pocket money and other small pecuniary presents were chiefly devoted to the purchase of such standard works, directly or indirectly relating to pharmacy, that my limited means would reach. At that time there was nothing in the English language published for the benefit of those following our particular business. This was very remarkable, seeing that Fellows of the College of Physicians were entirely dependent on the chemists and druggists as dispensers of their prescriptions, and for their success in practice. However, in London, and some large towns in the country, a few of the most intelligent chemists did the larger portion of the dispensing, to the exclusion of those who would not or did not take sufficient pains to acquire the right kind of knowledge, or who could not resist the temptation to use inferior or sophisticated drugs compounded according to formulæ well known at that date, but now rapidly becoming obsolete.

"I ought, perhaps, here to bear testimony to the exertions of the late Thomas Herring, who was the first, I believe, to introduce pharmaceutical preparations of such excellence and elegance as had never before been offered to the trade. In fact, they were a rapid stride in advance, and by many druggists were looked upon with suspicion. Ultimately the old system was broken down by his innovations; and we, of the present day, have much for which to thank him.

"After I was out of my time, at Reading, I was fortunate enough to get a situation at John Bell and Co.'s, in Oxford Street, when I soon found that I was unacquainted with the practical duties of a large business, and I sometimes wished the floor to open and swallow me up, so ashamed was I that such a big fellow should know so little. However, "*Labor omnia vincit*," I stuck to my early resolution of never allowing anyone to feel dissatisfied for want of a proper answer, and I read a variety of useful books at every opportunity, carefully avoiding politics and novels. All this was heavy work with my average daily labour of fourteen hours. I was much encouraged by the friendship of both the late Jacob and Frederick Bell; to them, or rather to their memory, I owe a deep debt of gratitude for their many acts of consideration for my faults, and the opportunities placed in my way for improvement. One inestimable boon I must specially mention—their allowing me to attend a course of lectures, at the Royal Institution, by Faraday and Brande. This was a great privilege, and not one to be slighted. Never shall I forget the clear and impressive manner of both those great men. They were perfect each in his own way; but Faraday cannot ever be forgotten for his simple eloquence and unfailing success in all his experiments. His kindly, earnest, and impressive manner, conveying in every word the evidence of truth, made an indelible impression on my mind and all who heard him.

"Between my first entry into the establishment in Oxford Street, and my ultimately leaving it, there was an interval of about two years, during which I was at home endeavouring to manage and improve the business of my father, who had become paralysed, and incapable of attending to it. There I continued some time after his decease. I was in Oxford Street altogether about five years, and had become greatly attached to it, both on account of friendships formed and the many privileges enjoyed, when a circumstance occurred which rendered it needful for me to leave. John Bell had an excellent library which was accessible to the assistants; but as yet there was nothing specially written for chemists and druggists, and this want was the frequent subject of conversation between Jacob or Frederick Bell and myself, and we more than once suggested the formation of a society adapted not only for mutual improvement, but with a view to the general improvement of the whole body of chemists and druggists. It was not, however, till some time after I had left, and was in business on my own account, that Mr. Hawes's Bill stirred up the general body, and gave rise to the formation of the Pharmaceutical Society.

"In the autumn of 1837 I took the business now occupied by me at Clapham, assisted by several friends, but more especially by the late Richard Hotham Pigeon, whose large pecuniary aid, afforded in the most liberal and trusting spirit, was supplemented by the advice of a judicious parent. This step was looked upon as certain failure, but my friend Pigeon and the minority encouraged me with better hopes. Besides, had I not my dear mother and sister with me entirely dependent on my success? My own mind never wavered; I was not afraid of work, and I knew how to live on bread and cheese with no stronger drink than a cup of tea or a glass of water. Providence favoured me in a most wonderful manner, and my best hopes were more than realized, so that in a very few years I was out of debt, and prospering to my heart's content.

"In 1841, on the establishment of the Pharmaceutical Society, I became one of its first members, but took no active part in its formation. In 1844 I was requested to become one of the Board of Examiners. After a little hesitation I accepted the honourable post, a step which I have never regretted. It afforded me large means of self-improvement and at the same time brought me in contact with men, the value of whose friendship I cannot express in words. The same may be said of my connection with the Council, upon which I was elected in 1851. In 1840 the Microscopical Society was formed, and my friend Frederick Bell and I joined it on the foundation. I invested £10 in a microscope, and began work investigating and mounting objects with great ardour. This instrument did not long please me, and I got the basis of a better and more complete one, with which in 1845 I made the remarkable discovery of the existence of Xanthidia and Polythalamia in the grey chalk of Folkestone, a bed below the common white chalk. It is well-known that the white chalk is chiefly made up of the *débris* of the shells of Foraminiferæ—a fact first brought to my notice by the late Dr. Pereira—and that the layers of flints, supposed with strong reason by Dr. J. S. Bowerbank to be the fossilized condition of ancient sponges, contained a great variety of the organisms called Xanthidia and Polytha-

lamia. I looked carefully in the chalk itself for the Xanthidia without success, but found them freely distributed in some portions of the grey chalk in which flint in layers, like those of the white chalk, do not exist, but in which occur occasional masses of chert, showing abundant evidence of the structure of sponges without, so far as I could detect, any evidence of Xanthidia. The Polythalamia in this grey chalk were in a very remarkable condition, showing what appeared to be the investing membrane of the shells and the bodies in a truly fossilized but not silicified condition. The species seemed to be identical with those found in the white chalk. Another curious fact seemed to me to be brought out, namely, the mode of distribution of the silica in these two kinds of chalk. In the white chalk it chiefly exists in the form of layers of flint; in the other it is distributed in minute grains or crystals. I also discovered in a Fucus (?) prepared as an article of diet in China or Japan, an abundance of a beautiful silicious organism occasionally found in Ichaboe guano, and which, in a notice read to the Society, I named *Arachnoidiscus Japonicus*, forming the basis of a genus of great beauty, and deservedly popular amongst amateur observers with the microscope.

"The distribution and exchange of these and other objects of interest with members of the Society led to the most friendly intercourse with many excellent men, to whom I am greatly indebted for kindly feeling, and for hints in the art of observing and mounting objects, thousands of which I have had intense pleasure in distributing. It is almost invidious to name one good friend without naming others, but it would be unjust not to mention Mr. Bowerbank's open weekly evening meetings at Islington, where any one with a desire for knowledge was ever welcomed, with or without personal introduction. Frederick Bell and I went thus, were kindly welcomed, and had our first lesson in observing with a good microscope. So began what little skill I possess in the use of an instrument which for full thirty years has afforded me an inexhaustible source of elevating and unalloyed pleasure. My microscope led to a most friendly intercourse with the late Dr. Pereira, and some of the illustrations in the edition of his 'Materia Medica,' in progress, and unfinished at his decease, were made from objects prepared and mounted by myself.

"The first meeting of the new Society that I attended was at 338, Oxford Street, when I read a short and very indifferent paper on "Displacement,"* as a method of preparing tincture, etc.; yet poor as it was, I believe it set many chemists experimenting and working at that method of preparing tinctures and extracts. The process has since that time become more completely understood, and consequently more successful. My next contribution was "Experiments on Senna,"† noticed by both Dr. Pereira and Dr. Royle, subsequently many smaller ones of no great value until those on opium preparations and extract of meat, the chief merit of which is due to H. B. Brady, without whose ready pen and pencil their interest would have been very small.

"When I took my place at the Board of Examiners, I found that very efficient arrangements had been made for conducting the examinations (I believe by Mr. P. Squire, of Oxford Street); and although not so efficient as they afterwards became under energetic care and ordering, they were fully up to the acquirements of the students. The tables were well supplied with specimens of all kinds, fresh plants, drugs, and chemicals, but as yet there was no practical dispensing. I am quite satisfied that although not so systematically conducted as they are at present, the Examiners arrived at a correct estimate of the qualifications of those who presented themselves. One striking fact was constantly noted for many years, that the larger number of the best qualified men were those who had acquired their knowledge in the country, without those special advantages afforded to those who attended the lectures and laboratory at the establishment in Bloomsbury Square. This was the case for several years after the institution of examination; but it is notorious that these first men have now taken their proper place as leaders amongst their brethren in pharmacy.

"The examinations for many years did not occupy many hours on each occasion; the number of examiners was small, and they were conducted *con amore* without fee, other than that afforded by a good conscience: "and all for love, and nothing for reward." Of late their onerous duties have wisely been remunerated; and it is the concurrent testimony of all that they are discharged with strict impartiality.

"I was elected on the Council in June, 1851, and almost before I had taken my seat, Mr. John Watts, of the Edgeware Road, proposed me as Vice-President, which extraordinary proposition was at once carried, and I was enthroned at the lower end of the table. Thomas Herring was President. The following year, 1852, Mr. Joseph Gifford was elected President, and I again Vice-President. In 1853 and 1854 I was President, and underwent the severe ordeal of the prosecution by Mr. Dickenson, from which the Society ultimately emerged victor.

"In 1854, the College of Physicians applied to the Council of the Pharmaceutical Society for aid in the preparation of a new Pharmacopœia, and a committee was formed to assist in this object. As President I was chairman of the committee, and at the special request of the chairman of the Pharmacopœia Committee of the College of Physicians, Dr. F. Farre, I retained that position, as the medium of communication between the two bodies until the Royal Medical Council was appointed, and took proceedings to form a national Pharmacopœia. Our services were no longer required; but I may state that when we entered upon our duties we resolved to do what we could to promote the formation of a national Pharmacopœia, and for this object Mr. Squire's admirable book, 'The Three Pharmacopœias,' afforded a means of comparison, and a basis of operation.

"Dr. Redwood was our efficient Secretary, and performed many experiments as circumstances suggested. I made many hundred of experiments between the meetings, which were seldom held oftener than once a month. Once a week would not have been too frequent, but council, committee, and examinations already occupied a large amount of time, which few of us could afford to sacrifice. I can safely say that during the six years I held these responsible positions, one fourth of the time was entirely taken up in the service of the Society.

"This service of twenty-six years has been a service of love, a kind of second bride, and during that time, being fully aware of my deficiencies, I trust I have laboured with some degree of success to promote the great object set on foot by my late valued friend, Jacob Bell, to stimulate the mental energies of our young men, and to institute a system of education which should fill the void which had hitherto existed. How far my colleagues and I have been successful it is not for us to know, but another generation will develope the truth and pronounce a verdict."

The remains of the deceased were removed from Dover to the house where his wife's parents lived and died, at Coglinge, near Shorncliffe. On Thursday they were interred in the neighbouring village of Cheriton. Amongst those who were able to pay the last tribute of respect by being present at the funeral were the President of the Pharmaceutical Society, Mr. T. H. Hills; the Vice-President, Mr. A. Bottle; the Treasurer, Mr. J. Williams, and the Secretary, Mr. E. Bremridge; the President and Secretary of the Pharmaceutical Conference, Mr. T. B. Groves, and Professor Attfield; Messrs. Morson, F. J. Hanbury, and numerous friends from Clapham, Dover, and the neighbourhood. The service was conducted by the Rev. Edwin Grice, a friend also of the deceased.

* PHARM. JOURN., vol. i., p. 61.
† Vol. iv., p. 61.

Correspondence.

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

Analysis of Milk.

Sir,—I observe in the Pharmaceutical Journal for 14th March, 1874, a paper which Dr. Voelcker is reported to have read to the Farmers' Club. The paper is entitled, "Milk: its Supply and Adulteration," and in it I read some amusing, but not very wise comments upon a little 'Manual of Milk Analysis,' which I have recently published. The Doctor says one might as well talk of a 'normal potato,' or a 'normal cabbage,' or a 'normal pig,' as of normal milk.

Doubtless this is very funny, but it is neither happy nor true. Potatoes vary greatly in size and weight; some are ten times as big or as heavy as others, but even among the Doctor's own analyses we look in vain for examples of the percentage of milk solids having doubled. After having indulged in such comparisons, it was hardly to be expected that the Doctor should say precisely what it is that I maintain is so very constant in milk. I maintain that the percentage of "solids not fat" is a very constant quantity; and, notwithstanding the generally unsatisfactory nature of his analyses, Dr. Voelcker's results do not entirely conceal this constancy.

Those who are familiar with the subject will know that no such irregularities as Dr. Voelcker mentions in his paper were observed in Sweden, and that there is the most cogent evidence in favour of there being certain regularities in the composition of milk.

It is obvious also that irregularities of composition would be simulated by defective analyses. The drying up of milk solids was, until recently, a most tedious and uncertain operation, but with the modifications introduced by myself it has now become one of the easiest and most accurate operations which the chemist has to perform.

I have very little doubt that the extraordinary irregularities described by Dr. Voelcker depend upon defective analysis, and not upon real differences in the samples.

In the Doctor's paper he gives a tabular statement of his Cirencester results. From this we gather that the evening milk in October contained 3·76 per cent. of milk-sugar; and that in November the evening milk contained 5·68 per cent. of milk-sugar. Equally curious was the percentage of ash in this wonderful milk, viz., 0·58 in October and 1·15 per cent. in November.

For my part, I cannot accept these results as true, and regard them as merely affording evidence of the badness of the analyses.

J. Alfred Wanklyn.

117, *Charlotte Street, Fitzroy Square.*
April 7th, 1874.

The March Examinations.

Sir,—An advertisement appears in the Pharmaceutical Journal of April 4th, stating that at the "*last*" Major and Minor Examination "*all the honours fell*" to students in the South London School of Pharmacy.

I am not a student in the above school, nor have I ever been.

George P. Gilders.

8, *Osborn Place, Blackheath.*

Sir,—I was rather surprised to read an announcement in your advertisement columns to the effect that all the honours in each examination last month fell to the students of the South London School of Pharmacy. Now, as I was fortunate enough to obtain honours I think I may be allowed to speak in the matter. I most emphatically deny ever having had anything whatever to do with Dr. Muter or his system, and I have not even seen either him or his establishment.

I am able also to state, on reliable authority, that five out of the six candidates who gained honours in the examinations last month did not receive their training at his hands.

In conclusion, I may, perhaps, venture the remark that it would be better for the credit of the establishment where "systema omnia vincit" if its conductors adhered more strictly to the truth in their advertisements.

W. Pickard.

205, *St. John Street Road, April 7th*, 1874.

The Society's Conversazione.

Sir,—In reading the account of the recent conversazione, held by the Nottingham and Notts Chemists' Association, I was glad to see South Kensington in the provinces, but must confess (without wishing to disparage our pleasant gatherings therein) that somewhat an envious feeling came over me that the association in question was able to afford, in addition to the attractions of music, etc., matters of interest connected with the profession.

Is it quite inadmissible under present circumstances to infuse more of this element into the conversazione at South Kensington? I feel assured the distinguished members of the medical profession, and others who attend our annual May gathering, would feel none the less gratified by its introduction, while to the pharmacists themselves the value of this large meeting would be vastly enhanced. Hoping this suggestion may be favourably received, I am, etc.,

Jno. Lasham.

Romford, March 31, 1874.

"*Live and Let Live.*"—In reference to the letter of Mr. J. N. Place, of Exeter, we have received a communication signed by Messrs. A. Evans and Company, George Cooper, and Matthew Husband, wholesale druggists in Exeter, requesting us to notify that they emphatically deny having supplied the co-operative stores in that town, and stating that they have refused to do so.

A. P. S.—The address of Messrs. Winsor and Newton is Rathbone Place, Oxford Street, London.

"*Fructus.*"—There is a considerable proportion of henbane seed present.

"*Quærens.*"—Mayne's 'Vocabulary of Medical Terms,' published by Messrs. J. and A. Churchill, price 8*s.* 6*d.*

E. Yewdall.—Your letter has been handed to the Secretary.

T. P. B.—The article referred to was published in vol. i. of the present series, p. 167.

F. C. Clayton.—The preparation in question is a proprietary one, respecting the composition of which we are unable to give you any information.

"*Amateur Microscopist.*"—We are unable at present to say what the specimen may be, but hope to be able to furnish you with the information shortly.

"*Llandudno.*"—The information asked for will be given in an early number.

"*Hampton.*"—(1) Butler and McCulloch, Covent Garden. (2) Vide Pharm. Journ. [2] vol. x., p. 590; also Pharm. Journ. [2] vol. ix., p. 58. By insane root was probably meant *Atropa mandragora* or belladonna. The latter grows near the locality of the scene mentioned. Shakespeare is not known to have been a botanist, and probably alludes to some tradition extant at the time. The exact plants meant by insane root, cursed hebenon, etc., have long been matter of conjecture, and will probably remain so.

"*Theta.*"—The candidates either pass or do not pass, and there is no part of the arrangements of the Board of Examiners to allow candidates to pass piecemeal.

J. F. Brown.—We know of no book better suited for the purpose than the one mentioned, nor do we think it would be found dry by any Student really desirous of acquiring a thorough knowledge of the subject.

Mr. George Delves (Exeter).—The subject you refer to is a frequent source of perplexity to us as well as to others; but careful consideration has led us to conclude that no good would be done by any such public discussion as you suggest. With much of what you say we entirely agree, but it must be remembered that there is at the present day little ground to hope for legislation protective of classes. The act you refer to was not in any way of this nature but merely one to secure the safety of the general public.

Communications, Letters, etc., have been received from Messrs. Leach, Broad, J. Abraham, J. Z. Holmes, Fairlie, Bell, "Brunswick."

EXPERIMENTS ON SOME VARIETIES OF CAMPHOR.

BY PROFESSOR FLÜCKIGER.

The interesting investigations on the Ngai Camphor due to Mr. Plowman * induced me to submit several camphors of my collection to the following experiments. They refer to the common camphor of *Cinnamomum Camphora* F. Nees et Eberm, and to the following other kinds :—

1. *Ngai camphor* in the crude state, as mentioned by my friend Daniel Hanbury, † to whom I am indebted for this sample as well as for those described under 2 and 3.—This sample consists of whitish crystallized granules.

2. *Ngai camphor* in the pure state, forming flattish colourless pieces, highly crystalline, yet not exhibiting well developed crystals.

3. Camphor of *Dryobalanops aromatica* Gärtn., *Borneo camphor*, also called *Malay camphor*, in the crude state, given by Prof. de Vriese to Mr. Hanbury ; the sample came from Sumatra.

4. Camphor of *Dryobalanops aromatica* Gärtn., as met with in the London market by Mr. J. E. Howard in 1850 under the name of "Native Camphor."

5. *Crude camphor* from Hong Kong, presented to me as well as the last by Mr. Howard, and presumed, on account of its peculiar odour, to be different from common camphor. It occured in the London market in 1864.

It will be observed, that only the Ngai camphor (2) consisted of pure crystals ; I thought it not advisable to purify the other samples for fear of losing too much of the substances, of which I had no considerable quantities at my disposal.

It is well known by the researches of Des Cloizeaux, ‡ that common camphor crystallizes in forms belonging to the hexagonal system. They exhibit in polarized light brilliant colours like other crystals not belonging to the cubic system. This is easily demonstrated by examining a clear splinter of camphor under the polarizing microscope, or by melting a little camphor between two slips of glass and examining it in the same way. Hexagonal crystals are evident in every bottle in which ordinary camphor is kept for some time, and camphor dissolved in alcohol of about sp. gr. 0·89 separates on cooling in crystalline tufts exactly resembling the crystals which are slowly formed in winter time on the surface of water. The crystals of camphor are unable to deviate the ray of polarized light, but their alcoholic or other solutions turn the plane of polarization to the right hand.

The crystals of the camphor of Borneo, derived from *Dryobalanops*, according to Des Cloizeaux, § belong to the cubic system. I can fully confirm the assertion that, examined in the way just stated, the crystals of my samples 3 or 4 of this substance, as well as several others, do not display any action on polarized light ; it is well known that cubic crystals, that is to say regular cubes and all allied forms, are devoid of that optical power. The alcoholic solution of Borneo camphor, on the other hand, possesses, as showed long ago by Biot, a dextrogyre power a little inferior to that observed in common camphor under the same circumstances.

Now, the crystals of *Ngai camphor*, 1 or 2, which I examined by means of the polarizing microscope, proved likewise to belong to the *cubic system*.

As to Mr. Howard's camphor, mentioned under 5, it seems to consist of a cubic camphor, accompanied by a certain amount of another camphor doubly refracting in polarized light like common camphor. It is well worth noticing, that the presence of the latter would scarcely be revealed by any other means than the microscope, for the odour and optical behaviour of this sample is on the whole that of Malay or Dryobalanops camphor.

Mr. Plowman has well ascertained the leading chemical and physical characters of the Ngai camphor. I have but a few remarks to add. On the surface of water it turns as rapidly as common camphor ; the same applies to Borneo camphor.* Both these varieties are able to swim on water owing to adhering air, for they sink if deprived of that air.

There is another curious fact concerning camphor. Common camphor and chloral hydrate, about the same weight of each, both in perfectly dry and large pieces or crystals, kept for some hours in a carefully dried and closed vessel are liquified, as recently pointed out by J. F. Brown.† I have found that this is the case with Borneo camphor and with Ngai camphor likewise.

Mr. Plowman's researches tend to show that the latter differs but slightly from Borneo camphor, both being of the same composition, and exhibiting the same general behaviour. My observations just alluded to point out a few characters more, equally possessed by both these forms of camphor. Yet there is a well-marked difference, inasmuch as the *Ngai camphor* in alcoholic solution *deviates the ray of polarized light to the left hand.*

As to my optical researches, I used Wild's polaristrobometer, and observed the deviations in monochromatic light afforded by a flame coloured by means of a salt of sodium. (I prefer the borate.) The results are summarized in the table on the next page, which shows the numbers as observed directly. The starting-point of the observations being 47°·7, this number is to be deducted from those given in the table in order to get the dextrogyre deviations, the latter answering to numbers exceeding 47°·7. The numbers inferior to 47°·7 point out a levogyre power, the amount of which is found by deducting the number directly observed from 47°·7. The table thus shows for instance that the solution 6 of common camphor, in a column of 50 millimetres long, deviated 57°·5 — 47°·7 ; that is to say, 9°·8 to the right hand, whereas the *levogyre* power of a similar column of solution 2 of Ngai camphor is 47°·7 — 40°·3 = 7°·4.

The true deviation of Ngai camphor is represented by the figures under 2; the sample 1 contained a certain amount of impurities, its solution showed therefore a weaker action. In working with the alcoholic solutions of sample 1, as well as of sample 2, I was struck with the very peculiar odour of the Ngai camphor, which seemed to me rather suggestive of ambergris than of wormwood. I cannot agree with

* PHARM. JOURN., 7th March, 1874, 710.

† Ibid.

‡ Etude du camphre ordinaire ; *Comptes Rendus*, 48 (1859), 1064.

§ *Comptes Rendus*, 70 (1870) 1209 ; also Poggendorff's *Annalen der Physik und Chemie*, 141 (1870), 302.

* And likewise, according to Chautard, to the stearoptene of feverfew, *Chrysanthemum Parthenium* Persoon, which will be mentioned hereafter.

† PHARM. JOURN., 14th March, 1874, 729. This extremely curious liquefaction is also produced by dry crystallized carboli acid.

Mr. Hanbury's statement that the odour of 2 is scarcely distinguishable from that of ordinary camphor. An alcoholic solution of Ngai camphor exhibits a very well-marked difference if it is allowed to evaporate on the hand. The odour of the Ngai camphor, especially of 1, seemed to me to agree with that of Borneo camphor, yet to be decidedly *stronger*.

Under 3 and 4 my table presents not quite the full deviation of Borneo camphor, my samples being too small to allow of purification. The numbers are nevertheless sufficient to manifest the great difference between the Ngai camphor and that of Dryobalanops; they confirm also that the rotatory power of ordinary camphor is stronger than that of Malay camphor.

TABLE SHOWING THE DEVIATIONS OF THE FOLLOWING SOLUTIONS OF CAMPHORS AS OBSERVED IN WILD'S POLARISTROBOMETER.

Starting Point: 47°·7.

	Millimetres. = 25	Millimetres. 50	Millimetres. 100
1. Crude Ngai camphor, dissolved in its equal weight of absolute alcohol	43°·6	38°·5	
2. Pure Ngai camphor, dissolved in its equal weight of absolute alcohol	43·8	40·3	
3. Dryobalanops camphor, De Vriese's, dissolved in its equal weight of absolute alcohol	52·0 51·6	56·6	
4. Dryobalanops camphor, Howard's, dissolved in its equal weight of absolute alcohol	51·2	55·0 56·0	
5. Crude comphor from Hong Kong, dissolved in its equal weight of absolute alcohol	52·1	56·6	
6. Common camphor, dissolved in its equal weight of absolute alcohol	52·4	57·5	68·5
7. Common camphor, 1 part in 9 parts of absolute alcohol	48·3	49·9 49·3	51·0
8. Common camphor, 1 part, alcohol 0·8185 sp. gr. 6 parts, and 3 parts of water		49·7	
9. Common camphor, in its equal weight of chloroform	54·5 54·8	62·4	
10. Common camphor, in its equal weight of bisulphide of carbon	54·4	62·0	
11. Common camphor, in its equal weight of acetone	52·7 53·0	58·7 58·3	
12. Common camphor, in its equal weight of methylic alcohol	52·2 52·4	57·5	

Being engaged in these experiments I was curious to know whether the polaristrobometer would afford the means of estimating the percentage of camphor in solution. The experiments under 7 and 8 prove that the rotatory power of somewhat dilute solutions of camphor decreases too rapidly to allow such a quantitative method. Moreover, there is another fact still less in favour of such an estimation. The table gives in many instances two different numbers for one and the same observation; it is in fact not always possible to meet with an undoubtedly exact number of deviation. I am not able as yet to explain this uncertainty, which is sometimes very troublesome, whereas in other cases the observation can be performed with all desirable exactness.

Another question, well worthy of examination, concerns the influence of different solvents on the optical properties of camphor. I have not thoroughly investigated this point, but the few facts ascertained under 9 and 10, show that influences of that kind exist; the rotatory power of ordinary camphor is increased by dissolving it in chloroform or bisulphide of carbon. It would be a matter of interest to examine, in that respect also, the other varieties of camphor mentioned in these notes.

From the above observations it follows, that the new camphor from the Ngai plant, *Blumea balsamifera* DC., of the order *Compositæ*, crystalizes in the cubic (regular) system, like that of Borneo from *Dryobalanops*. Both, according to Mr. Plowman, agree with the formula $C_{10}H_{18}O$, but my experiments prove that the Ngai camphor in alcoholic solution is as much levogyre as the solutions of Borneo camphor are dextrogyre. The camphor of *Blumea* has therefore very correctly been termed by Professor Attfield* the *twin-brother* of the famous product of *Dryobalanops*, the Borneo or Malay camphor.

There are two other camphoraceous substances forming optically indifferent crystals of the cubic system, namely, *Terecamphene*, $C_{10}H_{16}$, and the monochlorhydrate $C_{10}H_{16} + H\,Cl$ of the oil of turpentine of *Pinus Pinaster* Solander, and other pines. Both these substances have been prepared and examined in 1862 by Berthelot. The alcoholic solution of the latter appears to possess nearly the same levogyre power as that of our Blumea or Ngai camphor. The rotation of the solution of terecamphene is twice as considerable.

These two substances are in composition widely different from the camphor of *Blumea*, but there is another camphor agreeing with the latter in that as well as in other respects. In 1856 Jeanjean† examined the products of the fermentation of the sugar contained in madder, the root of *Rubia tinctorum* L. One of these is a camphor having the composition of Borneo camphor, but possessing exactly the same rotatory power as our Ngai camphor. It seems to me, after all, very likely that camphor of *Blumea* and camphor of *Rubia*, as produced in the fermentation of sugar of madder, are but one and the same substance. I am indeed sorry that I am not in possession of the latter in order to prove the correctness of this view. Jeanjean attributed to it a peppery odour.

This chemist has not examined the nature of the crystals of the Rubia camphor; by boiling them for a short time with nitric acid he obtained the compound $C_{10}H_{16}O$, agreeing in composition with ordinary camphor, but differing from it by deviating the ray of polarized light as much to the left as common camphor does to the right hand. I need scarcely mention that this refers to the alcoholic solutions of these camphors.

I devoted to a similar treatment the small quantity of Ngai camphor, sample 1, still at my command after the foregoing experiments. I obtained crystals which were entirely devoid of the peculiar odour of Ngai camphor and rather reminded one of ordinary camphor. The quantity of that camphor of sample 1 being too small for further exact investigations, I could only ascertain that its alcoholic solution was levogyre, without estimating the amount of deviation. But what is more interesting is the fact, that the polarizing microscope proved the crystals of the camphor

* PHARM. JOURN., 7th March, 1874, 722.

† *Comptes Rendus* 42 (1856) 857; also Gmelin's *Organic Chemistry*.

under notice not to belong to the same system as their mother substance; they displayed, indeed, brilliant colours, showing that there was no longer any question of the cubic system.

It is very remarkable that, according to Chautard,* the oil of feverfew, *Chrysanthemum Parthenium* Pers., on cooling, or by treating it with nitric acid, yields a levogyre camphor $C_{10}H_{16}O$, which in all probability is identical with that prepared by Jeanjean as just stated from Rubia camphor. It would consequently, likewise, agree with that which I obtained by oxidizing Blumea camphor, a question which requires more material for investigation than I had at hand.

I need scarcely remark that the camphor $C_{10}H_{16}O$, which may be obtained by oxidizing the Malay camphor, is absolutely identical with ordinary camphor. By treating the small remaining quantity of sample 4 with nitric acid, I quickly succeeded in getting it. The crystals, after washing and drying, were examined under the polarizing microscope, where they proved most brilliantly not to belong to the cubic system but to the hexagonal. The microscope thus enables us to demonstrate very manifestly the transformation of the optically indifferent crystals of Dryobalanops camphor into Laurel camphor, even in the smallest fragment.

Mr. Hanbury has pointed out† how much Ngai camphor is esteemed in China; it is curious, from a historical point of view, that the Chinese possess in their own country a variety of camphor so very closely allied to the Malay camphor. Why have they imported, from time immemorial, the latter from the Archipelago? Why do they still appreciate Malay camphor so enormously higher than even Ngai camphor? And not the least curious is the fact that they appear to be well aware of physical differences, which we in Europe have been endeavouring to fix more precisely by the implements of modern science.

We have proved that *Blumea balsamifera* DC., the Ngai plant of the Chinese, yields a camphor $C_{10}H_{18}O$, which forms crystals of the cubic system; these are optically inactive, but afford alcoholic solutions which deviate the ray of polarized light to the left hand. These crystals can be transformed into a camphor, agreeing no doubt with the formula $C_{10}H_{16}O$, whose crystals no longer belong to the cubic system. Their alcoholic solution is levogyre. This latter camphor appears to occur in feverfew.

Malay camphor from *Dryobalanops*, equally in cubic crystals devoid of optical power, and having the formula $C_{10}H_{18}O$, affords alcoholic solutions which possess the same rotation as those of Ngai camphor, but to the right hand. The camphor $C_{10}H_{16}O$, obtainable from Malay camphor, belongs to the hexagonal system, its solutions are dextrogyre; it has been met with as yet only in *Cinnamomum Camphora*.

ADULTERATION OF GINGER.

BY THOMAS GARSIDE.

A gross and very obvious sophistication appears to have been quite overlooked. I allude to the whitewash on the so-called bleached ginger. According to the text-books the white appearance is supposed to be imparted to it by the fumes of burning sulphur, or by a solution of chloride of lime. Owing to the very chalky character of a sample which was inspected, a suspicion was raised that the above mentioned methods were not sufficient to account for it.

In order to test the matter, five samples were obtained from different shops. On two of these the easily detached white powder was found to consist of calcium sulphate, in one case with a trace of chloride and in the other without any. The presence of calcium disposes of the supposition that sulphurous acid only was used in the bleaching process. If, however, the ginger had been first steeped in solution of chloride of lime and afterwards exposed to sulphurous acid fumes, calcium sulphite would in all probability be formed, which, on exposure to the air, would become converted into sulphate.

The absence of any notable amount of chloride would preclude this idea.

The powder on the remaining three samples was found to consist principally of calcium carbonate, with smaller proportions of sulphate and chloride. In order to ascertain the amount, an average piece of ginger was taken and the adhering mineral matter separated and weighed.

It was 2·33 per cent. of the ginger employed, and consisted of

Calcium chloride	4·98
Calcium sulphate, with other salts. . .	7·90
Calcium carbonate	87·12
	100·00

The small proportion of chloride here shown, I think, would justify the assumption that the chloride of lime process had not been employed. Moreover, on two out of the three samples containing calcium carbonate, small particles of ultramarine blue were detected; and this, under the name of lime blue, is commonly used to improve the colour of lime washes.

From these facts it would appear that three of the samples had been simply whitewashed, without any attempt at bleaching, but how the other two came to be covered with plaster of paris is not very clear, as this material has not the same "body," nor does it adhere so well as the lime wash, and would scarcely be preferred to the latter if the method of applying it were the same.

Apart from this, however, the fact that a common article of food should contain between two and three per cent. of chalk is so evidently a fraud upon the public that it is to be hoped the practice will cease when attention is drawn to it.

10, *Cross Street, Southport,*
March 23rd, 1874.

THE PRESENCE OF NITRATE OF POTASH IN THE LEAVES OF PLANTS.

BY T. AND H. SMITH.

The observation made by Mr. E. S. Wayne, of the occurrence of nitrate of potash as a natural constituent of the leaves of *Ricinus communis*, in his paper reprinted in a recent number of the PHARMACEUTICAL JOURNAL, confirms the writers in a belief which they have long entertained, that the existence of that salt in the products of the vegetable kingdom is more common than is generally accepted.

Some few years ago Messrs. Smith obtained about two ounces of nitre from a hundredweight of *Cannabis Indica*. It was obtained by evaporation of the watery liquid left in distilling the spirit from the alcoholic solution of the gunjah, in preparing the resinous extract of Indian hemp. On examination

* *Journ. de Pharm.* 44 (1863) 22.
† PH. JOURN., 7th March, 1874, 710.

the crystals proved unmistakably to be nitrate of potash. They have since obtained similar crystallizations from Indian hemp, but have not been induced to carry the investigation further, in order to determine whether, in those cases also, the crystals were those of nitrate of potash.

Although, in the case mentioned, probably the quantity of nitrate of potash obtained may be considerably more than what the spirit of wine could have dissolved, were the solution attempted directly upon the salt, yet the writers look upon this as an instance of what occurs in many similar circumstances. Substances are often unexpectedly found in solvents, of crude organic matters, which the solvent could not have taken into solution unless through the aid of other constituents simultaneously present.

THE QUALITY OF MILK SUPPLIED TO TOWNS.

BY DR. STEVENSON MACADAM, F.R.S.E.,

*Lecturer on Chemistry, etc., etc.**

(*Continued from p.* 813.)

An important point regarding the time and mode of sampling milk requires now to be considered. When the milk is brought into the sale shop, it is generally placed in a large sale can, from which portions are removed by a measure now and again, as demand requires. During the sale of the milk the process of creaming is going on slowly, and as the fat rises to the surface and the sale measure is being dipped in, the milk which is thus removed becomes richer in cream or fat, so that in course of time the milk which is left behind becomes poorer, owing to the floating up and removal of part of the cream or fat originally diffused through it. Milk begins to cream immediately on being set at rest, and the mere disturbance of the upper half of the contents of a vessel will not reintermingle the cream with the whole milk, and thus keep up the original composition.

I have made special trials to determine the effects of the sale "ladling" process on the quality of the remaining milk. In the first experiment the original milk gave 10 per cent. of cream; after a process of sale removals for one hour, the remaining milk only showed 9 per cent. of cream when allowed to stand; and after sale removals for three hours, the remaining milk only gave 7 per cent. of cream. A second trial was made with a mixture of twenty-two samples of milk, and a portion of the original mixture of milk was analysed side by side with another portion, which had been subjected to the ladling process for three hours. The results were as follows:—

	Original Mixture.	Remainder of Milk in sale can in three hours.
Specific gravity	1032	1033·1
Cream per cent. by volume . .	9	6
Total solids per cent. by weight	12·06	11·39
Solids not fat „ „	9·67	9·58
Fat „ „	2·39	1·81
Ash in solids „ „	0·70	0·67

It was thus apparent that during the period milk is retained in a sale can, and successive quantities ladled out from time to time, the remaining milk becomes poorer in quality through loss of cream or fat, and in the space of three hours the proportion of fat is reduced by 25 per cent., or one fourth of the whole.

In endeavouring to fix on a standard for genuine milk, and which might be fairly deducible from the foregoing experimental results, I am of opinion that taking large dairies, where the runnings of a number of cows can be thrown together, so as to equalize the rich and the poor milk and yield an average, the following proportions may be taken as a standard for genuine or normal milk:—

Specific gravity . .	about	1030
Cream	not under	6 per cent.
Total solids . .	„	11 „
Solids not fat .	„	9 „
Fat	„	2 „
Ash in solids . .	„	0·65 „

But we must be prepared for even lower results in individual cases, as in dairies where only one, two, or three cows are kept, and where they are probably not very well fed. Even in the larger dairies, where the milk of the cows is not mixed together, or where probably the milk of every two or three cows is simply placed in a can by itself, there might occasionally be found a sample having a lower composition than the standard given above, and yet the milk be undoubtedly of genuine quality. Any difficulty in this respect, however, would be avoided by the whole milkings of the dairy being placed in a large common vessel, and thereafter the sale or town cans filled from this mixture of the whole runnings of the dairy.

The foregoing experimental results of the analyses of the samples of milk taken direct from the udders of 40 cows belonging to three large dairies, prove that the standard for genuine or normal milk which has recently been put forward for the guidance of city analysts is far too high. The assumed standard declares that normal milk must have 12·5 per cent. of total solids, of which 9·3 per cent. are solids not fat, and 3·2 per cent. must be fat. This so-called standard has been assumed in the face of an analysis of *average country milk*, which is also quoted, and which *average* milk contains actually less than the assumed standard which ought to indicate *minimum* and not *average* quality of genuine milk. According to this so-called standard, adopted in so arbitrary a manner and blindly followed by town analysts, by far the greater number of the samples of milk taken direct from the udders of the 40 cows in the dairies A. B. and C. would be held to be adulterated, either with water or with skimmed milk or with both, and taking the average of the whole of the samples of milk, which shows only 2·44 per cent. of fat, we find that it contains about 25 per cent. less fat than the assumed standard, so that the entire bulk of the genuine milk yielded by the 40 cows, if mixed together in equal quantities would be held to be adulterated with about 25 per cent. of skimmed milk. The results obtainable from the assumed high standard should not therefore be depended upon; and yet by calculation from such data, carried out to the tenths and hundreths of a grain, we find prosecutions taking place and convictions attempted to be obtained and enforced.

The assumption of a definite high standard for milk, and the further assumption that all milk is of equal, or nearly equal, quality, is even directly contrary to all previous researches on the subject, as shown by the great diversity in the composition of milk as given in analyses published in different chemical treatises. Even the amount of fat in cows' milk on which the proportion of adulteration with skimmed milk is based, is authoritatively stated to be sometimes as low as 1·25, 1·4, 2·13, though ranging up to 3·42, 4·56, etc., showing great variations in the amount of this ingredient. Probably the best evidence on this point is given in a Government report, written by Prof. John Wilson in 1866, where the Danish dairy farms are referred to, and where the variations in the amount of fat in milk are observable in the amount of milk required to yield a pound of butter at different seasons of the year. The proportions range in the same dairy farm from 19½ to 33 lbs. of milk, and in another dairy farm from 21½ to 31½ lbs. of milk, which must be employed to yield a pound of butter.

Since the analyses of the samples of milk were made by me, and I was called upon to give evidence in two cases of alleged adulteration, there has been published in the PHARMACEUTICAL JOURNAL, an excellent paper by Prof.

* Read before the Pharmaceutical Society (North British Branch) at the meeting on the 26th March, 1874.

Voelcker, "on Milk, its Supply and Adulteration," in which he gives the results of the analyses of the milk yielded by the herd of cows at the Royal Agricultural College, Cirencester, during eleven months of a year, and shows the great variations which occur in the quality of the milk obtained from the whole herd. The total solids range from 9·3 to 13·8 per cent. and the fat from 1·79 to 4·12 per cent., and, judging from the assumed high standard adopted by some town analysts, the whole runnings of this herd of cows would have been declared to be adulterated for two-thirds of the year.

The Adulteration Act was framed for the protection of the public, and, if properly worked out, would undoubtedly lead to the suppression of adulteration in food, drink, and medicine, and would at the same time be of national service, and a protection to the honest merchant against the dishonest and fraudulent dealer. But if anything is calculated more than another to render the Act inoperative and untrustworthy, it is the framing and setting up of a standard of genuineness which can seldom be reached by the genuine article itself; and by blind adherence to which the majority of the samples of the genuine and unadulterated material must be declared to be mixed and adulterated.

Considering the great variations in the quality of genuine milk and the beneficial effects of the good feeding of the cows upon the milk, it is worthy the attention of dairymen whether they would not sell their milk under a guarantee of quality, say 11 per cent. of total solids, of which 9 are solids not fat and 2 are fat. In large dairies this could be ensured by mixing the whole runnings of the milking of the herd in a common tank, and thereafter filling the sale or town cans from this mixture of the whole milking. Milk could thus be sold with a guarantee which would give certainty to the purchaser that he was obtaining not only genuine milk, but genuine milk of good quality.

Since reading the foregoing paper before the meeting of the society, I have had the opportunity of testing the quality of the milk yielded by the cows in another dairy which supplies milk to Edinburgh. This dairy, which we may call dairy D, contained six cows at the time complaints were lodged against the genuine character of the milk, and I have tested the quality of the milk given by each of these six cows in the morning, at noon, and in the afternoon. My assistants, Mr. William Ivison Macadam and Mr. Charles Edward Bourchier, went to the dairy on each occasion, inspected the milk pails, saw all the cows milked, sampled each milk from the whole runnings taken from the udder of each cow, and brought the samples to me in a locked case. The analyses were made by me in the manner stated before, and the results obtained are given in the following table :—

No. of Cow.	Specific gravity of milk.	Cream per cent. by vol.	Total solids per cent. by wght.	Solids not fat, per cent. by wght.	Fat per cent. by wght.	Ash in solids, per cent. by wght.
Morning milk.						
1. whole runnings	1034·5	6	11·52	9·76	1·76	0·72
2. „	1033·3	5	10·63	9·05	1·58	0·68
3. „	1033·4	6	10·96	9·22	1·74	0·69
4. „	1032·3	8	12·29	9·75	2·54	0·74
5. „	1033·3	6½	11·04	9·18	1·86	0·71
6. „	1034·1	6	10·95	9·21	1·74	0·73
Average of morning milk	1033·5	6¼	11·23	9·36	1·87	0·71
Noon milk.						
1. whole runnings	1033·1	8	12·94	10·23	2·71	0·71
2. „	1030·9	9	12·78	9·66	3·12	0·70
3. „	1032·2	7	11·42	9·26	2·16	0·72
4. „	1030·6	8	11·98	9·37	2·61	0·73
5. „	1030·7	8½	12·66	9·70	2·96	0·70
6. „	1030·9	10	13·73	10·26	3·47	0·72
Average of noon milk	1031·4	8½	12·58	9·74	2·84	0·71
Afternoon milk.						
1. whole runnings	1033·0	7½	12·52	10·08	2·44	0·73
2. „	1031·1	8	12·09	9·33	2·76	0·71
3. „	1030·2	10	13·11	9·86	3·25	0·73
4. „	1028·3	8	11·25	8·62	2·63	0·74
5. „	1031·4	9½	12·81	9·69	3·12	0·70
6. „	1030·8	10	12·84	9·58	3·26	0·72
Average of afternoon milk	1030·8	9	12·43	9·52	2·91	0·72
Total average of morning, noon, and afternoon milk	1031·9	8	12·08	9·54	2·54	0·71

These results prove that, taking either a single cow or the whole herd, the morning milk did not come up to the assumed high standard of 12·50 of total solids, of which 9·30 are solids not fat, and 3·20 are fat ; the noon milk only gave one sample above the standard, whilst the five remaining samples were below the standard; and the afternoon milk gave two samples equal to the standard and four samples below it. Of the whole eighteen samples only three were up to the standard and fifteen were below it, so that the milk of these fifteen cows would have been declared mixed or adulterated with water, or skimmed milk, or with both water and skimmed milk, according to the assumed high standard. Again, taking the whole morning milk, the whole noon milk, or the whole afternoon, separately or together, the entire runnings of this dairy would on the same standard be declared to be adulterated.

The differences in the quality of the milk yielded by the same cow at different periods of the day, and the variations in the character of the whole milk given by the whole herd at morning, noon, and afternoon, are markedly observable in the results obtained from dairy D. It is quite apparent that the morning milk is the poorest, whilst the noon and afternoon milks are decidedly richer. It may be stated that all of those cows were of the Ayrshire breed, that they were fed on draff, turnips, oats, straw, and peas meal ; that No. 1 cow calved in August and the milk was almost out, Nos. 2 and 5 calved in February, No. 3 in January, and No. 6 in September, and the milk of the latter was nearly done.

In conclusion I may mention that out of 66 samples of genuine milk taken from 46 cows, and which have been fully analysed by me, only eleven of these samples came up to the high standard of 3·2 per cent. of fat, of which one sample was of the last runnings of the milk, and three samples were deficient in the high standard of 9·3 of solids not fat; so that only seven samples of the whole runnings of milk came up to the assumed high standard on all points. Neither the average quality of the genuine milk obtained from any one of the four dairies nor the average quality of the genuine milk yielded by all the dairies taken together was equal to the arbitrary high standard assumed by City Analysts.

THE CHEMISTRY OF THE LIVER.

In one of the Croonian Lectures recently delivered on the subject of Functional Derangement of the Liver, and published in the *British Medical Journal*, Dr. Charles Murchison, LL.D., F.R.S., etc., deals at some length with the chemical history of the compounds that are formed in connection with the functions of that organ.

The following is taken from this portion of the lecture :—

In the first place, it is now known that the liver is one of the organs mainly concerned in the process of sanguification. So long ago as 1820, it was shown by Magendie and Tiedemann that the absorption of nutritive matters from the bowel was not limited to the lacteals, but that part was taken up into the blood through the portal vein ; and the researches of subsequent physiologists have clearly established that the liver exercises most important functions in assimilation and nutrition. The most valuable

contributions towards our knowledge of this matter have been the researches of Claude Bernard and other observers, who have shown that the liver has the power of making and storing up for a time within its cells glycogen ($C_6H_{10}O_5$), a substance resembling dextrin ($C_6H_{10}O_5$) in its chemical composition and reactions, and like it capable of conversion into sugar by the action of albuminoid ferments. This substance always exists in the liver in larger amount during digestion than during fasting, attaining its maximum usually about four or five hours after a meal. It does not yet seem certain what the materials are from which it is mainly formed, but there can be no doubt that its amount is increased by the use of starchy or saccharine food. The starch ($C_6H_{10}O_5$) of the food is believed to be converted into grape-sugar or glucose ($C_6H_{12}O_6$) by the saliva and pancreatic secretion, while the cane-sugar ($C_{12}H_{22}O_{11}$) is transformed by the intestinal secretion into grape-sugar and another form of sugar called lævulose ($C_6H_{12}O_6$). The glucose and lævulose are absorbed by the intestinal veins and carried by the portal vein to the liver, where they are converted partly perhaps into fat, but mainly into glycogen, which is stored up in the hepatic cells, and distributed for the nutrition of the tissues during the intervals of fasting. The circumstance, however, of glycogen being formed in considerable quantity in the livers of animals who have been fed for a month or more on flesh alone, and the fact that its quantity in the liver of a dog is always increased after a meal of flesh, show that it can also be produced from albuminous matter. The albumen of the food is converted by the gastric juice into peptone, which is also absorbed by the intestinal veins and carried to the liver, where it is believed to be decomposed into glycogen and nitrogenous products such as leucin ($C_6H_{13}NO_2$) and tyrosin ($C_9H_{11}NO_3$), which are ultimately resolved into urea (CH_4N_2O). The glycogen derived from these two sources does not remain long in the liver, for the large quantity formed after a meal is quickly diminished on fasting. It is not got rid of by the bile-ducts, for bile contains neither glycogen nor sugar. But, either as glycogen, or more probably as sugar, into which it is believed by Bernard and most other physiologists to be reconverted through the action of an albuminoid ferment in the liver or in the blood, or transformed in some other way, it enters the blood by the hepatic veins.

One object of the glycogenic function of the liver is supposed to be that of continuously supplying an easily oxidizable material, such as sugar, which in the presence of oxygen and albuminous matter is readily converted in the lungs into carbonic acid and water, and thus contributes to the maintenance of animal heat. But, although there is still some difference of opinion among those most competent to judge, the bulk of evidence goes to show that a portion only of the glycogen formed in the liver is transformed into sugar to be burnt in the lungs, and that the maintenance of animal heat is far from being its chief use. There are good grounds for believing that it assists in cell-growth ; for, just as in plants the presence of sugar seems to be necessary for the most rapid development of cells, so in animals glycogen can be found wherever cell-growth is actively going on.

But, in the second place, modern research has made it probable that the liver is endowed with a function not suspected by Galen, and which, from a pathological point of view, is even more important than that which we have been considering. Many observations, pathological as well as physiological, point to the conclusion, that the liver is not only a blood-forming, but a blood-destroying or purifying, organ, and that it contributes in a great degree to the destruction of albuminous matter derived from the food and textures, and the formation of urea and lithic acid, which are subsequently eliminated by the kidneys. First, there seems to be little doubt that the albumen and fibrin of the blood become largely disintegrated in the liver. Lehmann and Bernard have shown that, while portal blood contains much fibrin, blood from the hepatic vein contains little or none. Brown-Séquard has calculated that no less a quantity than 2690 *grammes*, or about 86½ ounces, of fibrin is daily lost to the blood in its passage through the digestive organs and the liver. If this be so, we can readily understand that, when anything occurs to interfere with this fibrin-destroying function, there should be a rapid increase of fibrin in the blood, as we know to occur in acute rheumatism and in other diseased states. Moreover, there are grounds for believing that, while white blood-corpuscles take their origin in the liver, the red corpuscles are destroyed there, and that the nitrogenous colouring matters of the urine are partly the result of this destructive process. Gréhaut has ascertained that there is a positive destruction of hæmoglobin in the passage of blood through the liver. Red blood-corpuscles are known to be at once destroyed when brought in contact with a solution of bile-acids of a certain strength (12 per cent., Legg) ; while the researches of our late colleague, Dr. Bence Jones, make it very probable that the various shades of yellow, brown, and pink, presented by the sediments of the urine are due to different degrees of oxidation of the pigment of the bile. Further, there is evidence that the liver is largely concerned in the formation of the nitrogenous matters which are eliminated by the kidneys.

The third function of the liver is the secretion of bile. The composition of this substance is complex, and its uses are not yet sufficiently known. Human bile, as found after death, is usually a dark brown fluid, of tenacious consistence, from the presence of mucin, which it derives from the gall-bladder and bile-ducts ; but, when fresh, as it flows from the liver, it is a thin transparent liquid, of a golden yellow colour like that of yolk of egg, of a very bitter taste, of alkaline reaction, and having a specific gravity of about 1018. It has an unctuous feel, and mixes freely with oil or fat. It contains from 9 to 17 per cent. of solid matters (the proportion being always greater soon after a meal), consisting for the most part of substances peculiar to bile. Excluding the mucin, its principal ingredients are—1. Bile-pigment ; 2. Biliary acids combined with soda ; 3. Cholesterin and fats ; 4. Mineral matter, such as phosphates of soda, potash, lime, magnesia, and iron, chloride of sodium, and traces of copper.

The following analysis of bile, obtained from a man aged 22, killed by an injury, was made by Frerichs.

Water	859·2
Solid residue	140·8
Glycocholate of soda } Taurocholate of soda }	91·4
Fat	9·2
Cholesterin	2·6
Bile-pigment and mucus (of which, mucus about 1·4)	29·8
Salts	7·7

The yellow pigment is now designated *bilirubin* ($C_{16}H_{18}N_2O_3$). On standing, it becomes greenish from oxidation, and is converted into *biliverdin* ($C_{16}H_{20}N_2O_5$), which accounts for the dark colour usually presented by the bile in the gall-bladder after death and in the fæces. Biliverdin is also the principal colouring matter of the bile of the herbivora. Bilirubin is now known to be formed from blood-pigment or hæmoglobin by the hepatic cells, in the passage of the blood through the liver. That this was the source of the bile pigment, was suggested at the end of last century by a distinguished Fellow of this College, Dr. W. Saunders, who observed : "Green and bitter bile, being in common to all animals with red blood, and found only in such, makes it probable that there is some relative connection between this fluid and the colouring matter of the blood, by the red particles contributing more especially to its formation." This view, revived in our own day by Virchow, is supported by the apparent identity of bile-pigment with the pigment-hæmatoidin found in old extravasations of blood, and by the fact that what appears to be bile-pigment can be produced from blood-pigment by the action of chemical reagents ; by the

discovery of Zenker and Frerichs of crystals of hæmotoidin in inspissated bile and in the bile of jaundiced urine; by the observation of Gubler that bilirubin and hæmatin give the same play of colours with nitric acid, except that the green colour is most persistent in the former, and the violet in the latter; by the discovery of Frerichs, Kuhne, and others, that when any substance, such as bile-acids or even water, which has the property of dissolving blood-corpuscles and liberating hæmoglobin, is injected into the veins, bile-pigment (bilirubin) appears in the urine; and by the statement of Grehaut, that there is a positive destruction of hæmoglobin in the passage of blood through the liver. There are, on the other hand, grounds for believing that bile-pigment is in its turn converted into urinary pigment. A substance presenting spectroscopic characters similar to those of urinary pigment can be prepared by deoxidation from bilirubin; and it is believed that, in the organism, bile-pigments are reduced by hydrogen or other reducing agents present in the intestines. It is also a well known clinical fact, that nothing influences so much the characters of the urinary pigment as functional or structural disease of the liver. The liver, then, together with that osmotic circulation constantly going on between it, the blood, and the contents of the intestines, to be referred to presently, appears to be the medium of conversion of blood-pigment into bile-pigment, and of bile-pigment into urinary pigment.

The bile-acids in human bile are two—glycocholic acid ($C_{26}H_{43}NO_6$) and taurocholic acid ($C_{26}H_{45}NO_7S$). Both acids are derivatives of albumen, and contain nitrogen; and taurocholic acid, to which the bitter taste of bile is due, contains all the sulphur of the bile. Both are in bile combined with soda, and both are what are called conjugate acids; that is to say, that they are composed of cholic acid ($C_{24}H_{40}O_5$), which contains neither nitrogen nor sulphur, in combination with taurin ($C_2H_7NO_3S$), which contains both nitrogen and sulphur, and glycocin ($C_2H_5NO_2$), which contains nitrogen, but no sulphur.

Cholesterin ($C_{26}H_{44}O$) is a fatty substance, which crystallizes in colourless rhombic plates, one corner of which is often indented. It is met with in nerve-matter, in the spleen, in blood, and in certain morbid exudations, as well as in bile. An American physician, Dr. Austin Flint, jun., has endeavoured to show that cholesterin is formed for the most part, if not entirely, from nerve-tissue, from which it is taken up by the blood; and that one of the chief functions of the liver is to eliminate this cholesterin, the accumulation of which in the blood, from the liver ceasing to act, is attended by cerebral and other symptoms of blood-poisoning.

Bile thus constituted is being constantly secreted by the liver. There is still much difference of opinion as to the part played by the liver in the formation of bile. It is generally admitted that the biliary acids are formed in and by the liver; but many physiologists and physicians still maintain that the bile-pigment is preformed in the blood, and is merely separated from the blood by the liver; and they explain those cases of jaundice in which there is no obstruction of the bile-duct, by saying that bile-pigment accumulates in the blood from the liver ceasing to act, or from its function being suppressed. But it has long appeared to me that there are weighty objections to this view.

1. Although bile-pigment appears to be derived from the colouring matter of the blood, it has not yet been satisfactorily shown that bile-pigment, as such, exists ready formed in the blood of persons who have not jaundice. Frerichs denies that it ever has. Lehmann, who has investigated with great care the changes which the blood undergoes in passing through the liver, has never been able to detect the colouring matter of bile in portal blood, and infers that this, as well as the bile acids, must be formed in the liver itself. The blood of the hepatic artery has been examined with a like result. It is obvious that, if bile-pigment exist in healthy blood at all, its quantity must be very minute; and, when we consider that the quantity of bile secreted by the human liver daily is about two pints, and yet that jaundice is not a normal condition, it seems impossible that all the bile-pigment secreted by the liver can be formed in the blood; and it is not probable that part is formed in the blood and part in the liver.

2. The discovery by a few observers of a small quantity of bile-pigment in what appeared normal blood does not prove that it was formed in the blood. It is quite conceivable that it may have been formed in the liver, and been subsequently absorbed.

3. It often happens that, from various diseases, such as fatty and waxy degeneration, cancer, and cirrhosis, the secreting tissue of the liver is for the most part or entirely destroyed, bile is no longer secreted, and yet no jaundice results. Several cases of this sort are referred to by Haspel, where the gall-bladder and bile-ducts, after death, contained only a little white mucus. Frerichs records a case of fatty liver, where the contents of the bowels were pale, the gall-bladder empty, and the biliary ducts coated with a greyish mucus, notwithstanding which the skin was of a chalky paleness, and the urine contained no bile-pigment. Similar observations have been made by Budd in cases of waxy disease and cancer of the liver, and several instances of a like nature have come under my own notice. If bile-pigment be formed in the circulating blood, it is difficult to account for what becomes of it in these cases.

4. If the constituents of bile be formed in the blood, intense jaundice ought at once to follow the extirpation of the liver in any of the lower animals, in like manner as urea accumulates in the blood after removal of the kidneys. But, so far from this being the case, Müller, Kunde, Lehmann, and Moleschott have repeatedly extirpated the liver of frogs, and have invariably failed to find a trace of the biliary acids, or of the colouring matter of the bile, in the blood, the urine, or the muscular tissue.

The supposition that bile-pigment is formed in the blood appears to the author for these reasons to be untenable.

COMBINATION OF CHLORAL WITH ALBUMINOID MATTERS.*

BY M. PERSONNE.

The theory put forward by Liebreich, that chloral is decomposed into chloroform in the system, has been disputed on the ground that the blood does not possess sufficient alkalinity for the purpose, such a change not being affected by alkaline bicarbonates, as they exist in Vichy water, for example. The author having endorsed Liebreich's conclusions in a former communication to the Academy, was induced to investigate the subject afresh, the result of his new experiments being confirmatory of his former. They show that beside the stronger alkalies, all the weak alkalies, magnesia, akaline salts like the bicarbonates of potash and soda, borate and phosphate of soda, and all the alkaline animal liquids, such as blood or white of egg, are capable of converting chloral into chloroform when the mixture is heated to a temperature of 40° C.

To explain the difference of physiological action that actually exists between chloral and chloroform—the action of chloral being longer in duration than that of chloroform—another product of the decomposition of chloral, formic acid, has been brought in, and it has been admitted that this acid, burnt up in the system, yields carbonic acid, the hypnotic action of which is added to that of the chloroform. It is known, in fact, that the decomposition of chloral hydrate gives 72·2 per cent. of chloroform and 27·8 per cent. of formic acid, according to the following equation:—

$$C_2HCl_3O,H_2O = CHCl_3 + CH_2O_2.$$

Further, a more or less considerable portion of chloroform can be broken up, giving rise to formic acid and chloride of sodium.

* Abstract of a paper read before the French Academy (*Comptes Rendus*, vol. lxxviii., p. 129.)

$$CHCl_3 + 2Na_2O = CHNaO_2 = 3NaCl.$$

All the formic acid produced is far from being consumed, one portion is certainly eliminated by the urine, which possesses the property of reducing the copper solution, although glucose is absent. But even admitting that all the formic acid produced by the complete decomposition of the chloral is transformed into carbonic acid, should it be concluded that the action of this carbonic acid is added to that of the chloroform? The author thinks not, for the following reasons: 10 grams of chloral hydrate produce, upon complete decomposition, 5·6 grams of formic acid, a quantity that cannot always be administered to a dog of medium size. He has however administered to dogs as much as ten grams of dry formate of soda—representing 5·83 grams of formic acid—without observing the least anæsthetic symptom. Nevertheless the salt was always completely absorbed, for it never produced any purgative effect.

In the course of M. Personne's experiments he made an observation which he considers to throw a light upon the physiological action of chloral. Fresh blood, added to chloral hydrate and kept at the ordinary temperature, is completely coagulated, preserves its red colour and remains without alteration. A morsel of muscle immersed into a ten per cent. solution of chloral hydrate became slightly paler; a reddish liquid exuded from it which quickly deposited a brick-like sediment. After a few hours' immersion, the muscle, left at a temperature of 15° to 20° C., underwent no further putrefaction; it dried rapidly, took a brighter tint, and became sufficiently friable to pulverize. The dried substance contained chloral, and yielded chloroform with alkalies. An estimation of the chlorine, operating upon a specimen dried at 100° C., gave 8·30 to 8·38 per cent. of chlorine, corresponding to 11·50 per cent. of chloral.

Albumen also combines with chloral. The author has attempted to obtain a definite compound, but has hitherto failed to determine the precise conditions under which such a compound is formed. He therefore confines himself to stating that this combination dissolves in an excess of albumen as well as in an excess of solution of chloral, after the manner of the compound of albumen and bichloride of mercury. On one occasion he obtained a product which first dried during eight days at 40° or 45° C., then pulverized and dried at 100° C., yielded, upon analysis, 12·56 per cent. of chlorine, which represents 17·23 per cent. of chloral. The quantity of chloral led him to presume that this was a definite compound. In fact, if the formula for albumen given by Lieberkühn, $C_{72}H_{114}N_{18}O_{11}S$, be admitted, we have—

$$C_{72}H_{114}N_{18}O_{11}S + 2\,(C_2HCl_3O, H_2O) - H_2O;$$

which gives 12·65 of chlorine, corresponding to 17·36 per cent. of chloral.

It is now generally acknowledged that albuminoid matters are amides; therefore, as the aldehydes are capable of combining with those bodies, it is not unreasonable to suppose that chloral, which is a trichlor aldehyd, might form with them analogous compounds.

The author's experiments have led him to suggest the following explanation of the more prolonged action of chloral compared with that of chloroform. The first action of chloral hydrate upon the albuminoid matters with which it meets in the system produces chloroform at the expense of the alkali of those albuminoid matters. At the same time they, being impoverished or deprived of alkali, enter into combination with the undecomposed chloral, and this combination forms a sort of reservoir of chloroform, which is given up successively in proportion as the circulation destroys the combination thus formed. This would explain why only a small quantity of chloroform is met with in the blood of animals subjected to the action of chloral; it also justifies the employment of chloral in the dressing of wounds, as a powerful modifier of the tissues.

The author concludes by remarking that chloral can be advantageously employed for the preservation of the most readily alterable animal matters. A cerebellum, placed in a ten per cent. solution of hydrate of chloral, was preserved during a month without alteration, except that it became rather firmer without becoming hard. By using solution of chloral with glycerine, imputrescible products may be obtained, retaining a certain suppleness, which would allow of the preservation, under favourable conditions, of a number of anatomical preparations.

THE NIIN INSECT OF YUCATAN.*

BY M. DONDÉ.

Under the name of Niin, the natives of Yucatan designate a hemipterous insect of the Coccidæ family, which the author, who is a pharmacist at Merida, believes to be new to science, and proposes to name *Coccus Adipofera*. The male is small, red, ·015 millimetre long, with two wings, which shut horizontally upon the body, and are black in the interior and red on the exterior. The female is larger, ·025 millimetre long, and ·015 millimetre broad, and bright red in colour. They are found upon trees called "ciruelos," belonging to various species of the genus *Spondias*, of the family Terebinthaceæ. They adhere to the plants solely by a hard beak with which the lower part of the mouth is furnished very close to the thorax. They remain almost motionless, and are so numerous and crowded so closely together that often the greater part of the tree is hidden by them. From about July or August the female insects increase in size until November, which is the period of incubation. Each female deposits about fifteen hundred very small reddish oval eggs, of which two thousand weigh five centigrams.

From the females is extracted about one-fourth of their weight of a dark yellow fat, with an odour *sui generis*; this fat is homogeneous when recently melted, but shortly afterwards presents grains of a light yellow colour. Applied upon paper it dries in six or seven hours, forming a smooth, shining, inodorous surface. Mixed with copal or other resin and oil of turpentine it forms a golden yellow drying varnish.

This fat melts at 36° C and again solidifies at 30° C. Heated at between 200° and 210° C to the consistence of a syrup it loses 8 per cent. of its weight, and no longer renders paper transparent. Upon cooling it forms a golden yellow, glutinous mass, in thin layers, which is much less siccative than the crude fat. If the heating at the same temperature be prolonged until the substance acquires a glutinous consistence, it forms upon cooling a soft elastic mass (niin caoutchouc) nearly insoluble in oil of turpentine, perfectly soluble in carbon bisulphide. When the fat is heated with 6 per cent. of litharge it forms at first a deep yellow lather, which passes to a dirty yellow. Removed from the fire, when the froth subsides a yellow consistent glutinous mass is obtained, more siccative than the boiled fat, but less so than the crude.

The crude fat is soluble in 0·5 part of carbon bisulphide, 1 part of rectified sulphuric ether, and two parts by weight of oil of turpentine at 26° C. In the first two liquids solution takes place in an hour and a quarter, in the latter it requires two hours. Upon decrease of the temperature two or three degrees, light yellow particles are deposited. Alcohol of sp. gr. ·809 dissolves it slightly at ordinary temperatures, acquiring its colour and odour. 500 grams of alcohol dissolved at the boiling temperature, 3·06 grams of the fat, and deposited upon cooling yellowish white flocks, which when dried were reduced to a light yellow powder, insoluble in solvents of fats and soluble in a 10 per cent. solution of potash. The alcohol, however retains a very light yellow colour, and upon evaporation leaves a dark coloured slightly glutinous fat, which is not siccative.

Combined with caustic soda this fat forms a dirty yellow rather soluble soft soap, with a disagreeable odour;

* Abstract of paper in *L'Union Pharmaceutique*, vol. xv., p. 24.

upon exposure to the air this becomes reddish brown and then brown. Treated with hydrochloric acid this soap forms fatty acids, which, heated with water to wash them, change into a yellow, dry, friable substance nearly insoluble in ether and carbon bisulphide, and soluble in ten per cent. solution of caustic soda. Upon heating the fat with an equal weight of nitric acid, diluted with four parts of water, it gives in half an hour, without disengagement of nitrous vapours, a friable spongy mass, reddish brown on the exterior and yellow in the interior, which is soluble in ten per cent. solution of caustic soda.

These properties prove that this fat has a chemical constitution differing from that of any hitherto studied. Like the drying oils it forms a glutinous substance by the action of heat; but this preparation is required to render them more siccative, whilst the niin fat on the contrary loses that quality upon heating. The elastic substance of other oils is soluble in ether and oil of turpentine; that of niin fat is nearly insoluble in those substances. All other fats absorb oxygen from the air uniformly throughout their mass: those which are siccative consolidate and become diaphanous; those that are not turn rancid and lose their colour. Some niin fat which the author has preserved during twelve years presents now the same characters as formerly. It has neither acquired consistence or become rancid, the pellicle which has formed upon the surface having preserved it from further oxidation. In some parts of Yucatan niin fat is mixed with chalk and colouring matter and used as a paint for wood, which paint has been found very durable. The guitar makers also use this fat to varnish their instruments. It has not yet however received any application in pharmacy. It is thought probable that the former inhabitants of the Island used niin fat in the painting of their dwellings, and some of the decorations on the ruins remain after three centuries in a good state of preservation.

PROTECTION OF HYPODERMIC SOLUTIONS FROM CHANGE BY KEEPING.*

By Dr. Squibb.

It is supposed to be established by the investigations of Dr. Bourdon, M. Delpech, M. Gubler, and M. C. Paul, that the growth of confervæ is the only cause of the changes which commonly occur in solutions of the organic alkaloids and their salts; and that these confervæ decompose the alkaloids and consume a portion of their constituents, so that the solutions become weaker as the growths increase. Various methods have been proposed and used to prevent these growths, but thus far none seem more simple or more effectual than the addition of one or other of the phenols; and the crystallized carbolic acid is perhaps the most convenient if not the best of these. This carbolic acid being an irritant in proportion to quantity, and it being very important that solutions for hypodermic use should be as unirritating as possible, it becomes of some consequence to know how little of the protecting agent can be used with average success. The experience of several years in my laboratory, has shown that one volume of a five per cent. solution of crystallized carbolic acid in sixty-four volumes of a solution of sulphate of atropia of the strength of two grains in each fluid ounce, will generally, but not always, protect it from change. The carbolic acid here bears the proportion of about one-thirteenth of one per cent., and this proportion proves quite unobjectionable for the delicate purposes of eye surgery. But once or twice in an experience of about six years, it has proved ineffectual for protection.

In the endeavour to answer this query with accuracy, the first result reached was, that accidental circumstances from unknown causes sometimes prevent the growth of these confervæ in solutions not protected at all; and also admit of their presence in and absence from different bottles of the same solution, without discoverable relation to the proportion of the protecting agency. A series of solutions, prepared with care in August, 1872, some unprotected, and others with various proportions of carbolic acid, stood until May, 1873, many of them remaining without growths of any kind, while those which produced confervæ did so without discoverable relation to the protecting agency. Supposing that the atmosphere of a laboratory might be the cause of these confusing results, fresh solutions of acetate of morphia and sulphate of atropia were made; the former salt having proved to be the most easily attacked and the most rapidly changed. The bottles containing these solutions were placed for one week with stoppers out, in a hospital where such solutions were very liable to change. The solutions were then distributed into small vials, some without protection and others with various proportions of carbolic acid. These vials were observed every week during the months of May, June, and July, until they ceased to show any farther changes. One vial of the solution of sulphate of atropia which was entirely unprotected, failed, from first to last, to show any signs of change. Two vials of sulphate of atropia solution, and one vial of a pair of acetate of morphia solution, all protected with small quantities of carbolic acid, also failed to show distinct evidence of confervæ. But with these exceptions, the entire number of twelve pairs exhibited a diminution of confervoid growths, in proportion to the quantity of carbolic acid added; until the proportion of carbolic acid reached, in the solution of sulphate of atropia, about one-eighth of one per cent., and in the solution of acetate of morphia about one-seventh of one per cent., all with larger proportions remaining clear and unchanged. Hence it appears that solutions of some salts, though of the same strength, require more carbolic acid for protection; but the proportion which under ordinary circumstances will protect the most difficult ones of those tried, does not exceed about one-seventh of one per cent.

But these solutions were all made with distilled water, and with more than ordinary care, and were all filtered. When similar solutions were made with ordinary undistilled water, nearly double the quantity of carbolic acid was required to afford a doubtful protection. Hence these solutions should, under all circumstances, be made with distilled water, and be carefully filtered.

The query may then be answered as follows: When such solutions are properly made, the smallest proportion of carbolic acid which will protect them from change, is about one-seventh of one per cent.; but that a proportion of one-sixth of one per cent. is practically better and safer in ordinary practice; and that this latter proportion is unobjectionable in all known respects. To make these solutions with this proportion, the following formulas are suggested. First, to make a five per cent. solution of carbolic acid, which is useful for this and many other purposes:

Take of crystallized carbolic acid 10 parts, or 10 grammes, or, 54 grains; distilled water 200 parts, or 200 grammes, or 3086 grains. Weigh the distilled water in a glass-stoppered bottle, capable of holding one-fourth more than the sum of the quantities. Melt the crystallized carbolic acid in the stock bottle by setting this in water warmed to about 50°C.=122°F., and weigh the quantity by pouring it carefully into the bottle containing the water, as it sits upon the scale. Then shake the whole together until the carbolic acid is dissolved, and filter the solution through paper. Label it, "Solution of Carbolic Acid, five per cent."

Of this solution, about fifteen minims in each fluid ounce gives a proportion of one-sixth of one per cent.

For solution of sulphate of morphia, of the strength called "Magendie's Solution:"

Take of sulphate of morphia, solution of carbolic acid, 5 per cent., of each two parts, or 2 grammes, or 31 grains; distilled water, a sufficient quantity. Dissolve the sul-

* Read before the American Pharmaceutical Association, September, 1873.

phate of morphia in about 50 parts, or 50 grammes, or 775 grains, of distilled water ; add the solution of earbolie aeid, filter through paper, and pass distilled water through the filter, until the filtrate weighs 57 parts, or 57 grammes, or 883 grains. Label, "Solution of Sulphate of Morphia ; Magendie's ; about 3·51 per cent., or 16 grains in the fluid ounce."*

POISONING BY VANILLA-ICE.

BY DR. L. ROSENTHAL.†

I come before you with the open confession that, in spite of all the trouble I have taken, I have not sueeeeded in solving the problem of poisoning by vanilla-ice. Thc chemical investigations earried on under my direction, by order of the president of poliee, by Dr. Sehädler, have shown that the hitherto most current and plausible hypothesis—that the poisoning is to be attributed to eardol —is untenable ; but experiments whieh I have made in eonjunetion with that gentleman on rabbits and cats, have had a negative result. We fed the animals with decoetions both of the pod and of the pulp of vanilla ; we repeatedly administered to them vanilla-ice obtained from the Vienna *café* : in all eases, the animals subjected to experiment remained healthy, and showed no condition varying from the normal state.

In my opinion, poisoning by vanilla-iee is not so very rare as is generally assumed, espeeially when we consider that vanilla-iee is not one of the articles of food in every day use. Cases of poisoning of this kind were, within my knowledge, first observed and deseribed by Orfila, in Paris, more than twenty years ago ; and in that eity eases of poisoning by ices have repeatedly eome under notiee from time to time. Similar observations have been made, in some other plaees on several occasions—in Vienna, in Munieh, in Leipzig, in Ameins, in Erlangen, Altona, and Bergen. In Berlin, also, cases of poisoning by vanilla-ice have occurred more than once.

All these eases of poisoning have this peculiarity, that they always have one starting point ; all, or, I will say, nearly all the persons, who at a eertain time eat vanilla-iee in a eertain *café*, become ill ; while other persons in another place eat the iee with impunity. Here in Berlin, in the last days of August, 1873, an endemie of this kind prevailed ; all the persons, who at that time ate vanilla-iee in the Vienna *café*, suffered from more or less severe symptoms.

During the night of August 26 27, I was ealled to a family, in whieh I was attending one of the daughters in the last stage of phthisis ; I had visited on the evening of the 26th. With the exeeption of the eonsumptive patient, all the family, consisting of the father, mother, and two other daughters, were in perfectly good health. The messenger told me, that nearly the whole family had eholera. Even though, as you know, cholera was prevalent here at the time, the simultaneous and sudden attack of the whole of the members of a family was rather extraordinary ; and the next idea that oeeurred to me was, that it was a ease of poisoning. On inquiry, I was informed that the patients had eaten ices in the *café* in the evening. As, so far as we know, it is only vanilla-ice that eauses poisoning, I made inquiries as to whether they had taken vanilla-ice, and found they had done so.

The mother and one of the daughters had eaeh eaten a portion of vanilla-iee about 10 p.m. They had taken a third portion home, and had divided it into two equal parts. Of one of these the father ate two teaspoonfuls, and gave the remainder to his eonsumptive daughter ; the third daughter ate the other half ; and a little old dog lieked the one plate that was used. All the members of the family, ineluding the dog, were taken ill during the night. At 11 p.m. the eldest daughter began to vomit, and violent diarrhœa soon afterwards set in ; half an hour later, the same symptoms showed themselves in the mother, and the remaining members of the family followed. It is to be observed, that only the two healthy daughters slept together in the same room ; all the other patients had separate bedehambers. On the whole, the severity of the symptoms was in proportion to the quantity of the ice taken ; so that the mother and eldest daughter suffered most ; the father least. He had vomiting and diarrhœa twiee only ; then followed the phthisical daughter, and finally the third daughter and the mother. As no notice was taken of the dog during the night, I cannot say when the symptoms of the disease began in it ; but the next morning we found the room extensively soiled with vomited matters and fæees, and the symptoms continued through the whole of the next day.

I return now to the human subjects. The symptoms in the mother and one of the daughters were so violent that they nearly eompletely assumed the form of cholera. Vomiting followed vomiting, stool followed stool. To these were added violent cramps in the calves of the legs, eoldness of the extremities, lividity of the limbs and of the face, and the pulse eould hardly be felt. Under these cireumstanees, I am not surprised that other colleagues, who had not the opportunity of observing these cases of illness in the greater number of members of a family at the same time, have diagnosed the disease to be cholera or eholerine. I will, however, remark that both those who were most severely attaeked had violent gastralgic and enteralgie symptoms, and that the pupils (as also in the other cases whieh I have observed) were moderately dilated, and were slow in responding to the stimulus of light.

The prognosis, from the observations already made, was favourable ; for, hitherto, no ease of death from poisoning by vanilla-ice has eome to our knowledge.

In the same night, several quite similar cases occurred. I will here briefly relate those whieh have come to my knowledge. Herr Güterboek, senior, was kind enough to send me one of his patients after recovery. He and his wife had suffered from the same symptoms as have been deseribed above. It is remarkable, however, that this gentleman suffered for some time from a painful sensation as of burning, in the mouth and throat. In these parts, a number of red and inflamed spots were seen on the third day ; and, at the time, I was inclined to attribute them to the action of eardol, which, aecording to Sehroff, aets even more energetically than eantharidin. This observation in the meantime stands alone ; in the other cases I observed nothing of the kind.

Three other cases were observed on the same night by Herr Riedel, in a family which had eaten vanilla-iee. As, however, Herr Riedel deelared the patients to be suffering from eholera, and at the present day asserts that this was the disease, I will make no further eomment on his cases. The patients reeovered.

A day later another case eame under my observation. The patient had eaten some iee about 2 p.m., after his dinner at 5 o'eloek he was taken ill, but reeovered the next morning. Finally, two other eases came to me in the night of September 1st and 2nd.

Similar cases were eommunieated to me by Messrs. B. Fränkel, Steinauer, Danziger, O. Simon (who himself was poisoned), J. Meyer, Citron, and Oppenheim. Besides these, I have heard of a number of cases through the publie ; among them I will mention a family in the Chausseestrasse, of whieh all the eight members were taken ill in one night.

(*To be continued.*)

* The original "Magendie's Solution," as given in the 'Officine' of Dorvault, p. 242, is, 1 part acetate of morphia in 40 parts water, or about 16 grains in 640 grains of water. As used in the United States, however, it is made from either aeetate, muriate, or sulphate of morphia, and in the proportion of 1 part in about 28½ parts water, or 16 grains in a fluid ounce (of 455 grains) of water.

† Read before the Berlin Medical Society. (*Berliner Klinische Wochenschrift*, March 9, 1874, from the *London Medical Record*, for March 25.)

The Pharmaceutical Journal.

SATURDAY, APRIL 18, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACY IN IRELAND.

THROUGH the courtesy of the Registrar of the King and Queen's College of Physicians in Ireland, we have been favoured with a copy of a draft Bill to Amend the Practice of Pharmacy in Ireland, and for the information of our readers, we publish this bill at page 747.

The means by which it is proposed to assimilate the position of the pharmacist in Ireland to that which he has in Great Britain are very simple, and the effect of them would be to extend the operation of our Pharmacy Act to Ireland. This is what has been suggested very frequently by several of our correspondents; and it seems to be a course, desirable not only on account of its simplicity, but also by reason of the admitted need there is in Ireland for compounders of medicine who are not necessarily medical men.

We are not at present aware what may be the attitude the Irish Apothecaries' Hall will assume in regard to this proposed bill; but from what has been reported lately in our columns, it may be inferred that body will not be altogether adverse to it. It is also worth mentioning that on the occasion of an interview with the Chief Secretary for Ireland last January, the Secretary of the Apothecaries' Hall stated of his own knowledge that there were some 28 or 30 important market towns in Ireland, with populations varying from 10,000 to 50,000, where there was no apothecary or other person competent to compound medicine. In fact the want of chemists and druggists' shops throughout the whole of Ireland is generally known to be a matter causing serious inconvenience.

According to the present state of the law in Ireland, the compounding of prescriptions and the sale of medicines are part of the art and mystery of the apothecary, and there is a penal clause in the Apothecaries' Act—31 GEO. III., cap. 34, clause 26—providing that if any person shall open shop or wareroom for the retail of medicine "within the kingdom of Ireland, without having obtained the proper certificate for that purpose, such person shall for every such offence forfeit the sum of twenty pounds." Under this clause frequent prosecutions have been instituted from time to time.

In order to obtain the requisite license to dispense prescriptions, it is necessary to spend four years in professional study, as follows:—

Chemistry, one Winter Session.
Anatomy and Physiology, two Winter Sessions.
Demonstrations and Dissections, two Winter Sessions.
Botany and Natural History, one Summer Session.
Materia Medica and Pharmacy, with instruction in a Laboratory, three months.
Practical Chemistry, three months.
Principles and Practice of Medicine, one Winter Session.
Midwifery, and Diseases of Women and Children, six months.
Practical Midwifery at a Recognized Hospital, with attendance on twenty cases.
Surgery, one Winter Session.
Forensic Medicine, one Winter Session.
Instruction in Practice of Vaccination, and attendance on a recognized Medico-Chirurgical Hospital for two years.

Such a protracted and expensive course of instruction is admitted to be totally unnecessary to qualify persons for compounding medicine, besides being beyond the means of those who would be disposed to open shop as chemists and druggists.

The dearth of such shops now felt in Ireland did not exist formerly, because the Apothecaries' Hall only required qualifications similar to those demanded by the Pharmaceutical Society of Great Britain.

The attempt now being made to establish reciprocity of rights between Great Britain and Ireland in regard to the practice of Pharmacy, similar to those enjoyed in Medicine, will doubtless call forth entire sympathy on the part of the Pharmaceutical Society. However, we imagine it will be necessary to have some more precise definition of the qualification for obtaining the licence of the Apothecaries' Hall of Ireland, by means of which it is, we observe, provided in the third section of the draft Bill that persons possessing that licence shall be qualified to keep open shop for the compounding of prescriptions in Great Britain as well as in Ireland. This will be necessary, because the Apothecaries' Hall, the Irish examining and licensing body, seems to possess considerable powers in regard to the examination standard. In establishing any such system of reciprocity as that contemplated, it will, of course, be desirable that it should be in every sense thorough, and that the practice as well as the aim of the several examining bodies shall be harmonious and consistent, so as to afford reasonable protection to competent educated pharmacists and due security to the public. Within these limits we heartily wish success to the Irish Pharmacy Bill, and are very glad to see that the introduction of the measure into Parliament has been taken in hand by so influential a body as the College of Physicians in Ireland.

THE CAMBRIDGE LOCAL EXAMINATIONS.

THE sixteenth Report of the Syndicate on the Local Examinations held in connection with Cambridge University, which has been recently issued, necessarily contains much that is interesting to the majority of our readers; for the subject-matter is the comparative success or failure of the directors of our middle-class schools to impart an education to

the scholars, based upon a clear apprehension of principles, such as shall enable them to apply advantageously in the battle of life the knowledge acquired. Every movement that appears likely to raise—whether by direct effort or by the exposure of faulty systems—the standard of the education obtained by those youths from amongst whom the present apprentices and future pharmacists must be drawn, is valued by the Pharmaceutical Society, not only as beneficial to the interests of its individual members but also as conducive to the attainment of the more general object for which the Society was established.

The total number of candidates last year was 3550, of whom 2481 were boys (2020 junior and 461 senior) and 1069 girls (668 junior and 401 senior). This was a larger number than presented themselves in any previous year, the total in 1872 having been 3075.

One very notable feature in these figures is the remarkable disproportion between the number of junior and senior boys, especially when compared with the proportion of junior to senior girls. The most obvious explanation of this disparity is that a much greater number of boys than of girls are withdrawn from school whilst yet very imperfectly educated.

Of the reports on subjects included in the Society's Preliminary Examination, that on English grammar speaks favourably of the senior candidates, but unfavourably of the junior; the parsing by the latter having been incompletely done at many centres, and the mistakes surprisingly bad. In the English subject (Richard II.) the boys showed signs of "unintelligent teaching," taking "much pains to evade giving direct answers on the one hand, and on the other to quote passages from the notes which they clearly did not understand. Their phonetic spelling of uncommon words seemed to show that they were writing them down for the first time, after many mechanical repetitions of them."

In Latin there appears to have been some improvement upon the work of former years, the translation of an English passage into Latin excepted. Here again, however, signs of "unintelligent labour" are noted; for, whilst the translations of a previously announced passage from Livy were carefully done, and evidently were the result of considerable pains in preparation, those of an unprepared passage were in the majority of cases signal failures, apparently because the pupils "had not been taught to think out translations for themselves." Moreover, the contrast between the former translations and the ignorance displayed in syntax and accidence is described as very remarkable. It is curious to observe that in both the preceding subjects the girls fully sustained the reputation of their sex for a more facile manipulation of language.

On the other hand, in arithmetic, whilst much of the work done was satisfactory, the percentage of failures was nevertheless high, and was considerably higher among the girls than the boys. This, it has been suggested, arises from arithmetic requiring a more sustained attention; but it may be attributed with at least equal justice to the "laborious and faulty methods" which some of the girls had been taught to use.

Notwithstanding that the teaching of science has, during the last few years, taken a much higher position in many schools, it cannot yet be said to be satisfactory, so far as it may be judged by the aid of the evidence in the present Report. Several candidates presented themselves for examination in Chemistry, Heat, etc., who seemed "almost absolutely ignorant of the subject;" and although the answers sent up by most of the others showed a fair knowledge of elementary facts, the questions on general principles were seldom successfully answered either by seniors or juniors. In Physics, all except three showed comparatively little grasp or range of knowledge. The results of the examination in Botany, also, illustrated a similar evil; in some cases a considerable knowledge of facts was evinced, but there was a marked deficiency in the answers to those questions which required thought rather than memory; and the almost universal failure of the attempts to describe plants from actual specimens, seemed to show that this part of the subject had scarcely been taught at all.

It would be difficult to attach too great importance to documents such as that under notice. Not only are they valuable to schoolmasters and parents, but they are pregnant with teaching to every student. In the present day, with its examination tests and its multitude of teachers and chaos of text books devoted to the express purpose of overcoming or sometimes evading those tests, there is danger that the student may place Captain Cuttle's advice to "make a note" of everything above the time-honoured injunction to "read, mark, learn, and inwardly digest." But the foregoing extracts afford fresh testimony to the truth that true education consists, not in the acquirement of a knowledge of certain facts to meet a special emergency, but in such a clear apprehension of the principles that everywhere underlie those facts, that the student, after having passed his examination, may be enabled to utilize and extend his knowledge by applying it to the varying needs of everyday life.

THE ADDITIONS TO THE BRITISH PHARMACOPŒIA.

As some of our readers may be apprehensive that the mistake in issuing the 'Additions to the Pharmacopœia,' which Mr. Bottle alluded to at the last Evening Meeting of the Pharmaceutical Society, may apply to other copies besides that which he had purchased, we may state, as the result of inquiries which have been made, that there was only one uncorrected sheet that could have got among those prepared for publication, and that must have been the one that fell into the hands of Mr. Bottle. It appears that twenty-five copies of the 'Additions,' in the form in

which they existed in 1873, were printed for the use of the members of the Medical Council, and that twenty-four of them were sent out for the purpose of eliciting further suggestions. The one remaining sheet, which was not so used, must have got mixed with those that were finally published after the suggested alterations had been made.

THE PHARMACY OF THE PHARMACOPŒIA.

It is satisfactory to find that the desirability of securing the services of practical pharmacists in the work of supplementing or amending our Pharmacopœia is recognised by a medical journal so fully as in the following quotation from the *British Medical Journal* in reference to the paper read at the late meeting of the Pharmaceutical Society—

"Many of the objections urged by Mr. Umney, seem to indicate the necessity of giving greater prominence to the element of practical pharmacy in the Pharmacopœia Committee of the Medical Council. This has long been done in other countries, and the adoption of such a course would certainly be advantageous here; for, though it is true that the decision as to the medicines to be comprised in the *Pharmacopœia* must always remain with those who have to prescribe their use, still questions as to the best means of preparing them for various purposes call greatly for the aid of the practical pharmacist, who, being daily occupied in such work, is enabled to bring to bear the results of his experience, so as to advantageously promote the objects of the physican. If this were properly done, we should then, perhaps, hear less of complaints that officinal formulæ were inferior to other methods of preparation. The material services which Professor Redwood has already rendered in this direction may, perhaps, not without advantage, be supplemented by the aid of other pharmacists."

SPIRITUS ÆTHERIS NITROSI.

We have on more than one occasion endeavoured, without success, to induce our contemporary, the *Practitioner*, to take up the inquiry into the causes which give rise to the sale of inferior qualities of pharmaceutical preparations, and now a medical correspondent, Mr. H. Maturin, of Hartley Row, Hants, writes to that journal as follows:—

"In the last number of the *Practitioner* you give an analysis of Sp. Eth. Nit. B. P. purchased from a famous wholesale establishment, and it appears that the preparation was anything but the Sp. Eth. Nitros. of the Pharmacopœia.

"I believe you would be doing the profession a good service if you would procure (from some of the wholesale druggists that chiefly supply general practitioners) and make an analysis of some of the B. P. preparations that are in the habit of being most frequently prescribed, and after doing so give the results of the experiments in the *Practitioner*, with the names of the druggists from whom the preparations were purchased, and the results of analysis. The practitioner in the country has no means of accurately verifying whether the drugs he purchases and prescribes are or are not such as they are represented to be, but has to accept everything for the most part in faith. The daily increasing desire for accurate therapeutical knowledge makes the question the more important."

We would also suggest that the *Practitioner* should obtain and publish statistics to show in what degree "practitioners in the country" promote the demand for B. P. preparations.

Only a few weeks since we had occasion to condemn the intemperate zeal with which the editor of the *Practitioner* dealt with this subject; it then became our duty to show that his statements were unfounded, his opinions incorrect, and his arguments illogical. Our worthy contemporary has not, however, received punishment with that humble fortitude which would have suited the circumstances of the case, but has responded to our criticism in a manner which can be illustrated only by allowing him to speak for himself, which he does as follows:—

[We are glad to observe that the vulgar abuse which was heaped upon us in a leading article of our hitherto decently conducted contemporary, the *Pharmaceutical Journal*, on account of our remarks on this subject in the February *Practitioner*, has not prevented sensible men from heeding our words. A letter from a druggist, in the very next number of the *Pharmaceutical Journal* to that which contained the explosion of editorial spite against us, simply and candidly took up a position which justifies our whole criticism. We are fortunately saved from any necessity of replying to the arguments of the *Pharmaceutical Journal* by the remarkable *exposé* which its editor gave of his own degree of qualification as a pharmaceutical critic. He supposes — it is impossible to imagine why—that officinal sp. eth. nitrosi should contain 10 per cent. of real nitrous ether. The fact is that it must contain about 3 per cent., in order that 2 per cent. may be separable by the Pharmacopœial test. After that, it does not seem worth while to trouble our readers any further about the editorial opinions of our contemporary.—Ed. *Pract.*]

With this quotation we leave our readers to judge who has most claim to the attributes of vulgarity and ignorance.

MEDICINE CHESTS FOR FISHING SMACKS.

Messrs. Dakin of Cree Church Lane have recently made and fitted up, under the direction of Mr. Henry Leach, Medical Officer of Health for the Port of London, a very simple medicine chest, containing only about a dozen drugs, and a few simple surgical appliances. It is intended solely for use in fishing smacks, and the measurements are so arranged that it can be stowed under the berth of the aft cabin, or in any other equally convenient corner. Although smacks are not compelled by law to carry medicine chests, it is expected that this practical idea will receive official attention and recommendation, and that some such chest with the "Ship Guide" will be put on board most of the good class smacks at Hull, Grimsby, Greenwich, Lowestoft, etc. Fishing boats of all classes form no inconsiderable item in our mercantile marine navy, for the last official return indicated no less than 40,446 boats of all classes, and 163,000 fishermen and boys on the list of the Registrar General of shipping and seamen.

THE DINNER AT THE CRYSTAL PALACE.

We are glad to be able to state that a considerable number of gentlemen have already expressed their wish to fill the office of steward on the occasion of the next annual dinner of the Members of the Pharmaceutical Society and their friends, which is to take place on the 19th of May. As it is desirable that a list of the stewards as complete as possible should be published next week, other gentlemen who wish to have their names included, are requested to communicate at once with the Secretaries, Mr. R. Bremridge and Mr. M. Carteighe, 17, Bloomsbury Square.

Transactions of the Pharmaceutical Society.

EXAMINATION IN LONDON.

April 10th, 1874.

Present :—Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Taylor, and Umney.

MODIFIED EXAMINATION.

Thirty-four candidates were examined. *Fifteen* failed. The following *nineteen* passed, and were declared duly qualified to be registered as Chemists and Druggists :—

Appleyard, William ....Hunslet.
Clarkson, Thomas.....Kingston-on-Thames.
Collins, Edward de Tedney.....Brighton.
Driver, John George .....Liverpool.
Ellis, Frederick..... .....Seacombe.
Evans, David Powell .....Knighton.
Harrison, William Dale ...Richmond, near Sheffield.
Horner, Robson.....Alne, Yorks.
Hughes, James .....Birmingham.
James, James Thomas ....Chelsea.
Kirk, Snowden ....Poplar.
Leman, Edmund .....Bath.
Lindley, Henry.....Liverpool.
Lowther, Maslyn Kelsey.....Leeds.
Munn, Charles .....Worcester.
Patten, William Henry .....Islington.
Streater, James Hobbs.....Sloane Street, S.W.
Williams, George .....Maidstone.
Wordsworth, Hewley Charles...Kensington.

PRELIMINARY EXAMINATION.

Certificates, as undermentioned, were received in lieu of the Society's examination :—

Certificates of the University of Oxford.

Alldridge, William Edward ...Birmingham.
Lawrence, George Richard .....Boston.

Certificate of the University of Cambridge.

Allwood, William Henry.....Wellington, Salop.

Certificates of the College of Preceptors.

Knights, George Ekins .....Ashby-de-la-Zouch.
Wilson, Griffith Phillips ....Merthyr.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.—Session 1873-74.

The last general meeting for the present session was held in Anderson's University on April 1st, Mr. John Currie, President, in the chair.

The minutes of previous meeting having been read, the chairman thought that it would be advisable to defer the discussion of the same till further on in the evening. He then called upon Dr. Fergus to deliver his lecture on "Pure Air and Water."

The lecture, which was experimentally illustrated, proved to be very interesting, and was listened to with marked attention. At the close, the lecturer was accorded a most hearty vote of thanks.

Mr. J. McMillan then, in the name of Messrs. Calvert (Bradford), presented to the Association a number of chemical specimens, and the secretary was instructed to forward the best thanks of the Association to Messrs. Calvert for the same.

The members of the Library Committee who were present, then handed in the money collected by them, which amounted to £30 16*s.* 6*d.*, there being still three subscription sheets to be taken into account. It is thought that there will be a total of about £40.

Mr. J. M. Fairlie exhibited the new preparations of the Pharmacopœia.

HULL CHEMISTS' ASSOCIATION.

A report on the Chemistry and Materia Medica classes held during the session 1873-74, under the auspices of the Hull Chemists' Association, has been presented to that Society by the teacher, Mr. H. J. Parson. In this report Mr. Parson states that he has delivered 17 lectures on chemistry, 7 on materia medica, and 1 on pharmacy, at which the attendance and attention of the students has been good. The lectures on the first named subject have been illustrated by experiments as far as the limited resources have allowed, but now experience in this department has shown the necessity for increased means of practical study.

There has been a decrease in the number of students compared with last year. Though there are many young men in Hull and its neighbourhood who have not passed the examinations of the Pharmaceutical Society, only nine have taken advantage of this means of instruction. The cause Mr. Parson attributes principally to the number of apprentices who have not passed the Preliminary Examination. The examinations for prizes were held on the 11th and 18th of March, with the following results :—

Senior Chemistry . . . Mr. F. W. Lambert.
Junior Chemistry . . . „ Septimus Walgate.
Senior Materia Medica . „ F. W. Lambert.
Junior „ . „ Not awarded.

In the junior chemistry the competitors failed to obtain sufficient marks for the prize. Mr. Padley, however, one of the competitors, is recommended as deserving some reward.

Proceedings of Scientific Societies.

NEWCASTLE-UPON-TYNE CHEMICAL SOCIETY.

At the meeting of the above Society on the 26th February, a paper was read, of which the following is an abstract, on—

The Rate at which Bleaching Powder Loses its Available Chlorine.

BY J. PATTINSON.

In dealing commercially with an article of such vast importance as bleaching powder, unstable in its composition, and the value of which is determined by the amount of chlorine it contains in a condition available for bleaching purposes, the question naturally very often arises—"How much available chlorine does it lose in a given time?" The examination of a number of samples of bleaching powder, from time to time during about twelve months, was undertaken by the author with the view of making a contribution towards the solution of this question, and also to the further one, "Does weak bleaching powder, say containing about 32 per cent. of chlorine, retain its strength better than a stronger bleaching powder?"

The samples examined were made by what is now known as the old process, in which the chlorine is generated in the ordinary stone stills by the action of hydrochloric acid on native peroxide of manganese. Three sets of samples were obtained from different manufactories on the Tyne, each set consisting of three samples. It was intended that the three samples of each set should be taken from the same portion of lime—one when it contained about 33 per cent. of available chlorine, one when it contained about 35 per cent., and the third when it contained about 37 per cent.—and with this object the lime was placed in a box in the chlorine chamber, so that it could be easily removed in order to take out the samples at each stage. The samples obtained, although not exactly of the strengths wished, were perhaps sufficiently near for the required purpose. They were placed in glass bottles holding about half a pound, and kept in these, loosely corked, in a room where they were never

exposed to the direct rays of the sun. At first they were tested about once a week, afterwards once a fortnight, and ultimately once a month during the last six months.

The process used for testing was that known as Penot's process, in which an alkaline solution of arsenious acid, with iodized starch paper as indicator, is employed.

As might have been anticipated, the loss of chlorine was found to be greater in the warm summer months than in the winter months. The *average* loss of chlorine, taking the whole of the samples into account, was, during the three months ending April 24th, 0·33 per cent. per sample per month; during the three months ending Sept. 8th, 0·86 per cent. per month; and during the three months ending Feb. 3rd, 1874, 0·28 per cent. per month. The greatest loss in any one month was in the month ending Aug. 8th; the average loss for this month being 1·4 per cent. of chlorine, taking the whole of the samples into account.

The average loss of chlorine per month in each sample during the whole time was tested was 0·63 per cent.

The total loss of available chlorine in each sample from the 20th of January to the 8th of September, a period of about eight and a half months, during which all the samples were tested, ranged from 3·3 per cent. to 6·1 per cent.

With reference to the question as to the relative stability of weak and strong bleaching powder, the author states that there is practically no difference in the rate at which they lose available chlorine. The weak 28·7 per cent. bleaching powder loses its strength at about the same rate as the 37 per cent. samples.

Whether the loss of strength goes on in the same ratio in large masses in casks as in the comparatively small quantities placed in bottles; the effect of using lime containing various amounts of water of hydration; the influence of different temperatures in the chamber during the time chlorine is being absorbed; and various other conditions affecting the stability of bleaching powder; and whether the bleaching powder made by the Deacon process keeps better than that made by the old process, as is sometimes asserted, are points which the author suggests for further investigation.

SOCIETY OF ARTS.

Cocoa and its Manufacture.*

BY JOHN HOLM, F.R.C.S., EDINBURGH.

(*Continued from page* 806.)

The chemical composition of cocoa is shown in the table at the foot of this page, which gives the different analyses of any importance which have been made.

* Reprinted from the *Journal of the Society of Arts.*

It is a table which is not very flattering to chemical science, the analyses being of the most contradictory character and containing discrepancies which cannot be at all reconciled with each other. I should judge that the analysis prepared by Drs. Playfair and Lankester is the most correct, while those of Tuchen and Muter appear least so. We thus see that, taking the important constituents, cocoa contains :—

	Parts.
Cocoa butter	50
Albuminoid substances	20
Starch, sugar, etc.	13
Salts	4
Theobromine	2
Other constituents	11
	100

Taking these in the order of their importance, we first notice the fat, or cocoa butter, which forms about half the substance of the nibs. It is a hard, fatty substance which, when clarified, is of a dead white colour. Its melting point is about 100° Fah., which being the heat of the body renders it of great value for therapeutical purposes. The fat never becomes rancid, however long it may be kept, a quality peculiar to itself. It is hardly necessary to point out how valuable this quality renders this portion of the bean, for it places cocoa-butter first in the list of the fatty class of our carbonaceous or heat-giving foods. The albuminoid constituents form about twenty per cent. of the nib. These are classed amongst the nitrogenous principles of food, and their presence renders cocoa one of the richest flesh-formers we have. The starch, gum, and sugar present, like the cocoa butter, belong to the non-azotised principles; they form about 13 per cent. of the whole. The alkaloid of cocoa, *theobromine*, is very similar in its physiological effects to its analogues, *théine* and *caffeine*, from which it differs very slightly in chemical composition :—

Essential Alkaloid Principles.

Yielded by	Name,	Composition.	Proportion.
Cocoa	Theobromine	$C_7H_8N_4O_2$	2 per cent.
Coffee	Caffeine	All identical	1 to 5 per cent.
Tea	Théine		
Guarana	Guaranine	$C_8H_{10}N_4O_2$	
Maté	...		In less quantities

In regard to these alkaloids, it is interesting to note that throughout the world the instinct of man has led him to seek some substance which contains one of these prin-

Analyses of Cocoa.

	Lampedius.	Tuchen.	Payen.	Johnson.	Playfair and Lankester.	Miller.	Boussingault.	Mitscherlich.		Muter.	Average of several other analyses.
Fat (Cocoa Butter)	53·10	36·97	52·00	51·00	50·00	56·00	44·00	45·00	49·00	42·67	50·00
Albuminoid Substances	18·70	...	20·00	...	...	17·00	...	13·00	18·00	...	...
Albumin	...	...		...	20·00	...	20·00	...	...	...	18·00
Fibrin	...	...		...	...	...	...	...	...	...	
Gluten	...	30·20	...	20·00	...	...	...	...	...	12·21	...
Extractive Matter	...	4·14	...	...	...	...	...	...	...	...	...
Sugar	...	...	...	...	...	...	...	0·60	...	...	...
Starch	10·91	0·55	10·00	22·00	7·00		...	14·00	18·00	19·03	10·00
Gum	7·75	0·69	...		6·00		6·00	...	...	6·40	8·00
Lignine	0·90	...	...	...	...	22·00	13·00	...	...	...	...
Cellulose	...	30·00	2·00	...	...			6·08	...	5·95	...
Woody Fibre	...	...	...	...	4·00		...	...	...	...	...
Colouring Matter	2·01	6·61	traces.	...	2·00	...	...	3·05	5·00	3·96	2·60
Water	5·20	6·01	10·00	5·00	5·00	...	11·00	5·05	6·30	5·98	6·00
Theobromine	...	0·56	2·00	2·00	2·00	1·50	2·00	1·02	1·50	0·90	1·50
Salts	...	3·00	4·00	...	4·00	...	4·00	...	...	...	...
Ash	...	...	...	...	...	...	...	3·05	...	2·90	3·60
Humic Acid	...	7·25	...	...	...	...	...	...	...	...	...
Parts unaccounted for	1·43	1·02	...	...	...	3·50	...	9·14	...	...	0·30
Total	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	...	100·00	100·00

ciples, which owe their value to the specific influence they exert on the nervous system, stimulating it and checking waste of tissue. *Theobromine*, when extracted, presents the form of a white crystalline powder of almost amorphous appearance, differing from *caffeine* and *theine*, which have a very beautiful crystalline appearance.

In most of the analyses of cocoa the existence of a volatile oil has been overlooked. It is probably present only in small quantities, and appears to be developed by roasting; but upon it depends the flavour and aroma which exist in cocoa.

Having thus noticed the principal component parts of cocoa, a comparison with other foods, as given in the following table, will be of interest as showing its relative value to them.

TABLE SHOWING THE RELATIVE COMPOSITIONS OF

	Cocoa.	Milk.	Meat (Beef).	Wheaten flour.
Fat	50·0	3·5	2·87	1·2
Azotised substances	20·0	4·0	20·75	14·6
Starch	7·0	...	...	59·7
Gum	6·0	...	...	...
Sugar	...	4·3	...	7·2
Water	5·0	87·5	67·80	13·2
Salts	4·0	0·7	5·60	1·6
Woody fibre	4·0	...	...	...
Cellulose	...	...	...	1·7
Colouring matter	2·0	...	...	...
Ash	...	...	1·60	0·8
Extractive matters	...	...	1·38	...
Theobromine	2·0	...	...	...
Parts	100·0	100·0	100·0	100·0

By this it is apparent that in nutritive power cocoa holds an entirely exceptional position. It combines in a high degree of concentration nearly all the elements necessary to man's existence. It is deficient in moisture, which renders it comparatively richer in both nitrogenous and non-nitrogenous elements than any of those with which it is compared. Thus, although one half of its weight consists of cocoa butter, it still presents 20 per cent. of albuminoid material, as against 4 per cent. in milk, 20·75 in beef, and 14·6 in wheat. In addition it contains starch, which is present neither in milk nor beef, but in smaller proportion than in wheat, of which it forms 59·7 per cent. Comparing cocoa with milk, we thus see the former is richer in the nitrogenous substances analogous to those contained in milk, and that the fat also exists in a considerably larger proportion. The same remark applies to beef, and it further contains valuable substances which they do not possess. In wheat, the starch appears to hold the place the butter takes in cocoa; otherwise their composition has great similarities, but cocoa has again the advantage of possessing qualities which the other has not. The value of cocoa as a food is thus apparent, and fully justifies the high eulogiums which have been passed upon it by so many men eminent in science. I have noticed the large amount of fat that cocoa contains, and its especial value on account of its non-liability to become rancid. Its presence, therefore, constitutes cocoa as essentially a heat-giving food, of which class it is certainly the most valuable; and its value as such is fully recognized by the instincts of the people who use it much more largely in cold than in warm weather. Drs. Miller and Letheby, amongst many other authorities, state that cocoa owes its chief value to its cocoa butter, and to this is undoubtedly due the benefit which consumptive patients derive from its use. But its possession also, in so rich a degree, of albuminoid substance, theobromine, and phosphatic salts, renders it almost equally valuable in other ways. Unlike tea and coffee, whose virtues can be extracted by infusion, and the non-soluble parts of which are useless as food, the whole substance of the cocoa-nib, if properly prepared, can be taken into the stomach, and all but an inappreciable amount digested. The object of the manufacturer should therefore be, to prepare the raw cocoa in such a manner that the whole of its valuable properties shall be preserved to the consumer; that it shall be easy of preparation, and of such a price as to be within the means of the bulk of the population for whom it is especially valuable, and far superior to tea or coffee. We will therefore proceed to consider how this end is best gained, and the modes of manufacture practised in this country, with their influence in causing the great increase which has taken place in the use of this food.

For many years after the introduction of raw cocoa into England, its manufacture was conducted in a very rude manner, no attempt being made to separate the husks of the cocoa nut from the nib. The mode of manufacture was to grind the whole bean with sugar and farinaceous substances. This was then either run into rude block and called rock cocoa, or cut into cakes or long rolls somewhat of appearance of short rulers, and sold under the name of the cake or roll cocoa. Gradually an advance was made in this rude method of manufacture, and in the preparation of what was called chocolate an endeavour was made to imitate the Spanish manufacturers. This led to the husks being carefully removed, and the ground nibs alone incorporated with sugar, or sugar and farina, in the manufacture of what was called chocolate. The mode adopted in the manufacture of chocolate was to roast the nuts, and when cool to break them down and separate the shell from the nibs. The nibs were then again subjected to futher roasting, and the extent to which this process was carried, then gave the distinctive character to the chocolates produced in different parts of Europe. The cocoa nibs were now placed upon a heated smooth stone, and crushed with a roller until the nibs assumed the form of a smooth paste, which was then mixed with sugar, and sometimes some farinaceous substance. Various spices were also now incorporated, according to the flavour desired, and the mass when thoroughly mixed was placed into moulds, where it remained until cool and ready to be turned out.

Another form of cocoa, called flake, was also much used, and this consisted only of the cocoa beans, shell, and nib, crushed in a mill into the form of flakes.

Notwithstanding the inherent value of the food, none of these productions, however, met with any great consumption. They were all expensive, but the finer cake chocolates were of so high a price as to be only obtainable by the wealthy. The cocoas besides being dear were also unpalatable, and owing to the presence of the husk, very indigestible and irritating to the internal mucous membranes. Both kinds, in addition, laboured under the disadvantage of requiring boiling.

This drawback, which is common to all cocoas and chocolates of foreign manufacture, does not appear in Spain and France to have militated against their large consumption; but for some reason or other—it may be that we do not as a nation like trouble where it can be avoided—the tedious and somewhat unpleasant process of first having to scrape and then boil the cake of chocolate, carefully stirring the while, and afterwards milling it, has never found favour, and this is one of the reasons that its use was so limited until the last fifty years.

The removal of this drawback is due to Mr. Daniel Dunn. After a long series of experiments in relation to the treatment of cocoa, he found that by making a slight variation in the mode of the preparation and mixture of the sugar with the cocoa nibs, he was able to produce a substance in the form of paste, which only required the addition of boiling water to be ready for use. This cocoa or chocolate paste was the first form of soluble cocoa ever made. From the first, he discarded, in his preparations, the barbarism of grinding up the husk with the cocoa nib, a practice both wasteful and unwholesome.

Having succeeded in producing, in the form of paste, a cocoa which did not need boiling, it was found that a serious drawback existed from the need of its being contained in earthenware pots or other vessels. These were not only inconvenient, but being expensive and heavy, they added both to the cost of production and transit. Mr. Dunn therefore further pursued his experiments,

and found that by varying his process so as to reduce the amount of moisture, he was enabled to bring the paste into a condition sufficiently hard to enable it to be cut; at the same time the soluble properties still being retained. The cakes had the disadvantage, however, of requiring to be scraped into the cup, a somewhat sticky process; and were also not very pleasing to the eye.

Mr. Dunn, still pursuing his investigations, found that by adding some farinaceous substance (he preferred and only used arrowroot), he could bring the cocoa into the form of a powder, which was more readily miscible even than his previous preparations. This form is the most convenient one in which cocoa can be prepared, and although from the price usually paid, we are accustomed to preparations somewhat inferior in flavour to the finer French chocolates, there is no difficulty in making a soluble cocoa or chocolate powder quite equal in quality to them. The mode of manufacture of soluble cocoa or chocolate powder is as follows: The raw nuts are first picked in order to remove any mouldy or damaged nuts, the presence of which would injure the flavour of the cocoa. The picked nuts are then placed in revolving heated cylinders. When sufficiently roasted—a process which takes from three-quarters of an hour to an hour and a half—they are either spread out thinly on a grating, or placed in coolers so constructed as to offer a large conducting surface, and are thus rapidly cooled down. The roasted nuts are then conveyed to a kibbling mill supplied with fans; the cocoa is here broken down and the shell winnowed from the nib. When this operation is fully effected, the nibs are slightly warmed before being ground.

A cocoa mill, constructed to reduce the nibs into a fine paste, consists of two parts, viz., the feed-mill and the grinding-mill. The object of the feed-mill is merely to regulate the supply of cocoa sent into the grinding-mill. The latter is not unlike a flour-mill, consisting of a horizontal bed, on which revolves a runner. These mills have to be heated, and the cocoa runs from them in a smooth, semi-liquid condition, when it is ready for incorporation with the sugar and farinaceous substances with which it is to be mixed. It is afterwards reduced to a powder. This powder may be made either fine or coarse, it being a question of merely manipulative process, which has no relation to quality. If required very fine, it may have to be more completely pulverized in another mill. But whether coarse in grain or fine matters not; the cocoa is the same in quality. That is, either fine or common preparations may have either appearance. With slight variations of process, this is the only way in which soluble cocoa powder can be produced; that is, it must contain sugar and farina. The cocoa being in the first place very finely ground, the sugar causes it to mix readily, while the farinaceous substance holds the particles of cocoa in suspension, and the whole forms an emulsion.

This mechanical suspension renders the particles of cocoa more digestible, and keeping the globules of cocoa-butter in a finely-divided condition, they also are more readily assimilated. Thus the farina, in addition to its important office in aiding in the production of powder, has another distinct advantage. It really causes the cocoa-butter to be in a similar condition as regards the cup of cocoa that the fat globules of milk are in before rising to the surface as cream. And it does not need any deep physiological knowledge to know that we can take in milk a considerable quantity of these fat globules without inconvenience, whereas the same amount taken in the more concentrated form of cream, would produce indigestion and biliousness. Some chemists have denied that this effect is produced in cocoa by the addition of farina; but by practical experiment I can vouch for the fact. The reason they have fallen into this error is by looking at the subject only from the chemist's view, and not from that of the practical physiologist, and assuming that such a result could only arise from a definite chemical action produced by the farina on the fat. This is not so; there is probably no such action; but by separating the particles of fat, that is forming an emulsion, they are presented to the stomach in a form in which they can be readily assimilated.

As I have before said, soluble cocoa powder is of necessity a compound substance, and should consist only of cocoa, farina, and sugar. Unhappily, excessive competition, and the desire on the part of the public to obtain greater value for their money than is possible to be given, has caused several forms of adulteration to be practised in cocoa manufacture. The more harmless of these is the addition of animal fat to cover the use of a poor cocoa, and to enable the addition of an excessive quantity of sugar and farina; but, unfortunately, as one sin often leads to many, the result thus obtained requires further "doctoring" to render it acceptable to the public taste.

Cocoa, thus adulterated, would be poor in flavour and light in colour, and therefore the adulterating manufacturer must add something, which, while cheap, will impart a flavour which, under much disguise, may be mistaken for cocoa. With this view chicory is added, and this is the most harmless of the adulterants used for this purpose of disguise. It is, however, a fraud, as the only object of its addition is to impart a flavour which shall be mistaken by the consumer for that of cocoa, which he will imagine present in larger quantities. *Terra japonica*, or catechu, as well as other substances, has been used to produce the same effect. Curiously enough, these adulterations appear to have baffled the analytical chemists, and this probably because of their addition in the form of concentrated decoctions. We have thus got a cocoa adulterated with foreign fat and chicory, and other flavouring substances, but we have not yet reached the end of these additions. The cocoa now, although seemingly rich in butter and of strong flavour, is not yet sufficiently pleasing to the eye, and therefore the adulterator adds some mineral colouring substances, the most harmless in use being perhaps peroxide of iron. But there are others, amongst which figure such abominations as red-lead and cinnabar, or sulphide of mercury. But for the credit's sake of even our dishonest countrymen we must hope such fiendish modes of adulteration as those just mentioned are no longer practised.

I have thus sketched the mode of manufacture of soluble cocoa powder, and have glanced at some of the frauds practised in its manufacture. As I have already stated, soluble cocoa powder can only be obtained by the addition of certain substances to the cocoa. But the cocoa nib can be flaked or ground into a coarse powder by itself, or, a portion of the fat being extracted, it can then be reduced to a fine powder. This mode of preparation is practised in what are improperly called the pure cocoa powders, but these cannot be regarded as cocoa pure and simple any more than can these prepared with farina and sugar. In them a larger quantity of the most valuable portion of the substance of the cocoa bean is abstracted, and it is, indeed, thus rendered analogous to skim-milk. Now, skimmed cocoa, like skimmed milk, is very good in its way, and when it is required, as it is in some diseases; but as the principal object in most cases in drinking cocoa is, or should be, the consumption of all the good qualities of this valuable bean, the unnecessary abstraction of the fat is greatly to be deprecated. The mode in which these powders are prepared is by subjecting the ground nibs, which are usually placed in bags, to strong pressure, the press being heated. The cocoa-butter then slowly runs off in the form of oil, which quickly solidifies on cooling, and a hard mass is left in the press. This is afterwards broken up and powdered in mills, and after being dressed is ready for use. Unfortunately, this form of cocoa powder is as liable to adulteration as are the mixed ones, and one of these, which has at the present time a great reputation, contains ash greatly in excess of what would be yielded by pure cocoa so prepared, and thus points unmistakably to the use of some adulterant.

These powders also have the disadvantage of being very expensive, ranging from 2*s.* 8*d.* to 6*s.* the pound, while soluble cocoa powders range from 6*d.* to 1*s.* 8*d.* They are, further, not so miscible in boiling water, but require further boiling, and even then the particles sink to the bottom of the cup, and are thus wasted.

This objection also applies, but in a greater degree, to the use of flaked cocoa, and plain and ground nibs. However much these forms are boiled, but little substance is really dissolved, and the gluten is especially lost. When we also consider that in the cocoa made from the nibs or flaked cocoa, the fat is generally carefully skimmed off, and the residue or grounds are thrown away, we must see how sinful a waste is made of this food when used in such a manner. This is apparent when we remember that with the exception of about 5 per cent., the whole substance of the nib is valuable as food, and when properly prepared, digestible as such. In the beverages made in the way I have described, the nutritive value derived is reduced to its minimum, and is but slightly greater than could be obtained by an infusion of the shells, which contain a small proportion of theobromine, and can be obtained for 2*d.* per pound. I may here mention that these shells are largely used in Ireland for the purpose of calf feeding, and also by the poorer people. They make an infusion with them, which is not inappropriately called "miserable." There are a few persons who use even nibs and flaked cocoa, and perseveringly consume the whole substance of the nib or bean, as the case may be; but they very speedily have to give up the use of cocoa from the dyspepsia which results from taking it in so rich a form. A glance at the composition of cocoa will fully explain this fact, from the highly concentrated form of nourishment it presents.

The present mode of making French chocolate in cakes differs somewhat from the mode of producing soluble cocoas. The nibs are placed in a heated mill, called a *mélangeur*, formed of a revolving granite table, with two heavy granite runners. When brought to the consistency of a smooth paste, sugar, or sugar and farina (as is the case in the cheaper qualities) are added, and the whole well ground and mixed together. When thoroughly incorporated, the mill is cleared, and the partially prepared chocolate is passed between three horizontal rollers, which thoroughly crush any particles not previously sufficiently ground. This operation is repeated several times, to bring the chocolate into a perfectly smooth condition; it is then again placed in the *mélangeur* to be finally mixed, when it is ready to be moulded into cakes or fancy forms, or to be used for covering the bon-bons called chocolate creams. The mode of moulding the cakes is first to weigh the chocolate, which is then put into a number of moulds placed on a tray to receive it. It is then removed to a table, to which, by means of an intermittent action, a strong vibratory motion is communicated, and this shakes the chocolate well into the moulds, from which, when perfectly cool, the cakes can be turned out. A circumstance to be noted is that these are then in a highly electrified condition.

Having thus briefly explained the mode in which cocoa and chocolate are prepared, I would now conclude with a few words touching the operation of the "Adulteration of Food Act" as it affects cocoa.

This Act of Parliament, so ill-considered and faultily arranged, was not deemed of sufficient importance by the House of Commons to be worthy of their careful attention, and it was at an important stage shovelled through a bare House at two o'clock in the morning. Its further progress was then the result of a stratagem, participated in by one of its prominent supporters and a member of the Upper House; and the Bill was finally passed in the House of Commons by about twelve members. It is not, therefore, surprising that it should have proved impracticable in working, and been the cause of much oppression and injustice. The wonder is that it has produced any good results, although even these are already diminishing, owing to the odium it has excited having already caused the commencement of a laxity in its enforcement. The subject of food adulteration is one of the most intricate and difficult on which to legislate, and one on which hasty legislation is most strongly to be deprecated.

The result of the present Act has been not so much to check the real adulterations which are practised, as to harrass small tradesmen caught tripping on what are really technicalities. Whether it be that the amount of adulterations practised has been greatly exaggerated, or that the present race of analysts is unable to discover them, I know not; but certain it is, that almost the only adulterations they have detected have been the mixture of water with milk, and of chicory with coffee, the colour facings of tea, and the circumstance that wheat flour and turmeric frequently exist in prepared mustard, facts that were perfectly patent to everybody. An effort has also been made, but unsuccessfully, to bring mixed cocoas within the category of adulterated articles; but, unfortunately for the public, not a single case of really adulterated cocoa or chocolate has been prosecuted, although large quantities adulterated with chicory, animal fat, and mineral earths, are daily sold throughout the country. Of course I am aware that no Act of Parliament can supply discretion and intelligence to its administrators; but still it is to be regretted that one dealing with so all-important a subject should not have been more carefully prepared. Looking at it merely as it affects manufactured cocoa, we find all the prosecutions under it have broken down with the exception of two or three cases which were not properly defended, and in which adverse decisions were pronounced by country justices ignorant of the merits of the case.

(To be continued.)

Parliamentary and Law Proceedings.

The Juries Bill.

The Juries Bill which was brought in by Mr. Lopes, and set down for a second reading on the 22nd inst., has been issued. Mainly it is the same as that introduced last year by the Attorney-General of the late Government. The amounts of the proposed county qualifications, however, are reduced, and one of the greatest innovations in last year's Bill —that reducing the number of jurors to seven except in trials for high treason, treason felony, and murder—is omitted. The present Bill proposes to enact that in all criminal trials twelve jurors shall be impanelled, in trials in county courts five, and in all other trials seven. But in any of the latter cases a defendant would be able to claim twelve jurors by giving notice in writing twelve days before the sitting of the court. Another omission is a clause that stood in the former Bill providing that, in order to secure rotation of service, a juror having been once summoned was not liable to serve again until after all the other jurors in the same class had been summoned for a fresh term of service.

The exemptions in the present Bill include all those proposed last year, with the addition of schoolmasters of public schools, professors, college tutors resident in the universities to which they belong, and members of the Royal College of Veterinary Surgeons actually in practice. The clause containing the exemptions in which our readers are most concerned stands as follows:—

"Apothecaries certificated by the Court of Examiners of the Apothecaries' Company, dental surgeons certificated by the Board of Examiners in Dental Surgery of the Royal College of Surgeons in England, and all registered medical practitioners and registered chemists, if actually practising as apothecaries, dental surgeons, medical practitioners, and registered chemists respectively; also members of the Royal College of Veterinary Surgeons actually in practice."

Amongst other points of more general interest, it is

significant of the unsettled state of the question of local taxation that some of the charges which last year were to be thrown on the poor rates are now to be paid "out of moneys to be provided by Parliament for that purpose." Another provision, which would have quieted many speculative fears in a recent notorious trial, is that "In the event of the death or illness of any juror or jurors during any trial, civil or criminal, the judge presiding at such trial shall have power, except only in a trial for murder, if he shall think fit, to direct that the trial shall proceed with the reduced number of jurors, provided that such number be not in any case less than five. In all such cases the verdict of the remaining jurors shall be a sufficient verdict."

Proposed Bill to Amend the Practice of Pharmacy in Ireland.

The following is a copy of a Bill which is proposed by the King and Queen's College in Ireland, to amend the practice of pharmacy in Ireland:—

Whereas a great deficiency exists throughout Ireland of establishments and shops for the sale of medicines, and compounding of prescriptions, and great inconveniences thereby arise to the public, in many parts of the country:

1. It is hereby enacted, that from and after the passing of this Act, the provisions of the Pharmacy Acts of England, 15th and 16th Vict. c. lvi., 30th June, 1852; 31 and 32 Vict. c. xxi, 31st July, 1868; and 32 and 33 Vict. c. xvii., 11th August, 1869, be extended to Ireland as follows:—

2. That from and after the passing of this Act every person duly qualified and registered under the aforesaid Pharmacy Acts, as chemists, or chemists and druggists, being thereby entitled to keep open shop in Great Britain for the compounding of the prescriptions of duly qualified medical practioners, shall in like manner be deemed to be qualified to keep open shop for the sale of medicines and compounding of prescriptions in Ireland, and shall not be subject for so doing to any prosecution or penalty, notwithstanding any enactment to the contrary in the Apothecaries' Act of Ireland of 1791 (31 Geo. 3, cap. xxxiv.).

3. Moreover, that every person duly registered by the Apothecaries' Hall of Ireland as qualified to keep open shop in Ireland for the compounding of prescriptions, shall, in like manner, be deemed to be qualified to keep open shop for the compounding of prescriptions in Great Britain, and shall not be subject to any penalty for so doing, notwithstanding any enactment to the contrary in the Pharmacy Acts of Great Britain hereinbefore enumerated.

Poisoning by Bichromate of Potash.

The *Times* quotes the following from an American source:—Messrs. Murray and Connor, two actors connected with the John Murray troupe, were playing *Ten Nights in a Bar-room* at Portland, Maine, on the 16th ult., and through the alleged negligence of the property man came very near losing their lives. In the scene where the revellers are clustered about the bar, Mr. Murray and Mr. Connor clinked their goblets and emptied them of a pale yellow liquid, resembling whisky in colour. Almost immediately Mr. Murray hastened from the stage, apparently in great agony, and Mr. Connor fell upon the floor in convulsions. The curtain came down with a rush, and the manager announced that the performance could not go on because some of the actors had accidently taken poison. It seems the property man hired some show bottles from the City Hotel for the bar-room scene in the play, the water in one of which was coloured with bichromate of potash and the other with red cochineal. He used the water in these bottles without changing it. Those of the actors who drank from the bottle the contents of which were coloured with cochineal escaped unharmed. The two men suffered great agony all night, but on the following morning they were recovered sufficiently to proceed to Biddeford with the other members of the company.

Review.

The Birth of Chemistry. By G. F. Rodwell, F.R.A.S., F.C.S. With numerous illustrations.

This is one of Macmillan's 'Nature Series.' The author says, "I have endeavoured in the following pages to trace the rise and early development of a very old science, mainly that we may mark the attitude of thought which actuated the scientific mind in bygone times . . .;" but the practical tendency of the work is to show that chemistry as a science is not very old—that a few chemical facts have been known from a very remote period, but that little progress was made in extending this knowledge, and none in deducing any sound principles for the explanation of the phenomena observed, until a comparatively recent date. The very limited knowledge of chemistry possessed by the ancients is represented to have consisted of an acquaintance with some of the metals—at most seven—the means of working them, of producing glass, and of making and applying colours for painting and dyeing. Chemical knowledge had hardly progressed beyond this point when the absurd doctrine of transmutation became so firmly ingrafted in the minds of those who devoted themselves to chemical investigation, that their efforts were all directed to the discovery of facts consistent with the popular doctrine, instead of carefully observing and arranging the results of experiments, and endeavouring to discover the means of connecting these, and of explaining them by reference to some general laws. Much of the work is necessarily devoted to the history of the alchemists and a notice of their published works, many of which purport to be of great antiquity, but most of these are ascribed by the author to no earlier date than the eleventh century. The clearing of the mystery by which the claims and pretensions of this class of writers has been surrounded forms a leading feature in the work, and we are thus brought to the seventeenth century before we find any marked evidence of the approaching birth of chemistry. The author says, "The time when the foundation stone was laid is too remote to be even suggested; the basis of the edifice is sunk deep in Eastern soil; the walls were slowly and laboriously raised during the middle ages, and were completed by Lavoisier, Black, and Priestley; the men of our day are working at the roof."

The work is well written and illustrated, and cannot fail to be entertaining and instructive to those who are desirous of acquiring a knowledge of the early history of chemistry.

BOOKS RECEIVED.

A Treatise on Food and Dietetics, Physiologically and Therapeutically Considered. By F. W. Pavy, M.D., F.R.S., etc., London: J. and A. Churchill, 1874 From the Publishers.

Qualitative Chemical Analysis and Laboratory Practice. By T. E. Thorpe, Ph. D., F.R.S.E. and M. M. Pattison Muir, F.R.S.E. (Text Books of Science.) London: Longmans. 1874. From the Publishers.

Obituary.

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

On the 4th April, 1874, Mr. James Hore Allen, Pharmaceutical Chemist, of Union Street, Torquay. Mr. Allen had been a Member of the Pharmaceutical Society since 1859.

On the 31st March, 1874, Mr. John Lovering Cotton, Pharmaceutical Chemist, of London Road, Liverpool.

On the 19th December, 1873, Mr. Dennis Grundy, Chemist and Druggist, of Bury.

On the 25th January, 1874, Mr. James Foster, Chemist and Druggist, of Bradford. Yorkshire.

On the 27th February, 1874, Mrs. Ann Watson, Chemist and Druggist, of Annfield Plain, Gateshead-on-Tyne.

On the 3rd March, 1874, Mr. Robert Mitchell Welcher, Chemist and Druggist, of Chatteris, Cambridge.

On the 6th March, 1874, Mr. James Kellett, Chemist and Druggist, of Wigan.

On the 18th March, 1874, Mr. Robert Gordon Nichol, Chemist and Druggist, of Lauder, N.B.

On the 27th March, 1874, Mr. Henry William Coles, Chemist and Druggist, of Poplar, London.

On the 31st March, 1874, Mr. Samuel Birdwhistle, of Oldham Road, Manchester.

On the 5th April, 1874, Mr. Thomas Younger, Chemist and Druggist, of Brampton, Cumberland.

Notes and Queries.

[391]. LOTION FOR MANGE.—Beasley (1857) gives Mr. Guest's recipe (p. 787) as Clater's for red mange, but with twice as much $HgCl_2$, and a difference in the S of 1·60 and 3·80. I have used Clater's satisfactorily for the destruction of parasites on dogs. But read Mayhew on 'Dogs and their Management' (Routledge), p. 229: "Receipts for the cure of mange are all nonsense, unless we can imagine that one physic is good for various disorders." We are, however, picked up with this on p. 231: "The unguent which I have employed, and with such success as emboldens me to recommend it, is composed of:—

Ung. Resini (*sic*)	As much as you please to take.
Sulph. Sub. . .	A sufficiency to make the resin ointment very thick.
Ol. Junip. . .	Enough to make the unguent of a proper consistency, but not too thin."

This refreshes one. There is also a refresher at p. 84. Every chemist should read it, and then forgive the author for the sake of his chapter on distemper. By-the-bye, Mr. Guest should add a few drops of Sp. Terebinth. to save the dog from licking off the lotion. A fruitful source of so-called mange in dogs is bad "greaves"; in other words, bad food often causes eczematous eruptions. Let me suggest the use of anvil chippings, boiled in the drinking water for hard-worked hounds, as a preventive of a lot of the evils dog's hair is heir to. Of course, any chemist will know why (*malgré*, p. 84.) Has anybody tried storax for mange?—L.

[393]. INEXHAUSTIBLE SMELLING SALTS.—I am in want of a good formula for *inexhaustible* smelling salts. If any of your correspondents will kindly furnish me with one I shall feel greatly obliged.—Jas. Doubell.

[*** We cannot do better than refer our correspondent to a paper read by Mr. Allchin, at an Evening Meeting in 1861 (Pharm. Journ. [2] vol. ii., p. 543). Mr. Allchin's method is based upon the conversion of sesquicarbonate of ammonia into neutral carbonate, previous to placing it in the smelling bottle, by the addition of the necessary quantity of strong aqueous solution of ammonia (sp. gr. ·880). Forty avoirdupois ounces of the sesquicarbonate are broken into small pieces the size of a filbert, placed in an air-tight jar, and 20 fluid ounces of the solution of ammonia, previously perfumed, poured over it. The jar is then carefully closed and allowed to stand for two or three weeks, until the mixture becomes hard; but to prevent it setting too closely it must be stirred with a stiff spatula every other day during the first week. Afterwards it is kept in well-stoppered bottles containing one to two pounds each.—Ed. Ph. J.]

Correspondence.

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

The March Examinations.

Sir,—The Secretary of the South London School of Chemistry and Pharmacy asks us to explain, in reply to the letters of Messrs. Gilders and Pickard, that the advertisement to which exception has been taken, should not have appeared after the recent Examinations.

Mr. Baxter sent an altered form of announcement; but through some indistinctness in his instructions, or misconception on our part with regard to them, the *old* form of advertisement was inserted.

J. & A. Churchill.

11, *New Burlington Street, London, W.*
April 13th, 1874.

Cocculus Indicus.

Sir,—Permit me to give the results of my inquiries on the above subject.

In the art of calico-printing (I am informed by a machine printer) "Oclus Indiberries," as they are called by the workpeople, are largely employed in the production of a yellow colouring matter, hundreds of tons being used for this purpose.

These berries are about the size of peas, generally of a yellowish-green colour (a few are black), wrinkled, and sometimes have the stalks attached. They are occasionally used by the workmen for fish-poisoning.

The berries are imported in hair bags, which are much prized for carpets by the workpeople.

I have no doubt that the above are a species of cocculus, probably in an unripe state; if so the large quantity imported to this country is readily accounted for.

Hoping this may assist somewhat in removing the odium attaching to the brewer of *malt liquors*.

"Brunswick."

April 6th, 1874.

"*Mac.*"—See the report of the papers on materials for suppositories, and the discussion thereon at the Evening Meetings of the Pharmaceutical Society last year, in vol. iii., pp. 715 and 781; also the new suppositories in the additions to the Pharmacopœia.

"*Inquirens.*"—(1) Herbaria sent in for competition must consist of specimens of indigenous wild plants only. (2) No candidate is allowed to compete unless he is an associate or a registered apprentice or student of the society, or if his age exceed twenty-one years.

J. W. is referred to the rule respecting anonymous communications.

"*Pharmacopola.*"—In conformity with your note we have forwarded the manuscript enclosed to the publishers, who conduct all business connected with our advertisements, and will inform you as to the charge.

C.L.M.—(1) 'How Crops Grow,' published by Macmillan and Co. (2) We cannot say what the Board of Examiners think of the system you refer to, and we are not sufficiently acquainted with it ourselves to be able to advise.

Communications, Letters, etc., have been received from Mr. Wanklyn, Mr. Armstrong, Secretary of the Quekett Club, Mr. J. Young, Mr. Broad, Mr. G. Carroll, Mr. Jackson, Mr. Rimmington, Mr. Mee, Mr. W. Pickard, Hon. Secretary of the Bristol Association, J. F., W. H.

The following journals have been received:—The 'British Medical Journal,' April 11; the 'Medical Times and Gazette,' April 11; the 'Lancet,' April 11; the 'London Medical Record,' April 11; 'Medical Press and Circular,' April 11; 'Nature,' April 11; 'Chemical News,' April 11; 'Gardeners' Chronicle,' April 11; the 'Grocer,' April 11; 'Journal of the Society of Arts,' April 11; 'Grocery News,' April 11; 'Produce Market Review,' April 11; 'Practical Magazine,' for April.

A SUGGESTED IMPROVEMENT IN THE PREPARATIONS KNOWN AS "SYRUPS OF PHOSPHATES."

BY JOHN MORRIS BROAD, JUN.

It occurred to me some time since that an improvement might be made in those most unsatisfactory preparations, the "Syrups of the Phosphates," though the condition of the dispensing chemists was greatly improved by the boon conferred on them by that well-known and appreciated paper by Mr. Carteighe, published in the PHARMACEUTICAL JOURNAL of March 25th, 1871. I am indebted to him for his most valuable formulæ.

My idea is to substitute glycerine and water, equal parts by measure, for syrup, which I find will help to keep the phosphates in a better condition with less phosphoric acid: the taste is far preferable to the syrups, and, in a therapeutical point of view, it may be beneficial. Being half water, it is thinner, and a nicer form. The cost of preparing is about the same. I find it answer equally well with iodide and bromide of iron. The following are, I think, the best formulæ :—

Glycerine of Phosphate of Iron.

Phosphate of Iron	16 grs.
Phosphoric Acid (Syrupy), sp. gr. 1·5 .	1 fl. drm.
Glycerine and Water, eq. pt. ad . .	fl. ℥ij.

Rub the phosphate of iron down with a little water and glycerine, add the acid, and filter into the rest of glycerine and water.

Glycerine of Phosphate of Manganese.

Phosphate of Manganese	16 grs.
Syrupy Phosphoric Acid, sp. gr. 1·5 .	fl. ℥j.
Glycerine and Water, eq. pt. ad . . .	fl. ℥ij.

Rub the phosphate of manganese down with a little glycerine and water, add the acid, and filter into the rest of the glycerine and water.

Glycerine of Phosphates of Iron and Manganese.

Phosphate of Iron	12 grs.
„ „ Manganese	8 grs.
Syrupy Phosphoric Acid, sp. gr. 1·5 .	fl. ℥j.
Glycerine and Water, eq. pt. ad . . .	fl. ℥ij.

Rub the phosphates of iron and manganese with a little glycerine and water, add the acid, and filter into the rest of the glycerine and water.

Glycerine of Phosphates of Iron and Lime.

Phosphate of Iron	grs. 16
„ „ Lime	grs. 32
Syrupy Phosphoric Acid, sp. gr. 1·5 .	fl. ℥j.
Glycerine and Water, eq. pt. ad . . .	fl. ℥ij.

Rub down the phosphates of iron and lime with a little glycerine and water, add the acid, and filter into the rest of the glycerine and water.

Glycerine of Phosphate of Zinc.

Phosphate of Zinc	grs. 32
Syrupy Phosphoric Acid, sp. gr. 1·5 .	♏ 50
Glycerine and Water, eq. pt. ad . . .	fl. ℥ij.

Rub down the phosphate of zinc with a little glycerine and water, add the acid, and filter into the rest of the glycerine and water.

Glycerine of Phosphate of Quinine.

Phosphate of Quinine	grs. 16
Syrupy Phosphoric Acid, sp. gr. 1·5 .	♏ 20
Glycerine and Water, eq. pt. ad . . .	fl. ℥ij

Rub down the phosphate of quinine with a little glycerine and water, add the acid, and filter into the rest of the glycerine and water.

Glycerine of Phosphates of Iron and Quinine.

Phosphate of Iron.	grs. 32
„ „ Quinine	grs. 16
Syrupy Phosphoric Acid, sp. gr. 1·5 .	♏ 70
Glycerine and Water, eq. pt. ad . . .	fl. ℥ij

Rub down the phosphates of iron and quinine with a little glycerine and water, add the acid, and filter into the rest of the glycerine and water.

Glycerine of Phosphates of Quinine, Iron, and Strychnine.

Phosphate of Iron	grs. 32
„ „ Quinine	grs. 16
Strychnia (in crystals)	gr. ½
Syrupy Phosphoric Acid, sp. gr. 1·5 .	♏ 70
Glycerine and Water, eq. pt. ad . . .	fl. ℥ij

Rub down the phosphates of iron and quinine, with the strychnia, with a little glycerine and water, add the acid, and filter into the rest of the glycerine and water.

Glycerine of Phosphates of Iron and Strychnine.

Phosphate of Iron	grs. 32
Strychnia (in crystals)	gr. ½
Syrupy Phosphoric Acid, sp. gr. 1·5 .	♏ 70
Glycerine and Water, eq. pt. ad . . .	fl. ℥ij

Rub down the phosphate of iron and the strychnia with a little glycerine and water, add the acid, and filter into the rest of the glycerine and water.

A preparation which I made according to one of these formulæ more than two months ago remains unchanged.

Rise House, Hornsey Rise, N.

THE TASTELESS IRON COMBINATIONS.

BY E. RUTTER.

Having been some years connected with the drug trade in London and still taking some interest in British Pharmacy, I notice that at the meeting of the Society last month, the tasteless iron combinations introduced by Mr. Creuse, of Brooklyn, U.S., were somewhat warmly advocated and proposed for adoption in the British Pharmacopœia. I think English pharmacists would do well to look into the matter a little more closely before sanctioning preparations, the chemical composition of which does not answer, as I believe, to the names given them. These salts were, and are still to some extent, popular in the United States; and I was at one time somewhat extensively engaged in the preparation, more especially of the chloride iodide and pyrophosphate, the last having been for some time official in the U.S. Pharmacopœia, and in extended use. Believing that there was some doubt connected with the composition of these preparations, which it was desirable in the interests of pharmacy to clear up, I undertook some experiments on the subject, and the results obtained were published in the American Journal of Pharmacy, of December last. The theory of double decomposition has been advanced, but Mr. Creuse has shown, that in that case only two molecules of the alkaline citrate would be necessary for every molecule of the ferric salt, whereas it is found that invariably four molecules are requisite for the production of the characteristic change of colour. The result of experiments has led me to suppose that the reactions may be formulated as follows :—

$$Fe_2'''Cl_6 + 4(K_3C_6H_5O_7) = 2(Fe'''K_32C_6H_5O_7) + 6\,KCl.$$

$$Fe_2'''I_6 + 4(K_3C_6H_5O_7) = 2(Fe'''K_32C_6H_5O_7) + 6KI.$$

$$Fe_4'''3P_2O_7 + (8\,K_3C_6H_5O_7) = 4(Fe'''K_32C_6H_5O_7) + 3K_4P_2O_7$$

And in like manner with the ferric phosphates, arseniates, and sulphates. The potassium salt may also be replaced by sodium, ammonium, or even magnesium. My reasons for arriving at this conclusion are as follows:—On treating the solution of the iodide with strong alcohol, the double citrate of iron and potassium, being totally insoluble, separates out as an amorphous green mass, and the alcoholic solution being evaporated gives all the reactions of the potassium iodide. The sulphate may be proceeded with in a similar way, but the potassium sulphate, being almost insoluble in strong alcohol, can only be washed out mechanically. Further, on mixing solutions of ferric citrate and potassium citrate, taking care to use exactly equivalent proportions, a liquid results identical in appearance with the so-called tasteless iron combinations, and being evidently a double citrate of potassium and iron, with the formula $K_3Fe'' 2C_6H_5O_7$. The amorphous form of these citrates precludes an exact analysis, but there can be no doubt that these tasteless iron preparations are merely a double citrate of iron and potassium, ammonium, sodium, or magnesium, mechanically mixed with the by-products of decomposition, alkaline chlorides, iodides, or pyrophosphates, as the case may be. Whether it is advisable that preparations, the actual composition of which is so far from being expressed by the names given them, should be included under those names in a National Pharmacopœia, I leave for better pharmacists than myself to decide.

Philadelphia,
9th March, 1874.

JABORANDI, A NEW DRUG FROM BRAZIL.*

Pilocarpus pinnatus, Linn.

Dr. Coutinho, of Pernambuco, has recently brought under the notice of the French faculty a substance called by the Brazilians "jaborandi," which he describes as an energetic diaphoretic and sialogogue. It consists of the leaves and small branches of a shrub that grows in the interior of some of the northern provinces of Brazil. The leaves resemble those of the bay; they have no smell until gently bruised, when they exhale a slightly aromatic odour. The taste is rather acrid, without being bitter, and does not recall that of any other plant used in medicine and known to the author.

Dr. Coutinho forwarded some specimens to Professor Gubler, who, besides verifying their therapeutic effect, sought to ascertain their botanical origin. The names of "jaborandi," "iaborandi," and "jamborandi" appear to be generic terms popularly used in Brazil to designate plants that are stimulants, sudorifics, sialogogues, and consequently alexipharmics and alexiterics. According to Mérat and Delens the first word is applied solely to a species of *Gratiola, G. monneria,* which has become the type of the genus *Monneria* of Brown, whilst the "iaborandi" include all the species of peppers, a group remarkable for their excitant properties. The principal of the latter is the *Piper nodosum,* Mart., the acrid and sialogogue root of which, bruised, is applied to poisoned wounds and bad ulcers. The roots of the *Piper citrifolium, P. reticulatum,* and of a fourth species, which also bears the name of "iaborandi," are used for the same purposes, and are reputed stimulants, sternutatories and sialogogues. These properties appear to resemble those of the plant sent by Dr. Coutinho, but there the analogy ceases; in its botanical characters it is entirely different.

The specimens of "jaborandi" sent by Dr. Coutinho consist principally of leaves, with a small quantity of slender branchlets. The leaves are impari-pinnate, and are sometimes more than three decimetres long. Upon many of them there are as many as eight or ten leaflets ten to twelve centimetres long by three to four centimetres at their broadest part. The leaflets are nearly opposite, oval, elongated or ellipsoid, obtuse and even retuse at the apex, slightly unequal at the base, and sometimes incurved laterally. They are glabrous, shining, ordinarily thick, particularly brittle in the dry state, shortly petiolate or even nearly sessile. The petiolules are cylindrical, scarcely thickened at the point of insertion upon the common petiole. The rachis itself is enlarged at its base, straight, rounded beneath, slightly channelled above. Altogether, these characters were sufficient to show that the plant was not one to which the name "jaborandi" has hitherto been applied by authors; but, in the absence of the floral organs and fruit, it appeared difficult to determine the genus to which it belonged. Fortunately, by comparing it with the Brazilian plants in his herbarium, Professor Baillon was able to identify it with a Rutaceous species, *Pinocarpus pinnatus,* Lem., received from the province of St. Paul in Brazil.

The method of employing this drug, as described by Dr. Coutinho, is very simple. The leaves and small branchlets are bruised, and from four to six grams are infused in a cup of hot water. Upon drinking this quantity the effects are remarkable. The patient has to retire promptly to bed and cover himself well, and ten minutes afterwards he is seized by sweatings that continue four or five hours to such an extent that it is necessary frequently to change the linen during that time. There is also an abundant salivary and bronchial secretion, so that the patient can scarcely speak without his mouth being filled with the liquid. The quantity excreted is stated to equal a litre or more.

In their descriptions of sudorifics therapeutists have stated that the action attributed to those substances is due to heat. But the action of the jaborandi, although assisted by is not dependent upon heat, and it is a powerful sudorific even when taken cold.

Dr. Gubler has administered this drug a great number of times in the Beaujon hospital, and fully supports all that has been said of it by Dr. Coutinho as an incomparable diaphoretic and sialogogue. In one or two cases the profuse secretion was accompanied by diarrhœa. He considers that it will be used with advantage in a great number of morbid states, differing much among themselves in nature and gravity, but presenting the common necessity for stimulating the secretory action of the skin and salivary glands; since probably the leaves contain one or more principles capable of stimulating them directly during elimination. Dr. Gubler thinks that this Brazilian plant forwarded by Dr. Coutinho will be the first indisputable example of a diaphoretic truly worthy of the name; that is to say, a medicine having the power of provoking directly by an elective action the secretion of perspiration.

* From the *Répertoire de Pharmacie,* vol. ii., p. 171.

A NEW METHOD FOR THE DETECTION OF ALUM IN BREAD.

BY EDWARD LAWRANCE CLEAVER.

The Adulteration Act of 1872 has caused the detection and estimation of alum in bread to become almost a daily operation to the analyst; and as the varying results obtained by different chemists from identical samples seem to prove that a good process is not in general use, I have endeavoured to devise a *short* and *satisfactory* means by which the alum can be estimated.

The best process at present published, is that modification proposed by Mr. Crookes in the *Chemical News* (vol. iii, No. 70); but this, although it leaves nothing to be desired on the score of accuracy, requires a considerable time for its execution, and from the number of filtrations and subsequent washings, is liable to be inaccurate in the hands of any but a careful and skilful manipulator.

The method I have adopted is based on Esilman's process of estimating alumina in mineral phosphates by means of hyposulphite of sodium. (*Chemical News*, vol. xxviii., No. 72.) A slightly acid solution of an aluminium salt in the presence of excess of a phosphate and hyposulphite of sodium, is decomposed, the radical which was combined with the aluminium uniting with the sodium of the hyposulphite, sulphurous acid being set free, whilst the aluminium is completely precipitated as phosphate of aluminium together with free sulphur, and on ignition pure phosphate of aluminium remains.

It will be seen from this that the hyposulphite of sodium merely plays the part of a neutralizer of the acid, much in the same way as acetate of sodium acts in the preparation of phosphate of iron.

The details of the process are as follows :—

Take 1250 grains of bread, ignite in a platinum dish until fumes cease to arise, and powder the coke-like mass thus obtained. Treat this with 4 c. c. of sulphuric acid and 10 c. c. of water, cover with a glass to avoid loss by spurting, and set aside till action has ceased. Evaporate until fumes of sulphuric acid begin to be evolved, and when cold add water and boil for 15 minutes. Transfer the mass to a graduated measure and when cold make up to 125 c. c. Filter through an unmoistened filter until the filtrate measures 100 c. c. This liquid will contain the alumina from 1000 grains of bread. Add to the liquid 16 c. c. of a ten per cent. solution of ammonia (or sufficient to nearly neutralize the acid present without causing a precipitate) and a solution of about 20 grammes of hyposulphite of sodium. Set aside for about 15 minutes to allow of the deoxidation of any iron that may be present, and then boil for half an hour. Set aside for some hours, filter, wash the precipitate until the filtrate no longer precipitates with nitrate of barium, dry, incinerate in a *porcelain* crucible and weigh the resulting phosphate of aluminium, 245 parts of which are equal to 907 parts of ammonia alum or 940 of potash alum. The advantages of this process are its simplicity, and the short time in which it can be performed; the details are very few and can be carried out by any one with a slight knowledge of practical chemistry.

A few examples are appended, to show the correctness of the results.

1000 grains of bread mixed with ·105 gramme ammonia alum, gave ·029 gramme of phosphate of aluminium equal to ·105 gramme alum.

1000 grains of bread mixed with ·109 gramme ammonia alum, gave ·030 gramme phosphate of aluminium equal to ·111 gramme alum.

1000 grains of bread mixed with ·211 gramme ammonia alum, gave ·058 gramme phosphate of aluminium equal to ·215 gramme ammonia alum.

ANALYTICAL AND TOXICOLOGICAL INVESTIGATION OF CARBOLIC ACID.*

BY E. JACQUEMIN.

The employment of carbolic acid in therapeutics, and especially as a disinfectant, and the numerous cases of poisoning by it inadvertently, give an importance to its analytical and toxicological history. The author examines the various methods proposed for the detection of its presence, and suggests in each case certain modifications. It has been recommended to distil liquid or solid organic matters—urine, blood, or organs rich in blood—with a little sulphuric or phosphoric acid. If the distillate presents the characteristic odour it is to be shaken with ether, the decanted liquor left to evaporate spontaneously, and the residue tested with the usual reagents.

When no information exists respecting the cause of the accident under investigation, the author recommends the method published by M. Dragendorff, of Dorpat. The matter, after perfect division, is suspended in sufficient distilled water to render the mass very fluid; ten parts of dilute sulphuric acid are then added to one hundred parts of the mixture, and the whole allowed to digest for several hours at 50° C.; then expressed, and again treated with an equal quantity of acidulated distilled water. The liquors, mixed and filtered, are evaporated to a slightly syrupy consistence; to the residue is added three or four times its volume of alcohol, which is allowed to digest for twenty-four hours, filtered, and the filter washed with 70° alcohol. The alcoholic liquor being distilled leaves in the retort an aqueous liquor, which is filtered after cooling into a large flask, where it is agitated at the ordinary temperature with rectified petroleum spirit, boiling at 50° C. The petroleum having been decanted, the treatment is repeated, and the petroleum is afterwards left to evaporate in a certain number of watch-glasses.

The odour of the residue, and the property of blanching the skin, and of precipitating albumen and gelatine, belongs equally to creasote and to the cresylic phenol, as also does that of colouring blue a deal shaving exposed to the air after being plunged in hydrochloric acid. Some caution, however, is necessary in using this latter test, as M. Ritter states that he has seen a chip of deal coloured blue or green by the action of hydrochloric acid alone. Bromine water, which precipitates carbolic acid yellowish-white from very dilute solutions, is a delicate test; but although the precipitate which is obtained very slowly in dilute solutions takes a crystalline structure, the reaction is rather a complementary than a characteristic one. Neither is the conversion of carbolic acid into picric acid by nitric acid a characteristic test, although a very delicate one, for other substances yield a similar result. The property possessed by the ferric salts of colouring carbolic acid blue is a characteristic reaction, and sufficiently delicate when the phenol has been separated in the manner indicated above; for, according to Dragendorff, ferric sulphate colours lilac a solution of half a milligram to the cubic centimetre.

The reaction discovered by the author, which is the object of his paper, depends upon the extreme facility with which carbolic acid can be converted into erythrophenate of soda, a blue salt possessing a very considerable colouring power. He has found that upon adding to carbolic acid an equal weight of aniline and then of hypochlorite

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* Abstract of a paper read at the Lyons meeting of the French Association for the Advancement of Science, in August, 1873 (*Répertoire de Pharmacie*, vol. ii., p. 429.)

of soda, a deep blue solution of erythrophenate of soda is produced, remarkable for the purity and persistence of its colour. This blue colour is changed to red under the influencc of acids, in consequence of the setting free of the erythrophenic acid, the blue reappearing when the acid is saturated by an alkali. The same result is obtained with hypochlorite of lime, but less clearly, a slight turbidity being produced. A single drop of carbolic acid, treated with a single drop of aniline, and afterwards with hypochlorite of soda, gives a very deep blue liquid. If the same quantity be added to two litres of water, after a minute the blue colour begins to appear, and so increases in intensity in an hour or two that after further dilution with two fresh litres of water the colour is still marked. This the author estimates as being equal to about 1 part in 66,000. The extreme delicacy of this test has enabled the author to simplify the methods of proceeding for the detection of carbolic acid, especially as the presence of organic matters, such as alcohol, soap, fatty matters, etc., provided they are colourless, does not interfere with the working of the test.

Detection of Carbolic Acid in Blood.—In a case where it might be necessary that the blood of a patient treated internally or externally with carbolic acid, should be examined for its presence, the author recommends that 100 grams of the blood be allowed to run from the vein into a warm tared capsule, and mixed well with an equal quantity of water containing two per cent. of sulphuric acid. But if thc blood be received in a coagulated state, it is necessary to rub it up in a porcelain mortar with a little sand to break up the fibrinous network, and afterwards mix it with the acid. After an hour's contact it is thrown upon moistened calico to strain; the albumenoid matters that pass through first cling to the bottom of the vessel, and allow of the decantation of the greater part of the liquid. To this is added its own volume of 95° alcohol, and it is again filtered. When about 30 c.c. have been collected, the acidity is neutralized by carbonate of soda; by means of a glass rod a fraction of a drop of aniline is added, and finally, the solution of hypochlorite of soda. If carbolic acid be present, the liquid, upon being shaken quickly, becomes grcen, passing to greenish blue.

In operating upon the heart, lungs, liver, or other organs or muscular tissue, about 100 grams should be cut up as small as possible, and the division completed by trituration in a mortar with clean sand. The process is commenced as in the previous case, but the residue left on the strainer is pressed, and then afresh treated with half the previous weight of acidulated water. After an hour's contact it is again strained, pressed, and the combined liquors added to their volume of 90° alcohol, allowed to stand several hours, and filtered through paper in the afternoon. The next day the alcoholic liquid is evaporated in a watcr-bath in a retort furnished with a receiver; and if, after the alcohol has passed over, the liquid be a little turbid, it is filtered into a stoppered flask.

If the preliminary test show the presence of carbolic acid, ether is poured into the flask, well shaken, and after separation the ethereal layer is decanted, and thc operation repeatcd with a fresh quantity of ether. Thc spontaneous evaporation of the ether leaves the carbolic acid in a concentrated state that allows of testing by all the known reagents, and the preservation of a portion of a drop to be used if necessary in evidence. If, however, the liquor be acid, it is necessary to saturate with carbonate of soda in order to be able to produce the blue reaction of erythrophenate of soda.

If the preliminary experiment give a negative result, the author recommends that ether be replaced by a petroleum spirit, boiling at 60°, or, still failing, that benzine be used.

Detection of Carbolic Acid in Urine.—About 200 grams of urine are treated with 4 grams of sulphuric acid, previously diluted with 16 grams of water, and maintained during one hour at a temperature of 50° C. When cool an equal volume of alcohol is added, and after standing some time the mixture is filtered and treated as indicated above.

Detection of Carbolic Acid in Milk.—200 grams of milk, after the addition of the dilute sulphuric acid, as above, are heated and kept at a temperature near to boiling until the casein has entirely separated. The liquid is allowed to cool, filtered, treated with alcohol, etc., as in the foregoing.

The author had occasion tc examine the milk of a cow which, having been severely wounded at pasture, had the wound dressed with carbolic acid. He states that a single drop of aniline and the hypochlorite added directly to the milk was sufficient to produce thc blue colouration of erythrophenate of soda in the course of one minute.

POISONING BY VANILLA-ICE.

BY DR. L. ROSENTHAL.*

(*Concluded from p.* 838.)

I come now to the question: Wherein lies the source of poisoning by the use of vanilla-ice? We may here reasonably take three possibilities into consideration. The symptoms may be caused: 1, by cold; 2, by the materials constituting the frozen substance; 3, by other injurious substances accidentally introduced.

Regarding ice as such, we know well that its use may bc followed by gastric catarrh and other slight stomach disorders, but it is not known that symptoms resembling those of cholera follow its use. Further, the following fact is opposed to this idea. Symptoms like those which I have already described have never yet becn observed to follow thc use of fruit-ices; and among cream ices it is, as far as our knowledge extends, only vanilla-ice that has produced symptoms of poisoning.

I here beg leave to remark, in passing, that fruit-ice is prepared with sugar and the acid of lemons, to which the desired fruit-juice is added; while, in the preparation of cream-ice, eggs and cream are used, and the flavour is given by adding vanilla, chocolate, etc. Besides these, the various kinds of cream-ice are boiled before being introduced into the freezing vessel, which is not the case with fruit-ice.

While we must exclude the cold mixture as such from suspicion as the cause of the severe symptoms of poisoning, we succeed no better when we take into consideration the materials accidentally introduced into the ice. The most careful chemical examinations have given thc following results. Most frequently (as in our case) traces of lead are found, now and then more or less iron, and in two cases there were not inconsiderable quantities of tin. As we may exclude the lead and iron (the former on account of its small quantity) from suspicion as the causes of illness, there remains only the tin; and, in fact, Green, who made a chemical examination of the ice which led to poisoning in Altona, has expressed the opinion that the tin combines with the lactic acid formed from the cream, forming a lactate of tin, which acts as a poison on the organism. The experiments, however, which Maurer of Erlangen has made with tin on animals have shown thc complete harmlessness of this metal. I will finally remark on this subject that in our case the vessels used in the preparation of the ice were found to bc in a faultless and thoroughly clean condition. The ingredients werc boiled in well-tinned copper vessels, and the freezing was carried on in clean porcelain cylinders.

With regard to the materials used in the preparation of the ice, I have already mentioned the milk. Whether eggs can give rise to symptoms of poisoning is unknown to me; and thus we come to the only remaining possibility, that the poisonous agent is contained in the vanilla-pods. Up to the present time we cannot furnish certain evidence

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* Read before the Berlin Medical Society. (*Berliner Klinische Wochenschrift*, March 9, 1874. From the *London Medical Record* for March 25.)

on this point. The idea is opposed by the fact that, though vanilla is extensively used in the preparation of tea and chocolate, as well as of sauces and soups, which only differ from vanilla-ice in containing greater quantity of milk and in being of a higher temperature, the use of these has never been observed to be followed by symptoms of poisoning. We cannot regard any of the substitutes for vanilla, such as balsam of Peru and storax, as the vehicles of the poison, since in all the known cases it was really vanilla that was used in the preparation of the ice, and neither Peruvian balsam nor storax can be reckoned among poisons.

I must, on the other hand, mention a circumstance which, in my opinion, gives incontestable evidence that the poison is contained in the vanilla-pods. Cases of poisoning by vanilla-ice occurred in a confectioner's shop in Altona. The proprietor of the shop was in consequence obliged to give up his business; the vanilla-pods in his store went into the possession of a confectioner in Bergen —and the ice made with these pods proved to be poisonous.

I now hold, with many others, the opinion that the symptoms of poisoning produced by vanilla-ice must be placed to the account of the vanilla-pods; but the endeavours to ascertain the poisonous agent have hitherto been in vain. Martius believed that he had found it in the crystals covering the pods, since he observed that the pods gathered in the East Indies were covered with crystals of a different shape from those on the pods imported from Mexico. In our case the pods had no crystals at all. Schroff, who had occupied himself with the subject most thoroughly, has put forth three hypotheses, of which he holds the first to be most probable. "In Columbia," he says (*Lehrbuch der Pharmacognosie*, 2nd ed., 1869), "the pods are greased with the fatty oil from the seeds of the *Anacardium occidentale* (cashew-nut) and dried in the sun. As a very acrid juice is contained between the endocarp and ectocarp of this fruit, it is possible that, in preparing the oil from the seeds without sufficient care, this, and the vanilla-pods over which it is rubbed, may become contaminated with the acrid juice; and that in this way the occasional occurrence of poisoning, after the use of vanilla-ice may be explained in these cases, where no other injurious condition can be ascertained." In another place (*Wiener Medizinische Wochenschrift*, No 82, 1863), he says that experiments on rabbits with cardol prepared from this oil have shown that it is capable of producing the symptoms observed in patients.

Setting aside the fact that other observers make no mention of the rubbing of vanilla pods with the cashew-nut oil, Schroff does not show that the cardol used in the experiments was derived from vanilla-pods. Thus his hypothesis loses probability; and Dr. Schädler has been informed that there was no cardol in the vanilla-pods obtained from the Vienna *café*.

The second hypothesis which Schroff put forth, and to which he himself attached little weight, is the following. In the vanilla-fruits, on careful microscopic examination, there are found in the parenchymatous cells of the mesocarp packets of sharp-pointed needle-shaped crystals, which were very large in the vanilla used in preparing the ice in question; and, according to Soubeiran, they act like nettles on the skin. These must act as mechanical irritants; but in the ice examined they were always in a broken-up condition.

Finally, whether any of the fatty acids formed under certain circumstances may be the cause of the poisoning, must remain undecided—as yet, there is no proof of such a cause.

In conclusion, while I thank those who have assisted me by contributing facts and by searching through the literature of the subject, I must guard myself against being supposed to advance a new hypothesis. I abstain from this the more, as the necessary knowledge is wanting to me. But there is one thing to which I may direct attention. Not to mention that the various kinds of vanilla differ much in quality, I have found it stated by Schroff alone that the pods are gathered when ripe. All other authors state that they are gathered in the unripe state, and prepared in many ways for use. I here add what Henkel (*Handbuch der Pharmacognosie*, Tübingen, 1867) says, from Von Müller's travels in Mexico. He first describes vanilla as the dried unripe capsules of the *Vanilla planifolia;* then gives the following account of its preparation. "The Indians of Misantla collect the vanilla in the mountains and forests of Quilates; the fresh capsules contain an acrid viscous juice, which protects them against insects. The Indians, who only betake themselves to the forests for eight days at the time of the gathering, often sell the raw fruit to the colonists, who then prepare and dry them, and tie them in bundles for sale. In Misantla, the most usual way of drying the vanilla is to spread the shrivelled yellow fruit on linen in the sun for some hours. When the pods are sufficiently heated they are wrapped in woollen cloths, where they soon assume a dark copper colour; they are then exposed to the sun from morning to evening until they are dry. When drying in the sun is prevented by continued rain, artificial heat is employed; frames are made of reed or bamboo, which are suspended by cords at the four corners and covered with woollen cloths, on which the capsules are spread. These frames are swung over a fire which does not smoke, until the pods are dried. . . . In the State of Oaxaca the natives dry the vanilla by piercing the capsules all over with needles, so as to allow the escape of the viscous juice."

Flückiger (*Lehrbuch der Pharmacognosie des Pflanzenreichs*, Berlin, 1867), expresses himself in a similar way, though not with so much detail. "In the second year, the fruit buds ripen into an entirely non-aromatic pod-shaded, fleshy capsule, with a viscous milky juice, and opening longitudinally in two unequal valves. It is not allowed to become fully ripe, but is collected when its green colour is beginning to pass into brown, and is dried, according to some accounts, in a very elaborate manner, inasmuch as it is subjected to heat either exposed, or wrapped in woollen cloths; under this treatment it ripens, and first develops the aroma and the favourite dark-brown colour of the commercial fruit."

From these statements, it is difficult to imagine that in some of the pods—and, as far as we know, it is only individual pods that are poisonous—the process of artificial ripening is not complete, and that it is the unripe pods which produce the symptoms? I content myself with having called attention to this question. May those who are more skilful decide it!

[The reading of Dr. Rosenthal's paper was followed by a discussion, a report of which is given in the *Berliner Klinische Wochenschrift* for December 22, 1873.]

Dr. B. Fränkel said that, as his name had been mentioned, he would give fuller information on the cases of poisoning observed in his family. Several persons were taken ill, nearly in the proportion in which they had partaken of a certain dish. The symptoms were those of vanilla-poisoning, such as had just been described by Dr. Rosenthal. One person alone of the household, who did not eat any portion of the dish, remained unaffected. The dish in question was a warm farinaceous compound, to which vanilla was added in preparation. It was made in a porcelain vessel, and was so simple in composition that the illness could only be attributed to the vanilla. He had given to Dr. Liebreich, for examination, some vanilla-pods, obtained from the same dealer, and taken from the same packet as those which produced the poisoning.

Dr. Veit said that, in the nights of August 28 and 29, he observed a case of poisoning with vanilla-ice. He took special notice of the fact, because a female friend of the patient (a woman) who had eaten of the same ice, was taken ill with similar symptoms. The symptoms were those of cholera, but the gastric pain was of longer duration, and recovery slower.

Dr. Kalischer on the same night saw a similar case of

illness in a lady who had eaten some ice in the Vienna *café*. One of her children also ate of the ice, but was not ill.

Dr. Henoch said he ate some vanilla-ice, obtained from one of the first confectioners in Berlin, and four hours later was taken ill. His evacuations were colourless, and resembled those of cholera. He had no pain in the stomach or bowels, a circumstance which spoke against metallic poisoning. In the same night, a young girl and fourteen other persons of the same party were taken ill with similar symptoms; they had all eaten vanilla-ice. Those who ate other ices were not attacked. On applying to the confectioner, he was assured that vanilla-pods of the same kind had been used for some months without producing poisoning. The pods shown to him were abundantly covered with crystals. It was remarkable that the symptoms were specially severe in those persons who had eaten the portions of ice nearest to the containing vessel; especially the servants, who scraped it to obtain the portions of ice that adhered to it. This circumstance appeared to indicate metallic poisoning.

THE ANNIVERSARY DINNER.

It has been decided that the Annual Dinner in connection with the presence in London of many members of the Pharmaceutical Society, to attend the Annual Meeting, shall take place, as last year, at the Crystal Palace, on Tuesday, the 19th May.

On Wednesday evening next, at eight o'clock, a meeting of the Stewards will be held at 17, Bloomsbury Square, to appoint a Committee, and make other necessary arrangements. The Secretaries will be glad if gentlemen interested in the gathering will accept this notice as a sufficient invitation to be present.

The following is a list of the Stewards, from all of whom tickets for the Dinner can be obtained :—

Atherton, John Henry	...Long Row, Nottingham.
Atkins, S. R.	...Salisbury.
Attfield, Professor ...	...17, Bloomsbury Square, W.C.
Baiss, A.	...102, Leadenhall Street, E.C.
Baldock, John Henry...	...3, High Street, South Norwood, S.E.
Barker, W. R.	...143, New Bond Street, W.
Barnes, J. B.	...1, Trevor Terrace, Knightsbridge, S.W.
Barron, Frederick ...	...2, Bush Lane, Cannon Street, E.C.
Baynes, James	...24, Waterworks Street, Hull.
Bell, R. E.	...161, East Street, Walworth, S.E.
Bentley, Professor ...	...17, Bloomsbury Square, W.C.
Betty, S. C.	...6, Park Street, Camden Town, N.W.
Bird, Augustus	...Wood Lane, Shepherd's Bush, W.
Bottle, Alexander ...	...37, Townwall Street, Dover.
Bourdas, Isaiah	...7, Pont Street, Belgrave Square, S.W.
Bremridge, Elias... ...	...17, Bloomsbury Square, W.C.
Broad, John...	...Rise House, Hornsey Rise, N.
Brown, William Scott	...113, Market Street, Manchester.
Burbidge, Thomas ...	...16, Coleman Street, E.C.
Butt, E. Northway ...	...13, Curzon Street, Mayfair, W.
Carteighe, Michael ...	...172, New Bond Street, W.
Cornish, Henry Robert	...24, Market Place, Penzance.
Cracknell, Charles ...	.. 217, Edgware Road, W.
Davenport, J. T.	...33, Great Russell Street, W.C.
Down, Dr. J. Langdon H.	...39, Welbeck Street, Cavendish Square, W.
Evans, Henry Sugden	...60, Bartholomew Close, E.C.
Farries, J.	...New Basinghall Street, E.C.
Fauleoner, R. S.	...272, Walworth Road, S.E.
Flux, William	...3, East India Avenue, Leadenhall St., E.C.
Francis, George Baggett	...5, Coleman Street, E.C.
Gale, Samuel	...338, Oxford Street, W.
Garratt, J. C.	...Rugby.
Good, Thomas	...47, Minories, E.C.
Greenish, Thomas ...	...20, New Street, Dorset Square, N.W.
Groves, Thomas B. ...	...80, St. Mary Street, Weymouth.
Hampson, Robert ...	...205, St. John Street Road, E.C.
Hanbury, Cornelius ...	...Plough Court, Lombard Street, E.C.
Harris, D. R.	...55, St. James's Street, S.W.
Harvey, Charles	...6, Giltspnr Street, E.C.
Harvey, Edward	...6, Giltspur Street, E.C.
Hill, A. B.	...Southwark Street, S.E.
Hills, Thomas Hyde ...	...338, Oxford Street, W.
Hills, Walter	...338, Oxford Street, W.
Hodgkinson, William ...	...127, Aldersgate Street, E.C.
Hopkin, William King	...16, Cross Street, Hatton Garden, E.C.
Horner, Edward	...20, Bucklersbury, E.C.
Howden, Robert	...78, Gracechurch Street, E.C.
Hughes, John	...York Glass Co., West St., Finsbury, E.C.
Lansdown, George ...	...3, Warwick Street, Charing Cross, S.W.
Lescher, F. Harwood...	...60, Bartholomew Close, E.C.
Linford, J. S.	...17, Charlton Villas, Charlton S.E.
Lynch, Thomas	...171A, Aldersgate Street, E.C.
McCulloch, Frederick	...13, Hart Street, Covent Garden, W.C.
Mackay, John	...119, George Street, Edinburgh.
Mackey, J. B.	...2, Bouverie Street, E.C.
Maltby, J.	...Lincoln.
Martin, T. C.	...11, Aldersgate Street, E.C.
Newbery, Lionel	...37, Newgate Street, E.C.
Paul, Dr. B. H.	...1, Victoria Street, Westminster, S.W.
Pound, Matthew... ...	...60, Leather Lane, E.C.
Preston, Alfred	...88, Leadenhall Street, E.C.
Preston, Joseph Classon	...88, Leadenhall Street, E.C.
Radley, W. Valentine	...74, Market Place, Sheffield.
Redwood, Professor ...	...17, Bloomsbury Square, W.C.
Rimmington, F. M. ...	...Bradford.
Roach, Pope...	...8, St. James's Street, S.W.
Robbins, John	...372, Oxford Street, S.W.
Sandford, George Webb	...47. Piccadilly, W.
Savory, C. Harley ...	...143, New Bond Street, W.
Schweitzer, J.	...79, Pavilion Road, Sloane Street, S.W.
Shaw, John	..24, Great George Place, Liverpool.
Skinner, Thomas	...Cirencester.
Smith, Nathaniel... ...	...Cheltenham.
Squire, William	...5, Coleman Street, E.C.
Stacey, S. Lloyd	...300, High Holborn, W.C.
Stoddart, William W.	. .Bristol.
Sutton, Francis	...Bank Plain, Norwich.
Taylor, G. S....	...13, Queen's Terrace, St. John's Wood, N.W.
Thompson, Hy. Ascough	...22, Worship Street, Finsbury Square, E.C.
Thompson, John	...10, Aldersgate Street, E.C.
Turner, John	...Aylesbury.
Twinberrow, J. K. ...	...80, Wigmore Street, W.
Umney, Charles	...40, Aldersgate Street, E.C.
Walker, William Henry	...Southport.
Warrick, R. B.	...Old Swan Lane, Upper Thames St., E.C.
Watts, W. Manning ...	...32, Lower Whitecross Street, E.C.
Wavell, John...	...Ryde, Isle of Wight.
Williams, John	...16, Cross Street, Hatton Garden, E.C.
Willows, Jesse	...101, High Holborn, W.C.
Wilson, E	...Brunswick House, Sheffield.
Wimble, Alfred	...34, Week Street, Maidstone.
Wootton, A. C.	...44, Burghley Road, N.W.
Wright, Wm. Valentine	...50, Southwark Street, S.E.
Yates, Francis	...64, Park Street, Southwark.

Tickets for the dinner may be obtained up to Thursday, May 14th, from any of the Stewards, or from the Honorary Secretaries, Messrs. RICHARD BREMRIDGE and MICHAEL CARTEIGHE, 17, Bloomsbury Square, W.C. In order to make the necessary arrangements and prevent discomfort, members and their friends are requested to make application for their tickets *at once*.

NOTE ON THE PREPARATION OF EXTRACT OF KRAMERIA.*

* Abstract of a paper in *L'Union Pharmaceutique*, xv. 66.

BY M. CASTEUIL PATTESON.

Two years since, the author, wishing to prepare some extract of krameria and having only some large roots difficult to powder, he had them dried. This process however not being carefully conducted, when the roots were percolated after maceration in water, the liquid obtained instead of being a fine red colour was of a dull yellow. Having read that the addition of sugar increased the product, he treated his drug with sugared water and applied heat. He was surprised to find that under the influence of the sugar the red colour quickly appeared, and he obtained a product consisting of equal parts of extract of krameria and of sugar, and perfectly soluble. The extract of krameria so obtained was found to be convenient as a pill mass, and could be brought to a hard consistence in a stove. In this form it preserves perfectly. Some that the author prepared two years since gives at the present time a perfectly limpid solution. The warmth of the hand is sufficient to soften the mass, and in case of need exposure to the vapour of water for a few minutes will reduce it to a suitable consistence for making pills. The author states that the pills are quickly made, do not alter in shape, contain no objectionable matter, and dissolve perfectly in the juices. Some further experiments have led him to propose a fluid extract in which the menstruum consists of glycerine, sugar, and water; but this is possibly open to the objection appertaining to the use of glycerine in the preparation of astringents, referred to in the discussion at the Bradford meeting of the Conference (*ante*, p. 336).

The Pharmaceutical Journal.

SATURDAY, APRIL 25, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

DRUGGISTS AND THE SALE OF ALCOHOL.

THE well-known paradoxical utterance that "extremes meet" has been verified in our literary exchanges received during the last few days. On the one hand, the *Good Templar*, asserting that in the Pharmacy Acts the "Permissive Bill" is already passed, calls upon the Council of the Pharmaceutical Society to place Alcohol amongst the poisons in Schedule A. On the other, the New York *Druggists' Circular* contains sundry protests against the fact that the women engaged in the whiskey war, in initiating the movement in a fresh district, advertise their intention of carrying on the crusade against the *druggists and saloon keepers.*

The *Good Templar* informs its readers that "the "political end and object of the temperance reforma- "tion in Great Britain at this moment, whether "recognized or not, is, in the first place and before all "else, simply to convince a certain number of scientific "men composing the Council of this Society that "they ought to pass a particular resolution." Absurd as such a proposition may appear, it is one that is put forward "soberly" in the official organ of a numerous body, and it is therefore quite possible that it will be brought in some way under the consideration of the Council which will shortly be elected by our Society. But is the temperance millennium to be brought about by labelling every bottle of alcoholic liquor "poison," the registration of the sale, and of the purpose for which it is required—from which it would appear that alcohol is to be classed among the poisons in part 1—and the transfer of the liquor trade from the publican to the pharmacist? Simple as is the faith shown in the deterrent efficacy of a name, and flattering as is the confidence exhibited towards the members of our honourable calling, pharmacists are hardly the men to subscribe to a creed that has been exploded at least since Romeo's time, or to believe that, if they were willing to accept the suggested transfer, the public would be likely to sanction it.

Some two years since, when a declaration respecting alcohol, largely signed by influential members of the medical profession, was put forth, an opinion was expressed in these columns that British pharmacists would be found ready and willing to second any efforts to limit the improper administration of alcohol under the guise of medicine; and that opinion has been supported in our own experience by the fact that, on more than one occasion, our advice has been asked as to the propriety of dispensing certain prescriptions that appeared more suggestive of dram-drinking than doctoring. Still there is no doubt that under various designations what are really stimulants are asked for and supplied by druggists, and it is not probable that the demand would be decreased by the introduction of such a term as "pick-me-up poison."

In some parts of the United States, however, a state of affairs is described as existing that goes much further towards the *Good Templar* proposition of combining the alcohol traffic with pharmacy, and with a resulting deterioration of the interests of the latter. Two causes seem particularly to be operating in this direction: one that the druggist is compelled to pay a tax of twenty-five dollars for a liquor license, which induces him in a few cases to set up a "gin mill" in his establishment in order to recoup himself; another, that the passage of a "local option law" in some districts has induced "some few unprincipled apothecaries" to carry on, in connection with physicians of the same stamp, an illegal trade in liquor, supposing that if they are detected they can hide themselves behind the physician who gave the prescription. In this, however, they would appear to be mistaken; for a judge, in sentencing some offending druggists, said that although a druggist might be fortified by the prescription of the most eminent physician, yet he is not justified in selling to persons of known intemperate habits, or where he knows the liquor will be used as a beverage.

Amongst the minor consequent inconveniences that have arisen to perplex American pharmacists, is a crop of terms in Latin far from Ciceronian. The *Druggists' Circular*, in replying to some queries of a correspondent says, "We are afraid that the temperance crusade in your State has caused such a sudden increase in the number of patients applying to their doctors for stimulant prescriptions that some physicians have had no time to burnish up their stock of Latin." We agree with our contemporary in thinking that a doctor is excusable in this instance: the Latin language had no words for distilled liquors, these having been unknown during the Augustan period; and it is not easy to coin in a hurry readily intelligible Latin expressions, even for the chief ingredients of the various forms of alcoholic stimulants for which America is famous. Although the British Pharmacopœia recognizes "egg-nog" under the name of "*Mistura Spiritus Vini Gallici*," many a good scholar would feel sorely puzzled to write prescriptions for a "sherry cobbler," a "cock tail," a "gum tickler," or an "eye opener."

On the whole, we think we may venture to assure our well-intentioned temperance friends that the pharmacists of Great Britain are averse to any closer connection with the sale of alcohol, either in the form preached for in England or prayed against in America.

THE COLLEGE OF PRECEPTORS AND MIDDLE-CLASS EDUCATION.

Of the many deputations by which the Government have been besieged during its yet brief term of office, one which waited on the Duke of Richmond last week to express the views of the College of Preceptors upon the subject of secondary education was not the least important. The opinion of the members of the College, as set forth in an address issued by them, is that the education of the upper and middle classes is at present very unsatisfactory ; and this is an opinion that will be endorsed by many parents who have found that time and money have been wasted in the effort to secure a good education for their children. Elementary education has now been placed under the supervision of the State, but the advancement of a higher class of education has been left mainly to the schoolmasters and mistresses, who, though numbering among them many possessed of great attainments, have as a body no recognized status. It is now proposed that the College of Preceptors should have such an extension of its charter, as would place it, with regard to the registration of teachers, on the same footing as the Inns of Court in respect to law, and the College of Physicians and Surgeons to medicine. This authority for examining and registering teachers, the College believes, would not only be a great advantage to those engaged in teaching, but would supply a machinery by which the scholastic profession would perhaps be more effectively influenced than by direct legislation. Some little uncertainty seems to exist as to whether the examination and registration should be optional or compulsory ; some speakers wishing for an optional registration, which should confer the sole right to use a certain title but not be essential to practice as a teacher, similar to what is enjoyed by surgeons !

Of course the Duke of Richmond promised to give the subject a most careful consideration, to which it is clearly entitled as another indication of the beneficial influence which is at length being brought to bear upon Middle-Class Education.

AMENDMENT OF THE ADULTERATION OF FOOD ACT.

The session of Parliament has not been allowed to advance very far without signs that the Adulteration Act will furnish a topic for discussion. On Thursday, April 16th, Mr. Mundella inquired of the secretary of the Local Government Board, what steps were being taken to prevent the *importation* of adulterated articles of food into this country, and to relieve honest traders from liability to conviction for the sale of articles adulterated by the foreign producer and on which customs duties have been paid. In reply, Mr. Sclater-Booth stated that any proceedings for the purpose of preventing the importation of adulterated articles of food, must under the existing law be taken by *local authorities* and not by the Government. He added that many memorials had been received, complaining of the hardships inflicted upon retail dealers by the operation of the Act, and the Government had therefore determined to ask the House to appoint a select committee to inquire into the subject.

PAYMENT OF ANNUAL SUBSCRIPTIONS.

It may be useful to remind some of our readers that the time for payment of the annual subscription to the Pharmaceutical Society, due on January 1st, expires on the last day of this month, after which time the names of Members, Associates, and Apprentices or Students of the Society, who have not paid their subscriptions, are omitted from the respective Registers. Under the new Bye-law, which is now in force, the Council will be unable to restore the names of such persons, except upon payment of the subscription for the then current year, and a sum not less than the amount of half of one year's subscription, nor exceeding five guineas, as for and in commutation of arrears of subscription.

APPOINTMENTS OF ANALYSTS.

Mr. Edward Lawrance Cleaver, Pharmaceutical Chemist and Assistant Demonstrator in the Laboratories of the School of Pharmacy, Bloomsbury Square, has been appointed Analyst under the provisions of the Adulteration Act, 1872, for the parish of St. Mary Abbott's, Kensington. The appointment has received the sanction of the Local Government Board.

We are glad also to learn that some objections which had been raised by the Local Government Board to the appointment of Mr. Joseph Young, Pharmaceutical Chemist, of Leicester, as Joint Public Analyst for the Borough of Leicester and the Counties of Leicester and Rutland, have been removed upon consideration of that gentleman's testimonials, and his appointment has now been confirmed.

COCCULUS INDICUS.

A paragraph quoted by the *British Medical Journal* from the *Hospitals Tidende*, and headed "Poisoning by Picrotoxin," appeared at first sight to promise definite evidence respecting the alleged use of the berries containing this bitter principle for the adulteration of beer. A Danish medical practitioner relates that he and three friends, a quarter of an hour after drinking a small glass each of "English ale" with their supper, were attacked with pain in the stomach and frontal headache, followed by violent vomiting and profuse diarrhœa, and other disagreeable symptoms. It is stated that an examination of the ale remaining in the bottle from which the guests drank, and others, revealed the presence of colchicine ; but what method was used for its detection, and why the case is called one of poisoning by picrotoxin, does not appear. A report of the analysis, however, is promised in a pharmaceutical journal. Meanwhile, it is consoling to our *amor patriæ* to learn that the "English ale" was imported into Denmark in bulk and bottled in that country.

THE ANNIVERSARY DINNER.

The attention of those interested in this gathering is directed to an announcement on a previous page that a meeting of the Stewards will be held at 17, Bloomsbury Square, on Wednesday evening next, at eight o'clock, to appoint a Committee, and make other necessary arrangements.

Transactions of the Pharmaceutical Society.

BOTANICAL PRIZE FOR 1875.

A Silver Council Medal is offered for the best Herbarium, collected in any part of the United Kingdom between the first day of May, 1874, and the first day of June, 1875; and should there be more than one collection possessing such an amount of merit as to entitle the collector to reward, a second prize, consisting of a Bronze Medal, and also Certificates of Honour and Merit, will be given at the discretion of the Council. In the event of none of the collections possessing such an amount of merit as to warrant the Council in awarding Medals or Certificates, none will be given.

The collections to consist of British Flowering Plants and Ferns, obtained in a wild state, and arranged according to the Natural System; the collections to be accompanied by lists, arranged according to the same system, with the species numbered.

The collector to follow some work on British Botany (such as that of Babington, Hooker, or Bentham), and to state the work which he adopts. The name of each plant, its habitat and the date of collection, to be stated on the paper on which it is preserved.

Each collection to be accompanied by a note, containing a declaration, signed by the collector, and certified by his employer, or a Pharmaceutical Chemist to whom the collector is known, to the following effect:—The plants which accompany this note were collected by myself, from wild plants, between the first day of May, 1874, and the first day of June, 1875, and were named and arranged without any assistance but that derived from books.

In estimating the merits of the collections, not only will the number of species be taken into account, but also their rarity or otherwise, and the manner in which they are preserved; and should a specimen be wrongly named, it will be erased from the list.

The collections to be forwarded to the Secretary of the Pharmaceutical Society, 17, Bloomsbury Square, on or before the first day of July, 1875, indorsed "Herbarium for Competition for the Botanical Prizes." After the announcement of the award, they will be retained one month, under the care of the Curator of the Museum, for the inspection of persons connected with the Society, and then returned to the collectors, if required.

No candidate will be allowed to compete, unless he be an Associate, Registered Apprentice, or Student of the Society, or if his age exceed twenty-one years.

NORTH BRITISH BRANCH, EDINBURGH.

The sixth and last meeting of the present session was held in the Society's Rooms, St. Giles's Street, on Thursday evening, 16th current, at half-past eight o'clock, Mr. J. R. Young, President, in the chair.

On taking the chair, Mr. Young intimated that the Secretary had received information of the sudden and unexpected illness of Mr. Sadler, of the Royal Botanic Gardens, who had arranged to read two papers to the Society—one on the "History and Structure of certain Edible and Poisonous Fungi," and the other on "Eucalyptus Globulus." The President was sure all present would sympathize with Mr. Sadler's condition, and exceedingly regret the cause which would prevent him fulfilling his kind promise in appearing before them this evening.

Mr. Young then addressed those present as follows:—

"This, as you are aware, is the last meeting of the session, and I may be permitted very briefly to say that on the whole the meetings throughout have been well attended; that we have, as in former sessions, been indebted in great measure for their success to those gentlemen who have so kindly addressed us, but that we have still to lament that so little has been done by those more immediately connected with the business—many of whom, did they but interest themselves a little more in the work of the Society, might feel disposed to contribute to some extent in making these meetings more practical and interesting than they hitherto have been. At the first meeting, in December, Mr. Gilmour, our Vice-President, gave an exceedingly interesting lecture on the polariscope. Mr. Gilmour was placed at considerable disadvantage, in having to conduct his experiments with very indifferent assistance; but, nevertheless, he succeeded in explaining satisfactorily the wonderful effects of polarized light, and in throwing upon the screen a great variety of very beautiful illustrations, which were highly appreciated by those present. The Society will look forward to Mr. Gilmour's future contributions with much interest. In January, Dr. Macadam was kind enough to address us on the collection and examination of potable waters. As the water question has been a subject of much discussion in Edinburgh for many years, and as it was well known that the Doctor had been largely engaged in supplying materials for that discussion, much interest was evinced, and those who had the pleasure of hearing the address were able to realize how much was necessary in regard to the proper collection, and what care was requisite in the examination before giving a detailed analysis of any water. In February, Professor Archer lectured "On the Use and Abuse of Food," when he urged very strongly the importance of right views on the subject, and the hope that at no distant day there would be a course of lectures in every university in Europe in connection with it. In March, Dr. McKendrick, Assistant Professor of Physiology in the University, gave an address on the "Chemistry of Certain Physiological Processes which take place in Digestion, Nutrition, and Excretion." From the numerous diagrams and the variety of illustrations, most carefully conducted, with which this lecture abounded, the greatest pleasure and profit was derived, and the meeting testified its approbation very effectively during its delivery. In April, Dr. Macadam was again kind enough to lecture "On the Quality of Milk supplied to Towns." Some prosecutions under the Food Adulteration Act had taken place in various parts of the country, and very conflicting views were held in reference to a proper standard for genuine milk, and it is hoped that the contributions of Dr. Macadam and others on this very important matter may lead to such a result that the public may be supplied with genuine milk, and that honest dealers in the commodity may be sufficiently protected. The library during the session has been increased to a considerable extent, more especially by the valuable donations of Messrs. Brown and Baildon, which have added very materially to its efficiency and value, and it is pleasing to know that it has been made use of to a considerable extent by those for whom it was intended.

"The museum has been enhanced by donations from Messrs. Howards and Son, Professor Maclagan, and more especially by Mr. Jamie, of Singapore, who, through Mr. Baildon, his former employer here, has sent the most valuable contribution which has yet been made to the museum. Descriptive papers in reference to this presentation are given in the PHARMACEUTICAL JOURNAL of April 4th, and one cannot read these without feeling his heart warm towards Mr. Jamie for the kind and generous manner in which he has acted in making this presentation.

"In connection with the examinations, it may be mentioned that the President of the Society, Mr. Hills, with that liberality for which he is so conspicuous, has during the session given funded property yielding £5 per annum to the North British Branch for the purpose of presenting a prize of books to the young man who stood highest in marks at each minor examination in Edinburgh; and the examiners have already had the pleasure of thus applying this endowment. It is hoped that this prize may have the effect on our candidates that the generous donor intended, and that a healthy stimulus will be introduced, resulting in a desire not merely to pass the

examining Board, but to pass in such a manner that this prize may fall to their lot. In regard to the examinations it would, perhaps, be out of place that I should make much allusion to them on this occasion, but there can be no doubt that the dread of such is already evincing a marked influence in our business arrangements. Assistants are not more plentiful, and those that are procurable, are not, in my experience, better or even safer than men in the olden time; while the influx of apprentices is not so great as to warrant the hope that better times are in store. It appears to me right and reasonable that a chemist should be an educated person, that he should be an examined person, that he should have served an apprenticeship, and that, if practicable, he should have had the benefit of attending lectures on various subjects; but this latter point I would not press too far, as it is consistent with my own knowledge that in several instances parties have appeared at our examining Board, and taken honours in the major examination, who never attended a single class. You may call it "cram" if you will, but their knowledge of the various subjects of examination was honestly and fairly tested, and the result was as I have stated, the whole merit being due to steady persevering industry on their part; and in the face of such successful efforts, it appears to me that any hard and fast line in reference to compulsory attendance on any course of lectures would, in present circumstances, be detrimental to the interests of the business generally. The examinations are, in my humble judgment, sufficiently stringent for the next ten years; and I cannot but feel that a great hardship is about to be inflicted on the mass of our young men by the regulations which come into operation in October.

"Urge education by all means, give facilities for such wherever it is practicable; but it appears to me a mistake to make the test of admission to the Society such that none but those who are skilled analytical chemists have much chance of meeting its requirements.

"Some additions to the Pharmacopœia have been made under the direction of the General Council, and it will be expected that we shall have these in readiness in due course.

"In the Journal for April 4th, a very full account of these is given in a paper read by Mr. C. Umney at an evening meeting in Bloomsbury Square. Most of the preparations have been more or less used for some time past; but there are one or two changes in nomenclature and in composition, which may give rise to many unpleasant complaints causing worry and annoyance to a conscientious chemist. Pulvis Glycyrrhizæ Compositus for example, as sold in Edinburgh, has been prepared invariably according to the formula of the Prussian Pharmacopœia. This contains sulphur and fennel seed powder. The new preparation omits both; so that, unless medical men are very careful in prescribing, there will be a constant succession of doubts and fears as to the preparation wanted. Then nothing is more common than that the preparation of bismuth presently most in use is ordered as oxide of bismuth; and now we have a new preparation bearing that name evidently with the desire of superseding the subnitrate. There are many consumers of medicine, and these the best customers of the Pharmaceutical Chemist, who watch very jealously the appearance, and nicely judge the taste, of the articles they use; and changes such as these give rise to much discomfort to all parties.

"Our apartments here having in some respects been found unsuitable, the Council are glad to intimate that, when they had almost given up the hope of securing more eligible premises on reasonable terms, they were offered such through the kindness of Mr. Mackay on the first flat of 119, George Street. The suite of rooms there are in process of being obtained, and it is hoped that at the opening of next session they will be in such condition as will permit the work of the Society to be carried on in a more efficient manner and with greater comfort than heretofore.

"And now, gentlemen, as this is the concluding meeting of the session, and my retirement from this chair will speedily take place, let me say how grateful I feel for the kindness which has been invariably shown to me. Circumstances have prevented me discharging the duties so fully as I could have desired, but so far as I have been able I have had much pleasure in endeavouring to advance the interests of the Society. You have given me every encouragement, and from the honorary secretary I have derived such assistance as leads me to assure my successor that he need have no fear but that he will find the office in all respects an agreeable one."

As there was abundance of time, in consequence of Mr. Sadler's unavoidable absence, Mr. Mackay, at the President's request, proceeded to make a few remarks in reference to some of the subjects referred to in the valedictory address. He went very fully into the examinations. Alluding to the system at present followed, he spoke of the change about to be introduced on the 1st of October. While quite in favour of increased education and a fair knowledge of the various departments required by the Board, he much feared, unless greater facilities were given for study among the young men, both in town and country, that the stringency of altered chemical and botanical examinations might press so heavily against the candidates that, great as the percentage of rejections had been, they were very likely to be increased. This he very much regretted, because the difficulty of getting young men to come into the business was daily increasing, while of the very best of those already engaged in it some were gradually leaving and finding employment in other spheres. He could not help comparing those requirements with the small remuneration which was offered by town and country chemists to young men who had passed the standard, to fit them for the Government Register. Mr. Mackay then brought before the meeting the recent proposal to establish scholarships in connection with the parent Society. He would be glad to hear the opinion of some now present on this subject. For his own part he did not think it was at all desirable that the funds of the Society should be so spent, nor did he think the large sum proposed to be spent annually for this purpose would be found a successful investment.

Mr. Baildon quite coincided with the views which had been so well expressed by Mr. Mackay, and thought it would be a very unwise thing indeed for the Society to institute the proposed scholarships. He also feared that they were somewhat premature in making the changes in the minor examination, which he understood would really come into operation on the 1st of October.

Mr. Ainslie, while quite agreeing to all that had been said regarding the scholarships, still thought that it might be advisable to compel attendance on certain courses of lectures, even though it entailed the necessity of young men coming from a distance to larger towns, where they might have the benefit of attending the teaching of those capable of giving instructions in materia medica and kindred subjects.

Mr. Gilmour also quite agreed in all that had been said regarding scholarships, and would personally much regret to see them established as had been recently proposed by Mr. Schacht. He rather thought the time was coming when young men would require to visit certain centres to study before passing their examinations, and he would like to see the funds of the Society expended to a certain extent in establishing courses of lectures to which the pharmaceutical students would be admitted free of charge.

Messrs. Blanshard, Finlayson, and Baildon, jun., all spoke against the establishment of scholarships, and were also averse to compelling attendance at a course of lectures.

Mr. Mackay, in replying to Mr. Ainslie's and Mr. Gilmour's remarks, thought it would be a very difficult thing indeed to get young men to come from a distance to large centres, with the view to study and attend courses of lectures, and fancied every object would be attained by

apprentices being obliged to attend prelections on materia medica, botany, and chemistry when this was possible, and where no such opportunity offered that masters should be bound to give time for the pupil to read and study the different subjects on which they would be afterwards examined.

Mr. Mackay then moved a hearty vote of thanks to Mr. Young, who, as had been stated, occupied the chair for the last time this session at a scientific meeting. He felt that the Society was deeply indebted to him for the warm interest he had all along taken in its affairs, and hoped that though for a time retiring from his present high position, he would long be spared to assist in conducting the affairs of the Branch here, in a manner which would prove serviceable not only to the present but more particularly to the rising members of the pharmaceutical profession.

This was carried with loud acclamation.

The Secretary then intimated that as Dr. Frazer had left Edinburgh for an appointment in England, Dr. William Craig, C.M., would lecture during the summer on materia medica, and had kindly agreed to admit students of pharmacy on very liberal terms. Any wishing to obtain tickets might apply to him, at 119, George Street, on or after Tuesday next. Dr. Craig had authorized him to state that as this was to be his first course, all the tickets issued would be perpetual.

The meeting then adjourned.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

At the monthly evening meeting, held on the 11th of March, a lecture on "Colour," experimentally illustrated, was delivered by Thomas Wills, Esq., F.C.S., of the Royal Naval College, Greenwich.

The seventh and concluding meeting of the session took place on the 10th instant; Mr. G. F. Schacht presided. Professor Redwood gave a discourse on "Pharmacy—Past, Present, and Prospective."

A Sketch of Pharmacy: Past, Present, and Prospective.

BY PROFESSOR REDWOOD.

I propose in this lecture to direct your attention to some points connected with the rise and early development of pharmacy, as an occupation distinct and separate from the practice of medicine; to trace its progress to the present time; to point out what I conceive to be the critical nature of its present position, and to indulge in a few speculations with regard to the future.

All our published accounts agree in representing the first rise of pharmacy to have occurred among the Arabs, and its earliest cultivation to have taken place in Spain during the dominion of the Arabs in that country. We read of the existence of a class of men devoted to the collection, preservation, and dispensing of medicines, among the Arabs, prior to the twelfth century. Laws were enacted for regulating the exercise of this business in Spain, in Sicily, and elsewhere, at an early period, and these were subsequently extended to France and Germany.

The richness of the Arabian territory and commerce in vegetable products possessing medicinal properties, the nomadic character of some of the Arab tribes, and their commercial intercourse with many nations, no doubt promoted the encouragement of the study and practice of medicine among them; for there is no better passport for travellers among half civilized people than a knowledge of the means of treating human ailments, and relieving the sufferings of disease.

During the 13th, 14th, and 15th centuries, apothecaries' shops or dispensaries were established in most of the large cities in France and Germany, and these in the first instance were often supported at the public expense. But nothing of that sort existed as yet in England.

So late as the beginning of the 16th century, the preparation and dispensing of medicines in this country was exclusively in the hands of the physicians, who generally kept assistants as the apothecaries do now, for the purpose of preparing the medicines they prescribed. In process of time some of these assistants commenced business on their own account as apothecaries, while at the same time the physicians began to relinquish the practice of supplying medicines to their patients, and sent their prescriptions, or bills as they were called, to be dispensed by the apothecaries.

But although pharmacy had not at this time been separated from the practice of medicine in this country, excepting to the small extent to which a few physicians' assistants had established themselves as dispensing apothecaries, it is obvious that both the physicians and the apothecaries must have obtained the drugs they used in preparing their medicines through some regular commercial channel; and the question naturally arises, How, and by whom was the commerce of drugs conducted? We find an answer to this question in a small work, entitled "Short answers to Tentamen Medicinale," published in 1704, where it is stated that at the beginning of the 17th century, "what drugs and medicines were then in use were sold in common by the grocers; and as for the preparing and compounding of them, *that* the physicians principally took charge of themselves."

There is reason to believe, however, that the grocers dealt only in such drugs as came from abroad; many of which, being imported with articles of grocery, and some of them, such as spices, being used in the preparation of food as well as medicine, naturally passed through their hands, at a time when there were no special dealers in drugs.

After some time those grocers who had devoted most attention to drugs, confined themselves principally to that department of commerce, and from being drug-grocers took the name of druggists.

But there was still another class of dealers in drugs, namely, the simplers or herbalists, who collected and supplied the indigenous vegetable substances used in medicine.

The connection of the grocers of those days with the commerce of drugs, and also the origin of the class of dealers who were first called druggists, are clearly indicated by the manner in which the grocers and apothecaries became associated, just as the barbers and surgeons had been.

In the beginning of the 17th century (1606), the grocers of London were incorporated into a company with the then existing apothecaries, of whom there were but few; and soon afterwards, in 1617, when the number of apothecaries had no doubt increased, that partnership was dissolved and a new company, the Apothecaries' Company, formed, by adding to the apothecaries a few of those grocers who were best acquainted with drugs, and thus making up the number to 114. This number corresponded with that of the physicians then practising in London, so that there was a dispensing apothecary for every physician.

The incorporated apothecaries, to whom the dispensing of medicines was transferred by the physicians, became a prosperous body. In 1623 the company opened an establishment in Blackfriars for preparing and compounding the medicines used by its members. This was commenced on a small scale, but in 1671 it acquired a much more important character by the addition of a chemical laboratory, which afforded the necessary means for the production of chemical as well as galenical medicines. The establishment still exists as the Apothecaries' Hall of London, where medicines are supplied, wholesale and retail, as they were 200 years ago, but with this difference, that it is now a dispensing establishment, which it was not then. The addition of the dispensing department has been made within my recollection.

By the end of the 17th century the number of apothecaries had increased from 114 to nearly 1000 ; and as they had now united prescribing with dispensing, they became formidable rivals of the physicians.

This rivalry is supposed to have originated an important undertaking by the physicians, who, finding that their former dispensing assistants, instead of adhering to their legitimate duties, were now competing with them for the medical treatment of patients, were anxious to provide some other means of getting their prescriptions dispensed than by sending them to the apothecaries.

Accordingly, the leading physicians of London, including the President, Censors, most of the elects, and other members of the College, subscribed a fund for, and otherwise promoted, the establishment of dispensaries ; ostensibly for supplying cheap and good medicines to the poor, but practically, as it appeared, for dispensing generally the prescriptions supplied by the physicians to their patients. There were three of these dispensaries established in London, and they were looked upon as rival establishments to those of the apothecaries. Much acrimonious controversy took place between the physicians and apothecaries respecting these dispensaries, and with reference to the practice which the apothecaries now freely indulged in of prescribing and visiting patients. Each party accused the other of engaging in occupations which did not properly belong to it—the apothecaries were accused of interfering with the legitimate province of the physicians, and the physicians of practically engaging in trade.

At this time—rather less than two hundred years ago—no such body of men as that which has since arisen, with the occupation and title of chemist and druggist, existed. There were the simplers, or herbalists, who collected and supplied indigenous medicinal plants ; the drug-grocers and druggists, who dealt in drugs as imported ; the chemists, or alchemists, who made and supplied such chemicals as were then used in medicine ; the apothecaries, who, from having been the physicians' assistants, made a fair start on their own account as dealers in drugs and compounders and dispensers of medicines, but who, imitating their late employers in giving advice and visiting patients, became the rivals of those who should have been their patrons ; then there were physicians who still supplied their own medicines, and there were also many, and these an increasing number, who, having relinquished that practice, were interested in having suitable provision made for the dispensing of their prescriptions.

It may be well here to consider what was the nature of the medicines principally prescribed in those days.

Until the 16th century chemistry had scarcely contributed anything to medicine. As a science, indeed, chemistry had not yet come into existence, yet there were certain results obtained in the arts through chemical agencies, and a limited number of chemical products were used in medicine.

But nearly all the medicines on which reliance was placed were natural products derived from the animal, vegetable, or mineral kingdoms, but chiefly from the two former ; and these were prepared and compounded according to a system of profuse complication, which obscured if it did not obstruct the action of the individual agents employed.

We may judge of the pharmacy of the 16th and 17th centuries by referring to the early editions of the London Pharmacopœia, which commenced in 1618, and to the Dispensatories which preceded and accompanied that work.

We find here a very profuse Materia Medica. The London Pharmacopœia, for instance, contained no less than 1700 vegetable, 240 animal, and 260 mineral substances in the list of what we may call the crude drugs ordered. From these were prepared simple and compound powders, simple and compound waters, decoctions, vinegars, syrups, honeys, oxymels, lohochs, candies, conserves,. electuaries, pills, troches, oils, ointments, and plasters.

The class of electuaries appear to have comprised the preparations that were considered the most important. One of these, entitled "*Antidotus magna Matthioli adversus venena et pestem*," contained more than 150 ingredients, consisting of animal, vegetable, and mineral substances.

Among the electuaries we find the celebrated *Mithridatum Damocratis*, *Theriaca Andromachi*, and *Philonium Persicum* and *Londinense*, with a host of other complex mixtures bearing the high-sounding names of *Athanasia Mithridatum*, *Benedicta Laxativa*, *Caryocostinum*, *Diacorum*, *Diastyrion*, *Diacatholicon*, and I don't know how many more Dia's.

Now, although there was but little science, there was a good deal of labour involved in the preparation of these medicines, and it is no wonder that the physicians desired to be relieved of the work, and yet to see adequate provision made for having their "*prescriptions faithfully prepared.*"

Some of the drug-grocers, if they had been acquainted with medical Latin, might perhaps have been induced, from their knowledge of drugs, to undertake the compounding and dispensing of such medicines as were then principally ordered ; but there were symptoms of an approaching change in the nature of the remedies that would ere long be prescribed. Efforts had for some time been made to introduce a new class of medicines the production of which involved the exercise of chemical art.

In the 15th and 16th centuries, two great reformers, Basil Valentine and Paracelsus, had been trying to bring about a revolution in the practice of medicine, by substituting chemical remedies for the complex mixtures of animal and vegetable substances which had previously been used, and which were distinguished as Galenicals.

This was the commencement of a new era in pharmacy. For ages the chemical art had been cultivated almost exclusively with a view to the realization of two great objects of human ambition,—the discovery of the means of acquiring wealth, and of prolonging life ;—but hitherto nothing had come of it but the increased poverty and premature death of those who practised the art.

With a zeal and energy deserving of better success, but with a perverseness of purpose which entirely frustrated the attainment of the objects sought, the alchemists of the middle ages endeavoured to unlock the secrets of nature with a key of their own forging, instead of seeking nature's key by a course of inductive research.

It is difficult to say when the extraordinary infatuation of those alchemists commenced. Some of their followers have endeavoured to trace the belief in transmutation and the search for the philosopher's stone and elixir of life through a period extending to remote antiquity, commencing with the perhaps mythical *Hermes Trismegistus*, who is said to have lived 2000 years before Christ. But it is probable that most, if not all, of the writings on which the claims to this great antiquity for the doctrines of alchemy were founded, have no earlier origin or better authority than the Monks of the middle ages.

The earliest works on chemistry we have, that can be relied on as authentic, are those of Geber, an Arab, who lived in the 8th, and part of the 9th, century. He alludes to the seven metals, *gold*, *silver*, *mercury*, *copper*, *tin*, *iron*, and *lead*, which were known from a very early date. He regarded all these except *mercury* as compounds of *mercury* with *sulphur* in different proportions. Gold and silver he considered the most perfect metals, into which the others could be converted by purifying their constituents and uniting them in different proportions. He describes the production of *nitric acid* and *aqua regia*, *caustic potash* and *sal ammoniac*, *corrosive sublimate*, *red precipitate*, and *milk of sulphur*. In fact all the chemistry that was known for many centuries afterwards was known to Geber. The alchemists who followed him, instead of extending chemical knowledge, confined their efforts almost exclusively to the search after the means of producing gold and a panacea for all diseases, including that of old age.

Albertus Magnus, Raymond Lully, and Roger Bacon, were alchemists of the 12th and 13th centuries. Even in the 15th century the belief in the power of alchemy was such, that a law was passed in this country in 1404 prohibiting the making of gold and silver, from a fear of the power it would give to those who practised the art. Half a century later, Henry VI, in a more liberal spirit, granted patents for the discovery of the philosopher's stone, which was to turn base metals into gold ; in fact the king was well advised, for the patents enriched *his coffers* much more than those of the pretended discoverers.

Faith in the power of the alchemists was now evidently on the wane. Basil Valentine and Paracelsus were satisfied to study the effects of the baser metals, and to treat diseases with these and other chemical substances. Valentine was the great champion of antimony, which was afterwards alternately vaunted as a blessing or condemned as a curse through two centuries or more. In his '*Currus Triumphalis Antimonii*' Valentine includes antimony as one of the wonders of the world ; but it was soon afterwards condemned as a dangerous poison, and in 1566 a decree of the French Parliament prohibited its use in medicine. In 1609 a physician in Paris was expelled from the faculty for administering it, but in 1637 antimonial wine was admitted into the '*Antidotarium*,' the work referred to by French pharmacists prior to the publication of the Codex. It was much employed about 1650, although many medical men still considered it a poison and strongly objected to its use. In 1666 the French doctors assembled, to the number of 102, to decide upon the merits of antimony, and 92 voted in its favour ; upon which its use was authorized by the Parliament.

Among the forms in which antimony was used as a remedial agent were those of pills and cups, made of metallic antimony, alloyed with a little tin, the alloy being probably intended to promote, or, at any rate, having the effect of promoting, a galvanic and more powerful chemical action in contact with acid wine, or the contents of the stomach. There is an interesting specimen of an ancient *antimony cup* in the Museum of Practical Geology, in Jermyn Street, London, of which I exhibit an enlarged drawing. Wine allowed to stand for a few hours in one of these cups dissolved some of the metal, and acquired, or was supposed to acquire, the property referred to in the German inscription, which says—

Thou art a wonder of Nature,
And to all men a certain cure.

Antimony cups, and the everlasting pill of antimony, were convenient forms for administration at a time when the use of antimonial preparations was prohibited by law.

Calomel was not introduced into medical practice until the beginning of the 17th century, shortly before the publication of the first London Pharmacopœia, in which there were two processes given for its preparation—one by sublimation and another by precipitation. It was but very slowly that chemical medicines were adopted, but still they were gradually increasing and it became necessary to provide for their production. The drug-grocers were quite unequal to this duty, which was performed by a distinct class, who called themselves chemists, and who, in the 17th century as far as we can judge, were strongly tinctured with the spirit and doctrines of the Hermetic or secret art of alchemy. An advertisement or prospectus of a chemical establishment in London, in 1686, runs as follows :—

"Gaza Chymica.

"A magazine or storehouse of choice chymical medicines, faithfully prepared in my laboratory, at the sign of Hermes Trismegistus, in Watlin Street, London, by me, George Wilson, Phylo-Chym."

It was the common practice, about the period we are referring to, for establishments of this kind to have special signs over the door, as public houses have now. The sign of George Wilson's establishment was *Hermes Trismegistus*, the celebrated oracle of the alchemists, whose effigy we have here, as found in the Temple of Pseleis. The chemical art, as practised by the alchemists, was often called the *Hermetic*, or *secret art*, profound secrecy having been enjoined upon those engaged in the search after the philosopher's stone. Important products were often sealed with the seal of Hermes, as it was called, which was supposed to render the secret of their production inviolable ; and hence superstitious value was attached to substances bearing this seal—a value often required to compensate for intrinsic worthlessness. We retain some vestiges of this practice in the *Terra Lemnia* and *Terra Sigillata*, or *sealed earth*, which is still ordered in the Paris Codex, and we continue to use the term *Hermetically sealed* to represent the most complete cutting off of communication with the outer world that we can effect, as by the fusion of the open end of a glass tube.

An establishment somewhat similar to that of the Gaza Chymica of George Wilson existed at an early period in the Poultry, with the sign of *Bell and the Dragon* over the door. The late Mr. Richard Phillips, whose name is so intimately associated with the London Pharmacopœia, was, I believe, originally connected with this house.

But perhaps the most celebrated of the houses of this class was that which was established in Southampton Street, Covent Garden, in 1680, by Ambrose Godfrey Hanckwitz, the German assistant of the Hon. Robert Boyle, an eminent philosopher and chemist of the 17th century. Mr. Boyle's laboratory was situated at the back of Southampton Street, and here the first practically successful processes for the manufacture, on a commercial scale, of ether and phosphorus were conducted by Godfrey Hanckwitz, who shortly afterwards opened a shop, with the sign of *The Phœnix*, in an adjoining house in Southampton Street, which became celebrated as that of Godfrey and Cooke, the name of Hanckwitz having been dropped and that of Godfrey used.

An original advertisement of this house serves to throw light upon the state of pharmacy at the latter end of the 17th and beginning the 18th century. It runs thus—

"Ambrose Godfrey Hanckwitz, Chemist in London, Southampton Street, Covent Garden, continues faithfully to prepare all sorts of remedies, chemical and galenic. He hopes that his friends will continue their favours. Good cordials can be procured at his establishment, as well as Royal English drops, and other articles, such as Powders of Kent, Zell, and Contrajerva, Cordial red powder, Gaskoins powder, with and without bezoar, English smelling salts, true Glaubers salt, Epsom salt, and volatile salt of ammonia, stronger than the former. Human skull and hartshorn, essence of Ambergris, volatile essence of lavender, musk and citron, essence of viper, essence for the hair, vulnerary balsam, commendeur, balsam for apoplexy, red spirit of purgative cochliaria, spirit of white cochliaria, and others. Honey water, lavender water of two kinds, Queen of Hungary water, orange-flower water, and arquebusade.

"For the information of the curious, he is the only one in London who makes inflammable phosphorus which can be preserved in water. Phosphorus of Bolognian stone, flowers of phosphorus, black phosphorus, and that made with acid oil, and other varieties. All unadulterated. Every description of good drugs he sells, wholesale and retail.

"Solid phosphorus, wholesale, 50*s*. an ounce, and retail £3, sterling, the ounce."

Now, these are the earliest records we have of the existence of establishments of this kind in England, and observe that in neither of these cases is there any reference made to the dispensing of physicians' prescriptions. The chemists as well as the druggists were mere dealers in medicines and certain articles of perfumery, both simple and compound. The dispensing of medicines from prescriptions was as yet confined to the apothecaries, whose special duty it was, or ought to have been ; to the dispensaries, which had been established and were still supported by the physicians ; and to those physicians who continued to send out their own medicines.

It is interesting to trace the first appearance of a class of men professing to deal in chemical medicines—men who, like Mr. Godfrey, had laboratories with chemical furnaces and the means of conducting all sorts of chemical processes. Few men, in those days, were so favourably circumstanced in this respect as Mr. Godfrey, who had the advantage of commencing his career in the service of a distinguished and wealthy philosopher, by whom he was supplied with anything required for carrying out the scientific objects which he and his patron had in view. The interesting account published some years ago by Mr. Joseph Ince, explains the circumstances under which Godfrey commenced the building of furnaces and setting up of stills in Maiden lane, a narrow turning out of Southampton street, Covent Garden; where English smelling salts as well as phosphorus and ether were practically produced, and where Mr. Boyle received his scientific friends to witness the "marvellous lumen" as the newly discovered phosphorus was called. Here Godfrey and his successors continued to make smelling salts, for which they were celebrated, until, aristocratic London having migrated westward, they were fain to follow in the train; and Robert Boyle's laboratory, with its furnaces, after passing through an ignominious transformation into a potato warehouse, at length wholly disappeared, and is now, *Phœnix-like*, in the act of rising from its ashes as a *Catholic chapel*.

The Gaza Chymica in Watlin street, the chemical laboratory and shop in Southampton street, and the physicians' dispensaries in Warwick lane, at the back of Newgate, in St. Peter's Alley, Cornhill, and in St. Martin's lane, Westminster, appear to have started nearly at the same time, or at any rate they were all simultaneously in existence at the end of the 17th and beginning of the 18th century. I have no knowledge of the exact time at which the physicians gave up their dispensaries; but it has been suggested that their doing so in the 18th century, caused the assistants who had been previously employed in those establishments to commence business as chemists and druggists, and to engage as such in the dispensing of medicines, an occupation to which they had been thoroughly trained.

Several important changes occurred through the 18th century in connection with the practice of medicine and pharmacy. At the commencement of this century the elements of an improved organization were discernible among the means provided, but as yet but imperfectly developed, for the administration of medicine. The more prominent appearance of men professing a knowledge of chemistry, among those who dealt in medicines, was a significant fact. Those who previously, from being druggrocers, had adopted the title of druggist, now assumed the more comprehensive title of chemist and druggist. Improvements were effected in the London Pharmacopœia which indicated an advancement in the qualifications, not only of those who were practising medicine but of those also who produced medicinal compounds, galenical as well as chemical, and by whom improved processes were devised and introduced. The first step towards a really scientific improvement in the Pharmacopœia was taken in preparing the edition of 1721, when the botanical names of the plants yielding articles of the 'Materia Medica' were given. This was followed by further and more extensive improvements in the edition of 1746. A better system of prescribing than had previously prevailed was now beginning to be adopted. The College, in their preface to the Pharmacopœia of 1746, say:—

"It were certainly a disgrace and just reproach if pharmacy should any longer abound with those inartificial and irregular mixtures, which the ignorance of the first ages introduced and the perpetual fear and jealousies of poisons enforced; against which the ancients endlessly busied themselves in the search of antidotes, which for the most part they superstitiously and dotingly derived from oracles, dreams, and astrological fancies; and, vainly hoping to frame compositions that might singly prevail against every species of poison, they amassed together whatever they had imagined to be endowed with alexipharmic powers. By this procedure the simplicity of physic was lost, and a wantonness in mixing, enlarging, and accumulating, took place which has continued even to our times."

We could say nothing more to the purpose than this, even in the present day, after the experience of another century and a quarter. Important changes were made in the formulæ inserted in the Pharmacopœia of 1746, and these may be said to have originated and formed the bases of the preparations which have chiefly been used in medicine from that day to the present. Two of the old complex formulæ, however, were retained, namely, those for Confectio Damocratis or Mithridate, and Theriaca Andromachi, or Venice treacle. These preparations were still important items in the stock of every dispensing establishment, and we cannot say much against the London College of Physicians of 1746 for retaining those formulæ when we find that the existing French Codex, published in 1866, has a formula for the same *Theriaca* with 59 *ingredients*, including *dried vipers*, *agaric* and *Terra Sigillata*.

In 1723, increased powers were given to the College of Physicians to examine the medicines sold by apothecaries and others, and to destroy such as were found to be adulterated or otherwise defective.

In 1748, increased powers were also given to the Apothecaries' Company, who were empowered by charter to examine and license those who should practise as apothecaries in and within seven miles of London; and this license was understood to apply to the sale of compound medicines and the preparation of physicians' prescriptions, so that the apothecaries under this charter claimed the exclusive right to practise pharmacy, that is to compound and dispense medicines in London—a claim, however, which they failed to substantiate against the rapidly increasing class of chemists and druggists.

The apothecaries and chemists were now beginning to tread on each other's toes, and many complaints were expressed, especially by the former.

An association of apothecaries was formed in 1793 for the purpose of investigating the cause of evils which were said to exist, and from reports published by this association we are enabled to ascertain some of the facts of the case.

We are told that the druggists were a body of men unknown to the world until about the end of the 17th century; that towards the end of the 18th century those who called themselves chemists and druggists had encroached upon the province of the apothecaries, by vending pharmaceutical preparations and dispensing physician's prescriptions, for which they were very imperfectly qualified.

The association instituted inquiries throughout the country, and found that in many towns the number of chemists and druggists had increased four-fold in ten or twelve years. They declared this spread of a new class of traders, usurping the functions of the apothecaries, to be a "morbific infection—that it began at the capital as a central point, but diffused its deadly breath from thence to all the larger cities and towns throughout the kingdom. Nor stopped the contagion here: from the larger cities and towns it was beheld propagating itself to smaller cities and towns; till, at length, so general was the disease, that there was scarcely to be found a village or hamlet without a village or hamlet druggist, and if the sale of medicines and the giving of advice was not sufficient to support the vendor, he added to his own occupation the sale of mops, brooms, bacon, butter, and a thousand such articles besides."

An attempt was made to induce the legislature to stop this infectious disease, but it failed. The promoters of the movement, the apothecaries, were themselves no better qualified for the duties they were undertaking as medical practitioners than were the druggists as pharmacists.

The requirements of the public called both classes into

existence, and it remained for the process of "natural selection" to develop the characters of the respective species. After a contest of many years, *the Apothecaries' Act of* 1815 defined the qualifications of one class, and *the Pharmacy Acts of* 1851 *and* 1868 settled those of the other class.

Now, the question I wish to ask here is this, What progress has pharmacy made in the last century, and to whom are we indebted for it? That pharmacy has advanced, that better and more reliable forms of medicine are used now than was formerly the case, that the art exercised in their production is more highly cultivated, and that science is more successfully applied in guiding the exercise of the art, are, I think, facts beyond dispute.

In the improvements thus effected, the tendency has been to simplify the composition of remedial agents, and at the same time to obtain them in a more definite and concentrated state. By the application of chemistry the active constituents of natural products have been isolated, and new and active chemical compounds have been produced, which are among the most valuable of the agents employed by the physician in the treatment of disease.

It cannot, I think, be said that it is to the apothecaries we are indebted for these improvements. We are indebted to them for much of the prosperity which has marked the past career of the body to which we belong, but I must say they have done little towards advancing the art and science of pharmacy.

We have benefited from the profuse system of medicine-taking which resulted from the practice of paying the doctor in the price of his physic, and which induced people to think that it was necessary to attack a disease with a battery of physic bottles, just as we should attack a town with a battery of guns; but that system has had its day, and like many false systems it has produced a revulsion from which we are now suffering to some extent.

We cannot even say that it is wholly or chiefly to the chemists and druggists that we are indebted for the improvements of the past century in pharmacy. Mostly we are indebted to their representatives abroad, to those who although called apothecaries, have retained the true type of the pharmacist; and to a considerable extent also we are indebted to distinguished members of the highest branch of the medical profession,—to men who, like Sir Robert Christison, Dr. Pereira, and Anthony Todd Thomson, have cultivated the art of pharmacy, *con amore*, and have enriched our knowledge of medicines with the results of their investigations and labours.

By these means the pharmacy of this country has, I venture to say, been put on a footing of at least equality with that of any other country. You may, perhaps, think I am rather inconsistent in saying this, after giving so much of the credit for past improvements to our continental brethren; but the fact is that much of the improvement I have alluded to had been effected before our pharmacists had been trained, and were prepared, to perform their share of the work; and the principal credit therefore to which they are entitled is for recognizing, appreciating, and adopting the results of the good work done by others, and sifting out from among it that which is worthless and ought to be discarded.

But are we satisfied—have we reason to be satisfied,—with our position and prospects?

Our position is very different from that of the pharmacists, whatever they were then called, of a hundred, and still more of those of two hundred, years ago. The art of pharmacy no longer consists, as it did then, in beating some thousand or more of natural products to powder in a mortar, and then mixing them in various forms, to be administered to unfortunate patients, morning, noon, and night, as if it were their natural food.

The drug-grinder, the wholesale druggist, and the manufacturing chemist, have relieved the pharmacist of that and other parts of the duties involved in the preparation of medicines; but at the same time they have relieved him of some of the profits of his occupation, and the changes to which I have alluded, in the nature of the medicines used and the mode of using them, have still further operated in the same direction.

If we compare the pharmacy of this with that of past centuries, we may say of them that the pharmacy of the 18th century,—that of the old-fashioned apothecary,—was represented by draughts and mixtures, clysters and boluses, administered "*ad plenum et ad nauseam*," with returns and profits, nevertheless, that make our mouth water;—while the pharmacy of the 19th century, is that of the chemist, represented by active proximate principles, concentrated drops, and varnished pills, administered *ad minimum*, with returns and profits in proportion.

And now, if I may venture to speculate with reference to the future, and to suggest a pharmacy for the next century, I would say, Let us seek to give it a new character, in which neither the repulsiveness of the old nor the great concentration of more modern forms of medicine shall prevail.

The course we have hitherto pursued has been right as far as it goes, and we have not yet got to the end of it. We are patiently pursuing the analytical system, and physiologists are testing the effects of isolated agents individually and separately. All this is important and necessary, but it is but the stepping-stone, as I believe, to what will be the result of the final application of the knowledge we are thus acquiring. Nature does not work with isolated agents. All her results are produced by a concurrence of forces, and often by indirect means.

Now, do we sufficiently consult nature with reference to medicinal agents,—that is, as to the forms in which they are administered? We take great pains to consult her about our food, and find that our labours in that direction are not thrown away. Is it not perfectly true that the nutritive value of food is increased by the manner in which it is prepared?—not by isolating its constituents, but by judiciously combining them,—not by simplifying, but by complicating its composition, appealing and ever appealing to nature for her appreciation of results as expressed by all our senses? Thus we attain to perfection, or as near it as we can, in the preparation of food, and why not also—at least as far as the application of the principle is concerned—in the preparation of medicines? If it be the right principle in dietetics, why is it not so in therapeutics? Can we fix upon the exact point where one ends and the other begins, or show that the mode of action in one case is essentially different from that of the other?

I am not assuming that we should be able to make medicine absolutely attractive, but merely contending that we should make it as little repulsive as possible; and when we have attained to this result we may hope to find the use of medicines become popular again, and the pursuit of pharmacy worth following.

And now, in conclusion, allow me to refer again to three emblems which appear to have been used—and two of them frequently used—by those engaged in the practice of pharmacy.

In the first place we have—

Hermes Trismegistus, the oracle of the alchemists, and the emblem of the *Secret Art*, in which *ignorance is shrouded in obscurity*. This has been the emblem of some of our ancestors, but it must not be ours.

Then, in the next place, we have—

Bell and the Dragon—the dragon that destroys the last vestiges of the evil influences of the Hermetic art, and the bell, that with open mouth proclaims the means of alleviating the sufferings of disease. This rightly follows the preceding emblem, and its adoption has, in many instances, been fairly and fully justified.

And lastly, we have *the Phœnix*, which has been more generally used than either of the others; which represents not inappropriately the pharmacy of the present time and may, I hope, be still more appropriately adopted hereafter as the emblem of a system of pharmacy rising from the ashes of that which, being secret, deceptive, and worthless, has

been destroyed and replaced, like the laboratory of old Ambrose Godfrey, by an institution truly Catholic in its character, diffusing its blessings and benefits to all men, not excepting its ministers.

At the conclusion of the lecture, after a hearty vote of thanks had been accorded to Dr. Redwood, the chairman announced that Mr. Thomas Hyde Hills, the President of the Pharmaceutical Society, had been so kind as to place in the hands of the Council a sum of money which he desired should be expended in providing prizes for the pupils of the Association. Mr. Schacht, in acknowledging, on behalf of the Association, Mr. Hills' generosity, which seemed, he said, to be exercised on every possible occasion, remarked that it was especially gratifying on account of the testimony it afforded that their efforts in Bristol were viewed with interest and sympathy by those far removed from them. That would not fail to be an encouragement to them in the future. There probably would be no occasion to avail themselves of Mr. Hills' gift that session—then nearly at an end—inasmuch as the Council had already, as they were aware, provided for a scheme of prizes which at that period it would be desirable not to disturb; but the Council would take care, when new arrangements came to be made, that the best possible use should be made of the money entrusted to them. Meanwhile he would, with their consent, ask Professor Redwood to convey to Mr. Hills their very hearty thanks for his kind thought of them.

The President's remarks met with a cordial response, and a very satisfactory and successful course of monthly evening meetings was brought to a close.

LIVERPOOL CHEMISTS' ASSOCIATION.

The twelfth General Meeting of this Association was held at the Royal Institution, on Thursday evening, April 9th, 1874.

The following gentlemen were elected members of the Association: Messrs. John Horn, junior, and R. P. Sorty.

Mr. Abraham made mention of the death of Mr. Deane, of Clapham.

The following donations were announced: The current Nos. of the Pharmaceutical Journal; Transactions of the Historic Society of Lancashire and Cheshire; Annual Report, 1871, of the Board of Regents of the Smithoonian Institution; 2 copies of the additions to the British Pharmacopœia of 1867, and specimens having relation thereto, from Messrs. Evans, Sons, and Co., per Mr. Mason.

Mr. A. H. Mason, F.C.S., introduced the discussion for the evening, viz., on "Some notes on the 1874 additions to the British Pharmacopœia of 1867," in which he described the chemical and pharmaceutical preparations which have recently been made officinal.

In the discussion that followed the reading of this paper, Dr. Charles Symes said that not more frequently than once in 10 years is it thought desirable to publish a new edition of the Pharmacopœia; but during the interim a number of new remedies are introduced, and some of them have at least the merit of deserving an extended trial. In order that such trials might be made in a satisfactory manner, it was desirable that there should be some recognized standard of strength and character; and he was pleased when he understood that the Medical Council had decided to publish an appendix, a kind of secondary list, intermediately between the editions of the Pharmacopœia. He did not expect to find anything *very* new in the work, as that would frustrate its object. He simply expected to find that many remedial agents with which from almost daily use they had become familiar, and which, either from their non-existence or want of importance in 1867, were not included in the Pharmacopœia of that date, would now be brought forward in a definite form. He thought also that what had been written and said as to their merits, and the best manner of preparing the same, would receive due consideration. But the result was the meagre list before them, of which at least one-third was destined to speedy oblivion. It opens with Acetic Ether as an *internal* remedy, rarely prescribed *as such* in this country, and areca nut, which, though familiar as an anthelmintic for dogs, is a stranger in prescriptions. Injectio morphiæ hypodermica—a solution of acetate of morphia—why the acetate, if that salt is not sufficiently definite to admit of its being used in simple solution, especially as the united testimony of medical men and pharmacists go to prove that a solution of the sulphate is at once the most efficient and permanent preparation. Time alone could prove whether liquor magnesiæ citras will keep, if prepared *precisely according to the formula given*; Dr. Symes thought not. His experience went to show that about the worst form for pepsine possible had been chosen as regards its medicinal value, and the process for its preparation was exceeding crude, and the product disgusting. Pulvis glycyrrhizæ comp. had become popular with practitioner and patient, as *Prussian liquorice powder*; why not have adopted the Prussian formula? the one adopted is not even the ghost of it. He had already seen more than one prescription bearing the word *Prussian* underlined when ordering this remedy. Soap suppositories had too frequently proved a failure to have any right to introduction into even a tertiary list; the addition of glycerine might prevent them from hardening to the extent they otherwise would do, but in his opinion they were usurpers.

Then tinct. aurantii recentis was to be prepared with *rectified spirit*, which did not admit of a reason, much less an argument. Finally, this small book, with all its imperfections, is no secondary list—but essentially a part of our pharmacopœia—and, Dr. Symes presumes, stamped with its full authority.

Mr. John Abraham then made some remarks on the subject, and was to have read a paper on "Commercial Pepsine and its relation to the Pepsine of the Pharmacopœia," but Mr. Mason's paper having taken up so much time, it was thought advisable to postpone it to the next meeting; and after a vote of thanks had been presented to Mr. Mason for his paper, the meeting terminated.

MANCHESTER CHEMISTS' ASSISTANT'S ASSOCIATION.

The last ordinary meeting of the session of the above was held April 13th, 1874, the President in the chair. Mr. L. Siebold (Lecturer to the Manchester School of Pharmacy) delivered a most interesting and explanatory lecture on the "Constitution of Organic Bases," with particular reference to the artificial alkaloids, concluding with brief reference to organic analysis. A most hearty vote of thanks was accorded the lecturer for his kindness in being present and for delivering so instructive a lecture. Mr. Siebold thanked the students for the attention they had given, and stated that he always felt a vast amount of pleasure in being amongst them, remarking that it would have been very difficult some twenty years ago to have called together such a number of young men to listen to a lecture on Organic Chemistry, but he was now glad to find that such a state of indifference belonged to the past.

CHEMISTS AND DRUGGISTS' ASSOCIATION OF IRELAND.

The Pharmacy Bill for Ireland.

A special meeting of the Chemists and Druggists' Association of Ireland, was held at the Society's rooms, Molesworth street, on Monday evening, April 20th, for the purpose of considering the Pharmacy Bill proposed by the College of Physicians, Mr. E. M. Hodgson, President, in the chair.

The chairman said that the meeting was called for the purpose of considering how the interests of the trade would be affected by the proposed bill, and whether it

would be to their interest, as a body, to accept the bill as proposed, or to aid the Apothecaries' Hall in passing a measure prepared by them for a similar purpose. He believed the Apothecaries' Bill would best meet their views. Considerable discussion took place, Mr. Holmes urging the extension of the English Pharmacy Act to Ireland. Professor Tichborne strongly urged co-operation with the Apothecaries' Company, believing their bill would best suit the interests of the Society. It was ultimately agreed that a deputation should wait on the Apothecaries' Company to discuss the matter. The following deputation was proposed :—

Mr. Hodgson, President ; Mr. Hayes, Hon. Sec. ; Mr. Goodwin, Treasurer ; Mr. Grindly, and Mr. Simpson.

Mr. Simpson proposed the addition of the following names :—

Mr. L. Erson, J.P., and Mr. J. T. Holmes, which was agreed to.

HULL CHEMISTS' ASSOCIATION.

Mr. Henry J. Parson, the teacher of the Chemistry and Materia Medica classes in connection with the above Association, writes to say that the last paragraph referring to his report on p. 842, should read as follows :—"In the latter (Materia Medica) the competitors failed to obtain sufficient marks for the prize. He was pleased with Mr. Padley's work, who competed for the Junior Chemistry prize, and recommended him as deserving some reward."

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

The Juries Bill.

On Wednesday last, April 22, Mr. Lopes proposed the second reading of his bill for the reform of the jury system, which, he explained, was substantially the same as the one introduced by the late Government. The main provisions of the measure comprised the increase of the area of choice, the creation of a lodger qualification both for common and special juries, the extension of the liability to serve from 60 up to the age of 65 years, and that all summonses should pass through the post, to avoid bringing the summoning officer in contact with the juryman. Further, it proposed to retain twelve as the number of the jury in criminal cases, but that seven should be the number in civil cases, to be increased to twelve at the instance of either of the parties concerned. Moreover, it would continue the unanimous verdict, the necessity for which would be enhanced by the reduction in the number of the jury, assimilate the qualification in places with limited jurisdiction to that in counties, and, in case of the death or sudden illness of any member or members of a panel, authorize the presiding judge to go on with the trial, provided that where the jury numbered twelve it was not reduced below nine, or if seven was not reduced below five. Lastly, as to payment, the special juror would be paid the guinea for every case he tried, as at present, and the common juror 5*s*.

Mr. Young gave a general support to the bill, but intimated that in committee he should move the omission of the clause requiring unanimity, and the substitution of a majority clause.

Mr. Gregory thought that the present number of twelve ought to be generally retained, in which opinion Mr. Watkin Williams concurred ; but Sir J. Eardley Wilmot, on the other hand, had come to the conclusion that in civil cases the smaller number might fairly be tried, whilst he would adhere to twelve in criminal cases.

Sir H. James hoped that the Government would accept this amongst the other legacies left them by their predecessors in office.

The Attorney-General hoped to be able, before the Bill went into committee, to state whether he could adopt it as a Government measure ; at any rate, he should be prepared to give every assistance in his power to make it as perfect as possible.

Mr. Russell Gurney (Recorder) assented to the principle of taking the verdict of a majority in civil cases, the judge to have power to grant a new trial if dissatisfied with the verdict. As to the reduction in the number, he did not see that it was desirable in all cases to retain the number of twelve ; for the jury had not the same opportunity of consulting together, and a reduced number would impart increased sense of responsibility.

Mr. Secretary Cross tendered to Mr. Lopes the thanks of the Government for the pains he had taken with the subject, and the care with which the bill had been drawn. He hoped to see it in its present or amended shape passed into law this session. The bill was thereupon read a second time.

The Pharmaceutical Society *v.* T. Clarkson.

In this case, brought in the Sheffield County Court to recover a penalty of £5 incurred by using the name of "druggist" contrary to the provisions of the Pharmacy Act, the defendant's attorneys, prior to the day appointed for the trial, paid into Court the £5 sued for, and the costs.

Poisoning by Aconite.

On Thursday, April 16, an adjourned inquest was held by Mr. Wm. Codd, Coroner for the Northern Division of the County of Essex, at Elmstead, to inquire into the circumstances attending the death of Henry Gilbert, a labourer, aged 51, who died after taking some medicine supplied to him by Mr. Webster, a medical botanist, of East Hill, Colchester. On a previous occasion Mr. Squire, surgeon, of Wyvenhoe, stated that after a *post-mortem* examination he was unable satisfactorily to account for the death, and the inquiry was adjourned to allow time for an analysis of the contents of the stomach to be made.

The Coroner having received from Mr. Squire Dr. Tidy's report of the analysis, he read it to the jury as follows :—

"Report on the Analysis of Viscera received from Police-Constable Joyce, March 27th, 1874, at the Laboratory of the London Medical College. Also a bottle of mixture, labelled '*The Mixture: one tablespoonful to be taken an hour after every meal. W. P. Webster, Medical Dispensary, Colchester.*'

"The bottle and jars were securely sealed—the seals unbroken.

"I have carefully examined the mixture. The two principal ingredients were aconite and camphor. I am of opinion that there was sufficient aconite in the whole bottle to produce dangerous results, although I am unable to say that the amount of aconite in the dose ordered on the bottle (a tablespoonful) would be likely to cause death.

"I carefully examined the several viscera. There was nothing in the *post-mortem* appearances that need be specially noted, excepting the heart, which was large and excessively dilated. There were, moreover, evident signs of extensive valvular disease.

"I carefully examined the stomach for both mineral and vegetable poisons, and I found present a trace of aconite.

"I am of opinion that a very small dose of aconite may cause death under the circumstances of the extensive heart disease that existed, but I scarcely think that the dose taken would have proved fatal in an ordinary case, or in a person of fair general health.

"I consider, therefore, death was due in this case to heart disease, accelerated by the aconite taken.

"C. Meymott Tidy, M.B., M.A.

"Lecturer on Chemistry and Professor of Medical Jurisprudence at the London Hospital; Medical Officer of Health for Islington; Public Analyst for the City of London, etc.

"*The Laboratory, London Hospital,*
"*10th April*, 1874."

The Coroner added that there was no doubt, as Dr. Tidy said, sufficient aconite in the whole bottle to produce dangerous results, but no man would be foolish enough to take a pint or a bottle of medicine for a dose. The question for the jury now to consider was whether, after this report, they thought it desirable to further prolong the inquiry. It seemed to him to be perfectly clear that the death of deceased was not due to an overdose of aconite. He would remind them that on the morning in question the poor fellow had walked eight or nine miles to his daughter's home, and on his arrival there he complained of feeling very bad. Then, the *post-mortem* examination revealed the fact that he had an enlarged heart, with extensive valvular disease. It followed, as a matter of course, that he was suffering from his heart; and it was therefore quite within the range of possibility that he might have died from that attack without the intervention of aconite, although not quite so soon. They must also bear in mind that, according to the statement deceased made to his daughter, he must have taken the medicine not later than half-past two o'clock, probably before, because at twenty minutes to three he returned to her and said he had been to Mr. Webster's for some medicine, and had taken a glass of it. At five o'clock he got into the carrier's cart, and then he complained of the symptoms which had been described (tingling of the flesh, swelling of the body, and vertigo); so that two hours and a half must have elapsed from the time of his taking the medicine till the symptoms showed themselves. It followed, therefore, that the dose could not have been very strong. He did not know whether the jury wished to hear any further evidence—he was ready to hear it if they wished—but he could not see, under the circumstances, that they would be any nearer the result than they were now. They could hear what Mr. Webster had to say, if that gentleman wished to be examined.

The Coroner (to Mr. Squire): Are you of the same opinion as Dr. Tidy as to the cause of death?

Mr. Squire: I am of the same opinion—that death resulted from the aconite acting upon a diseased and weakened, and dilated heart.

The Coroner: You are of the same opinion as Dr. Tidy?

Mr. Squire: Yes, I don't say an overdose.

The Coroner: Of course not.

A strong opinion was expressed by some of the jury that aconite ought not to have been administered without first ascertaining the patient's condition. It was urged, however, on behalf of Mr. Webster, that if deceased had been a sickly-looking man there would have been something in the point; but it was not to be supposed that a doctor examined every apparently strong and healthy man who went and asked for something for a cough or cold.

The Foreman asked how long Mr. Webster had been in practice, whether he had ever prescribed aconite before, and whether it had ever before been attended with serious consequences.

Mr. Webster said he had used it every day for the last five or six years.

After a long discussion the jury, upon retiring, failed to agree in a verdict; nine wishing to give a verdict in accordance with the medical testimony, and three one that death occurred from natural causes, without mentioning the use of aconite. Eventually the jury were discharged without giving a verdict.

Alleged Adulteration of Milk.

At the Greenwich Police Court, on Saturday, April 19th, Mr. Daniel Phillips, farmer and dairyman, of Lewisham, appeared to an adjourned summons, at the instance of the Lewisham Board of Works, charging him with selling, or causing to be sold, milk adulterated with water.—Mr. Edwards attended to prosecute, and Mr. Pook appeared for the defendant.—The case was first heard on the 21st ult., when a certificate from Dr. Heisch, Chemical Professor at the Middlesex Hospital, was produced, to the effect that a sample of milk, not being disputed as having been purchased of defendant's servant, was found upon analysis, to have had an admixture of over 25 per cent. of water. Upon this evidence the case had been adjourned in order that Dr. Heisch might personally attend as a witness, so as to admit of a cross-examination taking place as to the date the analysis was commenced and completed; it being shown in evidence that the milk analysed was purchased between three and four on the afternoon of the 24th February, when it was placed in a bottle and sealed, and delivered to Dr. Heisch the next day, his certificate not being dated till the 4th March. The contention was that unless the analysis of milk is commenced within six hours after being taken from the cow the test is uncertain; the defendant, who was examined as a witness in another case, stating that he had then a bottle, into which milk was drawn direct from the cow by himself and sealed. This milk had been standing in a place of rest twelve days, and there was at least 20 per cent. of whey or water perceptible, the rest being curds.

Dr. Heisch now attended, and before giving evidence said he had, on the previous evening, received a subpœna from the office of the defendant's solicitors, and, seeing it related to the present case, he took it for granted that it required his attendance, and had not read it. He was not, therefore, aware he was required to bring his books containing entries of the analysis then under investigation. He then stated that the milk upon which his certificate was based was handed to him at a quarter to five in the afternoon of the 25th of February, and that he then commenced the analysis, the different tests and results of which he detailed. He obtained the residuum from the milk on the 26th of February, and the analysis was completed certainly not later than the morning of the 27th. In making these analyses it was usual to arrive at a conclusion as to the extent of adulteration on an average of tests of good milk, but the conclusion arrived at in this case was taken on an average of the worst forms of milk that could be analysed, and he found it had been very much diluted with water, certainly fully 25 per cent.

Professor Attfield was called, and said he had heard the evidence of Dr. Heisch, and concurred in the conclusions he had stated. In answer to questions, he stated that there was no difficulty in the analysis of milk to tell the component parts of milks that contain water from that known as water coming "from the cow with the iron tail," nor was there any difficulty in analysing milk that had been taken from the cow thirty-six hours, unless placed in a warm place and it had become very bad. He had analysed milk ten days after its being taken from the cow, and had found no change in it, but in others of ten days the milk was so bad it could not be analysed.

Mr. Pook said the defendant was the owner of 400 cows; and, holding many contracts, his character was of the greatest importance. It was true he had before been fined for a like offence—the adulteration being stated to be 8 per cent., but that, it was contended, was pure milk. He was prepared to call scientific witnesses, who would give evidence in the defendant's favour, among whom he mentioned the chief of the chemical laboratory department of St. Thomas's Hospital.

Mr. Balguy said this evidence would take up a great deal of time, and it was determined to again adjourn the case for a fortnight, to devote time specially to it.—*Standard.*

Review.

SKIN DISEASES: an Inquiry into their Parasitic Origin and Connection with Eye Affections; also the FUNGOID OR GERM THEORY OF CHOLERA. By JABEZ HOGG. London: Baillière, Tindal, and Cox. 1873.

The first impression produced on the reader of Mr. Hogg's treatise is an unfavourable one. His method is confused, his style not only inelegant but inaccurate, and his generalizations premature. He has been, however, at pains so obvious in collecting his materials, that the candid reviewer gives him the benefit and himself the trouble of a second perusal, with the result, we are sorry to say, of a confirmation of the first impression.

Having inured himself to such phrases as "the more deeper seated parts of the body" (p. 6); "the several functions of the skin *and which* are five-fold" (p. 9)—"the *dermis* or corium" (p. 10)—derma being the proper word, *vide* Dunglison's Lexicon; "the *quantative* and qualitative errors of the chemical composition of the different structures of the body" (p. 18.), etc., etc.—in other words, having got over the *stile*, we come to Mr. Hogg's theory, which is, as far as we can gather, the following: "there exists but one essential organism, a fungus whose spores find a soil common alike to the surface and the more secluded parts of the human or animal body; variations in skin diseases, associated with a parasitic growth, are due to differences in the constitution of the person affected; consequently it is neither correct nor desirable to separate and classify them as 'parasitic diseases of the skin.'" In other words, while the parasitic fungus is in all cases the same, the skin diseases it is associated with vary according to the constitution of the patient. This is a very old theory indeed; but its antiquity has neither given it acceptance nor prevented its being announced as a discovery by Mr. Jabez Hogg. The primordial identity of matter has been maintained by many philosophers—Huxley, with his protoplasm, being among the latest. The modification of matter in the individual, according as subjective conditions vary, was a truism almost as soon as it was truth.

"What," Mr. Hogg asks (p. 106), "has positively been made out with regard to the fungoid bodies in the production of disease? The most carefully conducted examinations have as yet produced only negative results. That most common form of disease in which fungoid bodies are found—Leptothrix—is known to arise from a neglected condition of the mouth and teeth, and is readily cured by a proper use of the tooth brush." This is a fair specimen of the looseness of Mr. Hogg's mode of reasoning and writing. He omits to tell us in what "a neglected condition of the mouth and teeth" consists. He seems to regard it, indeed, as a primary disease.

In the next page he tells us that fen-ague may be traced to accumulated and decaying animal matter. We had thought that the disease had been conclusively traced by M. Léon Colin, of the Val-de-grâce, to a telluric poisoning (*intoxication tellurique*), due to the absence of that vegetable matter which is the appropriate pabulum of the vegetative energy of the soil. But *n'importe*. The amount of enlightenment the reader has to get from Mr. Hogg's "Fungoid theory of disease" may be inferred from the following sentence, the last but two in his treatise: "If any one is determined to furnish a formula for cholera, he may take bad air, bad water, sewer emanations, floating stinks, *germs if you please*, bad ventilation, with perhaps a dozen or two more evils, which are all more or less concerned in originating the disease." Mr. Hogg subscribes to the maxim that "definition is dangerous" and makes his own elastic accordingly.

Obituary.

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

On the 13th April, 1874, Mr. James Hodge Byles, Pharmaceutical Chemist, of Hackney Road, London. Mr. Byles had been a member of the Pharmaceutical Society since 1842.

On the 19th February, 1874, Mr. David Howell, Chemist, at Camarthen, after a long and painful illness, aged 45 years. He served his apprenticeship to Mr. R. M. Davies, in the same town, with whom he lived some years afterwards as assistant. He then removed to Northampton, where he lived about two years with Messrs. Jeyes and Co.; after that he was several years in London, an assistant in the Apothecaries' Hall, and subsequently with Messrs. Savory and Moore. He also spent many years in Piccadilly, Manchester, first as assistant to Mr. Dymond, and afterwards to Mr. Pyne. He was also in business on his own account at Manchester for a short time, but failing health caused him to relinquish it and he took a voyage across the Atlantic in the hope of obtaining renewed health, but this was only realized in a small degree. He was of a kind, genial disposition, and was much esteemed.

On the 14th April, 1874, Mr. Edward Lister, Chemist and Druggist, of Cowbridge. A local paper says of him "The deceased gentleman, who died at the advanced age of 75, had carried on an extensive business for upwards of half a century in this town, and his loss will be deeply felt, not only by his nearest friends, but by those with whom he came in contact in his business capacity. The deceased gentlemen was by marriage related the Llewellyns, and nearly related to Lord Ribblesdale. He leaves one son, the Rev. E. Lister, of Newport, Mon., surviving."

On the 15th January, 1874, Mr. Edward Postill, Chemist and Druggist, of York.

On the 9th April, 1874, Mr. Samuel Pinder, Chemist and Druggist, of Laxton, Notts.

On the 21st April, 1874, Mr. John Croston, Chemist and Druggist, of Atherton, Lancashire.

Notes and Queries.

[391]. OINTMENT FOR MANGE.—If *L.* had occasion to try the ointment he refers to upon a dog, he would find it highly successful, in the following proportions:—

℞	Cer. Resinæ	℥j
	Flor. Sulph.	℥ss
	Ol. Junip.	℥iij

M.

I have seen it used in numerous cases with complete success, and I may add it is "refreshing not only to one," but to any mangy dog.

Hydrarg. sulph. flor. gr. iij may be given internally at the same time with advantage.—H.

[394]. PILL COATING.—*H. M. D.* would be glad if any one would kindly inform him of the best way to coat pills with a tasteless, pearly white coating. Treating with a saturated solution of *spent* Tolu in S.V.R., and afterwards roll in powdered French chalk has been tried, but not with good result. The pills by that process are contaminated by the odour and taste of the balsam; neither are they of the desired whiteness.—H. M. DAVIES, *Pontypool.*

JACOBI'S FOOD FOR INFANTS.—The following formula for a food for infants, recommended by Dr. Jacobi of New York, is quoted by the *British Medical Journal* from the *Ohio Clinic*. "Crack a teaspoonful of barley in a common coffee mill, then boil it fifteen minutes in a gill of water, adding a pinch of salt. Then strain, and, for a young child, add half as much cow's milk as

you have barley water, sweeten lightly with sugar, and whilst tepid feed from a nursing bottle. If the bowels be costive use oatmeal in the place of barley.

SOLUBILITY OF SUCCINIC ACID IN WATER.—M. E. Bourgoin, in a communication to the French Acadamy of Sciences (*Compt. Rend.*, lxxviii. 195), has recently reported the results of a series of experiments on the amount of pure succinic acid soluble in water at various temperatures. The method adopted up to 50° C. was to heat purified commercial succinic acid in distilled water by means of a water bath; allow the solution to cool slowly to the temperature desired, shake, and then test the acidity with baryta water. For temperatures above 50° the water was evaporated, and the residue weighed. The following were the quantities held in solution by 100 parts of water at different temperatures:—0° C., 2·88 parts; 8°·5 C., 4·22 parts; 14°·5 C., 5·14 parts; 27° C., 8·44 parts; 35°·5 C., 12·29 parts; 40°·5 C., 15·37 parts; 48° C., 20·28 parts; 78° C., 60·775 parts; boiling, 120·86 parts. Beyond 50° C., therefore, the solubility increases rapidly with the temperature.

Correspondence.

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

The Late Henry Deane.

Sir,—Is any movement likely to be made by the Chemists and Druggists, or by the Council, to secure for the Society some permanent remembrance of this distinguished pharmacist and honest man, in the shape of a portrait in oil, bust, scholarship, or in any other form? If so, I shall be glad, with many others with whom I have conversed, to subscribe towards raising a fund for the purpose.

FOUNDER.

The Benevolent Fund.

Sir,—I have read with great interest the correspondence relating to the Benevolent Fund. I quite agree with those who wish to have a good funded capital, and I also agree with those who wish to relieve as much distress as possible; consequently I think a good plan will be, in addition to my usual subscription of 10*s.* 6*d.*, to give a donation of like amount, the first to be funded, the second to be spent during the year. If others will follow my suggestion, I think the fund will derive more benefit than from any scheme which I have seen proposed.

THOMAS DAINES.

King William's Town, Cape Colony.
March 9th, 1874.

[*** We believe that for some years past benevolent members of the trade have volunteered subscriptions by which a fund has been placed in the hands of the Secretary for application by him in urgent cases.—ED. PH. J.]

The Analysis of Milk.

Sir,—Dr. Macadam, whose paper on milk you have published, affords an example of a kind of procedure which is not altogether unknown., viz., the putting forward of a set of experiments, and representing them as establishing the reverse of that which they really do.

Dr. Macadam has analysed 44 samples of milk, obtained from three dairies, and announces, as one of the results of his work, that the "Solids not fat" range from 8·74 per cent. to 11·23 per cent.

But on inspecting his figures it appears that the 8·74 stands quite alone, and that the high result also stands nearly alone. Inasmuch as these extremes are unsupported, and are not verified, they can only be looked upon as errors of experiment.

Rejecting the three extreme results—viz., 8·74, 11·23, and 10·79, as requiring confirmation, Dr. Macadam's work stands thus: he has analysed 41 samples of milk—sometimes the whole milk, and sometimes a fractional part of the milking—and finds, according to his analysis, the "solids not fat" ranging from 8·94 to 10·22. This result is obviously compatible with the real range being 9·3 to 10·0 (which is my proposition).

Should Dr. Macadam object to his single, unsupported, and unverified 8·74 being set down as an error of experiment, let him consider whether, if he had made 44 analyses of the same sample of milk, he would not most probably have at least once got a similar low result.

J. ALFRED WANKLYN.

117, *Charlotte Street, Fitzroy Square, W.*
April 14th, 1874.

Cocculus Indicus.

Sir,—Having noticed for some time the discussion carried on in your Journal in reference to Cocculus Indicus, and what became of it, I will, with your permission, take this opportunity of thanking your correspondent "Brunswick" for informing your readers of the ultimate destination of the large quantities of Cocculus imported, and thus relieving the brewers from the odium cast upon them in this matter. As a brewer I think I may safely venture to assert, without fear of contradiction, that not a single wholesale brewer in the country uses Cocculus Indicus *or any other adulterant.* There are those who use salt to precipitate the tannic acid contained in the hop, but this cannot come under the term adulteration.

It is the retail brewer, the keeper of the low public-house, who occasionally resorts to such practices, but this class of brewer is fast becoming extinct. The brewer who brews on a large scale, who has a properly constructed "brewing plant," and who practically and *scientifically* understands his business and gives it his attention, has no occasion to use anything else but good malt and good hops to ensure good ale.

T. B. ALLKINS,
Pharmaceutical Chemist.

Midland Brewery, Tamworth.

W. S. Wardle.—Apply by letter to Professor Bentley, 17, Bloomsbury Square.

"*Chemicus.*"—Mr. F. C. Hills, Manufacturing Chemist, Deptford, S.E., is the largest manufacturer in London. There are others at Birmingham.

J. B.—(1) American quinine is not imported. (2) About 50*s.* per oz. for large quantity. (3) Useless for pharmaceutical purposes; might be used in the arts as a flux.

"*Hydrargyrum.*"—PHARM. JOURN. [3] vol. iii., pp. 141 and 582, and the present volume, p. 79.

C. Warrior.—There is no law at present to prevent a registered chemist and druggist doing so.

W. H.—Dissolve the hypophosphite of soda in a portion of the water, and add the phosphoric acid to this solution. Mix the hydrochloric acid with the perchloride of iron, and dilute with the remainder of the water. On then mixing the two solutions the least precipitation of hypophosphite of iron will take place that is possible; but, of course, much will precipitate from such a mixture. Add the spirit of chloroform last.

J. F.—We have no doubt that the preparations are of the character you suppose.

C. P.—The graduates referred to have *no* legal statutory qualification.

S. E. Pritchard.—*Luzula sylvatica.*

W. A. W.—Your safest course would be to put the question to the authorities of the Inland Revenue Department.

"*Fair Play.*"—As a matter of expediency we do not share your opinions with regard to the evil you refer to, and as you will find on reference to the Journal of April 11th, we are disposed to think that it must be dealt with otherwise than by litigation. As regards one of the advertisements that you enclose, it is somewhat satisfactory to note that as it has appeared several times in the daily papers it does not seem to have met with very ready response.

"*Inquirer.*"—We imagine the preparations in question are seldom what they profess to be, and should not be used to produce the officinal infusions.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Gallais and Co., J. E. Moore, Evan Evans, Pickard, C. R. Blackett, Dr. De Vrij, Botanist, 806.

ANALYSIS OF SOME CINCHONA BARKS CULTIVATED AT OOTACAMUND.

BY DR. J. E. DE VRIJ.

In the PHARMACEUTICAL JOURNAL for September 6th, 1873, I published the results of my analysis of a part of the 25 samples of bark sent to me by Mr. McIvor. This number has since been increased to 30; and as the analysis of all of them has recently been terminated by me, I publish now the results.

Since the publication of that paper I have ascertained that Dr. Hesse is right, when he states that there exists no *bitartrate* of cinchonidine, and that the compound separated from a solution of a salt of cinchonidine, by bitartrate of sodium, is nothing else but a *neutral* tartrate of cinchonidine. Therefore I have given up the use of bitartrate of sodium to ascertain the quantity of cinchonidine, and use in its stead the Rochelle salt. This non-existence of a bitartrate of cinchonidine is a curious fact, as the well-defined bitartrates of quinine, quinidine, and cinchonine really exist and have been prepared by me.

No. 8.—Red bark; Deva Shola plantation. About 6000 feet elevation. A. Original bark, 8 years old.

48·8 grammes of dry bark yielded 5·3 grammes of mixed alkaloids = 10·86 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{14·6}{0·8634}$; l = 100 mm.; $a° = 5°$ ↖, was $[a]j = 84°·5$ ↖.

4·959 grammes of mixed alkaloids treated with ether yielded 1·692 grammes of alkaloids soluble in ether = 3·705 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{12·4}{0·67}$; $l = 100$ mm.; $a° = 6°$ ↖, was $[a]j = 111°$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{17·7}{1·232}$; l = 100 mm.; $a° = 3°$ ↖, was $[a]j = 43°·1$ ↖.

1·016 grammes of alkaloids soluble in ether yielded 0·385 gramme of herapathite = 0·2175 gramme of quinine = 0·793 per cent.

B. renewed bark 24 months old.

49 grammes of dry bark yielded 5·096 grammes of mixed alkaloids=10·4 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{15·9}{0·85}$; l=100 mm.; $a° = 4°$ ↖, was $[a]j = 78°$ ↖.

4·484 grammes of mixed alkaloids treated with ether yielded 3·3 grammes of alkaloids soluble in ether = 7·654 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{12·6}{0·797}$; $l = 100$ mm.; $a° = 10°$ ↖, was $[a]j = 158°$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{12·8}{0·4298}$; l = 100 mm.; $a° = 5°$ ↗, was $[a]j = 148°·9$ ↗.

2·535 grammes of alkaloids soluble in ether yielded 2·728 grammes of herapathite = 1·5413 grammes of quinine = 4·653 per cent.

The results of the analysis of these two barks taken from the *same* tree are very interesting. Whilst the amount of mixed alkaloids in both barks is nearly the same, the amount of quinine in the renewed bark is so much greater that this fact deserves peculiar attention; for if it should prove to be a general rule that the renewed bark of *C. succirubra* is so much richer in quinine than the original bark, then the millions of trees of *C. succirubra* actually growing in British India could be adapted to produce large quantities of bark fit for the manufacture of quinine.

No. 9.—Renewed red bark, 20 months old. Neddiwattum plantation. Elevation about 6200 feet.

50 grammes of dry bark yielded 4·577 grammes of mixed alkaloids = 9·154 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{15}{0·805}$; l= 100 mm.; $a° = 4°·2$ ↖ was $[a]j = 78°·2$ ↖.

3·971 grammes of mixed alkaloids treated with ether yielded 2·476 grammes of alkaloids soluble in ether = 5·707 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{12·1}{0·728}$; $l = 100$ mm.; $a° = 8°·3$ ↖, was $[a]j = 137°·9$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{12·6}{0·483}$; l= 100 mm.; $a° = 3°$ ↗, was $[a]j = 78°·2$ ↗.

1·791 grammes of alkaloids soluble in ether yielded 1·58 grammes of herapathite = 0·8644 gramme of quinine = 2·75 per cent.

No. 20.—Red bark, 10 years old, mossed. Neddiwattum—

50 grammes of dry bark yielded 5·335 grammes of alkaloids = 10·67 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{12·5}{0·604}$; l=100 mm.; $a° = 2°$ ↖, was $[a]j = 41°·3$ ↖.

4·805 grammes of mixed alkaloids treated with ether yielded 1·415 grammes of alkaloids soluble in ether = 3·1421 per cent. The molecular rotation calculated from the observation $\frac{V}{p} = \frac{13·1}{0·441}$; l= 300 mm.; $a° = 14°$ ↖, was $[a]j = 138°·6$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{13·6}{0·599}$; l = 300 mm.; $a° = 1°$ ↗, was $[a]j = 7°·5$ ↗.

0·976 gramme of alkaloids soluble in ether yielded 0·777 gramme of herapathite = 0·439 gramme of quinine = 1·413 per cent.

No. 21.—Red bark, 8 years old. Neddiwattum—

50 grammes of dry bark yielded 4·348 grammes of alkaloids = 8·696 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13·2}{0·757}$; l=100 mm.; $a° = 2°·5$ ↖, was $[a]j = 43°·6$ ↖.

4·154 grammes of mixed alkaloids treated with ether yielded 1·58 grammes of alkaloids soluble in ether = 3·3075 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{12·4}{0·511}$; l=100 mm.; $a° = 5°·5$ ↖, was $[a]j = 133°·4$ ↖.

1·068 grammes of alkaloids soluble in ether yielded 0·79 gramme of herapathite = 0·4463 gramme of quinine = 1·382 per cent.

No. 22.—Red bark, the same as No. 20, but unmossed.

50 grammes of dry bark yielded 4·088 grammes of mixed alkaloids = 8·176 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{12·6}{0·696}$; l=100 mm.; $a° = 2°$ ↖, was $[a]j = 36°·2$ ↖.

3·754 grammes of mixed alkaloids treated with ether yielded 1·365 grammes of alkaloids soluble in ether = 2·973 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{12·5}{0·477}$; l=100 mm.; $a° = 3°$ ↖, was $[a]j = 78°·6$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{12{\cdot}7}{0{\cdot}692}$; $l =$ 100 mm.; $a° = 1°$ ↖, was $[a]j = 18°{\cdot}3$ ↖.

0·903 gramme of alkaloids soluble in ether yielded 0·638 gramme of herapathite = 0·36 gramme of quinine = 1·185 per cent.

No. 23.—Red bark; Deva Shola; renewed bark, 3 years old.

26·8 grammes of dry bark yielded 2·779 grammes of mixed alkaloids = 10·37 per cent. The molecular rotation calculated from the observation $\frac{V}{p} = \frac{15}{0{\cdot}721}$; $l =$ 100 mm.; $a° = 2°$ ↗, was $[a]j = 41°{\cdot}6$ ↗.

This abnormal rotation *to the right* made me suppose that the quantity of cinchonine in this bark exceeded very much that of cinchonidine. The investigation proved that my supposition was right, as I obtained from 1·577 grammes of alkaloids insoluble in ether, by the use of Rochelle salt, 0·383 gramme of tartrate of cinchonidine=0·308 gramme of cinchonidine, and 1·269 gramme of cinchonine. Besides these I found a trace of quinidine.

2·755 grammes of mixed alkaloids treated by ether yielded 1·114 grammes of alkaloids soluble in ether = 4·193 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{20}{1{\cdot}114}$; $l = 100$ mm.; $a° = 7°$ ↖, was $[a]j = 125°{\cdot}7$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{13}{0{\cdot}632}$; $l =$ 100 mm.; $a° = 9°{\cdot}5$ ↗, was $[a]j = 195°{\cdot}4$ ↗.

1·075 grammes of alkaloids soluble in ether yielded 0·918 gramme of herapathite = 0·519 gramme of quinine = 2·024 per cent.

No. 24.—*C. Pahudiana*, original bark, 10 years old. Elevation 7800 feet.

55·8 grammes of dry bark yielded 1·402 grammes of mixed alkaloids = 2·51 per cent. The molecular rotation calculated from the observation $\frac{V}{p} = \frac{15{\cdot}1}{0{\cdot}51}$; $l = 300$ mm.; $a° = 10°$ ↖, was $[a]j = 98°{\cdot}7$ ↖.

1·402 grammes of mixed alkaloids treated with ether yielded 0·58 gramme of alkaloids soluble in ether = 1·038 per cent.

0·58 gramme of alkaloids soluble in ether yielded 0·032 gramme of herapathite = 0·018 gramme of quinine = 0·032 per cent.

No. 25.—*C. Pahudiana*. A. Original bark.

60 grammes of dry bark yielded 1·214 grammes of mixed alkaloids = 2·012 per cent. The molecular rotation calculated from the observation $\frac{V}{p} = \frac{20}{1{\cdot}214}$; $l =$ 100 mm.; $a° = 9$ ↖, was $[a]j = 148{\cdot}2$ ↖.

1·1533 grammes of mixed alkaloids treated with ether yielded 0·756 gramme of alkaloids soluble in ether = 1·324 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{12{\cdot}7}{0{\cdot}305}$; $l = 300$ mm.; $a° = 13°$ ↖, was $[a]j = 180°{\cdot}4$ ↖.

0·756 gramme of alkaloids soluble in ether yielded 0·612 gramme of herapathite = 0·346 gramme of quinine = 0·606 per cent.

B. Renewed bark, 2 years old. The renewed bark grew during the first six months under moss, and was later unmossed.

48·7 grammes of dry bark yielded 2·34 grammes of mixed alkaloids = 4·8 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{12{\cdot}7}{0{\cdot}545}$; $l = 100$ mm.; $a° = 6°$ ↖, was $[a]j = 139°{\cdot}8$ ↖.

2·286 grammes of mixed alkaloids treated with ether yielded 1·125 grammes of alkaloids soluble in ether = 2·362 per cent. 1·125 grammes of these latter alkaloids yielded 0·66 gramme of herapathite = 0·373 gramme of quinine = 0·783 per cent.

The alkaloids insoluble in ether consisted chiefly of cinchonidine, with a slight trace of cinchonine.

No. 26.—Strong growing seedling Cinchona, dark leaved, from lower part of the stem. Kartairy.

This and the following three barks were taken from two very strong growing varieties of *C. officinalis*. The barks, Nos. 26 and 27, were taken from a tree planted in 1868, which is now 26 feet in height, with a stem of 16 inches in circumference at 1 foot from the ground, and 12 inches in circumference at 15 feet from the ground.

50 grammes of dry bark yielded 5·43 grammes of mixed alkaloids = 10·86 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13}{0{\cdot}631}$; $l = 100$ mm.; $a° = 8°$ ↖, was $[a]j = 164°{\cdot}8$ ↖.

4·644 grammes of mixed alkaloids treated with ether yielded 1·808 grammes of alkaloids soluble in ether = 4·228 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13}{0{\cdot}781}$; $l = 100$ mm.; $a° = 10°{\cdot}5$ ↖, was $[a]j = 174°{\cdot}7$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{13}{0{\cdot}704}$; $l = 100$ mm.; $a° = 9°$ ↖, was $[a]j = 166°{\cdot}1$ ↖.

1·78 grammes of alkaloids soluble in ether yielded 2·081 grammes of herapathite = 1·176 grammes of quinine = 2·804 per cent.

No. 27.—Strong growing seedling Cinchona from upper part of the stem. Kartairy.

50 grammes of dry bark yielded 3·472 grammes of mixed alkaloids = 6·944 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13}{0{\cdot}614}$; $l =$ 100 mm.; $a° = 6°{\cdot}5$ ↖, was $[a]j = 137°{\cdot}6$ ↖.

As this bark and the former have been taken from different parts of the *same* tree, the difference of nearly 4 per cent. in the amount of the alkaloids is very instructive.

3·317 grammes of mixed alkaloids treated with ether yielded 1·072 grammes of alkaloids soluble in ether = 2·244 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{15{\cdot}8}{1{\cdot}072}$; $l = 100$ mm.; $a° = 10°$ ↖, was $[a]j = 147°{\cdot}4$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{14{\cdot}1}{1{\cdot}174}$; $l =$ 100 mm.; $a° = 13°{\cdot}5$ ↖, was $[a]j = 163°{\cdot}8$ ↖.

1·031 grammes of alkaloids soluble in ether yielded 1·035 grammes of herapathite = 0·585 grammes of quinine = 1·273 per cent.

No. 28.—Strong-growing seedling Cinchona from Welbeck; dark leaved.

50 grammes of dry bark yielded 3·367 grammes of mixed alkaloids = 6·734 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{13}{0{\cdot}663}$; $l =$ 100 mm.; $a° = 7°$ ↖, was $[a]j = 137°{\cdot}2$ ↖.

3·27 grammes of mixed alkaloids treated with ether

yielded 1·296 grammes of alkaloids soluble in ether = 2°·67 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{20}{1·296}$; $l = 100$ mm.; $a° = 8°·5$ ↖, was $[a]j = 131°·1$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{13}{1·132}$; $l =$ 100 mm.; $a° = 12°·5$ ↖, was $[a]j = 143°·5$↖.

1·264 grammes of alkaloids soluble in ether yielded 1·395 grammes of herapathite = 0·788 gramme of quinine = 1·681 per cent.

No. 29. –Strong-growing seedling Cinchona from Welbeck; light leaved.

50 grammes of dry bark yielded 2·144 grammes of mixed alkaloids = 4·288 per cent. The molecular rotation calculated from the observation $\frac{V}{p} = \frac{13}{0·642}$; $l = 100$ mm.; $a° = 6°·5$ ↖, was $[a]j = 131°·6$ ↖.

2·01 grammes of mixed alkaloids treated with ether yielded 0 975 gramme of alkaloids soluble in ether = 2·08 per cent. The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{17·4}{0·975}$; $l = 100$ mm.; $a° = 7°.5$↖, was $[a]j = 133°·8$ ↖.

The molecular rotation of the alkaloids insoluble in ether, calculated from the observation $\frac{V}{p} = \frac{13}{0·792}$; $l =$ 100 mm.; $a° = 10°$ ↖, was $[a]j = 164°·1$ ↖.

0·839 gramme of alkaloids soluble in ether yielded 0·589 gramme of herapathite = 0·333 gramme of quinine = 0·825 per cent.

No. 30.—*C. officinalis.* Prunings from Neddiwattum.

50 grammes of dry bark yielded 1·86 grammes of mixed alkaloids = 3·72 per cent. 1·811 grammes of mixed alkaloids treated with ether yielded 1·605 grammes of alkaloids soluble in ether = 3·297 per cent.

The molecular rotation, calculated from the observation $\frac{V}{p} = \frac{17}{1·605}$; $l = 100$ mm.; $a° = 16°·5$ ↖, was $[a]j =$ 180 ↖.

1·495 grammes of alkaloids soluble in ether yielded 2·085 grammes of herapathite = 1·178 grammes of quinine =2·6 per cent.

Although the total amount of alkaloids in these prunings is not high, the relatively large amount of quinine seems to me very striking.

I conclude this series of investigations by putting the results in a tabular form :—

Amount of Mixed Alkaloids and of Quinine contained in several specimens of Cinchona Bark grown under different conditions, by Mr. W. McIvor, at Ootacamund.

100 Parts of Bark, dried at 100° C., contain :—

Number.		Mixed Alkaloids.	Molecular Rotation Lævogyre.	Molecular Rotation Dextrogyre.	Alkaloids soluble in Ether.	Molecular Rotation Lævogyre.	Pure Quinine.	Crystallized Sulphate of Quinine.
C. Succirubra.	8 A	10·86	84°·5		3·705	111° 0	0·793	1·057
	8 B	10·40	78°·0		7·654	158°·0	4-653	6·204
	9	9·154	78°·2		5·707	137°·9	2·754	3·672
	20	10·67	41°·3		3·142	138°·6	1·413	1·884
	21	8.696	43°·6		3·307	133°·4	1·382	1·843
	22	8·176	36°·0		2·973	78°·6	1·185	1·580
	23	10·37		41°·6	4·193	125°·7	2·024	2·700
C. Pahudiana.	24	2·51	98°·7		1·038	not determined	0·032	
	25 A	2·023	148°·2		1·324	180°·4	0·606	0·808
	25 B	4·80	139°·8		2·362	not determined	0·783	1·044
C. Officinalis.	26	10·86	164°·8		4·228	174°·7	2·804	3·738
	27	6·944	137°·6		2·244	147°·4	1·273	1·697
	28	6·734	137°·2		2·670	1131°·1	1·681	2·241
	29	4·288	131°·6		2·080	133°·8	0·825	1·100
	30	3·72	not determined		3·297	180°·0	2·60	3·466

NGAI CAMPHOR AND BORNEOL.

BY JOHN MOSS, F.C.S.,

(*Late Demonstrator in the Laboratory of the Pharmaceutical Society.*)

In the Pharmaceutical Journal of a fortnight ago (March 7th, 1874, p. 722) is a most interesting paper by Professor Flückiger, in which that chemist gives in detail the results of his researches on the optical properties of *Ngai* camphor. One of the most interesting of these results was the discovery that an alcoholic solution of the camphor causes sinistral deviation of the polarized ray—a fact which had been previously made the matter of a suggestion by myself.* Professor Attfield, concurring with this suggestion, amplified and illuminated it, using for this purpose a remarkably successful research by Mr. A. Pedler, which resulted in the discovery of one of the two known varieties of valeric acid.

I would now draw attention to another similar case which is probably even more familiar to pharmacists than that of valeric acid, though it does not possess the recommendation (to them) of having been worked out by a Bell scholar,—I mean that of racemic acid. It is well known that ordinary racemic acid, as contained in the juice of certain kinds of grapes, is quite inactive as regards polarized light, yet is capable of being sundered into two other racemic acids, which, whilst they are identical in composition, in specific gravity, and indeed in most other physical properties, differ in these two—their action on polarized light and their crystalline form. One of these racemic acids twists the ray to the right, the other twists it

* Pharmaceutical Journal, March 7th, 1874, p. 722.

to the left. They are accordingly distinguished by the names dextro- and lævo-racemic acid respectively. In the shape of their crystals they correspond as the right hand corresponds to the left, or as an object corresponds to its own reflection in a mirror.

Now Mr. Sydney Plowman has shown* that in ultimate composition Borneol and Ngai camphor are identical, that in ordinary physical properties they are very like each other, and that he was unable to detect by microscopic examination any marked difference in the shape of their crystals. Professor Flückiger has shown in the paper above referred to that the crystals of both belong to the cubical system, confirming in respect of the whole what Mr. Plowman described of a part. He has also shown that these camphors are opposed in optical properties. The relations which obtain thus far are sufficiently significant to be suggestive of others even more intimate ; what these are is indicated by a study of the partly analogous but more completely unravelled case of the racemic acids. It seems to me highly probable that a very careful comparative examination of the crystals of Ngai camphor and of Borneol will result in the discovery that they are related to each other as are the crystals of the two active varieties of racemic acid,—that is, they are left and right handed. More than this, it is well within the bounds of probability that they may be so combined as to give a well-defined crystalline camphor, the alcoholic solution of which shall be inactive. (Of course an alcoholic solution of the two camphors in equal proportions is not at all referred to).

Certain volatile oils obtained from labiate plants, such as rosemary, sage, lavender, etc., yield, on oxidation by nitric acid or by lengthened exposure, camphors belonging to the $C_{10}H_{16}O$ class, which are inactive in alcoholic solution. Is it an unwarrantable "scientific use of the imagination" to suppose that these bodies are compounds such as it has just been suggested may be formed by the union of two optically opposed varieties ? It is at least worth while making the attempt to ascertain if this is the case. Were it found to be so, such a result would point directly to the existence in the above-mentioned oils, of isomerides of $C_{10}H_{16}$ having different optical properties. That many essential oils are made up of isomerides of $C_{10}H_{16}$ is well known, and our chemical knowledge of these bodies is being greatly increased by the classic researches of Dr. C. R. A. Wright.† In such of Dr. Wright's papers as I have at hand, however, no mention is made of any optical examinations of the isomeric terpenes. Such examinations could not fail of throwing considerable light on the mutual relations of these bodies, even if they did not lead to the more utilitarian result of enabling chemists to obtain the costlier essential oils having the composition $C_{10}H_{16}$, from those which are abundant and cheap.

Oil of lemons as it grows old becomes terebinthinate. Is this because oil of lemons is made up of terebenthene itself united with other more easily oxidizable terpenes, so that as the latter resinify and lose their odour, the smell of the former asserts itself ?

300, *Holborn, W.C.*

* Pharmaceutical Journal, March 7th, 1874, p. 810.

† See various papers in the 'Journal of the Chemical Society,' in the 'British Association Reports,' and in the 'Proceedings of the British Pharmaceutical Conference.'

THE CHARACTERS, PROPERTIES, AND USES OF EUCALYPTUS GLOBULUS AND OTHER SPECIES OF EUCALYPTUS.*

BY PROFESSOR BENTLEY, F.L.S., ETC.

The great and widely spread interest excited by the recent announcements in the daily papers and various journals of the extraordinary influence of plantations of *Eucalyptus globulus* in destroying the malarious character of marshy districts, and thus preventing the fever which is commonly attributed to them, induced Professor Bentley's colleagues on the Council of the Royal Botanic Society of London to invite him to deliver a special lecture to the Fellows and their friends, with the view of making generally known what has been stated in reference to this subject, and, at the same time, to give a sketch of the other properties and uses of this plant and of the species of *Eucalyptus* generally.

The discovery of the influence of *Eucalyptus* trees in destroying or improving the pestilential nature of the climate of marshy districts has been attributed to Sir W. Macarthur, of Camden, Sydney, Australia, who, for this purpose, offered, about the year 1860, to forward seeds of the plant for distribution among the colonists of Algeria and other marshy districts of the world. But Professor Bentley points out that previously to this period—that is, in 1854 (as mentioned by M. Raveret-Wattel† in a report which he published in 1871 in Paris, for *La Société d'Acclimatation*)—M. Ramel had his attention called while in Melbourne by Dr. Ferdinand von Mueller (now Baron Mueller), the Government Botanist for Victoria, to this tree ; and in 1856 M. Ramel sent some seeds to Paris, and subsequently, in 1857 and 1860, forwarded further supplies. M. Ramel not only called attention to the great value of the *Eucalyptus globulus* as a forest tree, but also claimed for it the power of destroying the miasmatic influence of marshy districts. It seems clear, therefore, that it is to M. Ramel, rather than to Sir W. Macarthur, that the discovery of this valuable property of *Eucalyptus globulus* properly belongs.

Subsequently to the above dates, several notices appeared bearing testimony to the febrifugal property of the bark and leaves of this plant when administered internally—among others by M. Pepin, Dr. Carlotti, of Corsica, Dr. Lorinser, of Vienna, Professor Gubler, and Dr. Maclean, of Netley ; and in 1870 Dr. Gimbert, of Cannes, wrote a memoir entitled '*Eucalyptus globulus* : its value in Agriculture, Hygiene, and Medicine ; ' and again in the *Comptes Rendus* for October 6th, 1873, he made a further communication narrating the results of his experiments in Algeria in improving the miasmatic climate by plantations of this tree, and also published a paper in the *Archives générales de Médecine*, entitled "Etude des Applications Thérapeutiques de l'*Eucalyptus globulus*."

The genus *Eucalyptus* belongs to the natural order Myrtaceæ of botanists, the same order to which belong the Myrtle, the Clove-tree, the Pimenta or Allspice, the Cajeput-oil plant, the Pomegranate, and numerous other plants which are well known as ornamental trees or shrubs, or for their timber, or from yielding various valuable medical and economic products. All the *Eucalypti* (of which 135 species are described in the 'Flora Australiensis'), with the exception of a very few and, in some cases, doubtful species, are natives of Australia, where they are commonly known either as "Gum-trees," from yielding what are generally described as gummy or resinous products, or as "Stringy-bark trees," from their rough fibrous bark. Various other local names are also applied to the different species by the colonists in Australia, such as "blue," "red," and "white" gum, peppermint, turpentine, iron-bark, woolly-butt, &c. All the species

* Abstract of a lecture delivered to the Fellows of the Royal Botanic Society of London, by desire of the Council, on March 14th, 1874.

† An abstract of M. Wattel's paper appeared in this Journal in July, 1872, (vol. iii. pp. 22 and 43).

have evergreen leaves, which, like those of certain species of *Acacia* and other trees that are natives of Australia, usually (after the tree has arrived at a few years of age) hang in an oblique or even vertical direction from the branches, and thus give a very peculiar aspect to the forests of Australia by the difference in the light and shade produced by the trees from those of forests generally in other parts of the world. These leaves are commonly studded with internal glands or receptacles of volatile oil, as may be seen by holding them up to the light, when they present a semitransparent dotted appearance. The flowers, which are usually pinkish or white, are frequently very beautiful, so that this character, combined with the beauty and singularity of their foliage, the elegant appearance generally of the species, and the agreeable nature of their odours, renders them favourite objects for culture. The flowers, when of a white colour, much resemble myrtle-blossoms, but are at once distinguished from them by the absence of petals, and by their peculiar calyx, which in the bud state is closed at the top by a little lid, which is thrown off as the flower expands. The fruit, which consists essentially of the hardened somewhat globular or tubular calyx, contains a number of seeds, which, considering the enormous size and height these trees sometimes attain, over 300 feet in altitude and 100 feet in circumference, are extremely minute. Thus, according to Mueller, one ounce of the seed of the Blue Gum-tree (*Eucalyptus globulus*) contains over 10,000 seeds, and a similar weight of another species more than double that number; and thus, from one pound of seeds of the *Eucalyptus globulus* nearly 162,000 plants could be raised.

The *Eucalyptus globulus*, commonly known as the Blue Gum-tree, is a native of Tasmania, where it is more especially found on the damp slopes of valleys with a southern aspect. The foliage presents in a remarkable degree the changing aspect of the species of *Eucalyptus*. Thus in young plants the leaves are of large size, sessile, placed horizontally on the stem and branches, and of a bluish glaucous-white colour; but on plants varying from three to five years old the leaves become narrower, of a bluish-green colour, somewhat scimitar-shaped, and hang vertically or somewhat obliquely on the branches, instead of horizontally. The flowers, which are large and axillary, and nearly sessible, grow singly or in clusters of two or three: before they expand, the flower-bud, covered by the lid or operculum of the calyx, has a rounded form; hence its specific name of *globulus*.

The tree is so rapid in its growth "that any man in twenty years' time could find himself, if he chose, surrounded by a forest of his own planting." It has been further stated recently that in a grove planted only sixteen years, the trees averaged 72 feet in height and 6 feet in girth. M. Raveret Wattel says that a *Eucalyptus* tree of "ten years old ordinarily presents the development of a well-grown oak of a century; and it is not rare to meet in Australia with specimens in their fiftieth year from 160 to nearly 200 feet high, and 50 to 60 feet in circumference at the base."

These statements are also fully confirmed by the growth of the *Eucalyptus* trees in Algeria; and the following extract from a letter received by Mr. Daniel Hanbury from his brother at Mentone, testifies to the same fact:—"In a good soil with a moderate amount of moisture the growth of *Eucalyptus globulus* is astonishingly rapid. In the ground of the Palazzo Orango, 4 miles east of Mentone, there is a specimen which was planted in March, 1869 (that is just five years ago), being then a seedling of about 3 feet high. This tree was measured a few days ago, when it was found to be 48 *feet high*, with a trunk having a *circumference of* 3 *feet* at 3 feet above the ground."

In some cases the Blue Gum-tree has been known to attain the colossal dimensions of 350 feet in height and 100 feet in circumference, rivalling if not exceeding, in these respects the celebrated Californian Coniferous tree the *Sequoia Wellingtonia* (*Wellingtonia gigantea* of Lindley). There is no question that, with the doubtful exception of this tree, it excels in dimensions any tree in the world: and as it rarely sends out a branch until its trunk is 100 feet high, and the wood is remarkable for its hardness and durability, its value as a timber tree is great.

It is now more or less successfully cultivated in various parts of Southern Europe—as France, Spain, Portugal, Greece, and Italy; also in Palestine, various uplands of India; in parts of North and South America; at Natal, and other places in South Africa; in Cuba, St. Helena, Egypt, Corsica, and Algeria. It has also been introduced into New Zealand, and is said to grow tolerably well in sheltered situations in the island of Jersey, and also in some parts of South Devon and elsewhere in the south and west of England; but the plants, except under very exceptional circumstances, are not likely to withstand the winter in this country. It has, however, been stated lately in '*The Times*' that some *Eucalypti* had been grown in the open air at East Grinstead, Sussex, and that they had survived two winters without any protection. Several other instances have also been mentioned of plants having survived the winter in this country; but it is not probable that this species of *Eucalyptus* will ever become naturalized with us. It would probably succeed admirably in the swampy regions of the west coast of Africa.

The first and most important influence which the *Eucalyptus globulus* tree exerts, and that which has brought it more especially into notice, is its power of destroying the malarious agency which is supposed to cause fever in marshy districts; from which circumstance it has been called "the fever destroying tree."

It is in this respect commonly regarded as being serviceable in two ways—first, by the far-spreading roots of this gigantic tree acting like a sponge, as it were, and thus pumping up water and draining the ground; and, secondly, by emitting odorous antiseptic emanations from its leaves. Professor Bentley said that he did not believe, as has been recently stated, that the branches of a solitary *Eucalyptus* tree can have had any effect in neutralizing the malarious influence of a district previously constantly infected by fever; but he does think that the foliage of groves of *Eucalyptus* trees, by diffusing an agreeable, aromatic, camphoraceous, stimulating odour in the surrounding air, would have an appreciable influence in neutralizing marshy miasmas, and thus improving the healthiness of the district. The great influence is, however, in his opinion, produced by the power the roots possess of absorbing water from the soil. It is stated that a *Eucalyptus* tree absorbs as much as ten times its weight of water from the soil.

But whatever be the cause or causes which render a marshy district thus comparatively healthy to what it was before the introduction of the *Eucalyptus* trees into the neighbourhood, the fact is now testified to in various parts of the world. Thus at the Cape, in a very few years, the cultivation of the *Eucalyptus* has completely changed the climatic condition of the unhealthy parts of that colony; in Algeria, where it has been tried on a large scale in a district previously noted for its pestilential air and consequent prevalence of fever, not a single case now occurs, although the trees are not more than nine feet high; and in the neighbourhood of Constantia it is also stated that at another noted fever-spot covered with marsh-water both in winter and summer, in five years the whole district was dried up by 14,000 of these trees, and the inhabitants now enjoy excellent health. In Cuba, marsh diseases are fast disappearing from the unhealthy districts where this tree has been introduced. In the Department of the Var it is also said that a station-house situated at one end of a railway viaduct, so pestilential that the officials could not be kept there longer than a year, is now as healthy as any other place on the line, in consequence of the planting of a few *Eucalyptus* trees.

Among the products obtainable from *Eucalyptus* wood is potash, in which it is particularly rich. Baron von Mueller found that the ashes of these trees "contained a larger proportion of potash than the elm or maple, which

are the trees most esteemed for that purpose in America. The yield from the latter trees is estimated at 10 per cent. of the ashes, while that from the *Eucalyptus* is 21 per cent."

The barks of various species are also now used to some extent in paper-making; those of *E. rostrata*, *E. obliqua*, *E. corymbosa*, and *E. goniocalyx* are amongst those so employed. Good writing-paper has also been made from the bark of *E. obliqua*.

The barks of many species are used extensively for tanning. They owe this property to the presence of similar constituents to those contained in oak-bark and other substances commonly employed in this country and elsewhere for a like purpose.

A number of species of *Eucalyptus* also exude a very astringent substance, which, from its resemblance to the ordinary medicinal kino, both in appearance and properties, is commonly designated as *Eucalyptus*, or *Botany Bay Kino*. This substance, which, when it first exudes, trickles like blood down the bark of the trees in a semi-fluid state, ultimately hardens into dark-red shining masses, which have a very astringent taste. It is employed for similar medicinal purposes as the official kino, and also for tanning and dyeing.

Another substance, called *Eucalyptus* or *Australian Manna*, is also yielded by *E. mannifera*, *E. viminalis*, and probably other species. Two varieties of this manna have been distinguished. One is in small, rounded, opaque, whitish masses, with an agreeable sweet taste. It has a similar action to the ordinary manna in use in this country, and contains somewhat similar constituents. It exudes abundantly during the summer months through punctures or wounds made in the leaves and young bark. As it exudes it hardens, and drops from the leaves on to the ground in pieces sometimes as large as an almond. The flowers also of species of *Eucalyptus* yield a large quantity of honey, and are therefore greatly affected by bees. It is said that Gould "has taken as much as a teaspoonful of honey from the mouth of a bird shot by him whilst it was feeding."

Another very important produce of the *Eucalypti* is the essential oil, which may be obtained in large quantities by aqueous distillation from the leaves. This oil is stored up in the pellucid glands already referred to as contained in the leaves, and readily observed when these are held up to the light by the semi-transparent appearance they then exhibit. These oils are prepared on a very large scale by Mr. Bosisto, of Melbourne, and now form an important article of commerce with this country and elsewhere. Mr. Bosisto alone produces about 1000 lbs. of *Eucalyptus* oils per month. These oils generally have a somewhat camphoraceous smell; but the odour differs in the various species, and the oil obtained from *E. citriodora* has a pleasant citron-like odour.

Some of these oils have been employed, as *Eucalyptus oleosa*, as a solvent for resins in the preparation of varnishes; but they are of far more value for diluting the more delicate essential oils used in perfumery. The oils of *E. amygdalina*, *E. globulus*, and *E. citriodora* are thus more especially employed. Most of these *Eucalyptus* oils are of a yellowish colour, although some have a bluish tint; by redistillation the oil may be obtained nearly colourless.

From the quantity of oil contained in the leaves, they yield, when burned, a very large proportion of gas; and it is said that one of the towns in the gold-regions was for a long time lighted by gas extracted from this source.

The febrifugal properties of the bark and leaves of *Eucalyptus globulus* have been testified to by many practitioners—as M. Pepin, Dr. Carlotti, Dr. Lorinser, Professor Gubler, Dr. Keller, Dr. Maclean, and more especially of late years by Dr. Gimbert. It is said to be a valuable remedy, and more especially in intermittent fevers and bronchitis.

Probably some of the exaggerated statements that have been made in reference to the efficacy of *Eucalyptus* bark and leaves in fevers have arisen under the mistaken idea that the bark contained an alkaloid resembling, if not identical with, quinine, the well-known alkaloid of Cinchona-barks. But the experiments of Mr. Broughton, the government chemist of Ootacamund, entirely disprove this; for upon careful examination of the bark and leaves, Mr. Broughton states that neither quinine nor the other alkaloids of Cinchona-bark, as quinidine, cinchonine, or cinchonidine, exist in the plant in any proportion. What properties the plant possesses would appear, therefore, so far as known at present, to be due essentially to the presence of eucalyptol, the principal constituent of *Eucalyptus* oil. From the testimony of numerous medical practitioners in various parts of the world, and from its popular reputation in fevers in Australia, it can scarcely be doubted that it does possess anti-periodic properties, although these are far less important than those of Cinchona-bark.

In making preparations of *Eucalyptus* leaves the narrow leaves should alone be used, as recent investigations by a German physician, Dr. Hermann Œffinger, have shown that these are far more efficacious than the broader leaves found on the younger and faster-growing herbaceous shoots.

Dr. Gimbert has also recently introduced a new method of dressing wounds by using *Eucalyptus* leaves instead of lint. The leaves are simply laid on the wounds; and it is said that their balsamic nature not only cures, but removes all the unpleasant odour. Another way of using *Eucalyptus* leaves is in the form of cigarettes, which are reputed to be efficacious in bronchial and asthmatic affections and in other ways.

HISTORY OF THE PARIS SCHOOL OF PHARMACY.

A short time since, the fact was mentioned that a discussion had taken place in the French legislature respecting the dilapidated and unsafe state of the Paris School of Pharmacy. As it appears probable that, after being used for about three hundred years for purposes more or less connected with instruction in the art of preparing medicines, this building will be shortly abandoned by the School in favour of a more commodious one, the opportunity has been taken to publish a short sketch of its history, past and present, in the pages of *L'Union Pharmaceutique*, from which the following is taken:—

The origin of this establishment is very ancient. Upon the site occupied by it at the present day there formerly stood an hospital, probably founded in the thirteenth century by Marguerite de Provence, widow of Louis IX., which, in the following century, belonged to Guillaume de Chanac, bishop of Paris and patriarch of Alexandria. In 1559 the building was in the occupation of a Pierre Galand, when by a parliamentary decree it was allotted to the lodging and treatment of paupers suffering from venereal maladies. So reconstituted, the establishment took the name of the Hôpital de Lourcine.

Afterwards, Nicolas Houel, a grocer, born in Paris in 1520, conceived the idea of establishing a charitable institution where orphans might be instructed in the apothecaries' art, whose mission it should be to administer medicines to the respectable poor. An edict of Henry III., dated 9th October, 1576, approved of this foundation, and of the formation of a garden of simples. Nicolas Houel applied for a portion of the building called the Hôtel de Tournelles, then abandoned, in order to put his project into execution. A commission appointed to consider his application accorded to him the Maison des Enfants-Rouges, in the Marais, and the new institution was installed and remained there until 1578. In that year, in consequence of difficulties met with by the founder, he asked to be allowed to transfer his establishment to the house in the rue de Lourcine, the buildings of which were in a very bad state. A decree of the parliament, dated 2nd of January, 1579, authorized the transfer, which was carried out in the following April. The establishment bore the name of "Maison de la Charité Chrétienne."

Some waste ground belonging to the house, the greater part of which belongs to the School of Pharmacy at the present day, was planted with trees, and on another portion of it Nicolas Houel raised a house at his own expense, which was on one occasion ruined by an inundation of the Bièvre. The inclosure was continued to the rue de l'Arbalète, and eventually Houel formed there, on the model of the garden at Padua, a botanic garden, which was the first that had existed in France. Nicolas Houel died in 1587. Nine years afterwards Henry IV. changed the destination of the establishment, which he appropriated to soldiers of all grades wounded in his service, and it thus became the first germ of the Hôtel des Invalides.

These invalids were in their turn transferred by an order of Louis XIII. to the Bicêtre, and the house of Christian charity thus vacated was occupied by various communities of women, the property being handed over to the Order of Saint Lazarus. From them it soon passed into the hands of the Bishop of Paris, who granted it to the Hôtel Dieu. Finally, by two decrees of parliament, issued in 1624 and 1625, the lands were granted to the Corporation of Apothecaries, who were charged to carry out the foundation of Nicolas Houel. Shortly afterwards, this corporation augmented the original land by the purchase of two large gardens in the rue de l'Arbalète. In 1629 it also built there a large house, which now forms the principal portion of the building of the School of Pharmacy.

This establishment at first went by the name of the "Jardin des Apothicaires." This, by order of the King in 1777, was changed to "Collége de Pharmacie," and to "École Gratuité de Pharmacie," by a decree of the Executive Directory, dated 3 floréal an iv. (22nd April, 1797). Finally the law of the 21 germinal an xi. (10th April, 1804), having established in France three schools, that of Paris, which was only a continuation of the previous school, entered into possession of the ground and buildings situated in the rue de l'Arbalète. This possession was confirmed by a decree of the Government a few months later.

At that time the school of pharmacy managed its own affairs, under the authority of the Minister of the Interior. This arrangement was continued until September, 1841, when, by a royal ordonnance, the schools of pharmacy were placed under the the same *régime* as the universities. In its earlier days the real estate of the school remained the same as when it was received from the apothecaries. It received its first augmentation in 1821 by the acquisition, for the sum of 9,000 francs, of an enclosed garden. In 1844, a neighbouring house, of which, however, possession was not obtained until 1853, was purchased for 20,000 francs. In 1857, part of the original land, abutting upon the rue de Lourcine, was exchanged for some land situated in the rue de l'Arbalète more convenient to the school. Such are some of the principal events in the history of the École Supérieure de Pharmacie, from its foundation in 1578 until the present time."

The buildings of the School of Pharmacy are now unfortunately falling into ruins, and it has become necessary to shore them up on all sides. They have, moreover, become insufficient, and it is under consideration to transfer the school to new premises, which might be built upon ground situated between the Observatory and the Luxembourg. An iron gate, opening upon the rue de l'Arbalète, gives access to a rather small court-yard, where may be seen, on each side of the steps facing the entry, the statues in bronze of Vauquelin and Parmentier. The school contains two amphitheatres, of which the larger would not seat more than 280. But there are 500 students. The same insufficiency occurs in the laboratories, which are six in number: of these, one will accommodate 50 students; the other five, more recently constructed, would not accommodate more than 20 each. So that only 150 students can be employed at the same time in manipulation, and this occasions a great loss of time.

The "salle des actes," where the examinations are passed, is well arranged, and contains a collection of portraits of all the professors who have successively taught in the school. Some of these portraits are remarkable works of art.

The chemical, physical, zoological, and natural history collections, as well as the library, are complete in relation to the teaching imparted in the school. Beyond this, they contain nothing particularly remarkable. They are open every day from 11 a.m. until 4 p.m.

The botanic garden also requires some augmentation. It is intended shortly to establish, upon government land close by, two temporary laboratories, built of wood, of which one is to be devoted specially to botany.

There are nine "chairs" connected with the school: (1) botany, (2) organic chemistry, (3) inorganic chemistry, (4) materia medica, (5) pharmaceutical chemistry, (6) Galenic pharmacy, (7) physics, (8) zoology, and (9) natural history of medicaments.

The staff consists of nine professors, eight assistant professors, a responsible secretary, a superintendent of practical chemistry and pharmacy, four lecture demonstrators, three demonstrators of the practical course, a librarian, and other officials, numbering in all thirty-five persons. The functions of director of the school are exercised by one of the professors.

During the four "trimestres" of the scholastic year 1872-73, there were 1382 entries. During the same time the number of examinations was 1664. The cost of the terms and examinations for the diploma of pharmacien of the first-class is 1390 francs; that for the terms and examinations for the diploma of pharmacien of the second class, 660 francs.

In 1872 the receipts of the École Supérieure de Pharmacie of Paris amounted to 238,790 francs. The expenditure during the same time, including the cost of the staff, was only 174,875 francs 76 centimes, leaving a balance of 63,914 francs 24 centimes.

Amongst the remarkable persons who have passed through this school may be mentioned Parmentier, Vauquelin, Robiquet, Pelouze, Pelletier, and Caventou, the latter two of whom first prepared the sulphate of quinine. At the present day the staff of the school is constituted as follows:—

Director.—M. Chatin.

Honorary Director.—M. Bussy.

Administrators.—MM. Chatin, Berthelot, and Planchon.

Honorary Professor.—M. Caventou.

Professors.—Botany, M. Chatin; Organic Chemistry, M. Berthelot; Zoology, M. Milne-Edwards; Physics, M. Buignet; Galenic Pharmacy, M. Chevallier; Natural History of Medicaments, M. Planchon; Toxicology, M. Bouis; Pharmaceutical Chemistry, M. Baudrimont. The chair of Inorganic Chemistry is at present vacant.

Delegates from the Faculty of Medicine.—MM. Bouchardat and Gavarret.

Assistant Professors.—MM. Soubeiran, Riche, Bourgoin, Jungfleisch, Le Roux, Marchand, Gustave Bouchardat, and Joannès Chatin.

Secretary.—M. Chapelle.

OZONE.*

BY DR. ANDREWS.

Soon after the discovery of ozone, Schönbein having observed that the air of the country frequently coloured a delicate ozone test-paper in the same manner as ozone itself, inferred that ozone is a normal constituent of our atmosphere. He concluded that the amount of this body present in the air is different in different localities, and in the same locality at different times, and with great boldness

* Abstract of an address delivered before the Royal Society of Edinburgh, December 22nd, 1873, and printed in *Nature*.

he attempted to connect its presence or absence with the prevalence or rarity of certain catarrhal affections. A new field for investigation was thus opened up, which has been assiduously cultivated by a large and zealous band of observers. Before referring, however, to their labours, it will be necessary briefly to allude to the present state of our knowledge regarding the existence of ozone in the atmosphere.

Schönbein always maintained that ozone is a constituent of atmospheric air, and his various papers on this subject would, if collected, fill a large volume. In his last memoir he observes that the active substance in the air acts in a parallel manner on iodide of potassium and suboxide of thallium papers, although more slowly on the latter; and that the thallium paper, which has been coloured brown by the air, behaves towards reagents in the same manner as that which has been exposed to artificial ozone. From these facts he infers that the active substance in the air is neither peroxide of nitrogen nor sulphuretted hydrogen. He further states that the atmosphere never contains free nitric acid, although nitrate of ammonium in small quantities is frequently present; and that neither chlorine nor bromine can be present in the free state in air, on account of their affinity for hydrogen. Houzeau also maintained that the existence of ozone in the air was proved by the alkaline reaction of iodide of potassium paper, which had been decomposed by exposure to the atmosphere. Although experiments and arguments of this kind were sufficient to give probability to the view that the active substance in the atmosphere which produces these reactions is ozone, they were at the same time far from conclusive; and some of the ablest chemists in Europe accordingly considered the question doubtful, while others attributed the effects observed to the presence of oxidizing agents altogether different from ozone. I will only cite on this point the opinion of M. Frémy, whose researches in conjunction with M. Becquerel on ozone have already been referred to. "Without denying," he remarked at a meeting of the Academy of Sciences in 1865, "the importance of the indications given by the paper of M. Schönbein, or by that of M. Houzeau, I do not find that these reactions demonstrate with sufficient certainty the existence of atmospheric ozone. I am of opinion that the presence of ozone in the air must be established anew by incontestible experiments."

In 1867 I made a set of experiments which I had contemplated some years before, for the purpose, if possible, of finally settling this important question. These experiments have since been successfully repeated by Dr. C. Fox.

The identity of the active body in the atmosphere with ozone we may now assume to be established beyond dispute, and the accuracy of Schönbein's views on this subject to be fully confirmed. To determine, however, the actual amount of ozone in the atmosphere is a problem of surpassing difficulty, on account of the extremely small proportion in which it exists, even when at a maximum. Its presence can be easily discovered by any of the ordinary iodised starch papers, or even more readily by white bibulous paper which has been moistened with a dilute solution of iodide of potassium, and allowed to dry spontaneously in a dark room. If a slip of this paper be exposed for five minutes to a current of air, which will be often supplied by the wind, or may be produced by walking briskly, it will be found to have acquired a delicate red tint, if ozone be present even in the smallest quantities. The tint will be best observed by comparing the slip after exposure with another slip of the same paper which has not been exposed. The action of the diffused light of day on the paper is rarely perceptible after so short an exposure, but this source of error can be easily avoided by enclosing the paper in a hollow cylinder of wood.

Although, with the experimental resources now at our command, we can scarcely venture even to estimate the actual amount of ozone at any time present in the atmosphere, yet it may be possible, as Schönbein long ago proposed, by applying a chromatic scale to the indications of the test papers, to ascertain approximately its relative amount in different localities, and its variations in the same locality. Such estimates must, however, be most uncertain, since the shades of colour produced on test-paper hardly admit of being defined by numbers; and in this particular case they are liable to a special source of error, as there can be little doubt that a large but unknown part of the ozone in the air which comes into contact with the paper is catalytically destroyed, and produces no chemical effect whatever. At the same time the ozonometer, especially when used with an aspirator, does unquestionably give indications of value regarding the ozone states of the atmosphere; and till more accurate methods are devised these observations ought certainly to be continued.

Ozone is rarely found in the air of large towns, unless in a suburb when the wind is blowing from the country; and it is only under the rarest and most exceptional conditions that it is found in the air of the largest and best ventilated apartments. It is, in fact, rapidly destroyed by smoke and other impurities which are present in the air of localities where large bodies of men have fixed their habitation, and I have often observed this destructive action extending to a distance of one or two miles from a manufacturing town, even in fine and bright weather.

Ozone is rarely, if ever, absent in fine weather from the air of the country, and it is more abundant, on the whole, in the air of the mountain than of the plain. It is also said to occur in larger quantity near the sea than in inland districts. It has been found to an unusual amount after thunderstorms—a fact which is favourable to the view that the presence of ozone in the atmosphere is due to the action of the free electricity of the latter on the oxygen of the air. The amount of ozone in the air is greater, according to some observers, in winter than in summer, in spring than in autumn; according to others, it is greater in spring and summer than in autumn and winter. As regards the influence of day and night, the observations do not all tell the same tale. Ozone has usually been found more abundantly in the air at night than by day, but some careful observers have found the reverse of this statement to be true.

Schönbein was the first who attempted to connect the fluctuations of atmospheric ozone with the prevalence or absence of epidemic disease; and since this suggestion was first published, numerous observations have been made in different countries with the view of ascertaining whether there is really any connection between the indications of the ozonometer and the health of a district. It has been asserted, for example, as the result of observation, that an outbreak of cholera is accompanied by a marked diminution of atmospheric ozone; but this statement has been disproved by later and more trustworthy observations. On the whole, I think it may be safely asserted that no connection has yet been proved to exist between the amount of ozone in the atmosphere and the occurrence of epidemic or other forms of disease.

The permanent absence of ozone from the air of a locality may, however, be regarded as a proof that we are breathing, if I may venture to use the phrase, adulterated air. Its absence from the air of towns, and of large rooms even in the country, is probably the chief cause of the difference which everyone feels when he breathes the air of a town, or of an apartment, however spacious, and afterwards inhales the fresh or ozone-containing air of the open country. It is, indeed, highly probable that many of the most important actions, by which the products of vegetable and animal waste are removed by oxidation from the air, are due to the action of ozone, and could not be effected by ordinary or inactive oxygen. If the amount of ozone in the atmosphere appear too small to produce such large results, we must remember that, from its powerful affinities, ozone is being continually used up, and must, therefore, be constantly renewed.

The physiological action of ozone on the animal system is a subject of interest, and I am able to state the general results of two independent inquiries—one conducted a few years ago, by Dr. Redfern, in Queen's College, Belfast, the other recently communicated to this Society by Mr. Dewar and Dr. McKendrick. Dr. Redfern's experiments have not been published, but he has kindly supplied me with the following note on the subject :—"The general results," he says, "I obtained from about forty experiments conducted from May to September, 1857, to find the effects of oxygen and ozone on different animals, are as follows :—The respiration for a very short time of oxygen, containing about $\frac{1}{240}$th part of ozone, is certainly fatal to all animals. The same gas, when passed over peroxide of manganese and freed from ozone, is comparatively harmless, even when respired for long periods. Respiration of such a mixture of ozone for thirty seconds kills small animals, some dying after respiring it only fifteen seconds ; whilst similar animals will live in good health for months after respiring oxygen alone for thirty-seven hours, the carbonic acid being removed during the experiment. Death is not due to the closure of the glottis, for it occurs when a large opening has been made in the trachea. Ozone causes death by producing intense congestion of the lungs with emphysema, and distension of the right side of the heart with fluid or coagulated blood, frequently attended by convulsions. If ozone be respired in a dilute form, the animals become drowsy and die quietly from coma ; the condition of the lungs and heart being the same, except that the emphysema is less marked. Animals which have respired oxygen for more than twelve hours will now and then die suddenly from the formation of coagula in the heart, even after they have appeared in good health for some days."

The following are the conclusions which Mr. Dewar and Dr. McKendrick have deduced from their researches : Inhalation of an atmosphere highly charged with ozone diminishes the number of respirations per minute, and reduces the cardiac pulsations in strength, the temperature of the animal being at the same time lowered from 3° to 5° C. After death the blood is found to be in a venous condition. Neither the capillary circulation nor the reflex activity of the spinal cord is appreciably affected. The same remark applies to the contractility and work-power of the muscles. Ozone acts on the coloured and colourless corpuscles of the frog like carbonic acid. Ciliary action is not affected by ozonized air or oxygen, but if the layer of liquid be very thin, the cilia are readily destroyed.

The thermal changes which accompany many of the reactions of ozone are well marked, and their investigation, which has been undertaken by Mr. Dewar, promises to yield a valuable addition to our thermo-chemical knowledge.

A PLEA FOR WILD PLANTS.*

There is a prejudice against the Umbelliferæ : they are poisonous (witness Æthusa, Hemlock, &c.); they are merely culinary plants (Angelica, Celery, Fennel, Carrot, Parsnip, Parsley, &c.); they are a difficult tribe to know. If yon ask the young student for a name, you are put off with "It is one of the Umbelliferæ," and the veteran shelters himself with the excuse that his botany has got rusty, or the plant is not in a fit state to name. I am convinced that a thorough acquaintance with this class of plants, acquired when the memory is retentive of knowledge, would make all plants with conspicuous flowers quite easy to the young botanist, and be a good preparation for the study of the grasses — a class sadly overlooked. It is such an advantage to master one confusing family at the beginning, and not to put off all difficulties to the end.

There is perhaps no tribe of herbaceous plants that supplies us with such a variety of foliage for so many months in the year. In January we find the fresh young leaves of *Chærophyllum sylvestre* (Cow Parsley) months before any Fern unrolls its young fronds, and when, with the exception of that persistent flowerer, Chickweed, there is positively nothing in flower. Soon the little *Draba verna* (Whitlowgrass) bristles on the tops of walls; *Mercurialis perennis* (Dog's Mercury) and *Lamium purpureum* (Red Dead Nettle), with its tops of soft purple bloom, give interest to the hedge bottoms, but the *Chærophyllum* is first. It is no small recommendation that this class of plants affects the outskirts of towns, waste places, and rubbishy corners, unpromising ground for the collector; or is found under trees where, with the exception of a carpet of Wordsworth's favourite Celandine (*Ranunculus Ficaria*), nothing flowers.

It must be owned it requires a positive conviction that the plant wished for is there, before plunging in the height of summer growths above one's ankles into Nettles, and up to one's waist among umbelliferous plants, Thistles, and intolerably hooking burrs ; but now (April) one sees where one is going — Nettles and grey stars of Thistles are equally harmless and close to the ground, this last seemingly retaining for itself a larger share of air and moisture on its hoary, greedy leaves; and the various clumps of *Scandix odorata*, *Conium maculatum* (Hemlock), and *Chærophyllum*, are then in the perfection of freshness. It is very improving to learn to distinguish them in their young state before the tell-tale bags at the base of the leaf-stalks of *Heracleum Sphondylium* (Cow Parsnip) are developed, or the spotted stems of the Hemlock, or the concave flower-head of *Daucus Carota* (Bird's Nest), or the edible roots of *Bunium Bulbocastanum* (Pig-nut) are formed, and before the long-beaked seeds of *Scandix Pecten-Veneris* (Venus' Comb) serve to identify the plant.

Most unenviably difficult to please must those be who are not attracted by the groups seen now : young plants of *Scandix odorata*, with white variegation at the base of each pair of light green decompound leaves, associated with the simple dark green Lily of the Valley-like leaf of *Allium ursinum* (Garlic), or the halberd-shaped *Arum maculatum* (Lords and Ladies) ; the little gold Celandine forming a groundwork under the scraggy trees, with an occasional flower almost entirely white. On the other hand, by the sandy margin of the river is again the Myrrh, making foliage for the pinkish club flowers of *Tussilago Petasites* (Butterbur), as yet devoid of its huge rhubarb-like leaves; then in a dry, exposed spot, is a patch of closely-fitting *Scandix Anthriscus* (small Hemlock Chervil); and under a hedge this same most beautiful of the Umbelliferæ, represented by fine plumy plants of brightest green and finest division, is dotted through a large mass of *Lamium purpureum*, which has now lost much of the soft velvet bloom of its tops, but is in profuse flower; its bright orange anthers and delicately spotted throat are well worth noticing.

Not far off the stronger-growing *L. album* is plentiful. I always think plants of the class Didynamia should be held downwards ; the upper whorl of the White Dead Nettle has its anthers still black, the lower story of which being longer exposed, are yellow, both most attractively dotting the white upper lip. *Ægopodium Podagraria* (Gout Weed) is everywhere. It is probably the least interesting of all the Umbelliferæ, and is a fearful pest in the garden (N.B. Let not a variegation hobby induce any one to admit the variegated form into a border) ; still, its smooth, uncut bright leaves are pleasant to look upon, especially as I saw it, with the cut leaves of *Tanacetum vulgare* (Tansy), and *Potentilla anserina* (Silver Weed) and small seedlings of Cow Parsnip.

Through a bramble-covered bank, thinly leaved, one can at present see the fresh tufts of *Hypericum pulchrum* (St. John's Wort), the blue-green *Antirrhinum Linaria* (Yellow Toad Flax), the delicate shoots of *Viccia cracca*, showing its first tiny tendrils; *Geranium Robertianum* (herb Robert), *G. dissectum*, and *G. molle*, all three with

* From the *Gardeners' Chronicle* for April 25.

red stalks and crowns; and how beautiful are the leaves of *G. molle* when held between you and the sunlight, so thickly clothed with soft down they look as if frosted. How different is this plant in such a position, with shelter and loose soil, its footstalks some 5 inches long, and in the hard, open field, laid down in grass seeds; then this Geranium fits closely to the ground, and spreads out star fashion, like *Semper vivum montanum*. There are patches of seedling Umbelliferæ that one almost takes for *Thalictrum minus* or *Adoxa Moschatellina*, only one is surprised to find this particular patch without flowers. One is never weary of admiring the little green Moschatel with its four-sided head of flowers, and a fifth at top, that being the first always to expand. The beautiful foliage of *Fumaria officinalis* (Fumitory), the pointed leaves of *Achillea* (well-named *Millefolium*), *Lathyrus pratensis* (Yellow Vetchling), *Stellaria Holostea* (Stichwort), *Vaillantia cruciata* (Mugweed), and *Galium Aparine* (Cleavers) —these four last-named plants have not yet begun to climb up by anything they can lay hold of to support their weak stems. The *Galium* is not so adhesive as in summer. *Tormentilla Myosotis*, *Sherardia arvensis* (Field Madder), Epilobium, &c.—all will be choked up by summer time with the mass of Bramble arches treacherously rooted firm at the tips, and ready to trip up an intruder. Such a trip-up, however, is not to be regretted if it gives one a hint how to propagate some select garden variety, troublesome or hopeless, by cuttings, grafting, or seed.

So pleasant is it to recognize one's old friends in their first spring freshness, and so varied and beautiful in foliage are many of the plants here named, that one hardly values as one ought the first white tops of *Erysimum Alliaria* (Jack by the Hedge), or the half-opened pink *Lychnis dioica* (Campion), or the first pair of flowers on *Veronica Chamædrys*, *V. agrestis* and *V. arvensis*. *V. Beccabunga* is not in flower, and is still temptingly like Watercresses, but there is one *Viola canina* and a flower of *Glechoma hederacea* (Ground Ivy), and the little wild Strawberry.

Broom in a sunny spot has a few blossoms, but one admires the pale green leaf-buds regularly set on the dark green stems like beads; the brown velvet Whin buds are in a mass of flower, and so is the leafless Sloe. The early *Tussilago farfara* is now in cottony leaf and full erect Dandelion-like seed; just here and there a bright yellow flower is left, and a few are nodding, not yet ripe enough to stand erect on their scaly stalks. *Draba verna* is also in seed.

A thicket of *Salix Helix* is a most beautiful object, there is such variety in the different stages of its male and female flowers—soft lilac catkins ticked with scarlet, gold, and black up their slender length, according to the time the anthers have come out. *Salix Caprea* also is still in beauty—the Saugh of Scotland, and Palm Willow of England; but handsome as are its catkins, and earliest of all, they are not to compare in beauty with those of *S. Helix*, or the large soft grey flowers of *S. purpurea*, which so strikingly catch the eye on the fine purple-barked twigs. But I will not trench on the Willows, a tribe of trees far more confusing to the botanist than even the Umbelliferæ are to the amateur. It would be a well-spent spring if a score or two were mastered: three hundred, I am told, are in cultivation in Nottinghamshire.

I must bring to a close these notes on the commonest weeds gathered up in a walk on very common ground, but I was so forcibly struck by the fact how much more one saw now, when all plants are on a level, so to speak, and have a fair start, than in summer. They are spread out like a mass before one, and very good is it to probe one's memory and take note of one's ignorance, marking those plants (you must know them) which you do not recognize at present, and returning in summer to identify them, being prepared to find them a new lot of Umbelliferæ to puzzle over, and such plants as *Symphytum*, *Epilobium*, *Doronicum*, *Digitalis Rumex*, and grasses choking up the weaker growers seen with such interest now.

A great charm of the Umbelliferæ is that all the season through there are young seedlings coming on; thus you have beautiful fresh leaves. It has always struck me this family would make a good addition or substitute for what in Covent Garden parlance is vaguely called Fern, and the small leaves of even the larger growers can be used intact. I cannot bear to see the waste and destruction of the perfect fronds of such-like Ferns as *Aspidium Filix-mas* and *Asplenium Filix-fœmina*, the tips of which are alone used for certain decorative purposes. Might it not answer to sow seed of umbelliferous plants in bare places, and under trees (rookeries) where grass has been tried and failed? It would insure a beautiful green undergrowth at the barest time, from January to April. It is easy to cut over the flower-stems if they are an objection, but seeding should be encouraged for a year or two to secure a succession of young plants; and in the openest spots plants of *Heracleum giganteum*, &c., would have a grand appearance.

Of the numerous garden varieties suitable as leaf plants, I shall make some remarks later on in the year, when I can prove from memoranda that beautiful foliage can be gathered every week in the year from this family alone.

As a conclusion to this paper on Common Weeds, let me recommend an uncommon winter and spring nosegay, and one from which the amateur will learn much, and that at present has daily growing interest. Have a bunch of twigs of all the forest trees you can get in a jug of water in your room, and simply watch their buds swelling, bursting, unfolding and expanding their leaves and flowers. I am in the practice of cutting off a handful of such twigs monthly, keeping each month's supply by themselves; and most interesting is it patiently to watch and compare their various and varied progresses from the end of January to April. It would take a long paper to note all one sees with the naked and, alas! ignorant eye, but it is a capital plan by which to learn a little of the different ways in which the leaves are packed and folded inside their numerous coverings—from the thick leathery scolloped outmost scales of the Walnut, or sticky ones of Horse Chestnut and Poplar, to the softest smooth ones lying closest to the tender leaves. Pleasant is it to stand under a bursting Sycamore or Horse Chestnut, and almost hear the cracking of the large buds, and be covered with the pretty pink bud-coverings of the one, and be stuck over with the resinous husks of the other; but more improving is it to have the buds under your eye from day to day. By this means one realizes (so far) the wondrous rapidity of growth in spring. We are all acquainted with, and talk freely of, the rush of the arctic summer at the Poles, and of the tropical growths after the rainy season in the torrid zone; but of the amazing bound that takes place under our own eyes every spring we live, we are grossly ignorant.

I have simply not been believed, and by country friends, too, when exhibiting the gross young shoot of a Horse Chestnut, and from a later tree a similar bud, out of which this marvellous growth of shoot (above a foot in length) and pairs of leaves has issued. Still more startling is it to observe the commencement of the new bud for next year at the base of the new-born leaf, not above a fortnight or so old, as these few days are sufficient for this huge leap into active life. To the amateur only seeing is believing in such a case. I will not add another word at present, but hope, for their own sakes, some may gather themselves a tree nosegay, and this very spring be a little less ignorant of "common things"—*i.e.*, of wonders that may never be understood, possibly, by them, but which, nevertheless, any, even the faintest, approach to them, enlarges the mind and heart, for then there must be deep and humble admiration of the amazing workings of Nature, obedient to the Great Creator.

The Pharmaceutical Journal.

SATURDAY, MAY 2, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACY IN IRELAND.

THE course of the Irish Pharmacy Bill which we published a fortnight since, bids fair to be far from smooth. The circular sent out by the College of Physicians, putting forward the reasons which had induced that body to introduce a Bill to amend the laws affecting the practice of Pharmacy in Ireland, has been promptly responded to by the Governor and Company of the Apothecaries' Hall of Ireland. It now seems evident that there is little ground for adhering to the hope we ventured to express that the Apothecaries' Company would not be altogether adverse to the Bill. In the circular that body has issued in reply to the College of Physicians it is stated that, after careful consideration of the Bill and its several provisions, it has been decided to object to it, and that a sense of public duty constrains the Company to make known the reasons for doing so.

These reasons are somewhat voluminous, and they do not appear to leave much room for anticipating cordial co-operation on the part of the Irish apothecaries, in the endeavour to remedy an evil which is severely felt in many cases by the public, as well as by members of the drug trade, and the existence of which is admitted by the Apothecaries' Company.

In the first place, the College of Physicians' Bill is objected to because when the English Pharmacy Bill was before Parliament, in 1868, a similar proposition was rejected by the House of Commons on the ground that there was a difference between the two parts of the kingdom; for while in Ireland for nearly a century every person who practised pharmacy had been compelled to attend a prolonged course of study, and undergo a strict examination prior to his doing so, any person in England or Scotland might keep open shop for that purpose, however unqualified. Hence it was held that the provisions of the Bill being throughout intended for Great Britain, they could not be extended to Ireland.

This certainly seems but a slender reason for objecting altogether to the present extension of the Pharmacy Act (1868) to Ireland, although we can well understand the difference above referred to might be successfully urged against the application of the Act to Ireland at that time. In the interval, the conditions under which the practice of pharmacy may be carried on in Great Britain have been vastly amended, and indeed, assimilated to those which have long obtained in Ireland, with this important difference, however, that here the course of study and the examination required are specially and properly adapted to secure competent knowledge and skill on the part of pharmacists, without imposing upon them the expenditure of time and money in studies that are of no kind of utility to them in their after career as compounders of medicine.

Another reason for objecting to the proposed Bill is, that it would subvert the rightful control over pharmacy exercised by the Irish Apothecaries' Company. In regard to this we have no desire to say anything in disparagement of the mode in which the Company discharges its duty in regard to pharmaceutical qualification, so far as the discharge of that duty extends; but we may at least point out that it falls short of present requirements. This is admitted by the Apothecaries' Company, as we showed in a recent article on the subject, and we fail to perceive why that body should object to a mode of supplying the want it acknowledges, which would afford facilities for competent pharmacists carrying on business in Ireland as they now do in other parts of the kingdom.

The next objection, however, appears to afford some clue to the real ground of opposition to the proposed Bill on the part of the Apothecaries' Company, for it is urged that by Clause 2 there would be introduced into Ireland a number of English "chemists and druggists," who are on the English register, but who never passed through the course of study or examination required for pharmaceutical chemists under the Pharmacy Acts, and with reference to several of whom it is pointed out that an eminent member of the Pharmaceutical Committee of the House of Commons is reported to have said in 1868 that many persons under the name of druggists were entrusted with the selling and compounding of poisons who were utterly ignorant of the nature of those poisons, and of the general effect of drugs. The Apothecaries' Company, in its circular, openly expresses the fear that "such is the class that the Bill of the College of Physicians would most probably introduce into Ireland as compounders of prescriptions for the public."

If there were any reasonable ground for such a fear we should not hesitate to share with the Apothecaries' Company its objection to the proposed measure; but we believe that is not the case necessarily. So far as the object of the Apothecaries' Company is to secure competency on the part of pharmacists, it would entirely command the sympathy of the Pharmaceutical Society, and, we may safely add, that of the entire pharmaceutical body in this country.

It may perhaps be inferred from the way in which the last-mentioned objection is stated by the Apothecaries' Company that nothing less than the Major qualification of the Pharmaceutical Society is looked upon as the requisite indication of fitness for the practice of pharmacy, and such a view will, we are sure, find many adherents among ourselves.

The third clause of the Bill is objected to because the licence of the Irish Hall is already a legally recognized medical qualification throughout the Queen's dominions, entitling the holder of it to practise both pharmacy and medicine.

Lastly, the especial reason why the company objects to the proposed Bill of the College of Physicians is that it has a Pharmacy Bill of its own which does not disturb vested rights—one drafted by consent of Government a few years since,* which it is considered provides amply for the pharmaceutical wants of the public, and has the approval of the Associations of the Licentiate Apothecaries and of the Chemists and Druggists of Ireland.

THE ADULTERATION OF FOOD ACT.

On Monday night Mr. Sclater-Booth nominated the following members of the House of Commons as a Select Committee on the Adulteration of Food Act, 1872:—Mr. Clare Reed, Mr. Muntz, Mr. Welby, Sir Charles Dilke, Mr. Peek, Mr. Colman, Mr. Carpenter Garnier, Mr. Alexander Brown, Viscount Barrington, Mr. Backhouse, Mr. Heygate, Mr. Mundella, Mr. Sandford, Dr. Brady, and Mr. Benyon.

LEGACY TO THE PARIS SCHOOL OF PHARMACY.

The director of the École Supérieure de Pharmacie of Paris has been authorized to accept, in the name of the State, and under the clauses and conditions laid down by the testator, a legacy to the School, by M. Leroze, of the sum of 10,000 francs. This money is to be devoted to the foundation of an annual prize for the best memoir upon qualitative and quantitative analysis.

ALTERATION IN PHOSPHORETTED RESIN.

At the March meeting of the Philadelphia College of Pharmacy, Dr. W. H. Pile showed a sample of phosphoretted resin which, from exposure to sunlight, had become changed in colour to a beautiful red. He also exhibited a sample of an emulsion made with phosphoretted resin, and a tube containing a mixture of alcohol and the resin, showing that the phosphorus had separated as a fine precipitate.

We are glad to learn that M. Masson has published a verbatim report of the important discussion in the French Academy of Medicine upon the questions referred to it by the Minister of War, relative to the future position of pharmacists in the French army. The pamphlet is entitled, "Discussion sur les Rapports à Établir entre la Médecine et la Pharmacie dans l'Armée, en réponse aux Questions posées par M. le Ministre de la Guerre." Some months since we gave a *résumé* from this interesting discussion, in which the interests of pharmacy were defended by such men as Dumas, Poggiale, Bussy and Gobley. Should the time ever come for the English pharmacist to put forward a claim to a similar position in the public service, powerful support for his arguments will be found in the pages of this *brochure*.

* See Pharm. Journ., i. 405.

THE NEXT EVENING MEETING.

On Wednesday next, May 6th, an extra Evening Meeting of the Pharmaceutical Society will be held, to afford an opportunity for discussing the "Additions to the Pharmacopœia," and the paper on this subject read by Mr. Umney at the last meeting. The Chair will be taken at half-past Eight o'clock precisely, and the discussion will be opened by a short paper by Mr. E. Smith, of Torquay.

THE JURIES BILL.

The consideration of the Juries Bill in Committee of the House of Commons has been postponed until Tuesday next, May 5th.

AN APOTHECARIES' OATH.

From an interesting work on the handicrafts of Paris, by M. Desmaze, which is shortly to be published, the *Répertoire de Pharmacie* produces two excerpts, relics of the middle ages, the one being the oath then taken by the apothecaries, the other that taken by the midwives. The following is a free translation of the apothecaries' oath, from which, although mainly of a negative character, it will be seen that his duties closely resembled those of the pharmacist of the present day:—

"I take to witness, before all, God the Creator of the Universe, in three persons, that during the whole of my life I will observe that which follows:—

"I will live and die in the Christian faith. I will honour my parents. I will honour the physicians and masters under whom I have studied. I will never say anything that shall be injurious to the seniors of our order, or to others. I will adorn with my best the dignity of the art, and I will not reveal its secrets. I will do nothing imprudently nor through hope of gain. In acute sickness I will not give purgatives without the order of the physician. I will not touch the secret parts, except to apply remedies to them. I will keep the secrets of the patients. I will administer no poison, neither will I allow it to be administered, even to my enemies. I will not give an abortive remedy, even to provoke the expulsion of a fœtus, except upon the order of a physician. I will not alter the prescriptions of physicians. I will never substitute one remedy for another without their knowledge. I will discourage the fatal practice of empirics. I will refuse to no person my legitimate assistance. I will not keep in my pharmacy stale or badly prepared medicaments.

"In making and observing these rules, may God assist me. *Ainsi soit-il!*"

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

April 15th, 16th, 17th, 22nd, 23rd, and 24th, 1874.

Present (15th and 22nd)—Messrs. Allchin, Barnes, Benger, Carteighe, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

(16th)—Messrs. Allchin, Barnes, Benger, Bottle, Carteighe, Corder, Cracknell, Davenport, Gale, Martindale, Schweitzer, Southall, Taylor, and Umney.

(17th)—Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Taylor, and Umney.

(23rd)—Messrs. Allchin, Benger, Bottle, Carteighe, Corder, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

(24th)—Messrs. Allchin, Benger, Bottle, Carteighe, Corder, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, Taylor, and Umney.

Dr. Greenhow was present on the 22nd and 24th on behalf of the Privy Council.

MAJOR EXAMINATION.

Eight candidates were examined. *One* failed. The following *seven* passed, and were declared duly qualified to be registered as Pharmaceutical Chemists:—

*Richmond, Robert, jun.	Leighton Buzzard.
Walsh, Albert	Richmond.
Carter, Arthur Joseph	London.
Willan, Robert	Ulverston.
Chamberlain, Arthur Garratt	Leicester.
Jones, Rees Thomas	London.
Polley, John	Chester.

MINOR EXAMINATION.

One hundred and fifty-eight candidates were examined. *One hundred and sixteen* failed. The following *forty-two* passed, and were declared qualified to be registered as Chemists and Druggists:—

	*Marsh, Edward Robert	Oakham.
	Thomas, William	London.
	Harvey, William Sutton	Margate.
Equal.	Gilbert, Sydney	Exeter.
Equal.	Spencer, Joseph	West Bromwich.
	Boultbee, Charles Edward	Norwich.
	Davies, Frederick	Chester.
Equal.	Crowden, Francis	Keswick.
Equal.	Kirk, John Robert	Leeds.
Equal.	Shakespeare, Alfred William	Leicester.
	Lowe, Arthur	Lynn.
Equal.	Atkinson, Henry B.	York.
Equal.	Fawthrop, Thomas	Ryde.
	Lilley, John Henry	Staveley.
Equal.	Spence, John	North Shields.
Equal.	Wood, Henry Thomas Gibbons	Hull.
Equal.	Hewett, William Herbert	Basingstoke.
Equal.	Marsh, William Henry	Norwich.
	Pitchford, William	Newton Abbot.
Equal.	Broughton, Thomas	Salford.
Equal.	Procter, Robert	Kidderminster.
	Willan, William	Preston.
Equal.	Naylor, Wm. Arthur Harrison	Manchester.
Equal.	Patridge, William Ford	Wisbeach.
Equal.	Rayson, John Thomas	Swineshead.
	Walmsley, Robert	Clitheroe.
	Blunt, George	Upton-on-Severn.
Equal.	Jones, William	Bagillt.
Equal.	Pearson, Walter	Hull.
Equal.	Woodland, John	Rochester.
Equal.	Woods, Richard	Cirencester.
Equal.	Partington, John James	Macclesfield.
Equal.	Stratford, Alfred Joseph	Kilsby.
	Smith, Charles Albert	Gosport.
Equal.	Parker, Robert Henry	Barnstaple.
Equal.	Patman, Francis Thomas	Whitehaven.
	Osborne, George Cooch	Nottingham.
	James, Isaac Rowland	Aberystwith.
	Owles, Arthur	Bungay.
Equal.	Hindle, William	Lowestoft.
Equal.	Jones, Thomas Glynne	Llanidloes.
	Francis, Charles	Winchester.

The above names are arranged in order of merit.

* Passed with Honours.

PRELIMINARY EXAMINATION.

The following is the result of the Preliminary Examination, held on the 13th ultimo :—

ENGLAND AND WALES.

Three hundred and fifty-five candidates presented themselves for examination, of whom *one hundred and eighty-six* failed. The following *one hundred and sixty-nine* passed, and have been duly registered as Apprentices or Students :—

FIRST DIVISION.

	Hubbard, Henry Joseph	Norwich.
	Stead, Thomas Gomersall	Chesterfield.
	Dawson, John William	Burgh-le-Marsh.
	Stevens, J. Jesse William	Strood.
	Holden, John	Burnley.
Equal. Equal.	Agars, John Charlton	South Shields.
Equal. Equal.	Tanner, Herbert	Wendlebury.
Equal.	Loney, Thomas Slade	London.
Equal.	Newth, Francis Henry	Southampton.
	Oliver, Henry C. Hewitt	Maidstone.
	Bainbridge, Arthur	Birkenhead.
Equal. Equal.	Campling, William James	Northampton.
Equal. Equal.	Jenkins, John	Haverfordwest.
Equal.	Cooper, David	Church.
Equal.	Davison, Thomas Grey	West Hartlepool.
	Nathan, Lewis Bernard	Jersey.
	Hart, Thomas	Darlington.
Equal.	Hudson, William	Sunderland.
Equal.	Mason, William Brandwood	Bolton.
Equal.	Phethean, James	Bolton.
Equal.	Quick, William Thomas	Chelsea.
	Eggett, Edmund Cater	Lynn.
Equal.	Duckett, John James	Preston.
Equal.	Parkin, George Anthony	Ripon.
Equal.	Silvers, William Brightin	Camberwell.
	Pollard, Alfred	Sherborne.
Equal.	Dewhurst, Thomas	Preston.
Equal.	Purser, Thomas	Stratford-on-Avon.
	Cooper, William Harry	Bridgnorth.
Equal.	Bevis, Walter	Newport (I. of W.)
Equal.	Booth, Thomas	Bolton.
Equal.	Morris, George Harris	Bristol.
	Tucker, Robert William	Totnes.
	Davies, Hugh	Machynlleth.
	Clarke, Isabella S.	London.
Equal.	Bulman, George	Keswick.
Equal.	Colley, Alfred James	Coventry.
Equal.	Waring, Edwin Scholey	Greetland.

SECOND DIVISION.

	Leithead, Robert	Sunderland.
Equal.	Jackson, William John	Lytham.
Equal.	Knight, Thomas	Nottingham.
	Creer, George	Castletown, I. of Man.
	Railton, William	Penrith.
Equal.	Chipperfield, Edmund	Southampton.
Equal.	Farmer, Septimus	Nottingham.
Equal.	Gibson, John Hanson	Newark-on-Trent.
Equal.	Minchin, Walter Edward	Reading.
Equal.	Orrell, Andrew Peel	Preston.
Equal.	Billington, John	Northwich.
Equal.	McCrindle, Thomas	Northampton.
Equal.	Watson, Edward Arthur	Cheltenham.

	Hirst, Francis	Highbury.
	Hetherington, Thomas	Penrith.
Equal.	Ashmore, George Johnson	Birmingham.
Equal.	Buckley, Walter	Bradford.
Equal.	Dodd, William Henry	Fulham.
Equal.	Munday, Joseph	Bridgnorth.
Equal.	Pearce, William Little	Dorchester.
Equal.	Stone, Samuel	Penzance.
Equal.	Wale, George	New Malden.
Equal.	Bullock, John William	Blackpool.
Equal.	Morgan, R. Percy Luttrell	Holloway.
	Griffin, John Taylor	Louth.
Equal.	Fox, William Henry	Nottingham.
Equal.	Herdman, James Gawin	Blackpool.
Equal.	Brunton, Edward James	Birmingham.
Equal.	Shiels, William	Belfast.
	Holt, George Paul	Birmingham.
Equal.	Bramald, Frederick Dixon	Wakefield.
Equal.	Stuart, Frederick	Gt. Yarmouth.
Equal.	Heaton, George	Farnmouth.
Equal.	Surfleet, Walter	Louth.
	Winterburn, Joseph Williamson	Manchester.
	Protheroe, John Godwin	Christchurch.
Equal.	Armstrong, George Clarke	Sunderland.
Equal.	Bird, William	Monkmeanmouth.
Equal.	Curtis, Frederic George	Dorchester.
Equal.	Sedgwick, John	Blackpool.
Equal.	Warriner, Robert	Manchester.
Equal.	Joy, Francis John Jessopp	Cardiff.
Equal.	Hopkins, William	Warwick.
Equal.	Kendrick, Alfred	Limehouse.
Equal.	Medd, Henry	Gloucester.
Equal.	Brown, Edward Oliver	Leeds.
Equal.	Ingham, George D. Warner	Penzance.
	Richardson, Joseph	Birmingham.
Equal.	Fox, Frederick William	Lincoln.
Equal.	Hart, William John	Brigg.
Equal.	Johnson, Walter Edmund	London.
Equal.	Oldershaw, George	Staleybridge.
Equal.	Cambridge, John Underwood	Hartlepool.
Equal.	Waters, William Allen	Rye, Sussex.
Equal	Butler, James Arthur	Leicester.
Equal	Cocker, Robert Benjamin	London.
Equal	Gamble, Arthur Gompertz	Grantham.
Equal	Griffin, Joseph Thomas	Smethwick.
Equal	Laslett, Thomas George	Hull.
	Westerman, Arthur	Wakefield.
Equal.	Gutch, George Hancock	Poole.
Equal.	Irving, Frederick William	Donington.
Equal.	Margetts, William Burgess	Kettering.
Equal.	Powell, Septimus	Bristol.
Equal.	Richmond, W. E. Smith	Blackpool.
Equal.	Roberts, Thomas	Margate.
Equal.	Shaw, John William	Guisborough.
Equal.	Smithurst, John	Nottingham.
Equal.	Spencer, Walter	Bradford.
Equal.	Thomas, David Robert	Aberystwith.
Equal.	Corlett, Edwin	Ramsey, I. of Man.
Equal.	Gibson, James Edward	Sheffield.
Equal.	Jones, John	Liverpool.
Equal.	Yeats, John Williams	London.
Equal.	Astley, Lacey Phillips Capewell	Dudley.
Equal.	Eaton, Edward Jarrett	Diss.
	Jones, Daniel Williams	Erwood.
Equal.	Bancroft, James	Halifax.
Equal.	Hamilton, Edmund Harry	Bromley, Kent.
Equal.	Hill, John	Portsea.
Equal.	Major, Henry John	Manchester.
Equal.	Marchant, F. D. Barker	Ipswich.
Equal.	Merryweather, John Thomas	Whitby.
Equal.	Parker, Thomas	Preston.
Equal.	Thomas, John	Aberystwith.
Equal.	Tomkins, William Kingston	Oxford.
Equal.	Walker, Henry James	Leamington.
Equal.	Whitney, Sydney Francis	Weston-super-Mare.
Equal.	Powell, John William	Reading.
Equal.	Thompson, George	Epworth.
Equal.	Anderson, G. Anthony Coulson	Bournemouth.
Equal.	Olliff, Charles Randall	High Wycombe.
Equal.	Place, Thomas	York.
Equal.	Richardson, Joseph William	Alderley.
Equal.	Dodd, Thomas Hunter	Sunderland.
Equal.	Fitzjohn, Francis	Whittlesea.
Equal.	Leigh, Harold Malcolm	Dover.
Equal.	Rees, John Arthur	Cardiff.
	Atkinson, Charles Henry	Heckmondwike.
	Ballinger, Arthur John	Coventry.
	Birchall, Joseph Henry	Swansea.
	Bowell, William Henry Gisburn	Leeds.
	Brooks, Tom	London.
	Compigné, Eugène	London.
	Chapman, Alfred	Wakefield.
	Clay, William	Cromford.
	Cooper, Robert	Huntingdon.
	Day, John	London.
	Edwards, Frederick William	Bradford.
	Franciosi, Eugène Auguste de	London.
	Gooch, William Hobbs	Norwich.
	Hartley, John	Bradford.[1]
	Hitch, Frederick	Leytonstone.
	Holmes, Charles Newman	Battersea.
	Hunt, Arthur	London.
	Jones, John Maurice	Conway.
	Lawrence, Harry	Dudley.
	Lenfesty, Arthur Mansell	Guernsey.
	Madeley, Edward Stanbury	Barnes.
	Mangnall, Walter	Kendal.
	Page, Joseph	Willenhall.
	Pearson, John	Cockermouth.
	Phillips, Evan	St. Clears.
	Redford, George Alfred	Liverpool.
	Richardson, William Clark	Nottingham.
	Stennett, William	Newark.
	Taylor, Henry	London.
	Todd, Joseph	Carlisle.
	Williams, William	London.
	Wood, Francis William	Leeds.
	Wood, Frederic Percy	Bolton-le-Moors.

SCOTLAND.

Forty-two candidates presented themselves for examination; of these *sixteen* failed. The following *twenty-six* passed, and have been duly registered:—

FIRST DIVISION.

MacEwan, Peter	Lochee.
Boa, Peter	Stranraer.
Glover, William Kensit	Aberdeen.
Jones, Frederic	Annan.
Picken, James Alexander	Brechin.
Buchanan, James	Glasgow.
Watt, James	Haddington.
Scott, Charles	Fraserburgh.
Keith, John	Forres.
Walker, William	Aberdeen.
Hutcheon, William	Montrose.

SECOND DIVISION.

	Fisher, Alexander Bowman	Greenock.
	Marsden, John	Banff.
Equal.	Kinross, William Malloch	Edinburgh.
Equal.	Moore, Frank Philip	Aberdeen.
	Anderson, James	Fraserburgh.
	Maconachie, Andrew Wyllie	Glasgow.
	Lee, Henry	Fraserburgh.
	Cruickshank, John	Aberdeen.
	Macdonald, John	Edinburgh.
	Wilson, Peter B.	Aberdeen.
	Keith, Sydney	Perth.

Anderson, James .....Dundee.
Davidson, Peter.....Insch.
Roy, Alexander.....Crieff.
Hay, Alexander .....Insch.

The following was received in lieu of the Society's Examination:—

Certificate of the College of Preceptors.

Porter, John Thomas ....Coalville.

The questions for examination were as follows:—

Time allowed: Three hours.

LATIN.

N.B.—Candidates are not required to translate more than two paragraphs, and are recommended to select either Nos. 1 *and* 2 *or Nos.* 3 *and* 4.

1. Ita ancipiti prœlio diu atque acriter pugnatum est. Diutius quum nostrorum impetus sustinere non possent; alteri se, ut cœperant in montem receperunt, alteri ad impedimenta et carros suos se contulerunt.

2. Nihilo secius Cæsar, ut ante constituerat, duas acies hostem propulsare, tertiam opus perficere jussit. Munitis castris, duas ibi legiones reliquit, et partem auxiliorum; quatuor reliquas in castra majora reduxit.

3. Misce. Fiat haustus, quartâ quâque horâ sumendus, donec paroxysmi non discrucient, instillando alternis vicibus, si diarrhœa adfuerit, tincturæ opii guttas duas vel tres.

4. Calci, aquæ pauxillo prius resolutæ, reliquam aquam affunde, et simul agita; tum protinus vas contege et sepone per horas tres; dein liquorem cum calce superstite in vasis vitreis obturatis serva, et, ubi utendum est, ex limpido liquore sume.

5. State the genitive singular of "pater, caput, genu, os, and corpus."

6. Give the infinitive perfect, and supine of "do, misceo, video, dico, vivo, cedo, fero, possum."

7. What case do the following prepositions take "ab, ad, ante, ex, post, propter, cum, pro?"

8. Parse "Pueri discendo fiunt docti."

ARITHMETIC.

9. Divide 1·69, by 1·3 by ·13, and also by ·013, and prove the truth of each result by fractions.

10. How much water must be added to a cask containing 60 gallons of gin at 12*s.* 6*d.* a gallon, to reduce the price to 8*s.* a gallon?

11. Reduce 3qrs. 4lbs. to the fraction of 2cwt.; and three-fifths of a guinea to the fraction of £1.

12. If the carriage of 1cwt. 3qrs. 21lbs. for 52¼ miles come to 17*s.* 5*d.*, what will be the charge of 2½ tons if carried 46½ miles?

13. Find the total value of 43 articles at £4 6*s.* 8*d.* each, 57 at £11 8*s.* 6*d.* each, and 4 at £13 15*s.* 4*d.* each. What is gained or lost by selling them at the rate of 3 for £28.

ENGLISH.

14. State the past tense and past participle of:—
"bear, strike, burst, bind, and choose."

15. Parse the following:—
"The last of all the bards was he,
"Who sang of ancient chivalry."

16. Write about 20 lines on *one* only of the following subjects:—
Courage,
Beauty,
War.

The following is a list of the Towns at which the Examinations were held, with the numbers of Candidates annexed:—

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Aberystwith	2	2	
Ashton-under-Lyne	1		1
Bangor	3	1	2
Bedford	2		2
Belfast	1	1	
Birkenhead	1	1	
Birmingham	6	3	3
Blackburn	5	1	4
Blackpool	4	4	
Bolton	4	4	
Boston	2		2
Bradford	13	5	8
Bridgnorth	2	2	
Bristol	6	2	4
Burnley	3	1	2
Buxton	1	1	
Cambridge	4		4
Canterbury	1		1
Cardiff	3	1	2
Carlisle	2	2	
Carmarthen	3	1	2
Cheltenham	3	2	1
Chester	2		2
Chesterfield	1	1	
Christchurch	2	2	
Cockermouth	2	1	1
Coventry	1	1	
Darlington	2	1	1
Denbigh	2		2
Derby	2		2
Diss	2	1	1
Doncaster	3	1	2
Dorchester	2	2	
Dudley	4	3	1
Dover	1	1	
Durham	2		2
Evesham	1		1
Exeter	2		2
Gainsborough	3	1	2
Grantham	1	1	
Grimsby	1		1
Guernsey	1	1	
Guildford	1		1
Hanley	1		1
Hartlepool	2	2	
Haverfordwest	1	1	
Hereford	3	2	1
Huddersfield	5	1	4
Hull	2	1	1
Huntingdon	1	1	
Harrogate	1		1
Ipswich	3	1	2
Jersey	1	1	
Kendal	2	1	1
Kidderminster	1		1
King's Lynn	1	1	
Launceston	2		2
Leamington	4	2	2
Leeds	7	4	3
Leicester	2	1	1
Lincoln	2		2
Liverpool	9	4	5
London	61	26	35
Louth	4	3	1
Manchester	23	5	18
Market Harbro'	1	1	
Newark	2	2	
Newcastle-under-Lyne	2		2
Newport, I. W.	1	1	
Newport, Mon.	1	1	
Norwich	7	2	5
Nottingham	6	5	1
Oldham	2		2
Oxford	2	2	
Penrith	2	2	
Penzance	3	2	1
Peterborough	3	1	2
Plymouth	1	1	
Poole	1	1	
Portsmouth	2	1	1
Preston	5	5	
Ramsgate	1	1	
Reading	2	2	
Ripon	1	1	
Runcorn	2	1	1
Rochester	1	1	
Rye	2	1	1
Salisbury	1	1	
Scarborough	2		2
Sheffield	3	1	2
South Shields	3	1	2
Southampton	4	2	2
Southport	1		1
Spalding	2	1	1
Stafford	2		2
Stalybridge	3	1	2
Stockton-on-Tees	3	1	2
Stroud	1		1
Sunderland	5	5	
Swansea	3	2	1
Taunton	1		1
Tavistock	1		1
Truro	1		1
Wakefield	3	3	
Walsall	1		1
Warrington	2		2
Warwick	2	2	
Wednesbury	1		1
Weston-super-Mare	1	1	
Whitby	1	1	
Whitehaven	4		4
Wolverhampton	2	2	
Wycombe	1	1	
Yarmouth	1	1	
York	2	1	1

SCOTLAND.

	Candidates. Examined.	Passed.	Failed.
Aberdeen	13	10	3
Banff	1	1	
Dumfries	4	2	2
Dundee	2	2	
Edinburgh	10	2	8
Elgin	1	1	
Glasgow	5	3	2
Haddington	1	1	
Montrose	3	2	1
Perth	2	2	

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

At a meeting of this Association on Friday, April 17th, the Chair having been taken by the President, Mr. W. D. Savage ;—a paper was read by Mr. T. Haffenden entitled "A few notes on Hippocrates." Mr. Haffenden commenced by giving an account of medicine before Hippocrates' time, tracing the progress of the art from Egyptian science and philosophy, and showing the intimate connection between religion and science in the fact that there were priest-physicians, called Asclepiades, who practised their art in the Asclepions or Colleges of Health, to which invalids resorted in those days as they do to the spas and hospitals in the present time. The office of priest-physician descended from father to son, and it was in one of these temples, the asclepion of Cos, that Hippocrates was born and educated. A list of contemporaries was read, showing that Hippocrates lived at a very remarkable period of Grecian history. He practised homœopathy and allopathy, and paid great attention to "*Diet*," looking upon roasting, boiling, diluting, as merely medicinal modes of preparing food for absorption into the body, really as the origin of medicine. A copy of an oath was also read, showing that there was in his day a corporate body of practitioners, bound by oath, and having regular instructors in the art. Extracts were also given from the Materia Medica of Hippocrates' time, showing that his contemporaries were familiar with many remedies in common use at the present time.

The Chairman drew attention to the fact that Hippocrates employed only vegetable substances as medicines, so that they had to thank the alchemists for a knowledge of chemicals. He also stated that as *post mortem* examinations were in the time of Hippocrates prohibited by law, he could have known very little about the anatomy of the human body, nor was he acquainted with the circulation of the blood, or of the existence of the nervous system, etc.

A lively discussion then ensued, and the meeting concluded by passing a hearty vote of thanks to Mr. Haffenden for his paper and to the Chairman for presiding.

HALIFAX CHEMISTS AND DRUGGISTS' ASSOCIATION.

April 23rd, 1874. Mr. Jessop, president, in the chair. The chief topics which occupied the attention of the meeting, were the Juries Bill and the Adulteration Act. With respect to the first subject, great satisfaction was expressed at the Bill having passed a second reading, and that there was a possibility that, before long, registered chemists and druggists would share, with their pharmaceutical brethren, exemption from jury service. With regard to the Adulteration of Food Act, the following resolution, on the motion of Mr. Dyer, seconded by Mr. Brierley, was carried :—"This Meeting records its satisfaction at the fact of the Government appointing a Commission to inquire into the working of the Adulteration Act, and trusts the Council of the Pharmaceutical Society will take such steps in the interests of the trade as may be deemed advisable ; more especially with respect to the retail dealer being held responsible for the faults and shortcomings of the wholesale dealer and manufacturer."

A copy of this resolution was ordered to be forwarded to the Registrar of the Pharmaceutical Society.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, April 16th, 1874. Dr. Odling, F.R.S., president, in the chair. The minutes of the previous meeting having been read and confirmed, Messrs. J. Smyth, Howard Barrett, H. L. Greville, T. M. Nishigaiva, G. H. Beckett, and A. J. Greenaway, were formally admitted Fellows of the Society.

The first paper 'On Aqua Regia and the Nitrosyl Chlorides' was read by the author, Dr. A. W. Tilden, who was induced to undertake this research in hopes of being able to obtain nitroso-compounds by the action of nitrosyl chloride, NOCl, on organic bodies. As no process existed for the preparation of this substance in quantity, the author devised the following :—The gases evolved on gently heating aqua regia were dried by calcium chloride, and then passed into concentrated sulphuric acid to saturation. The product, when exposed to a low temperature, deposits crystals having the composition $NOHSO_4$. These melt at 85° to 87°, and possess the characters of the ordinary sulphuric acid chamber crystals. Attempts to obtain a dinitrosyl sulphate $(NO)_2SO_4$, were unsuccessful ; on mixing either the crystals or the sulphuric acid saturated with the aqua regia gases with dry sodium chloride, and gently heating, nitrosyl monochloride is at first given off —$NOHSO_4 + NaCl = NaHSO_4 + NOCl$. When this has ceased, the application of a stronger heat causes the evolution of torrents of hydrochloric acid. The pure nitrosyl chloride thus obtained is an orange-yellow gas, which may be condensed to a mobile liquid of a deep orange colour, boiling at − 8°. It attacks platinum and gold, but only very slowly. The existence of the remarkable dichloride, $NOCl_2$, which, according to Gay-Lussac, occurs among the products of the decomposition of nitric acid by hydrochloric acid, seemed doubtful, as no compound having any analogy with it is known, except the vanadyl dichloride, $VOCl_2$, of Roscoe. The author endeavoured to prepare this substance by fractionally distilling nitrosyl monochloride saturated with chlorine, but no definite compound could be obtained ; a similar result ensued on examining the liquid produced by condensing the gases from aqua regia : from this it would appear that the monochloride is the only definite nitrosyl compound obtainable from aqua regia, the reaction being $HNO_3 + 3HCl = NOCl + Cl_2 + 2H_2O$. Gay-Lussac's dichloride was probably a solution of chlorine in the monochloride. The action of nitrosyl sulphate on potassium bromide does not give nitrosyl bromide but nitric oxide and a dark liquid which could not be distilled without the evolution of the same gas. It was not further examined.

The president, in thanking Dr. Tilden, said that the subject of which he had treated was one of very great interest to chemists, and the results he had obtained satisfactorily proved the existence of the compound NOCl, which, if he remembered rightly, Gay-Lussac had passed over with very slight notice, his attention being directed to the mixed body which he supposed to be the dichloride. This compound, whose existence Dr. Tilden had shown to be more than problematical, would be the legitimate analogue of nitric peroxide.

In reply to a question of the president, Dr. Tilden said that Roscoe's vanadyl dichloride was a green crystallizable body of definite composition, but, as it did not seem to be volatile, there was no means of determining its molecular weight.

Dr. C. R. A. Wright then read a paper on 'Isomeric Terpenes and their Derivatives ; Part IV.'—1. 'On Cajeput Oil,' by C. R. A. Wright, D. Sc., and T. Lambert. By carefully fractioning oil of cajeput, an oil, cajeputol, was obtained, boiling between 176° and 179°, and having the composition $C_{10}H_{18}O$, isomeric with the citronellol described in Part III. Like the latter, it combines with two equivalents of bromine, forming the compound $C_{10}H_{18}Br_2O$, which, when heated, splits up into cymene, hydrobromic acid, and water—

$$C_{10}H_{18}Br_2O = C_{10}H_{14} + 2HBr + H_2O.$$

This cymene, when purified, boiled at 176° to 177°, and, on oxidation, yielded terephthalic acid free from isophthalic acid, so that it is identical with that obtained from the other terpene derivatives.

2. 'Action of Pentasulphide of Phosphorus on Terpenes and their derivatives,' by Dr. C. R. A. Wright. On treating

cajeputol with its own weight of the pentasulphide, a vigorous reaction takes place, and a hydrocarbon distils over, which appears to be a mixture of cymene and a terpene, the former predominating. As it seemed probable that the cymene might result from the action of the pentasulphide on the terpene—$C_{10}H_{16}+S=C_{10}H_{14}+H_2S$, the terpene from turpentine oil, boiling at 159°, and hesperidene, boiling at 178°, were digested with an equal weight of phosphorus pentasulphide, when a continuous evolution of sulphuretted hydrogen took place, and much of the hydrocarbon was resinified, but about 30 to 40 per cent. distilled over, consisting almost entirely of cymene. It would seem that the class of bodies known as terpenes, and their derivatives of the form $C_{10}H_{16}O$ and $C_{10}H_{18}O$, are closely connected with cymene, so that this hydrocarbon may be regarded as the central form of matter from which these classes of substances are derived, by operations similar in character for all members of a given class, but differing apparently in the extent to which energy is involved in each operation respectively.

The president said the society was much indebted to Dr. Wright for the continuation of his investigations of the ten-carbon bodies. It was curious that the vegetable kingdom should yield such a vast supply and so great a variety of the ten-carbon bodies, and not other benzene derivatives containing C_9, C_7, etc. He believed that other bodies existed, having the same percentage composition as the terpenes, but only half the vapour density, so that they might be considered as five-carbon bodies ; he would like to ask whether any relation had been made out between these and the ten-carbon bodies.

Dr. Wright replied that this subject had been but little examined. It was a curious fact that, although we could obtain the polymerides from the C_{10} bodies, we could not perform the inverse operation, and unpolymerize them, so to speak,—that is, convert C_{15} or C_{20} compounds into C_{10} bodies.

The meeting was then adjourned until Thursday, May 7th, when there will be papers 'On the Constitution of Urea,' by Dr. D. Tommasi ; 'Researches on the Action of the Copper Zinc Couple on Organic Bodies : Part VII., On the Chlorides of Ethylene and Ethylidene,' by Dr. J. H. Gladstone and Mr. A. Tribe ; and 'On a Mineral from New Caledonia,' by Mr. A. Liversedge.

SOCIETY OF ARTS.

Cocoa and its Manufacture.*

BY JOHN HOLM, F.R.C.S., EDINBURGH.

(*Concluded from page* 846.)

Any Adulteration Act, to be successful in working, and that does not, while protecting the public against fraud, commit injustice against the trader, must be very comprehensive ; for it is impossible to put, in a few short clauses, the power of dealing with all the various substances we use as food, especially those of a mixed character, such as cocoa, condensed milk, etc. It appears to me that the difficulty would best be met by appending, in the form of a schedule to the present or an amended Act, a list of the various mixed foods we take, and of what they should consist ; but such a schedule could only be successfully compiled after an examination by a commission of the House, of practical as well as scientific men.

As regards the manufacture of cocoa, I most indignantly deny that the admixture of sugar and farina are adulterants in any sense. They are, as I have shown, necessary to make the article of commerce known as soluble cocoa, which, from being the form in which it is generally used, is known simply as cocoa. The public is but little acquainted with the raw nut, which, as I have said, is almost useless as a food without considerable preparation. Those, however, who like the unmixed forms of cocoa, obtain them at the shops by asking for them under their appropriate names. They are the raw and roasted and flaked nuts, and roasted, ground, and flaked cocoa nibs. These forms of cocoa have been accessible to the public almost since its introduction in this country, but have never been largely used on account of the time and trouble required to prepare beverages from them, the unsatisfactory nature of the result, and the wastefulness attending such a mode of use. We have seen that the only way to reduce cocoa into an elegant powder is either by admixture or abstraction ; and in the earliest record we have of the use of cocoa as a food in any form, that it has been always prepared with other substances ; the instinct of the Indian leading him to the same result as that attained by civilized man. This necessity has not only been fully recognized and sanctioned by high scientific authority, but also by Act of Parliament (3rd Geo. IV., c. 53) passed in the year 1822, to regulate, amongst other things, the manufacture and sale of cocoa. It is therein provided that it shall be lawful to manufacture "Cocoa Paste, Broma, and other Mixtures and Preparations of Cocoa with Sugar and Arrowroot Flour, or other Farinaceous Powders ; such Arrowroot Flour, or other Farinaceous Powder not being baked, scorched, roasted, or otherwise disguised or altered from its natural state, except by being mixed with cocoa as aforesaid." The latter provision is an instance of how favourably some of these old Acts compare with much of the over-hasty legislation of the present day, in the care with which they were prepared ; for it takes in the whole question of cocoa adulteration, and while not, on the one hand, prohibiting its preparation with other substances, yet guarding against a fictitious appearance of strength being produced in fraud of the consumer.

In the interests of honest cocoa manufacturers it is highly desirable that this clause should be incorporated in any future legislation, and a further enactment be made requiring a specification of the different ingredients employed. The proportions in which these are mixed it would not be just to require, as in this constitutes the difference of one manufacturer's preparation from another, and any such statement is quite unnecessary if the consumer is protected against deception, as he will then be able to judge fully the quality of his cocoa, and will refuse to take those preparations in which the admixture of sugar and farina is pushed to excess. Amongst the numerous eminent scientific men who have given their sanction to this mode of preparation, I will only name Drs. Pereira, Johnston, and Ure, and Messrs. Tomlinson, Brande, and Cooley, all Fellows of the Royal Society. The testimony of Drs. Normandy and Letheby is also of great value. The former states that "the preparation known as cocoa powder or chocolate powder, when genuine, consists only of cocoa nibs, sugar, and arrowroot," and states that the "butter of cocoa is thereby rendered emulsive and more digestible." Dr. Letheby states that cocoa and chocolate owe their chief value, as food, to the fat they contain," and further states "it is necessary to reduce it with some easily digestible substance." Johnston, in his "Chemistry of Common Life," states "that the presence of the cocoa-butter justifies also, as fitting it better for most stomachs, the practice of mixing the cocoa with sugar and farina," and says, "both practices are skilful chemical adjustments." The testimony of Dr. Ure is perhaps the most important of all, he having been appointed by Government to inquire into the manufacture of cocoa for the navy in the year 1842. The reason of his appointment was, that the cocoa as then made at the Deptford Victualling Yard was found to produce a spurious form of dysentery amongst the men. Dr. Ure soon discovered that this arose from the practice of grinding the whole nut, husk and nib, in a coarse and ineffective manner. He therefore conducted a series of experiments, which led him to recommend to the Lords of the Admirality the preparation of a chocolate combined with sugar and farina, but freed from the husks. This form is still used, and its value is shown by the fact that the virtues of navy cocoa are proverbial. That

* Reprinted from the *Journal of the Society of Arts.*

Dr. Ure should have arrived quite independently at conclusions so similar to those formed by Mr. Dunn so many years previously, is a source of satisfaction to that gentleman's representatives. The opinion is of the greater value from the fact that he is the only chemist of eminence who has studied this question with a view to practical results.

These facts show conclusively how unjust and unwise it is to asert that manufactured cocoas prepared with sugar and farina are adulterated articles, and it surely was never the intention of the legislature—even of the dozen members who passed the Bill—to annihilate a large industry supplying the public with so valuable a food in the best, and, indeed, as far as the poor are concerned, in the only way it can be rendered available for consumption.

The cocoa powders prepared without admixture, but which have a large proportion of the fat extracted, are deteriorated in value by such treatment, are not readily prepared, and are so expensive as to be beyond the reach of all but the wealthy classes. Yet this mode of preparation is justifiable, and in certain cases even desirable; the consumer being aware of the kind of preparation he is buying. The objection has been made to the use of sugar and farina that they are of less value than the cocoa with which they are admixed. This is perfectly true, but would also be an objection to almost every mixed article of food; and the effect of competition gives the full benefit in the difference of their price to the consumer, except in the cases where disguising adulterants are employed. The addition of sugar and farina to cocoa has also been objected to on the ground that, being carbonaceous elements, they are added to a substance which already contains them in excess. This would be a very valid objection were we condemned to exist on cocoa only; but as it is only one of many foods, it falls through. The necessity also exists of taking the carbonaceous elements in each of their different forms, and the presence of the cocoa-butter does not render them less necessary in the form of starch or sugar. The fact is, the deductions of mere theoretical chemistry have been pushed too far, as applied to the food of man. I do not wish, however, to disparage such investigations, or to deny their beneficial results when brought to aid the observations of the practical physiologist, and when kept in proper subordination. But it is undeniable that the instincts of man are a far safer guide as to the foods he requires, than mere chemical dogmas, founded on abstruse considerations, which vary from time to time. Reliance on these has, on more than one occasion, produced painful results in our workhouses and public institutions; and but recently Mr. Brudenell Carter, F.R.C.S., pointed out in how great a degree the recent epidemics of ophthalmia which have scourged our schools were due to insufficient dietaries, prepared, however, on the most abstruse chemical principles. He says that in the matter of food supply even the street Arab is in a better condition than some of these poor children.

The popularizing of cocoa as a food was greatly aided by the reduction of the duties on the raw material. Until the year 1832 the duty on cocoa was 6*d.* per lb.; it was then reduced to 2*d.*, and in 1842 to 1*d.* per lb. on that produced by our own colonies. A larger duty was levied on foreign produce for a time, but later on was wisely taken off and the duties equalized. The duty is now 1*d.* per lb. on all raw, and 2*d.* per lb. on all manufactured cocoa imported.

From these causes in combination, the consumption of raw cocoa has risen, as shown by the following tables, from 276,321 lbs. in 1820, to 8,311,023 lbs. in 1872, an increase equal to nearly thirty-threefold in about half a century.

AMOUNT OF COCOA DUTY PAID FOR HOME CONSUMPTION.

Year.	No. of lbs.	Year.	No. of lbs.
1820	276,321	1860	4,583,124
1830	425,382	1870	6,943,102
1835	1,084,170	1871	7,333,988
1840	2,645,470	1872	7,853,165
1850	3,080,641	1873	8,311,023

CONSUMPTION OF COCOA PER HEAD IN GREAT BRITAIN (W. HOYLE).

Year.	lbs.	Year.	lbs.
1841	0·08	1868	0·17
1842	0·07	1869	0·19
1843	0·08	1870	0·20
1844	0·09	1871	0·23
1845	0·09	1872	0·23

So great a result is not only gratifying as a mere matter of commercial statistics, but in a higher degree as showing the wide and extending appreciation and use of so valuable a food.

In reference to the foregoing lecture we have received the following letter from Messrs. CADBURY BROTHERS:—

THE COCOA QUESTION.

In the paper recently read before the Society of Arts by Mr. Holm, we are surprised to find that he reiterated the same arguments as to the *necessity* for adding starches to cocoa.

These mixtures are no doubt wholesome, provided they are thoroughly boiled, otherwise (as was clearly shown by Mr. Bartlett, who spoke on Mr. Holm's paper) they are not digestible; this being frequently the cause of "soluble cocoa" disagreeing with delicate and dyspeptic persons.

But there are much more important subjects involved in this portion of the question. Cocoa, as Mr. Holm himself showed, contains about 20 per cent. of albuminoid constituents, and he adds, "These are classed amongst the nitrogenous principles of food, *and their presence renders cocoa one of the richest flesh-formers we have.*"

It will therefore be seen that every pound of starch or sugar added (both being heat-givers and not containing any nitrogenous element) will reduce its value as food in the same ratio.

The most important constituent of cocoa—that which constitutes its stimulating and refreshing element—is theobromine, or the alkaloid principle, on which Mr. Holm remarks:—"In regard to these alkaloids, it is interesting to note that throughout the world the instinct of man has led him to seek some substance which contains one of these principles, which owe their value to the specific influence they exert on the nervous system, stimulating it and checking waste of tissue."

It will again be seen that the proportion of this important constituent is reduced in exact ratio to the amount of starch and sugar added.

It would be as sensible to add starch to tea and coffee as to add it to cocoa, except for the plea that such addition renders cocoa more easily miscible.

Progress in science and mechanism has rendered this antiquated plea unnecessary, for by expressing the *excess* of butter from the cocoa, as we do in preparing our cocoa essence, the necessity of adding starch is dispensed with, and consequently the proportion of nitrogenous and alkaloid principles is *considerably increased* instead of being diminished.

The abstraction of a portion of the butter renders cocoa easily miscible, and is not only much more valuable in a dietetic point of view, but is far more refreshing and delicious in flavour and aroma.

The assertion that has been made that the extraction of the butter from cocoa "is analogous to the abstracting of cream from milk" is incorrect in *fact* and in the *idea it conveys*, because the whole of the butter is never abstracted in the manufacture of genuine soluble cocoa. The addition of starch to attain the same result (viz., suspension in the cup), reduces the proportion of cocoa-butter to the same extent as by the extraction of the butter:—

Cocoa Essence contains:

Cocoa-butter	19·22
Albumen and other component parts of Cocoa	80·78
Total . . .	100·000

The Best Homœopathic Cocoa contains:

Starch and Sugar added	53·00
Cocoa-butter	20·15
Albumen and other component parts of Cocoa	26·85
Total . . .	100·000

The proportion of cocoa-butter given in these tables are from Dr. Muter's analyses.

Cocoa-butter is both nourishing and wholesome, but owing to the large proportion (50 per cent.) that cocoa contains, the addition of starch renders it an emulsion that may fairly be compared to melted butter, which is likely to disagree with many constitutions, and cannot be *refreshing* as a beverage should be.

Parliamentary and Law Proceedings.

Conviction for Illegal Sale of Poison.

At a magistrates' meeting held at Stradbrooke, Suffolk, on April 23rd, James Thurston, member of the College of Veterinary Surgeons, living at Fressingfield, was charged with selling a certain poison, to wit, strychnia, in the form of vermin-killer, the said James Thurston not being on the register of the Pharmaceutical Society of Great Britain.

The case arose in consequence of an attempt to poison by means of vermin-killer, which came on for trial at Norwich Assizes, in March last. The prisoner was a domestic servant, living at Harleston, in Norfolk, and having an illegitimate child out at nurse at Fressingfield, in Suffolk. She asked a boy to purchase a packet of vermin-killer at Thurston's, and he was supplied with a threepenny packet, without any questions being asked or any register of the sale being made. Having obtained the poison the woman put it into some cakes, and sent them by a carrier to her child out at nurse. The child had a portion of a cake given to it, but was immediately sick, and got rid of the poison. Some children of the nurse also had some, but spat it out on the floor. A portion was also given to a little dog in the room, and being swallowed, death resulted very speedily.

The circumstances being so suspicious, some of the cake was sent to Mr. Francis Sutton, analyst for the county of Norfolk, who found strychnia in considerable quantity.

When Mr. Sutton gave his evidence before the magistrates he learned how the poison had been obtained and at once suggested that the police should purchase some, and prosecute the seller of the vermin-killer.

This is the short history of the case, and the result of the prosecution for illegal sale was as follows :—

Superintendent Ward deposed that he went to defendant's place of business on the 7th February, and bought a threepenny packet of vermin-killer, the envelope of which he produced. He took the packet to Mr. Sutton on the 11th February ; and Mr. Sutton gave as the result of the analysis that it contained 20 per cent. of strychnia, the remainder being starch with a little colouring matter.

Mr. Francis Sutton was then called, and deposed that he received the packet from Superintendent Ward, and found the contents to be as he had stated.

The defendant was then asked what explanation he had to make ; when he stated that he relied upon his being a member of the College of Veterinary Surgeons, which in his opinion entitled him to act as though he were on the register, and alluded to Section 16 of the Act for the grounds of his exemption. The chairman, however, immediately pointed out that this did not affect his position in the slightest. Mr. Sutton also, as a member of the Council of the Pharmaceutical Society, tendered evidence to the same effect ; whereupon the chairman summed up by stating that he believed the defendant had acted innocently in vending the poison, and, taking into account his good character and respectable position, the magistrates had determined to fine him in the merely nominal sum of 6*d.*, which they thought would suffice, as the costs were very heavy ; but they trusted it would be a warning to all others illegally dealing in poisons, seeing how narrow an escape many people had received in the present instance.

The costs, £4 6*s.* 6*d.*, and fine, 6*d.*, were immediately paid.

Supposed Poisoning by Phosphorus.

On Monday, April 27th, an inquest was held before the Liverpool borough coroner, on the body of Mary Collier (32), who died at the Royal Southern Hospital from the effects of poison. The deceased suffered severely from a swollen and ulcerated leg, and on Wednesday obtained admission to the Royal Southern Hospital. On the following day she told one of the nurses that she had taken poison. This information was conveyed to Dr. Hughes, senior house-surgeon, but on his questioning the patient, she denied having taken anything of the kind, and he observed no symptoms to lead him to attach any weight to her statement. On Friday morning, however, she vomited, and died the same day. A *post-mortem* examination was made, but there were no traces of poisoning. It was stated that the deceased said she had taken phosphorus paste. The immediate cause of death was asphyxia, caused by a spasm. The jury, after hearing the evidence, returned a verdict that the deceased died from asphyxia, the result of a spasm caused by poison ; but that under what circumstances the poison was taken there was no evidence to show.—*Liverpool Daily Post.*

Prosecutions under the Adulteration Act.

Adulteration of Milk.

On Wednesday, April 22nd, Bank Horrocks, milk dealer, attended at the Manchester City Police Court, before Mr. Headlam, charged with selling adulterated milk. The prosecution was the first of the kind that had taken place in Manchester.

James M'Intee, provision and milk dealer, said he had entered into an arrrangement with the defendant for a supply of milk, not milk and water, and on the average he had been accustomed to take from him six or seven quarts a day. On Sunday, the 12th of April, the defendant called at witness's shop, and proceeded to supply him with his usual quantity of milk. The defendant had a small can in his left hand, and when about to fill this can from a larger can in the cart, witness went forward and seized the small can and found it to contain about half a gallon of a white mixture. Witness, followed by the defendant. took the mixture into the shop, and on the defendant being asked what he had to say he remarked "It is pure water." Witness replied, "There is something more than that here," when the defendant again said, "It is a drop of pure water." Subsequently Horrocks remarked, "I admit I have done it ; I don't deny it ; but they all do it, but if you will give me 3d. a dozen more, I will supply you with pure milk." Several complaints had been made to witness respecting the quality of the defendant's milk. The contents of the small can witness took to the nuisance office.

Mr. J. Wrigley, an official of the nuisance department, of the Corporation, proved having received from the last witness a bottle containing a portion of the contents of the small milk can. The bottle and contents were taken to the analyst of the Corporation.

Mr. C. Estcourt, the analyst, said he had examined the liquid in the bottle, and had found that 93 parts of it were water, the rest was milk which had evidently been the rinsings of the can.

Mr. Cobbett for the defence said the specific charge against the defendant was that he had adulterated a certain article of food. That charge was not proved, because the milk he was selling had not actually been supplied. He had been actually prevented from committing the very offence he was now charged with.

Mr. Headlam said the contents of the small can were

about to be supplied by the defendant, and that was sufficient to prove the sale. The point would be overruled.

Mr. Cobbett said the defendant was the first person who had been proceeded against for this offence in Manchester, and he hoped the bench would deal with the case in a light manner. It was a very notorious fact that there was no milk sold in Manchester that was not adulterated with water, and in this case the defendant plainly told M'Intee that the milk was mixed with water.

Mr. Headlam said this was the first case in Manchester, or else the fine would have been very heavy. As it was the defendant would be fined £5 and costs.—*Manchester Courier.*

The Secrets of the "Family Jam" Trade.

At the same sitting of the Court, Messrs. Stower and Company, jam and pickle merchants, Liverpool, were summoned for selling adulterated black currant jam.

Mr. Bennett (M'Culloch and Co., Brunswick Street) said that in February he bought a quantity of jam from the defendant, but so much dissatisfaction was expressed with it that he (witness) took it to the nuisance office. The order for the jam was given to the defendant on 'Change in Manchester.

The defendant said the witness was told that Messrs. Stower had several sorts of jam for sale. The jam sold to witness was not the best quality, and the best price was not paid for it.

Witness: Nothing was said about price.

Mr. Headlam (to witness): Did you say anything about wishing to buy "Family Jam?"

Witness: No; but the defendant said that what he was selling me was pure fruit—black currant.

Mr. C. Estcourt, analyst to the corporation, said the pot of jam called "Superior family jam," which he examined, contained over 25 per cent. of adulterated matter, which he believed to be parsnips. Taking the actual percentage he should say there was 25 per cent. of real black currant, and over 25 per cent. of adulteration. The matter used for adulteration was not of an injurious character.

Defendant: Are you sure the adulterated matter is composed of parsnips?

Witness: It is not apple.

Defendant: I have a letter here from the maker of the jam, in which he says that he will defy any analyst in the world to say that the jam is made with parsnips. He says it is apple.

Witness: It is not apple, because it would be too dear.

Defendant: Our firm have nothing to do with it. We simply buy the jam. It is invoiced to us, and then we sell it. We buy the jam for 5*s.* a dozen, and we sold it to Mr. Bennett for 6*s.* 4*d.* a dozen, and we have to pay the carriage from London.

Mr. Headlam: But you are not charged with that. The alleged offence is that you did not say that the jam was made of something else beside black currants.

Defendant: Every grocer knows that jam labelled "family jam" is not of the best quality. The words "black currants" were only put in to let the public know what the principal flavour of the jam was.

Mr. Headlam: I shall impose a fine of 20*s.* and costs, and recollect that when you sell this "Family jam" again, you tell the purchaser that it is not made solely of black currants.—*Manchester Courier.*

Alleged Adulteration of Butter.

The first case tried at Sittingbourne Local Petty Sessions under this Act elicited a point of considerable difficulty. Mr. Benjamin Nutt Rayner, grocer, was summoned for selling butter, which, according to the analysis of Dr. Tidy, one of the county analysts, was adulterated with about 21·5 per cent. of water, and a large admixture of fats other than butter. The defendant stated that a period of fourteen weeks had elapsed between the taking of the sample and his being served with the summons showing the result of the analysis. The butter was Lepelletier's Normandy, of the third quality. He had had a sample, from the same firkin from which the inspector took the butter complained of, analysed by Professor Wanklyn, and the result of the analysis was that the butter was not adulterated. Besides, it was preposterous to imagine that a pound of butter contained three ounces and a half of water; it could not be kept together. Under these circumstances the Bench ordered the butter in question to be re-analysed.—*Grocer.*

Correspondence.

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

Pharmaceutical Qualifications.

Sir,—Amidst the existing controversy with regard to the subjects and mode of the Pharmaceutical Examinations one thing seems to be overlooked, viz., the qualifications required by *employers* in their assistants.

I suppose that the advertising columns of the Journal may be taken as a fitting index for ascertaining what those requirements are; so, taking last week's issue, I find under the heading of "Assistants wanted," thirty-four employers advertising, one third of whom seem to be more solicitous about the *height* of applicants than about anything else (salary always excepted). Those gentlemen apparently measure a man by his inches, setting at nought the assertion contained in Dr. Watts' lines:—

"I must be measured by my soul,
The *mind's* the standard of the man."

To those in quest of employment in such situations, I imagine that the services of the author of the following advertisement, extracted from a weekly newspaper, would be found much more valuable than the assistance of any number of professors or "crammers."

"To Short Persons.—Remarks on a method of Increasing the Height and Improving the Figure, with 250 authenticated testimonials and reports of results. Sent post free on receipt of a directed envelope."

I suppress the address, as I have no notion of favouring our friend with an advertisement gratis. It may perhaps in the course of time become a question for the consideration of the Council "What is the standard of height for a chemist and druggist?" should this *gigantic* demand continue.

Zaccheus.

Mexborough, Yorks, April 24th, 1874.

J. E. Moore.—'Handbook of British Plants for Schools, science classes, and excursions,' by W. Lowndes Notcott. Published at 171 Fleet Street, price 3*s.* 6*d.*

"*Sawdust.*"—The price of the article has no other influence than that of regulating the amount of duty paid. Every medicine which is a secret or occult preparation, or is said to be prepared only by the person whose name it bears, or which is or has been recommended on the label, or on a handbill, or by any public advertisement, as a remedy for the cure or relief of any disorder, is liable to the stamp duty, and the vendor must take out a patent medicine license.

F. Newman.—Sanicula europœa.

Ignoramus.—The new regulations as to the subjects will come into force October 1st, 1874. Those with respect to the centres of examination, in July next.

T.R.—The age of the competitor must not exceed 21 years at the date of competition.

J. Heppel.—Tomes' 'System of Dental Surgery,' published by Messrs. Churchill, price 14*s.*

W. H.—We believe that such a practice would be illegal.

M. P. S. has not complied with the regulation respecting anonymous communications.

"*A Student.*"—Apply to the Secretary of the Liverpool Chemists' Association, Mr. J. T. Armstrong, 17, The Willows, Breck Road.

A. P.—Modelling Wax.—Bees-wax, lead plaster, olive oil, and yellow resin, equal parts; whiting, q.s. to form a paste. Mix well and roll into sticks.

Communications, Letters, etc., have been received from Walsh, W. Wilkinson, Flora.

CORTEX RHAMNI FRANGULÆ.

BY H. C. BAILDON.

When, in August, 1871, at the Pharmaceutical Conference held in Edinburgh,* I brought under the notice of its members this bark, as likely to prove a valuable addition to our Materia Medica, I could only give as my authority for its virtues the Dutch gentleman who first introduced it to my notice. Since then I have been applied to by various pharmacists throughout the country for supplies of it. Among the first of those to obtain it was Mr. Richard W. Giles, of Clifton: indeed, I think he has had three different quantities; and, being anxious to ascertain whether his experience of the action of the bark corresponded with my own, which was in all respects very favourable, I wrote to him in March last, and I now quote from his reply, having obtained his permission to do so.

"I have had less experience of the *Rhamnus frangula* under my own observation than you have happily met with in the case of your relative.

"I think that I once took it experimentally, and found that it produced precisely the action attributed to it in your paper, read to the Conference in Edinburgh, viz., a natural movement of the bowels without drastic action. I have recommended it very steadily when occasion has offered, and the consequence appears to be that the few cases who require habitual laxatives and make a trial of the *Rhamnus* stick to it pertinaciously. Some surgeons who have tried it tell me that it has answered in counteracting habitual constipation in a marvellous manner, when everything else seemed to lose its power.

"It appears to have tonic and aromatic qualities which stimulate the muscular action of the bowels, as distinguished from the cathartic effects produced by irritating purgatives through the influx of serum into the bowels, which latter action must necessarily be attended with debilitating effects. I feel that the *Rhamnus* fills up all that was wanted in purgatives in our Materia Medica, which is now copious in that class of medicines, including aloes, colocynth (extract) and senna (syrup if well made). I entirely agree with your opinion, that it should be included in the Pharmacopœia, and will willingly support your suggestion to that effect; but with you the honour of its introduction should rest."

The case alluded to by me in my letter to Mr. Giles was one of long standing indigestion accompanied with severe headaches, both of which yielded to the action of the bark.

As my stock of the bark was nearly exhausted, I wrote to Mr. Baruchson, the gentleman referred to, for a further quantity. In his reply he says, "I am glad you have taken pains to make this valuable medicine known. I have often reproached myself for not having made long ago an effort, and to benefit thereby suffering humanity. I wrote about eighteen months ago to the *Lancet* (I think it was that periodical), but received no reply. I do not think that I should now be living if I had not got this substitute for the drastic purgatives, and even the milder ones I used to take. The bark has the same effect on me now as it had twenty years ago."

I brought the *Rhamnus frangula* under the notice of Professor Redwood, but unfortunately too late for its introduction into the additions to the British Pharmacopœia recently published. In his reply the Professor says, "You certainly seem to have made a strong claim on behalf of the *Rhamnus frangula*. I have made a note of it for further consideration."

I believe it is already admitted into several, if not all, the European Pharmacopœias. I have the Pharmacopœa Germanica now before me, where it is thus described:—"A quilled bark, about one millimetre in thickness, grey or brownish-grey externally, with small white warty protuberances, which are generally lengthened transversely. . . . The bark of the younger trunks and the larger branches of the indigenous shrub are gathered in the spring."

This kind only should be used, as the bark taken from the thick part of the trunk is altogether different, and the decoction made from it is nauseous to the taste, whereas that made from the quill bark is singularly pleasant, with a slight almond or prussic acid flavour—no small advantage to those for whom it may be prescribed.

I hope this communication will have the effect of calling the notice of the faculty and of pharmacists generally to this valuable medicine; possessing, as it does, properties peculiar to itself, and which are not found in senna and other drastic purgatives, which it ought to supersede, at least to a considerable extent.

* See PHARMACEUTICAL JOURNAL, 3rd series, vol. ii., page 152.

IMPROVED FORMULA FOR CHARTA SINAPIS.

BY A. W. GERRARD,

Dispenser and Teacher of Pharmacy to University College Hospital.

The formula given in the "Additions to the Pharmacopœia" for the preparation of mustard paper is unsatisfactory and expensive. The proportion of solution of gutta-percha necessary to render the ounce of mustard ordered sufficiently fluid for coating is ten drachms. This would contain more than a drachm of gutta-percha, which, when it is applied to the paper and the chloroform has evaporated, gives the surface of the mustard a glossy, varnished appearance. In fact, the gutta-percha acts as a varnish, much retarding the absorption of moisture and the development of the essential oil upon which the activity of the paper depends. Another objection to gutta-percha is its insufficient adhesive power, for the coating cracks and peels from the paper after but slight handling.

With the object of remedying these objections, I made trial of a solution of india-rubber in benzol as a menstruum; for I judged from its physical properties much less of this than of gutta-percha would be required to keep the particles of mustard cohesive, and at the same time the action would be retarded only to a minimum degree. I found it well answered my intention. After several experiments to determine the most suitable proportions, I have adopted the following:—

Take of

Caoutchouc	1 part.
Benzol	49 parts.
Black Mustard, in powder, a sufficiency.	

Dissolve the caoutchouc in the benzol; then stir in the mustard till of a proper consistence for spreading on paper.

In this, as also the B. P. form, the presence of the fixed oil in the mustard gives the back of the paper a greasy appearance. Moreover, its removal, which might be effected either by pressure or by percolation

with benzol, would be an advantage, not only as removing the cause of this greasiness, but it would render the mustard more active.

Papers spread with a mixture made according to the form I have here given, have a dull, smooth surface, and the mustard adheres well together, although it contains only one-fourth as much india-rubber as the British Pharmacopœia formula does gutta-percha. The above preparation readily absorbs water and develops its activity. A piece applied to the arm gave evidence of its presence in less than two minutes, whilst a piece of the B. P. preparation required seven minutes, its full effect being comparatively slight. An estimate of the cost of the two forms shows that a Charta Sinapis prepared as suggested above could be made for one-eighth the expense of the B. P. preparation.

AILANTHUS GLANDULOSA AS A REMEDY FOR DYSENTERY.*

In a recent issue of the *Archives de Médecine Navale* is published an official note, addressed by Dr. Robert, who is the medical chief of the naval division of China and Japan, to the inspector-general of the health service in the French navy, calling attention to a drug used by Chinese physicians in the treatment of dysentery. It consists of the root bark of the *Ailanthus glandulosa*, Desf., a plant belonging to the natural order Simarubaceæ, very common in the North of China and less so in Japan. It is also frequently cultivated in France and Italy for the purposes of shade, whilst its leaves have been used as food for silkworms.

The bark of the root is the only part employed. It is white when fresh, resembling mallow root, but it acquires a greyish tint in drying. It is fibrous and loose in texture, and is almost without smell. An infusion of this bark however exhales a slightly nauseous odour, and possesses an excessive bitterness resembling that of sulphate of quinine. The Chinese physicians employ the root in the fresh state only; but Dr. Robert, having been compelled to use some that had become dry, found no sensible difference in its action in the two states.

For administration, 50 grams weight of the fresh root is cut into very small pieces and triturated with 75 grams of hot water for a few minutes in a mortar, in order to soften the bark, and then strained. A tea-spoonful of this strong infusion is administered as a dose morning and evening, alone or in a cup of tea. Taken in this form, it provokes vomiting. The medicine is administered in this manner during three days, the patient being kept upon full diet. After that time the ailanthus is omitted and the diet is altered to broths until health is restored. If after eight days' treatment the patient is not cured, the Chinese physicians recommence the use of the ailanthus; but Dr. Robert states that he has not met with a single case in which this resumption has been necessary, although he has had under his notice some where the disease had lasted several months as well as others of more recent origin.

The principal symptoms which follow the administration of the ailanthus are said to be nausea, and sometimes vomiting, followed by a temporary lowering of the pulse. The disappearance of blood from the evacuations commences on the first day and is complete on the second; the colic ceases a little later. The effect of the drug upon the colour of the evacuations is variable. Dr. Robert sums up by expressing his opinion that the administration of the *Ailanthus glandulosa*, as witnessed by him in China and Japan, gave superior results to that of ipecacuanha, astringents, alone or combined with opiates, or calomel. The remedy, he says, is only known to a portion of the Chinese physicians, a circumstance which he attributes to their custom of preserving the secrets of their practice.

Dr. Robert states that the root of *Ailanthus glandulosa* is not usually to be obtained in the Chinese pharmacies; but that in the dialect spoken at Shangai it is called "hiang" or "siang-tcham," and in the mandarin dialect spoken at Pekin and Tiensin, it is named "tchau-tchoun," which latter agrees with the name attributed to it by Dr. F. Porter Smith in his 'Contributions to the Materia Medica and Natural History of China' (p. 6). The latter writer points out that the *Pen Ts'au* includes *Ailanthus fœtida* or *glandulosa* with *Cedrela odorata* and other trees distinguished by their odour, under the common name "Chun-chu." He further remarks that "this species of *Ailanthus* grows all over China, and is met with on the walls of Pekin. The leaves are used to feed silkworms, and in times of scarcity are used as a vegetable, though much less agreeable than the young leaves of the *Cedrela*. They are said to be slightly deleterious, and are used as astringent, anthelmintic, and deobstruent remedies. They are given in diseases of the lungs, dysuria, tabes infantum, menstrual disease, spermatorrhœa, and fluxes in general; and a wash is made to promote the growth of the hair and to wash scabious eruptions and ulcers. In most of these cases the bark both of the tree and the root is used, having precisely the same properties. The bark of the mangrove tree is sometimes adulterated with this inferior substitute." But he does not mention its use in dysentery.

In the non-officinal portion of the Pharmacopœia of India, the *Ailanthus Malabarica*, D.C., a large tree of Ceylon, Malabar, and Concan, is mentioned as yielding an aromatic gum-resinous substance, known by the Tamul name of matti-pawl, which is used medicinally, especially in dysenteric cases and as incense. Dr. Gibson regards it as a good stimulant in bronchitic affections. The bark is rough and very thick, with a pleasant and slightly bitter taste; it is studded with bright garnet-looking grains, apparently of a resinous nature, but not burning like resin or dissolving either in spirit or water. A specimen of the extract prepared from this bark may be seen in the Museum of the Pharmaceutical Society.

The bark of another species of *Ailanthus*, *A. excelsa* is mentioned as being used by the natives in dyspectic complaints, and esteemed as a powerful febrifuge. This bark was the subject of an exhaustive treatise by Mr. Narayan Daji, read before the Grant College Medical Society of Bombay, in which its properties were attributed to the presence of ailanthic acid. The paper was published in the present series of the PHARMACEUTICAL JOURNAL, vol. i., p. 154.

* Abstract of a paper in the *Répertoire de Pharmacie*, vol. ii. p. 237.

NOTE ON SYR. FERRI PHOSPHATIS.

BY C. R. BLACKETT,

Vice-President of the Pharmaceutical Society of Victoria.

During the course of some experimental researches upon syr. ferri phosphatis, instituted through having

to prepare a paper for one of the evening meetings of the Pharmaceutical Society of Victoria, I found, as others before me have done, no method by which this preparation could be kept for any length of time without manifesting change of colour, accompanied by a deposit of oxy-ferric phosphate. It occurred to me that a solution of ferrous phosphate might be made that would keep indefinitely; on trying the experiment I found that I had a successful result. It may seem contrary to the generally received opinion, but I find that sugar, instead of being the preservative agent, is really the opposite as far as this particular preparation is concerned.

To prepare a liquor ferri phosphatis I suggest the following method. Proceed as ordered in the Pharmacopœia, but take the acid. phosph. dil. 5½ oz. and evaporate to 2 oz. (in a platinum dish if available), then add the well-washed ferrous phosphate, just as it remains upon the filter without pressing, add water (distilled) to make it up to 2 fl. ounces and 5 drs., dissolve and filter. This quantity of solution is of such a strength that it is, on making up to 12 ounces with simple syrup, exactly equal to the B. P. syr. ferri phosph. ℥j ♏xxij with syrup to one fluid ounce.

The same principle may be applied to the preparation of a liq. ferri phosphatis c. quiniâ et strychniâ to still greater advantage, as this syrup is more prone to change and darkens more. To make a solution so that ℥ij + ℥vj syrup should be equal to Easton's syrup, take:

Acid. phosph. dil. ℥x, evaporate to 4 fl. ounces, then add the usual proportions of ferrous phosphate, quinia and strychnia. Make up to 6 ounces, and filter. To make 24 fluid ounces with simple syrup.

Those pharmacists who do not consume very large quantities of these syrups will find it very convenient to keep ready these solutions. The syrups can thus be dispensed uniform in composition, colour, and taste. I venture to think that a liquor ferri phosphatis might advantageously be introduced into the Pharmacopœia.

THE PRESERVATION OF HERBS, ROOTS, BARKS, ETC., FOR PHARMACEUTICAL USES.

Mr. Hugo Dwyer, writing in the Chicago *Pharmacist*, speaks very favourably of some samples of herbs, roots, etc., submitted for his inspection, which had been grown at Niles, Michigan, and dried there by the "Alden process of pneumatic evaporation." The principal advantage claimed for this process is that it leaves the herbs in a comparatively unaltered condition, no injurious chemical change taking place during the drying. At the same time, it is stated that they resemble in appearance the finest qualities of dried herbs. It is asserted that whilst in the ordinary processes of drying the decay of the plants commences even before the evaporation, and continues during the whole of the operation until all the essential flavours which constitute the charm of freshness are lost, the pneumatic evaporation operates so rapidly as to leave no time for the exhalation of the flavouring essences or the deterioration of colour or structure by decay. Another important merit attributed to this process is the uniform quality of the botanical materials it supplies for pharmaceutical operations.

The process is described as follows:—"The principal part of the apparatus consists of a vertical chamber or shaft, 25 feet high and 5 feet square, containing a series of frames one above the other, 4½ inches apart, covered with netting, and moved upward all together by endless chains. The heating apparatus, consisting of a steam coil, is placed under this chamber, from which currents of air, heated to any required temperature, pass up through and around the herbs. On each frame is spread about 20 pounds of the material. The lowest frame is first placed in the chamber directly over the heat, at the bottom of the shaft, where it remains from three to six minutes. It is then moved up 4½ inches, and another frame of herbs is placed beneath it. At regular intervals the whole series of frames are moved upward 4½ inches, and a fresh frame is put on beneath them until they are all in, 50 in number, containing about 1,000 pounds. At this time, the shaft being full, one frame is taken off at the top and one is put in at the bottom, at intervals varying with the article treated. The water contained in the herb is seized by the ascending air, and passes with it up, through, and around it;—the moisture is taken gradually from the herb, enveloping it to the last in a cloud of vapour. The pores of the herb are thus kept open, free for the circulation and exit of vapour until all the free water is removed; the remainder (a small per centage) being held as hydrate."

Mr. Dwyer was at first inclined to believe that the heat used would destroy any volatile principle contained in the drug, but he is now firmly convinced that such is not the case, as a sample of peach leaves shown him tasted quite as strongly of hydrocyanic acid as any fresh leaf he had ever tasted. He thinks that if a volatile principle so delicate and so liable to be injured by heat is not so injured there need be but little fear of the others, such as those contained in the herbs of the mint family. The degree of heat used is from 80° to 110° Fahr., and with articles containing volatile principle never higher than blood heat.

THE RECTIFICATION OF ALCOHOL BY MEANS OF LIME.*

BY CHARLES BULLOCK.

The process usually employed to obtain absolute alcohol, is distillation of the spirit from quick lime.

The practical result of the process will appear from the following operation.

Fifteen gallons of alcohol. sp. gr. ·82361 at 60° F. = 93 per cent, was poured upon seventy pounds of well-burned lime (previously broken into small pieces), in a still, heated by a steam jacket. The still was then made tight, and heated to about 120°; after standing three days, a worm was attached and distillation commenced, protecting the distillate from the air. Each gallon was collected in a separate vessel, the heat being gradually increased as was necessary to cause the alcohol to pass over slowly.

Ten gallons was all that could be made to pass over by steam heat. Water was then added to the lime in the still, and most of the alcohol recovered as dilute alcohol.

The ten gallons of strong alcohol thus obtained was returned to a still with twenty-five pounds of quick lime, and the operation, as above, repeated. Eight gallons of alcohol was obtained, separated as before in fractional portions of one gallon.

The specific gravity of the several portions taken on a balance with the one thousand grain bottle, temperature at 60° F. is shown in the following summary:

Gallon.	First Distillation.	Second Distillation.
1st.	·80170	·80978
2nd.	·79756	·79700
3rd.	·69610	·79461
4th.	·79762	·79516
5th.	·80040	·79458
6th.	·79593	·79410
7th.	·79782	·79425
8th.	·79632	·79615
9th.	·79706	
10th.	·79780	
Mean	·79783	·79695

The density of absolute alcohol varies somewhat with

* From the *American Journal of Pharmacy* for April.

different authorities; Drinkwater and Fowne give ·79381, Tralles, ·7939, and Gay-Lussac, ·7947; taking the mean of these authorities, we have ·79413.

It will be seen, on reference to the figures given above, that the sixth gallon of the second distillation alone is absolute, according to this mean standard, and that the mean of the 3rd, 4th, 5th, 6th, and 7th gallon of the second distillation is ·79425, being within the figures given by Gay-Lussac.

It will be noticed that the weakest alcohol distills over first, which would lead to the supposition of an affinity of the lime for the stronger portion of alcohol, or else water having a greater disposition to vaporize in an atmosphere of alcohol vapour.

The distillates all contain lime, which does not separate on standing; the stronger the alcohol the greater appears to be the amount of lime present. Redistillation from over-dry tartaric acid removes the lime (Gmelin), and renders the alcohol perfectly clear.

THE SELECT COMMITTEE ON THE ADULTERATION ACT.

The select committee, appointed to inquire into the subject of adulteration, commenced its sittings on Monday last, Mr. Clare S. Read in the chair; and there was a full attendance of members. The subject did not seem to attract much public attention, and there were none of the large manufacturers present, although several principals of tea firms were in attendance. The evidence taken on Monday chiefly related to the subject of tea, all the witnesses concurring in their evidence to the effect that the colouring of green tea with gypsum and Prussian blue could not be considered an adulteration, as it was not in any way injurious, was not fraudulently done to increase weight or bulk, but had been done from time immemorial in order to suit the taste of the English public. One of the witnesses, Mr. Owen, an officer of the Local Government Board, gave some evidence as to the appointment and qualifications of public analysts. After referring to past legislation upon adulteration, and the provisions thereby made for the analysis of goods, he stated that in the metropolis the number of analysts appointed was about forty. In some cases, medical officers of health had been appointed; in others, persons practising as analysts on their own account; and in others, professors of chemistry at the different hospitals had been appointed to discharge the duties incident to the position. He also pointed out that there are different modes of paying the analysts thus appointed. In some cases they are paid by a fixed salary, the minimum being £50, and the maximum £150; while there are cases where the remuneration is partly by salary and partly by fees. In addition, there is one class where the payment is made entirely by fees; and Mr. Owen also pointed out the peculiar fact that, in one town, the analyst was paid according to a scale which varied for articles or commodities analysed. The Local Government Board, before giving their sanction to the appointment of analysts, sent out a form of queries as to their eligibility and the qualifications they possessed for the office. It was essential that they should possess competent chemical, medical, and microscopical knowledge. He believed that in some cases the question whether the analysts possessed such qualifications had been raised, and that there had been some discrepancies in analysis. Referring next to the country, he mentioned that the appointments of analysts in the counties numbered thirty-four, and the number in the boroughs was twenty-six. Of course, there were a very large number of boroughs and some counties where analysts had not been appointed; and the Local Government Board had not put their compulsory power into force with regard to the non-appointment of these officials. In some cases a considerable difficulty had been experienced in getting a competent person appointed as analyst, who lived in the district where his services were required; and, in consequence of this difficulty, persons at a distance had frequently been appointed. Dr. Tidy, he mentioned, residing in London, was analyst for Essex, Kent, and Sussex. The result of this was that when any samples were procured for analysis, the inspector who bought them was obliged to attend the analyst when the analysis was made; and thus some trouble was necessitated in that way. If the analysts were required to attend at any public courts, in support of any prosecutions, they received an additional fee; and he had not heard of any complaints from the analysts as to their remuneration being inadequate or niggardly. With regard to the question, whether the system of paying by salary only, or that of paying by a smaller salary and fees, or that where the remuneration consisted exclusively of fees, was the best, he could not offer any decisive opinion. It was somewhat difficult to judge, as it was also whether an analyst possessed the necessary qualifications. A medical man might not possess a very complete knowledge of chemistry, while a chemist might be also deficient. As to the medical and microscopical knowledge, however, there did not seem to be so much difficulty as with regard to the chemical knowledge. The item of expense had, perhaps, been an obstruction in small towns to the appointment of analysts. Again, if there were tradesmen in the local Town Council, they doubtless would not be too greatly desirous that such officers should be appointed.

The Committee then adjourned.

PHARMACY IN IRELAND.

A deputation from the Chemists and Druggists' Society of Ireland waited by appointment on the Governor and Company of the Apothecaries' Hall, on Friday, May 1st. The deputation consisted of Messrs. E. M. Hodgson, President; J. Goodwin, Treasurer; W. Hayes, Secretary; L. Erson, J. P., J. Grindley, J. T. Holmes, and R. Simpson. The object of the deputation was to request the Apothecaries' Company to form with them a joint deputation to wait on the College of Physicians, to discuss the provisions of the new Pharmacy Bill. The Apothecaries' Company, however, at once declined having any communication with the College of Physicians; and complained of the want of courtesy of that body, in introducing a Pharmacy Bill without either consulting them or advising them of their intention. Dr. Leet then informed the deputation that he had forwarded their Bill to the Attorney-General, together with their objections to the Bill of the College of Physicians. It transpired, however, that since the Bill had been agreed to by the Chemists and Druggists' Association, some alterations had been made by the Apothecaries' Company without either consulting the Association or apprizing them of the fact.

A long conversation then took place on the subject of the Examinations. In reply to a question from Mr. Holmes, Dr. Collins said they would entertain no lower qualification than that of the major examination of the Pharmaceutical Society. Mr. Holmes urged that an examination of so high a standard as the Major of the Pharmaceutical Society was utterly unnecessary for a proper fulfilment of the duties of a pharmacist. Dr. Collins replied that it was their determination to keep up the standard of pharmaceutical education. Mr. Simpson pointed out that, under the English Pharmacy Act, it was not necessary to pass the Major examination to carry on the business of pharmacist; that the Minor examination was all the law required; if that is considered qualification enough for England he thought it should also be considered qualification enough for Ireland. Dr. Leet said that when he received a reply from the Attorney-General he would communicate with the Association of Chemists and Druggists, and the deputation withdrew.

The Pharmaceutical Journal.

SATURDAY, MAY 9, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PHARMACY OF THE PHARMACOPŒIA.

ON reference to the report of the proceedings at the Evening Meeting of the Society, last Wednesday, it will be seen that they were more animated than is commonly the case with adjourned discussions. Not, indeed, that there was, properly speaking, much discussion upon the merits or demerits of the various preparations included among the Additions to the Pharmacopœia, for the obvious inutility of such discussion in regard to formulæ which have now acquired the force of law was generally recognized. The main point to which attention was directed had reference more especially to the way in which a Pharmacopœia may be most satisfactorily framed, and to the mode in which the practical experience of pharmacists may be most serviceably turned to account in determining the formulæ to be adopted for new remedies, or the alterations to be made in established preparations.

It was contended that the work of deciding how certain medicines should be prepared is essentially the business of the pharmacist, and that inasmuch as his assistance in this respect is desirable, in order to give full effect to the intentions of the medical practitioners, there should be a larger and more official co-operation of pharmacists with medical men than has hitherto obtained in the preparation of the Pharmacopœia of this country.

We do not hesitate to declare our opinion that this seems at once a well founded and a modest aspiration on the part of British pharmacists, one which is justified no less by the example of other countries than it is in the nature of things. So much indeed is this the case that we can only regard Professor REDWOOD'S opposition to the suggestions of Mr. CARTEIGHE and Mr. SMITH as having been based on the misapprehension that they involved some kind of disparagement of the services he has rendered in the preparation of our Pharmacopœia and its Additions. But, in reality, the argument that pharmacists should have some more prominent part in that work does not in the least involve such an implication, and we regard it as very unfortunate that, for the reason we have indicated, or for any other, such a marked personal tone should have been given to the reply to that argument.

In one respect, however, Professor REDWOOD'S remarks served to indicate that there is on the part of the members of the Pharmacopœia Committee a disposition to recognize the capability of pharmacists to be serviceable in the carrying out of the work entrusted to that body; and it is gratifying to find that this is the case not only in sentiment but in practice, since we learn that the four-and-twenty proof copies of the Additions were sent out to members of the Medical Council especially for the purpose of being put into the hands of their pharmaceutical friends, with the view of getting all the advice and assistance possible.

We repeat that it is as gratifying to learn that this was really done as it is natural to expect that it would not be omitted by a body so constituted as the Medical Council. But we do not think that this is merely a reason to "rest and be thankful." We regard it as evidence that there has been some progress in the pharmaceutical body, and we are fain to adopt it as being an adequate ground for asking the question whether that pharmaceutical progress has not advanced so far that the advice and assistance desired by the Medical Council may be asked officially of the entire body, through the medium of the Pharmaceutical Society, instead of being sought only from those with whom the members of that Council may chance to be acquainted.

It is to this end that we understand the more serious part of Mr. SMITH'S remarks to be directed, and this, to our apprehension, was also the purport of Mr. CARTEIGHE'S argument. We hope yet to see Professor REDWOOD prominent in promoting such combined action between the representatives of the medical profession and of pharmacy.

MASSACHUSETTS COLLEGE OF PHARMACY.

ON the 22nd of April the "Annual Commencement" of the Massachusetts College of Pharmacy was held in the City of Boston, with an "Order of Exercises," in which the musical performances of the Germania band were interjected between the annual report, conferring of degrees, and professors' addresses, and other more serious business.

From a prospectus of the College, issued with the invitation, we take the following particulars respecting the qualifications for graduation; premising that although pharmacy has not yet become the subject of special legislation in all the American States, such Pharmacy Acts as have been passed prescribe as a qualification for keeping an open pharmacy, and in some for acting as an assistant, the passing of a special examination in the respective State or city, or the possession of a diploma such as is here referred to. It will be seen that the tendency in the United States is to raise a more stringent standard than that which has been thought by some to be too high in Great Britain.

Every person upon whom the degree of "Graduate in Pharmacy" of this College is conferred must be of good moral character and twenty-one years of age. He must have attended two courses of lectures; one course, at least, being in the Massachusetts College,

and the other in a recognized college of pharmacy or medicine, where the same subjects are taught. He must furnish satisfactory evidence of having served an apprenticeship of at least four years with a qualificd pharmacist. Finally, he must produce an original dissertation, written with neatness and accuracy, upon some subject of pharmacy, materia medica, chemistry, or one of the branches of science closely connected therewith, and he must also be recommended in writing by the professors.

Only such students as may have served their time in "dispensing stores" can obtain the degree of graduate in pharmacy; medical students and others are allowed to attend the lectures, but are ineligible for the degree. The reason given for this distinction is that the art of dispensing medicines can only be properly learned by long practice at the dispensing counter, and that lectures, however good, are only valuable aids to practical instruction, but utterly fail to make a good dispenser in the absence of careful practical training under the supervision of a competent preceptor.

There are three series of lectures—pharmacy, chemistry, and materia medica and botany—and the fee for each series is fifteen dollars. The diploma fee is ten dollars.

THE GROWTH OF CINCHONAS.

Some idea of the rate of growth of Cinchonas in India may be gathered from a Report of the Assistant Conservator of Forests in Tinnivelly. He says "While engaged in examining the Surveyar and Lower Oollar plantations, I also paid a visit to the block of Cinchona trees planted in the heart of the Pappanasam forests in the year 1866, by Mr. Macgregor, the sub-collector. Something less than one fourth of an acre of forest was cleared and planted with two kinds of cinchona, the *Cinchona succirubra* and *C. Condaminea*." Of the former, at the time of the visit, now about two years since, "there were 62 alive, the largest measuring 19¼ feet in height and 11½ inches in girth, the smallest 14½ feet in height and 4½ inches in girth, and an average tree 17 feet in height and 7 inches in girth. Of the latter species there were 32 plants alive, the largest measuring 25 feet in height and 11 inches in girth, while there was another which measured only 21⅓ feet in height but 13 inches in girth; the smallest was 20 feet in height and 7 inches in girth, and an average tree 22¼ feet in height and 12 inches in girth." No attention had been paid to these trees for two years previous to the visit, and they are described as having had some of their branches broken off and otherwise ill used.

SCHOOL OF PHARMACY.

It will be seen, by reference to the advertisement of the School of Pharmacy of the Pharmaceutical Society of Great Britain, that Professor Bentley will commence his course of Lectures on Systematic and Practical Botany at the Royal Botanic Society's Gardens in the Regent's Park, on Saturday morning, May 16th, at Eight o'clock.

At the General Monthly Meeting of members of the Royal Institution on Monday last, it was announced that the managers had appointed John Hall Gladstone, Ph.D., F.R.S., Fullerian Professor of Chemistry.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

Wednesday, May 6th, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Present—Messrs. Baynes, Betty, Frazer, Greenish, Hampson, Mackay, Owen, Radley, Robbins, Sandford, Savage, Schacht, Shaw, Sutton, Urwick, and Williams.

The minutes of the previous meeting were read and confirmed.

The North British Branch.

Mr. Mackay explained the circumstances under which the North British Branch had felt it necessary to take immediate action with regard to securing more commodious premises. He drew attention to the statement which had appeared in the Pharmaceutical Journal of Feb. 7th, as made by himself, to the effect that the North British Branch had, for some time past, felt that they were paying too high a rent for the accommodation they possessed, which was not sufficient for their purposes; that they had now a prospect of receiving eight cases of specimens, for which they had no room; that he had given notice to terminate the lease in May; and that they were looking out for more suitable premises, as to which he would again communicate with the Council. He thought, without going farther into detail, that was a sufficient explanation of the reason for seeking fresh premises; and he had only to add that the reason why the offer of the new rooms was not communicated to the Council was that if they had taken time to do so, they would inevitably have lost the chance of getting them on anything like such advantageous terms. He now begged leave to submit plans showing the accommodation afforded respectively by the two sets of rooms; from which it appeared that in the new rooms there would be half as much more floor area, and also wall space. There was a large front room, to be used as a museum and examination room; another suitable for a library, reading, and waiting-room, and another which could be well adapted for a laboratory and dispensing-room. The proposed arrangements were, of course, all subject to the approval of the Council, but he might add that Dr. Maclagan, the Government visitor in Edinburgh, had expressed himself very much pleased with the plans suggested, and had offered to render any assistance in his power. He should be glad to know if the Council approved generally of the proposed arrangements, and if they would authorize him to obtain the requisite plans and estimates. The rent of these new rooms would be £75 per annum, as against £85, the present rent.

Mr. Williams explained that his principal reason for bringing forward this matter at the last Council meeting, was the statement made by one of the gentlemen who recently attended as a deputation from the North British Board of Examiners, that in the new premises there would not be accommodation for conducting the examinations, especially in practical chemistry. He thought Mr. Mackay would easily understand his astonishment at the proposed change on hearing such a statement, and why he felt it his duty to mention the matter to the Council. The explanation now given by Mr. Mackay was perfectly satisfactory, and he had no doubt the Council would also give their approval.

Mr. Mackay expressed his surprise at the statement quoted by Mr. Williams, which the plans he had now submitted most effectually disposed of.

Mr. Hampson said the explanation was no doubt satisfactory with regard to the change being made, but he thought the Council had some slight reason to complain of its being carried out without communication with them. He did not consider the reason which had been given, that in all probability the premises might have been lost, was a sufficient answer.

Mr. SAVAGE, on the contrary, thought the Edinburgh Board had acted very wisely in the course they had adopted. He wished to know, however, if there would be two rents payable for any time.

Mr. MACKAY said they would enter on the new premises on the same day on which they left the old ones, so that there would be no double rent.

Mr. BAYNES was glad the North British Branch had had the courage to set aside red tape routine under the circumstances, which he considered fully justified them.

Mr. WILLIAMS said there was one point he desired to mention before parting with this question. Another statement made by the deputation from the North British Board of Examiners was that there was a deficiency of specimens and appliances for conducting the examinations in Edinburgh; this he said at the time was chargeable solely to the North British Branch, because the Council were desirous of doing everything necessary to ensure efficiency in the examinations. He wished now to reiterate the same statement, and he hoped there would be no hesitation on the part of the North British Branch in making their wants known.

It was then resolved unanimously.

"That this Council approves of the change of premises of the North British Branch, and requests the Honorary Secretary to procure estimates for the necessary specimens, fittings, &c., and submit them to the Council at the meeting in June."

THE LATE MR. HENRY DEANE.

The PRESIDENT said: I have to call the attention of the Council to the fact that since the last meeting we have lost, as you are all aware, one of our most distinguished, most accomplished, and most amiable pharmacists. Mr. Deane was a member of the Council almost from the commencement of the Society's existence; he was also a member of the Board of Examiners, and, in all the operations of the Society, nobody took greater interest than Mr. Deane. He was a kind and warm friend, and a most amiable and straightforward man—I think I may say he was one of God's noblest works. I beg to move, therefore,

"That the Council deeply regret the loss they have sustained in Mr. Henry Deane, who was for so many years a member and one of the most active supporters of the Pharmaceutical Society; and that a letter be addressed to Mrs. Deane, expressing the great sympathy felt by the Council and the Board of Examiners for her in her great affliction."

The VICE-PRESIDENT, in seconding the motion, said he might reiterate all which the President had said with reference to the late Mr. Deane. It had been his privilege to know him, in connection with the Society, for many years, and it had been his painful privilege to witness the last scene of his career on earth. On Good Friday, the day before he died, he had spent some hours in Mr. Deane's society, most agreeably, the recollection of which would form a red-letter day in his existence. He had always highly esteemed Mr. Deane, as did everybody who knew him.

The resolution was passed unanimously, and the President, Vice-President, and Mr. Sandford were appointed a committee to draw up and send the letter to Mrs. Deane.

ELECTION OF HONORARY MEMBERS.

Robert Bentley, M.R.C.S., F.L.S.; and Frederick Porter Smith, M.B., M.R.C.S., L.S.A.; were elected Honorary and Corresponding Members of the Society.

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

Carter, Arthur Joseph.
Chamberlain, Arthur Garratt.
Jones, Rees Thomas.
Polley, John.
Richmond, Robert, jun.
Walsh, Albert.
Willan, Robert.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

Carter, Arthur Joseph	London.
Hetherington, Martin Luther	London.
Jones, Rees Thomas	Hirwain.
Modlen, Robert	Harrow-on-the-Hill.
Polley, John	London.
Richmond, Robert, jun.	Leighton Buzzard.
Senior, William Furber	Doncaster.
Thompson, Lawrence Joseph	Thirsk.
Walsh, Albert	London.
Willan, Robert	Barrow-in-Furness.
Williams, William Francis	Chepstow.

Chemists and Druggists.

Brown, Andrew Henry	Shanklin, I. of W.
Dorman, James	Stranraer.
John, William David	Cardiff.
Porter, John	Coalville.
Sargent, George West	Kensington.
Sharp, John Charles	Musselburgh.

ASSOCIATES.

The following, having passed their respective examinations, and being in business on their own account, were elected "Associates in Business" of the Society.

Minor.

Butterworth, Henry	London.
Collins, Martin Austin	Bradford, Yorks.
Flinders, Matthew Tom	London.
George, John	Kidderminster.
Haller, Frederick William	Boston.
Herd, Henry Wilson	Ambleside.
Kershaw, Joseph Henry	Glossop
Laverack, William Henry	Malton
Luke, Tom	Bacup.
Nicholls, Theophilus	London.
Peake, Arthur	Earlestown.
Sharrah, Richard	Rochester.
Smithies, William Edward	Elland.
Smyth, Arthur William	Yoxford.
Stephenson, Frederick	Edinburgh.
Tucker, Robert Lewis	Bristol.
Usher, John	Newcastle-on-Tyne.
Woods, Richard	Jersey.

Modified.

Ball, Samuel	Sutton, Chester.
Bannister, Theophilus Mayo	Burnley.
Boorman, Charles John	Malvern Link.
Cavell, John	Long Sutton.
Embleton, Bradley	London.
Furniss, Thomas	Liverpool.
Hobbes, Alfred Edward	Milton-next-Sitting-bourne.
Hughes, John Edward	Bath.
Hughes, John Henry	Southampton.
James, James Thomas	London.
Lowther, Maslyn Kelsey	Hull.
Nugent, George Thomas	Brighton.
Richardson, Alexander	Newcastle-on-Tyne.
Stewart, William Henry	London.
Swain, James	Roehampton.
Targett, Charles George	Weymouth.
Turner, Henry Prosser	Lydney.

The following, having passed their respective examinations, were elected "Associates" of the Society.

Minor.

Atkinson, Henry Bacon .....York.
Black, William Jones ... .Bangor.
Blunt, George ....Upton-on-Severn.
Broughton, Thomas ... .Salford.
Campbell, Henry .....Hammersmith.
Cardwell, Ernest .....Lytham.
Coleman, Alfred .....Southampton.
Crowden, Francis .....Keswick.
Davies, Frederick.....Chester.
Davies, William.....Llandilo.
Elkington, W. T. Woolldridge...Leicester.
Fawthorp, Thomas .....Ryde.
Foster, John .....Crieff.
Francis, Charles .....Winchester.
Geldart, William .....Seacombe.
Gibbs, Joseph .....Tunbridge Wells.
Goodacre, John William .....Coventry.
Harvey, William Sutton .....Margate.
Hindle, William ....Lowestoft.
James, Isaac Rowland .....Aberystwith.
Jones, Thomas Glynne.....Llanidloes.
Jones, William .....Bagillt.
Knight, Alfred George.....Swansea.
Lambert, William Henry.....Hull.
Marsh, Edward Robert.....Oakham.
Marsh, William Henry.....Norwich.
Murdoch, John McGill.....Glasgow.
Naylor, William Arthur Harrison Manchester.
Osborne, George Cooch .....Northampton.
Parker, Robert Henry .....Barnstaple.
Patridge, William Ford .....Wisbeach.
Pearson, Walter .....Hull.
Peat, Joseph .....Workington.
Procter, Robert.....Kidderminster.
Spence, John.....North Shields.
Spencer, Joseph.....West Bromwich.
Stratford, Alfred Joseph.....Kilsby.
Wakefield, John .....Teddington.
Whitney, William John .....London.
Wilks, Maurice.....Leeds.
Willan, William .....Preston.
Woodland, John .....Rochester.
Wrack, Frederick George .....Spalding.

Modified.

Collins, Edward de Tedney.....Brighton.
Driver, John George .....Liverpool.
Harrison, William Dale .....Richmond, Yorks.
Kirk, Snowden .....Poplar.
Patten, William Henry .....Islington.
Strachan, James .....Aberdeen.
Streater, James Hobbs.....Sloane Street, S.W.
Wordsworth, Hewley Charles...Kensington.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary Examination, were elected "Apprentices or Students" of the Society :—

Alldridge, William Edward ...Birmingham.
Anderson, James .....Dundee.
Ashmore, George Johnson .....Lindsworth.
Atkinson, Charles Henry.....Heckmondwike.
Aves, Arthur.....Mansfield.
Ballinger, Arthur John .....Coventry.
Bishop, Richard .....Lynn.
Bishop, Thomas .....Lynn.
Brewerton, Thomas .....Manchester.
Bright, Frederick .....Taunton.
Chapman, Alfred .....Wakefield.
Christopherson, Cornell .....Ipswich.
Cocker, Robert Benjamin .....London.
Corlett, Edwin .....Ramsey.
Cousens, John Stather.....Hull.
Curtis, Frederick George.....Dorchester.
Davies, Hugh .....Machynlleth.
Davison, Thomas Grey .....West Hartlepool.
Day, John .....London.
Dodd, Thomas Hunter.....Sunderland.
Dodd, William Henry .....Fulham.
Gardiner, Bruce Hubert John...London.
Gutch, George Hancock .....Poole.
Hartley, John .....Bradford.
Hatch, James Oliver .....Lancaster.
Heaton, George..... .....Farnworth.
Hitch, Frederick .....Leytonstone.
Holmes, Charles Newman .....Battersea.
Howard, George William .....Tunbridge Wells.
Hunt, Arthur .....London.
Jones, Daniel Williams .....Erwood.
Jones, John Maurice .....Conway.
Kerr, William Henry .....Honiton.
Lawrence, George Richard .....Boston.
Lenfestey, Arthur Mansell .....Guernsey.
Litchfield, John.....Longton.
Major, Henry John .....Manchester.
Marchant, F. Daniel Barker ...Ipswich.
Mason, William Brandwood ...Bolton.
Milton, William Edwin .....Chew Magna.
Orrell, Andrew Peel.....Preston.
Pearce, William Little .....Dorchester.
Pearson, John .....Cockermouth.
Porter, John Thomas .....Coalville.
Price, John .....Swansea.
Rees, John Arthur .....Cardiff.
Roy, Alexander.....Crieff.
Smailes, Robert.....Grantham.
Stead, Thomas Gomersall .....Chesterfield.
Sykes, Henry .....Huddersfield.
Topham, Harry.....Scarborough.
Turner, James .....Seaforth.
Unsworth, Walter.....Bolton le Moors.
Watson, Lund .....York.
Webb, William James .....Melbourn.
Williams, William .....London.
Williamson, Bamford, Jun. .....South Shields.
Wood, Francis William .....Leeds.
Wood, Frederic Percy .....Bolton.
Wright, Thomas David .....Lancaster.
Yeats, John William .....London.

Several members who had neglected to pay their subscriptions within the time specified by the bye-law, were restored to their former status, subject to the payment of the subscription for the current year and a fine of half the same amount.

LIBRARY, MUSEUM, AND LABORATORY.

The report of this Committee was read, the main feature of which was the draft annual report, the consideration and revision of which occupied the Council for several hours. It also mentioned a report from the curator of the museum, that he had received about one hundred specimens of medicinal plants in the green state for the herbarium. Professor Attfield had reported that 76 students had entered the laboratory since the commencement of the session, and that 39 were now at work. It had also been reported that the attendance books of the lectures showed that 26 students were now attending Professor Redwood's class, and 27 Professor Bentley's. The Committee recommended the purchase of five copies of 'The Additions to the Pharmacopœia' for the library. The report was received and adopted.

FINANCE.

The report of this Committee, recommending the payment of sundry accounts, was received and adopted. The auditors' report was also adopted and ordered to be printed.

BENEVOLENT FUND.

The Committee recommended the following grants of

money:—£10 to the orphan daughter of a late member at Southampton, being the seventh grant; £15 to a chemist and druggist at Croydon; £10 to a chemist and druggist at Wells, Norfolk. They also recommended that the name of William Atherton, of Liverpool, be placed on the list of approved candidates for an annuity. Other applications were deferred for further consideration and inquiry, and the report and recommendations of the Committee were received and adopted.

Parliamentary.

This Committee had held three meetings during the past month. The Committee reported that proceedings had been taken against Thomas Clarkson, of Sheffield, for infringement of the provisions of the Pharmacy Act, and that the penalty and costs had been recovered from him.

Some correspondence was read with reference to the Select Committee of the House of Commons, recently appointed to consider the working of the Adulteration Act; and the Committee recommended that the Society should endeavour to secure a hearing before the Select Committee of the House of Commons with reference to this measure, to show the difficulty under which druggists labour with reference to drugs coming into England in an impure condition, the impossibility of obtaining some of them without admixture of foreign matters, and the difficulty of detecting such admixture. They considered the question of guilty knowledge one of the most important points to be insisted upon. They also considered that prosecutions for the sale of impure drugs and chemicals involved the necessity of a technical knowledge not generally possessed by local authorities; and they suggested the desirability of one or more central boards being appointed, to which appeals should be made by inspectors for authority to take proceedings. With reference to the Juries Bill, Mr. Mackay had communicated to the Committee letters which he had received from the Lord Advocate, Earl Dalkeith, and Mr. Duncan McLaren, M.P. for Edinburgh; that from the Lord Advocate stating that he would take steps to secure that whatever rule was adopted in England with regard to the exemption from jury service of chemists and druggists should be extended to Scotland. A prescription containing poison, not duly labelled with the name and address of the compounder had been placed before the Committee, who had requested the Secretary to write to the offender, calling his attention to the provisions of the Pharmacy Act on the subject.

At the suggestion of Mr. Mackay, the President was requested to write to Earl Dalkeith, the Lord Advocate, and Mr. McLaren, thanking them for their promise to endeavour to secure the extension to Scotland of the exemptions with regard to serving on juries enjoyed by pharmacists in England.

Mr. Williams suggested that, as there were so many matters dealt with in this report, some of them had better be referred back to the Parliamentary Committee for further consideration.

Mr. Hampson asked what would be the scope of the proposed central board. It appeared to him the object of such a board should be that if two conflicting analyses were made, as had more than once happened, an appeal could be made to this board for an independent analysis, which should be accepted as final. Of course, the members should be well paid, and be of undisputed authority.

Mr. Greenish did not think it was possible to constitute such a board.

Mr. Urwick thought the central board referred to in the report was of quite a different character, and was desired rather as an authority whose consent should be required before local inspectors took proceedings.

Mr. Williams thought this matter had better be further considered by the Committee.

It was then resolved—

"That the recommendations of the Parliamentary Committee with respect to the amendment of the Adulteration Act be received; and that the Committee be requested to put themselves in communication with those gentlemen whom they may think it right to put forward for examination by the Select Committee of the House of Commons, and to take such other measures from time to time as may be required."

It was also resolved that the President should be requested to communicate with the Chairman of the Select Committee of the House of Commons appointed to consider the Adulteration Act.

The Committee further reported that the President had laid before them some correspondence which he had received from the Cororer of Lincoln, between himself and the President of the Medical Council, suggesting the insertion of chloral hydrate in Part 2 of Schedule A to the Pharmacy Act, 1868.

The Secretary read two letters, which had been received from the Chemists' Association at Hull and Halifax respectively, each containing a copy of a resolution which had been passed, expressing satisfaction at the appointment of the Committee to inquire into the working of the Adulteration Act; and expressing a hope that the Society would take such steps as might be necessary to protect the interests of the trade, especially with regard to retail dealers being made responsible for the faults of wholesale dealers and manufacturers.

A special meeting of this Committee was then appointed for Friday, the 8th inst., at 3 o'clock.

Additional Scholarships.

The report of this Committee, recommending that a paragraph, bearing upon this subject, should be inserted in the annual report of the Council, so as to bring the matter before the General Meeting, was read and adopted.

Report of Board of Examiners.

The Board of Examiners for England and Wales reported the result of their examinations as follows:—

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	8	7	1
Minor	158	42	116
Modified	34	19	15
Preliminary	355	169	186
	555	237	318

Certificates received in lieu of the Preliminary Examinations:—

College of Preceptors	3
University of Cambridge	1
University of Oxford	2

The Board of Examiners for Scotland reported that they examined 42 preliminary, passed 26—16 failed.

The Secretary reported that a letter had been received from the Secretary of the Royal Botanic Society, granting the usual privilege to the students in Professor Bentley's class to attend the Society's gardens.

The Congress at St. Petersburg.

Mr. Hampson asked if it was necessary to send an immediate reply to the communication from the International Pharmaceutical Conference, or whether it would be in time at the next meeting.

Mr. Greenish said he had, on the previous day, received from the Secretary an invitation in German, which he had translated, and it appeared therein that they requested the names of the representatives to be communicated before the 15th of July. The question was accordingly deferred till the next meeting.

Erratum.

No. 201, page 883, col. 1, line 4, *for* Hay, Alexander Insch, *read* Hay, Henry Scott, Aberdeen.

STATEMENT OF ATTENDANCE OF MEMBERS OF COUNCIL ON COMMITTEES FOR THE YEAR 1873-74.

	Committees held Once a Month or Oftener.		Committees held Occasionally.					Special Committees appointed to Draw up Reports, etc.	Total Number of Attendances.
	Finance.	Library, Museum, and Laboratory.	House.	Benevolent Fund.	Parliamentary.	Provincial Education.	General Purposes.		
Number of Committee Meetings held.	13	19	11	13	12	1	4		
Atherton (*Nottingham*)	*	*	*	*	5	1	1	8	15
Baynes (*Hull*)	*	*	*	*	8	1	4	1	14
Betty (*London*)	*	15	8	*	9	1	2	10	45
Bottle (*Dover*)	8	11	6	9	10	1	3	10	58
Brown (*Manchester*)	*	*	*	*	4	1	2	1	8
Frazer (*Glasgow*)	*	*	*	*	*	1	2	1	4
Greenish (*London*)	11	13	9	11	*	*	3	5	52
Hampson (*London*)	12	9	7	12	*	*	3	7	50
Hills (*London*)	0	16	10	1	9	1	2	15	54
Mackay (*Edinburgh*)	*	*	*	*	5	1	2	2	10
Owen (*London*)	7	*	*	7	1	*	1	0	16
Radley (*Sheffield*)	*	*	*	*	*	1	4	3	8
Robbins (*London*)	9	15	8	10	*	*	4	2	48
Sandford (*London*)	*	17	9	*	8	*	4	12	50
Savage (*Brighton*)	*	*	*	*	2	*	1	0	3
Schacht (*Clifton*)	*	*	*	*	*	0	2	7	9
Shaw (*Liverpool*)	*	*	*	*	6	1	3	6	16
Stoddart (*Bristol*)	*	*	*	*	*	0	1	1	2
Sutton (*Norwich*)	*	*	*	*	3	0	0	0	3
Urwick (*London*)	13	*	*	12	11	1	4	4	45
Williams (*London*)	*	17	10	*	11	*	2	14	54

* Not appointed on this Committee.

NUMBER OF ATTENDANCES OF MEMBERS OF COUNCIL AT COUNCIL MEETINGS FOR THE YEAR 1873-74.

Atherton, John Henry	9	Hampson, Robert	12	Savage, William Dawson	12
Baynes, James	10	Hills, Thomas Hyde	12	Schacht, George Frederick	10
Betty, Samuel Chapman	13	Mackay, John	6	Shaw, John	9
Bottle, Alexander	12	Owen, John	11	Stoddart, William Walter	9
Brown, William Scott	6	Radley, William Valentine	11	Sutton, Francis	9
Frazer, Daniel	6	Robbins, John	14	Urwick, William Walker	13
Greenish, Thomas	12	Sandford, George Webb	13	Williams, John	13

Number of Council Meetings during the year, 14.

PHARMACEUTICAL MEETING.

Wednesday, May 6, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting having been read and confirmed, the following donations were announced, and the thanks of the Society awarded to the donors :—

To the Library :—Durham University Calendar, 1874, from the University; Guy's Hospital Reports, vol. xix., 3rd series, from the Hospital; London University Calendar, 1874, from the University; Proceedings of the Literary and Philosophical Society of Manchester, vols. viii.—x., and Memoirs, vol. iv. 3rd series, from the Society; Gondard's 'Étude sur les Acides Oxyphénylsulfureux et les Oxyphénylsulfites,' Roucher's 'De l'Autorité et de la Responsabilité Médicales dans l'Armée,' Verne's 'Étude sur le Boldo,' and Bouchardat's 'De la Mannite et de ses Éthers,' from Dr. J. L. Soubeiran.

To the Museum :—A Specimen of Persian Stick Opium, from Mr. J. Wood; Liquid Chloride of Nitrosyl, from Dr. Tilden; Arrows tipped with Curari Poison, from the Executors of the late Mr. T. N. R. Morson; A Specimen of the Root of *Richardsonia scabra*, from Mr. D. Hanbury; A curiously formed Crystal of Bromide of Potassium, from Mr. T. Hudson; a Specimen of the Stem of *Chondodendron tomentosum*, from Mr. A. H. Squire, and of the Stem and Root, from Messrs. Corbyn and Co.; a Specimen of an Adulterant of Opium, from Mr. Romans; and a Specimen of *Tulipa sylvestris* for the Herbarium, from Mr. Corder.

Adulterated Opium.

Mr. Gostling, a student in the laboratories, read the following note :—

A few days ago, Mr. Romans, Chemist, of Wrotham, Kent, sent to Professor Attfield a contribution to the Museum collection of opium adulterants, in the form of a lump of what appeared to be earthy matter, which had recently been found in a piece of opium. The piece of opium weighed 28 ounces, the lump of "dirt" 2½ ozs.—or nearly ten per cent. of the opium. I find the adulterant to consist of silicious, aluminous, ferruginous, and calcareous matter, with a little oil and a small quantity of other organic matter. The lump furnished 3 per cent. of moisture, about 5 per cent. of oil, 26 per cent. of other organic and volatile matter, and 66 per cent. of ash. It is evidently a lump of clayey earth; no doubt the first that came to the hand of the person who buried it in the piece of opium. From long soaking in the opium it has apparently absorbed some of the moisture or juice of the opium, hence its "organic matter:" otherwise it is simply clay-earth.

Additions to the Pharmacopœia.

The discussion on Mr. Umney's paper on the Additions to the Pharmacopœia, adjourned from the last evening meeting (see before, p. 789), was then resumed by the reading of the following note, written by Mr. E. Smith, of Torquay :—

"Any attempt to criticize the recent addendum to the Pharmacopœia savours very much of the principle involved in locking the stable door after the horse has been stolen; for no matter how valuable or otherwise any particular preparation may be shown to be, the formulæ have all the force of law, in fact, have already become *the law*, so far as pharmacy is concerned.

"It has been known for a long time past that the General Medical Council contemplated the issuing of an addendum to the British Pharmacopœia which, it was supposed, would include all those medicines and preparations which had, since the publication of the 1867 Pharmacopœia, been brought into general use, and which had to a greater or less extent acquired the sanction of the medical profession. Whether such an addendum was really necessary, especially when issued as the present one has been, so short a time before the next decennial edition of the British Pharmacopœia, may well be doubted. It is, of course, eminently desirable to ensure uniformity in the strength of medicines whenever possible; but it is very questionable whether this is of so very supreme importance, in the comparatively few medicines of any value that are introduced and accepted in the course of the decade, as to necessitate the publication of a supplementary authorized Pharmacopœia. For, in the first place, the current medical and pharmaceutical journals generally indicate with sufficient exactness the general characters and doses of new preparations; and again, prescribers not unfrequently indicate the strength when there are known to be material differences of composition in medicines of like name.

"The doubt as to the unwisdom of issuing the present addendum becomes a certainty when the contents are examined. There is not a single 'medicine or preparation' that could not have waited—without any detriment to the world—until the next edition of the British Pharmacopœia, whilst the information to be derived from further experience of the value of some of the 'new preparations' would probably have secured for them a more appropriate position.

"If it were not now too late to comment, one would naturally ask, Why introduce such a wretched form for Tinctura Quiniæ Ammoniata? A much more agreeable and aromatic, and I think a much more universal one, is simply the solution of a grain of quinine in a fluid drachm of sal volatile. Then, again, syrup of chloral. The great majority of chloral takers have become so accustomed to a more grateful syrup, that the thin, mawkish, miserable syrup of the addendum has little chance of popularity, either amongst prescribers or patients.

"As for pepsine, the form involuntarily carries one back to primitive times. Scrape the stomach with a blunt knife indeed! Well, I should dearly like to see the Medical Council at this work! Some of them would most likely prefer a week's hard labour at Millbank to a day's stomach scraping with a blunt knife! I have had some little experience of pepsine making, and if I were asked to point out *the least desirable* method, I should have little hesitation in fixing upon the addendum process.

"Liquor Magnesiæ Citratis is out of place in a Pharmacopœia; it would be more at home in a volume dedicated to 'Domestic Receipts.' It may have been introduced to fill up a corner, and possibly in the next addendum, if ever we are blessed with another, we may find 'Nettle beer and Lancashire pop!' Who knows? Tinctura Aurantii Recentis is a desperate attempt at fancy pharmacy. Mrs. Jones' flummery may be all the better for it, but in the more serious matter of every day pharmacy one is at a loss to discover how, in any essential particular, the new tincture is better than the old.

"The contrast between the primitive simplicity of the pepsine formula, the dandy elegance of the new orange tincture, and the insipid crudeness of our new chloral friend, would be supremely ridiculous were it not for the harrassing position most pharmacists will be placed in. Some friend may peradventure suggest that there is some good in the addendum, that all is not bad, or doubtful, or childish, or what not. True, Tinctura Laricis is good, and so are Succi Belladonnæ and Hyoscyami, and one or two others; but, notwithstanding these, does not the prefatory announcement, printed on the very first page, cut the throat of the addendum most completely?

"Is it not there stated that 'several new medicines and new preparations having been introduced and established since the Pharmacopœia was published in 1867, the Council have thought it desirable to supply the requisite information concerning them?'

"Does not this statement directly, indirectly, or inferentially indicate that the best established, the most popular amongst physicians, the most commonly employed extra-pharmacopœial preparations, might be without doubt found in the addendum? Where, then, are Parrish's syrup and Easton's syrup, almost as commonly prescribed as Aqua Destillata or Mistura Camphoræ? where Nepenthe

and Chlorodyne ; where Tinctura Actææ Racemosæ ; or Pruni Virginianæ, or syrup of the same ; the two latter quite as frequently prescribed as Tinctura Laricis ? Has the Medical Council never heard of the utility of Syrupus Ipecacuanhæ and its superiority over the old Vinum ? But enough of this. Surely a more ricketty, weakly bantling, one more innocent of the least possible *raison d'être*, never was suffered to exist.

"I had nearly suggested its withdrawal, but there is really nothing of any moment to withdraw. Left to itself—in spite of its eminent parentage—its early atrophied condition leaves but little hope that the thing can survive, except as an amusing and instructive lesson, or as a remarkable illustration of the old fable of the mountain and the mouse.

"The time has long since passed when any Council composed of medical men can frame a Pharmacopœia. All future works of this nature can only be successfully accomplished by a medical council deciding of what preparations and medicines the Pharmacopœia shall consist, whilst *the method* of compounding and preparing is left to a council of practical pharmacists, well versed in such matters."

Mr. M. CARTEIGHE said he was prepared on the last occasion to bring forward one or two matters involving more or less pharmaceutical et[illegible]s, or, rather, his notion of how a Pharmacopœia and the [illegible]ditions or supplements to it should be compiled ; but, owing to the adjournment of the discussion, he had been anticipated by other members, who had naturally thought over the subject in much the same way as himself. He did not claim to criticize the book, because it was unnecessary to do so seriously at a time when it had been issued with legal authority, and was the recognized standard according to which they were bound to prepare their medicines. He considered, therefore, that the proper time for criticism and suggestions would be at a later period, when, perhaps, a new edition of the British Pharmacopœia was in preparation ; because any suggestions now made would probably be lost sight of before the time arrived, for, seeing how long it had taken to produce these few pages, they could not hope to see a new edition of the Pharmacopœia for many years. He would, however, fain express his regret that this little book did not reflect so much credit on its authors as did the original edition, which every one would admit was a decided success, at any rate, when regarded as in some sort a compromise between the Pharmacopœias of three different countries. They must also admit that the main part of that credit was due to one of their own professors, who had laboured long in the cause of Pharmacy and for whom they all had the greatest possible respect. He feared, however, the majority of the members would not be able to view this supplement in the same light ; not that they attributed the difference to any want of skill on the part of the gentleman he had referred to, but to the fact that probably he had had to deal with elements very difficult to manage. Mr. Umney had already covered nearly the whole ground which any fair criticism could be expected to embrace ; and some observations in Mr. Smith's paper as to the necessity for practical pharmacists being called upon to aid in the preparation of any Pharmacopœia, and a similar passage in the *British Medical Journal*, included practically the gist of what he himself wished to say. The last named journal, after giving a *précis* of Mr. Umney's paper, went on thus :—

"Many of the objections urged by Mr. Umney seem to indicate the necessity of giving greater prominence to the element of practical pharmacy in the Pharmacopœia Committee of the Medical Council. This has long been done in other countries, and the adoption of such a course would certainly be advantageous here ; for, though it is true that the decision as to the medicines to be comprised in the Pharmacopœia must always remain with those who have to prescribe their use, still questions as to the best means of preparing them for various purposes call greatly for the aid of the practical pharmacist, who, being daily occupied in such work, is enabled to bring to bear the results of his experience, so as to advantageously promote the objects of the physician. If this were properly done, we should then, perhaps, hear less of complaints that officinal formulæ were inferior to other methods of preparation. The material services which Professor Redwood has already rendered in this direction may, perhaps not without advantage, be supplemented by the aid of other pharmacists."

He regretted that the Medical Council had not thought fit to send copies of this book to a few practical pharmacists, when they issued the proof addendum which by accident got into Mr. Bottle's hands. As it was, it now contained some matters which must be dealt with in a sort of roundabout way, because it would be impossible to follow literally the directions given, of which he would give one or two instances to justify his assertion, though he must repeat his protest against this being the proper time for detailed criticism. With regard to the hypodermic injection of morphia, there might have been some objection to the introduction of sulphate of morphia when the strength was 1 gr. in 6 min., but now it was made so much weaker there was no reason why sulphate of morphia, if not acetate, should not be used. The sulphate formed a very practicable, definite, colourless solution, which acted very well, and would not involve the time and manipulation required by the process now given.* If he rightly understood the necessity for such a preparation, it was that pharmacists, not in London but in the most remote country districts, should be able to prepare it at short notice ; but how would it be possible to carry out this process under such circumstances ? Suppose the life of a patient depended on the prompt injection of such a solution, how could any one prepare it by such a formula ? He considered it a pure waste of time, because there were salts of morphia perfectly definite, which, as far as he could judge, answered as well as the solution of the morphia alkaloid in acetic acid. Why, again, did they omit sulphur and fennel from *Pulvis glycyrrhizæ comp.*, especially when it was being prescribed more frequently than formerly, and almost invariably, as he believed, with a sign indicating that not this formula but the one including sulphur and fennel was to be used ? If pharmacists had been asked to give an opinion on the book before it was published, many would have loyally devoted their time and attention to the various matters contained in it for the benefit of pharmacy. He did not attribute, however, any shortcomings to want of consideration on the part of the editor, but rather to his being overweighted by the other members of the body entrusted with its preparation. Again, take *Liquor magnesiæ citratis ;* on what principle was such a name given to such a compound ? He did not concur in Mr. Smith's condemnation of this compound, which he thought a very useful one ; on the contrary, he was rather astonished it had been omitted so long, and not introduced until some time after the Americans had published the formula in English, though it had been occasionally prescribed for a considerable period under its French designation. He objected to the name, however, especially bearing in mind the recent discussion on the so-called Effervescing Citrate of Magnesia, where the use of names not strictly accurate had been condemned by Professor Redwood and others. The name here given expressed a definite compound, whereas other ingredients were directed to be added ; and when penalties on all kinds of adulteration were being so rigidly enforced, he objected to these definite names being given.

Professor REDWOOD : What do you say to "tincture of rhubarb ?"

Mr. CARTEIGHE said he should object to such a name

* This salt is more soluble than is commonly supposed. A solution of the strength ordered has been made and kept for two or three weeks. See a paper by M. Adrian in vol. iii. of the present series, p. 2.—ED. P. J.

simply, but with the addition of the word "compound" it applied perfectly well. He contended that this case differed only in degree, not in kind, from the citrate of magnesia, of which so much had been said. "Magnesian lemonade" would better represent the preparation. With regard to suppositories, it was entirely a question for medical men whether or not soap would be an irritant. Syrup of chloral had been condemned as a syrup, but he did not think there was much in it; the only question was—why had such a form been introduced under the name of a Syrup? In conclusion, he would say—What had been the history of the Society as connected with the public and the medical profession for the last thirty years? It had often been stated by Presidents of the Society that it was recognized by the public and by the medical profession, but how was its recognition shown in the compilation of this book? It was true, the Society's professor of chemistry and pharmacy had been engaged upon it, but not in his official capacity as connected with the Society, and being only one individual, he was not sufficiently strong; he should have been supported by men engaged in the daily practical work of pharmacy, each of whom would make it a labour of love to work out every process which could be devised, with a view to its insertion in such a book. He thought the time was come when pharmacists should claim—he would not say the right, but the privilege—of assisting in the compilation of such a work. In days gone by, when the lamented Mr. Deane was President, the first Pharmacopœia Committee was formed, and its labours tended greatly to assist the fusion of Pharmacopœias which ultimately took place. Why should not a similar committee be formed when additions were proposed? He asked this, not because pharmacists wanted more work, but in the interests of the medical profession themselves; for what could be more mischievous than to insert formulas in a national book, some of which were practically unworkable? A Pharmacopœia in this country should be compiled by a joint committee of medical men and pharmacists, the latter to be only responsible for the preparation of the medicaments which the former decide on inserting. In asking this, pharmacists were only asking for the same recognition as had been accorded for many years to their brethren in Germany and France, and for a long time in the United States.

Mr. BLAND thought some gentlemen were scarcely disposed to make sufficient allowance for the difficulties which must always attend the preparation of a Pharmacopœia, and reminded the meeting of what had already been said, that it was much easier to criticize processes described than to suggest new ones which should be unassailable. Mr. Smith's note might be amusing, but he thought the censure it contained was scarcely justifiable. At the same time he thought some of the new preparations were superfluous, and others, he thought, would have only an ephemeral existence. For instance, he saw no reason for introducing the *Syrupus chloral* unless for the purpose of giving a definite strength to it, and with regard to *Aqua chloroformi*, all chemists kept at least one alcoholic solution of chloroform, and many two, from which there would be no difficulty at any time in preparing *Aqua chloroformi* by adding sufficient water. The *Tinctura quiniæ ammoniata* could certainly be improved, as suggested by Mr. Smith, whose form was the one he had used for many years. He had never been an advocate for introducing *Tinctura aurantii recentis* into the Pharmacopœia, though he had made it for a long time, and considered it useful for flavouring purposes. He feared it might be confused with the other preparation, made with proof spirit and dried peel. It was, however, quite a mistake to suppose, as some gentlemen seemed to do, that dried orange peel was the same as fresh, minus a certain quantity of water. When freshly-cut peel was exposed to the air, the first thing which took place was a loss by evaporation of a considerable portion of the essential oil; next, by far the larger proportion of the essential oil still left was oxidized into a bitter matter soluble in proof spirit. Hence the fact that tincture made with proof spirit was darker and more bitter the older the orange peel from which it was prepared. He thought the dose of the *Tinctura aurantii recentis* recommended much too large, and would be found objectionable. On the table he had placed a bottle of what he called "artificial orange juice," which he thought would be found a very agreeable flavour. The *Tinctura aurantii recentis* might be added to a ferruginous solution without causing any considerable alteration in colour, which was not the case with the tincture of dried peel. Amongst the corrections at the beginning of the book was one relating to the specific gravity of the *Liquor ferri perchloridi fortior*, which he was glad to see, for he had been for some time misled by the figures given in the Pharmacopœia. He found, however, that authorities were not agreed on this subject; Mr. Squire putting it first at 1·41, afterwards at 1·42; the present correction put it at 1·44, whilst Mr. Umney, some time ago, put it at 1·444. He had prepared considerable quantities of ferrous and ferric chloride in solution, for other than medicinal purposes, and hence had been led to notice certain circumstances which considerably modified the result in preparing the *liquor ferri perchloridi*. In the first place, the hydrochloric acid might be deficient, in which case when the alcohol was added the whole would soon become turbid, owing to a deposit of oxychloride. This could be easily remedied however, by adding a few drops of hydrochloric acid and shaking. A more serious defect was when the tincture, after a short time, acquired a strong ethereal smell; in some cases he had noticed a strong smell of aldehyd, while there was a partial reduction of the iron, so that the addition of a recent solution of red prussiate of potash would give a copious precipitate. This change could invariably be traced to an excess of nitric acid used in preparing the perchloride. In some samples, again, he had found the iron only imperfectly converted, and containing a considerable quantity of ferrous chloride; now this was considerably less soluble in alcohol than the ferric chloride, and in a few days crystallized, but leaving the solution weaker in iron than it should be. The Pharmacopœia process was in the main a good one, but required some little modifications. The hydrochloric acid need not be diluted; and if a mass of crystals were formed which prevented the action of the acid on the remaining part of the iron, the aid of a gentle heat and the addition of a few drops of nitric acid would remedy the difficulty.

Mr. T. H. WILLIAMS (Holloway), said he had tried making the carbolic acid suppositories with soap for several hours, according to the method given in the addendum, but he had completely failed. If he used properly powdered soap, as sent out by the wholesale houses, they could not be made without employing something like hydraulic pressure to form them into the moulds. On the other hand, if he used soap partly dried so that it could be rubbed to a coarse powder in a mortar, they could be made, but if the same kind of soap was used for the Tannin suppositories they acquired a size of about 30 grains, which was very objectionable. Mr. Umney had suggested that perhaps the *Acetum Ipecacuanhæ* did not keep; but he had been in the habit of making it for fifteen years, and found it keep perfectly; and Messrs. Ferris, of Bristol, whose preparation he had imitated, had used it for twenty years and always found it keep remarkably well.

Mr. MARTINDALE said he could scarcely concur in the unqualified condemnation which had been given to the hypodermic injection of morphia by Mr. Carteighe, as he thought it a really good formula, having had considerable experience in such matters; though he thought it was weaker than that generally used, which had one grain to six minims. There might be an advantage, however, in having it more dilute, especially if it had to be used by unskilful persons. He had no doubt that the precipitated pure morphia prepared from the hydrochlorate,

and re-dissolved in acetic acid, formed a more stable solution of acetate of morphia than could be made direct from the acetate. The sulphate required from 20 to 24 parts of water to dissolve it, which would make the solution much weaker, therefore it was objectionable on that score. There was perhaps a little objection to injecting so much as six minims at a time, but he supposed it was safer than using a more concentrated solution. The ordinary commercial acetate, when kept for twelve months, became liable to change in a variety of ways and was much less soluble than when freshly prepared, requiring almost as much water to hold it in solution as the hydrochlorate or sulphate. Some years ago he had given a formula for making the solution direct from pure morphia, in preference to making it from acetate, but the present process had an advantage over his, inasmuch as it required such a slight excess of acetic acid to re-dissolve the precipitated morphia. With regard to the phosphorated oil, he was rather surprised it was directed to be made so weak as one grain in 160 minims; and, as Professor Redwood was so much in favour of introducing the decimal system, it was rather strange he had not given the strength of one in 100. The French Codex had it one grain in 50 minims, but that proportion it was almost impossible to dissolve; one in 100, however, was easily dissolved. With regard to the mode of conducting the process, he had formerly suggested that it was an "unnecessary refinement" to heat the oil to 300° F. He was now prepared to go further and say that it was positively deleterious, because the phosphorated oil so made became much more viscid when kept for some time, in fact almost like castor oil. The next substance to which he wished to call attention was the phosphorus pill mass. He had had considerable experience in making phosphorus pills, it being rather a fashionable remedy lately, but he considered the process now given for making it into a solution in balsam of tolu was objectionable. You could not be certain that you had a perfect solution by such means, as the balsam became hydrated; there was also a difficulty when the wax was added in mixing the ingredients together, as the wax floated on the top of the water, while the phosphoretted resin sank to the bottom. He rather objected to the balsam of tolu being used in any form as a solvent, because phosphorus was not so soluble in it as in other resins he had found. However, having made the pills as directed, it occurred to him that they might not be really soluble, yellow wax requiring a temperature of 140° F. to melt it, that of the body being under 100° F.; and therefore, bearing in mind the old saying, *fiat experimentum in corpore vili*, he had tried them upon himself, taking one in the morning and one in the afternoon. As he expected, he found them both next morning perfectly globular, as slightly acted upon as possible, and not appreciably decreased in weight. He then repeated the process, rubbing the mass up with a little spirit of wine, as suggested; this certainly made it a little more plastic, but not more soluble, and he therefore could not approve of the preparation at all. He thought it would only tend to shake the confidence of medical men in any medicine, if formulæ of this misleading character were given. He further tried some of the advertised kinds of phosphorus pills, and one which was very extensively advertised he found was open to the same objection; it was almost perfectly insoluble. Mr. Gerrard's pills, however, completely disappeared, and he also found them to have much more influence on the system, the breath in particular being more affected; this was slightly affected by the pills prepared as directed in the addendum. In the case of Mr. Gerrard's pills, however, on rubbing the mass in a mortar, the phosphorus became oxidized in such a manner that it possibly might not act as phosphorus when taken. The compound powder of liquorice he thought would lead to a great confusion of names, and that it would have been much better, if such a preparation were needed, to adopt the Prussian formula; with regard to the suppositories, he had not had much experience in making them with soap, but it was not possible to mould them according to the new method with anything like the rapidity which was desirable. He believed that if they were made firm enough they would not be soluble. With regard to *Liquor magnesiæ citratis*, he thought Mr. Carteighe had justly condemned the name; and he did not see why light carbonate of magnesia might not be used as well as the heavy kind, it would be more economical. He was sorry to see the syrup of chloral in the form now produced, without flavour; the *Tinctura aurantii* he found increased 10 per cent., and thought it was better made with weaker spirit. He still held it was useful as a flavouring preparation. The chloroform water, he thought, would be a useful preparation. The *Charta sinapis* he considered a bad imitation of a good article.

Mr. Barnes said he had made phosphorus pills with soap, and found that the phosphorus dissolved uncommonly well.

Mr. Umney then said: I promised on the last occasion of our meeting to make some experiments upon acetic ether, the description of which, as given in the addendum, I then ventured to conjecture was inaccurate. I find that crude acetic ether, prepared by the process there indicated without desiccation by chloride of calcium will have a specific gravity of ·910, and will be much contaminated by acetic acid; also that by the use of chloride of calcium and subsequent distillation the specific gravity is ·895, and the product still contains free acid. Again, that the mere rectification of the crude ether over carbonated alkali as directed in the Codex, distilling a quantity equal in weight to that of the original spirit of wine employed, makes the specific gravity ·899, entirely removes the acid, and leaves by this simple process little to be desired. Finally, crude acetic ether, washed, digested over chloride of calcium and a small quantity of caustic lime, will produce, upon rectification, acetic ether having a specific gravity of ·8956, which I regard as very nearly pure. I am still of opinion that the Addendum is inaccurate.

Mr. Williams said he also had made some careful experiments on acetic ether, being the only chemical in the addendum for which a process was given. He could not agree, however, that the process was altogether a right one, for there was an omission of a most serious nature, namely, that the excess of acid which always accompanied the ether was not removed. He found that this ether, made exactly according to the Pharmacopœia and simply treated with chloride of calcium, had a sp. gr. of ·895; but if it were previously distilled over carbonate of potash, and afterwards, from the large quantity of chloride of calcium he obtained an ether having a sp. gr. of ·880, which was very different from the ·910 mentioned, that difference might be very serious, because they were bound to produce an article to the public when required which would answer the test of the Pharmacopœia. He was aware that Kopp gave ·910 as the sp. gr., but he made the ether in a peculiar manner with a large excess of acetate of soda and took the sp. gr. at zero Cent; whereas it was distinctly ordered in the Pharmacopœia that it should be taken at 62°F. In the last edition of Fowne's Chemistry, by Watts, the gravity was given at ·890, which he believed was correct.

Professor Redwood said very important, interesting, and valuable discussions had taken place on many previous occasions on similar subjects to the one now brought forward, but he must confess to having heard with very great regret much of what had now been stated. He did not know what authority was now exercised over papers read at these evening meetings; but if he had been in a position in which his opinion were asked, as to whether such a paper as that by Mr. Smith should be read, he should have said decidedly not, and he certainly considered it very undesirable that it should be published in the Journal, with the stamp and authority of the Society. However, it had been read, and had been followed by an harangue given by a gentleman occupying a prominent

position in the Society—an harangue not so objectionable as the paper which preceded it, but which he thought, going before the world at large and the medical profession, would not be calculated to elevate the Society and its proceedings in their estimation. The subject of it could hardly be said to be a continuation of that which had been so properly brought forward by Mr. Umney on the previous occasion, for that gentleman's paper was in every respect unobjectionable, and his criticisms had been very welcome, as also had some others which had been given that evening. He objected, however, to the political question, as it was called, being introduced; though in one respect the introduction of this extraneous matter served to explain and to account for the nature of the criticisms which had been offered, for it simply amounted to this—Here is a portion of the Pharmacopœia which we have not had a finger in, and therefore we will object to it. The animus, therefore, was most clearly explained.

Mr. CARTEIGHE: No.

Professor REDWOOD said that was certainly the impression produced on his mind, and when the discussion was published he thought the same impression would be produced on those who read it. Coming, however, to the criticisms themselves, what did they all amount to? Did they amount to anything? He found a difficulty in picking out any portion which really called for any serious answer, certainly any answer beyond what had been already given. Taking the present discussion in connection with that which took place on the former occasion, except what had just been said about acetic ether he did not think there was much left to answer. With regard to this article, he also had had some experience in its preparation, for it was an old and familiar operation with him; and he was quite prepared to defend what was stated in the Addendum with reference to it. He did not say that the specific gravity given was the true specific gravity of acetic ether, because he, like other gentlemen, had not always found precisely the same results following the same process of manipulation. He accordingly referred to some of the best and highest authorities on the subject; and here he must take a slight exception to one part of Mr. Umney's paper, where he referred to some authorities, and stated that Gmelin gave the specific gravity of acetic ether at ·888. The fact was, Gmelin hardly ever gave a fact on his own authority; and on referring to this article he found a number of authorities given, with specific gravities varying from ·866 up to ·932. Referring to different authorities, Thénard gave ·866; Miller and Pereira, ·890; Becker, ·903; Pierre, ·906; Kopp, ·910; the French Codex, ·920; and Gosmon, ·932. There was thus a great range given, and he had taken about the mean of the different results, which happened to be that recognized by Mr. Watts in his 'Dictionary,' given on the authority of Kopp. And he would ask how it happened that the same rule was not applied in this case as with reference to nitrite of amyl, for both might be put on the same footing. There was a difficulty in getting it in a state of absolute purity, and therefore it had been said it was excusable if there were a little deviation from what might ultimately turn out to be the absolute specific gravity. Mr. Umney had allowed in the case of nitrite of amyl a range of 8° or 10°; and why was not the same latitude to be allowed with regard to acetic ether, a preparation which involved the same difficulty? A strong point had been made that the necessity of rectifying it over lime, potash, or some alkali, had not been mentioned; but with reference to acetic ether, as with nitrite of amyl and hydrate of chloral—those being chemical compounds, which necessarily come from the manufacturing chemist—he had not professed to give a detailed process; they were merely outline processes, the details being left to the manufacturer. But taking what was strictly indicated in the Addendum, he maintained that a practically good preparation for all the purposes contemplated might be obtained without the use of either lime or any other alkali. If the distillation were conducted properly and judiciously in the first instance, you could get the result with no more excess of acetic acid than was almost necessarily contingent on preparations of that description. You never got it perfectly neutral in commerce, according to his experience, and if you made it neutral it soon became acid. If you added carbonate of potash to it and left them to stand, it caused a decomposition of the ether, for which there was no occasion. There were at least three methods for making it, of which that given was the best. If the spirit and acid were converted into sulphovinic acid and this were added to a perfectly dry acetate of soda, the acetic ether comes over of itself, without the necessity of applying any artificial heat, so rapidly that the only difficulty was in condensing it, and at a temperature which brought scarcely any appreciable quantity of free acetic acid with it. In that way acetic ether of considerable purity was obtained, as good as is commonly met with in commerce; and this could be further purified by chloride of calcium and rectification, the latter being a comprehensive term. Many remarks had been made of a disparaging nature, indicating that amongst the additions were substances which were unworthy of a place in any Pharmacopœia. That was a matter of opinion; and, judging from what had passed on this and other occasions, if the president were sitting as chairman of a committee, he would find a difficulty in ascertaining which way the opinion inclined with reference to some of the preparations which had been mentioned. He thought there could be no question as to the propriety of introducing acetic ether, which was one of the most agreeable of the compound ethers, and was destined, he believed, to occupy a prominent position in the pharmacy of the future. It contributed greatly to give the peculiar flavour to wines and vinegars, and if wine were to be replaced as a vehicle in medicine by some dilute spirit, this acetic ether would be advantageously used as a flavouring agent. If Mr. Bottle had looked into the copy which by an unfortunate accident had got into his hands, he would have found that acetic acid was intended to form a component part of one of the preparations which at one time was intended to be introduced, but which was subsequently rejected. But to proceed, nitrate of ammonia was now largely used for making nitrous oxide gas, and was therefore introduced. With reference to nitrite of amyl, it was a very powerful and valuable medicinal agent, and it was desirable and necessary that its composition and characters should be defined. With regard to the *Aqua chloroformi* again, it was a matter of opinion whether it ought to have been included or not. Mr. Umney said it was one of the most valuable preparations in the whole list, whilst others said it was not worthy of a place. He had long been of opinion that it was a very elegant and agreeable aqueous vehicle for medicines compatible with it. It was said, however, that spirit of chloroform might be used to make it. So it might, but then either too much or too little might be used. This was a perfectly definite preparation which would keep perfectly well for any length of time. He could say nothing with regard to the areca nut, because he had no experience of it, but on a former occasion, it had been stated on the highest medical authority to be a valuable anthelmintic, and as had been admitted by Mr. Carteighe it was for the profession to decide what medicines should be introduced; he considered therefore it was rather in bad taste to make the sort of disparaging remarks with regard to it which had been offered. With regard to fresh orange, that of course was required for the tincture. Oxide of bismuth he had heard nothing against, and it was one of the most definite preparations of bismuth, and easily obtained in a state of purity. In his opinion it was much preferable to the nitrate or carbonate. With regard to the hypophosphites of lime and soda, he believed all that had been said was in their favour. Hydrate of chloral came next, and was it right that it should be so extensively used as it now was, without having a recognized description of it and a

method of testing it? Next came the liquid extract of liquorice, which was not a matter of great importance, but it was a convenient preparation, and the formula given was that given by Mr. Squire. Gutta percha was simply used in another preparation, and was introduced as such. The yellow oxide of mercury had been recently used in medicine and had been recommended to the Society years ago by Mr. Squire in preference to the less soluble oxide generally employed. Then with regard to the hypodermic injection of morphia, he thought it fully time that this should be introduced, and that it was not right to wait until a new Pharmacopœia came out; in fact this one article alone was in his opinion sufficient to justify the issue of the Addendum, inasmuch as it would be a great advantage and convenience to retail pharmacists throughout the country to have a good practical process as he called it (and Mr. Umney further had said it was the best process) for making this hypodermic solution. It was done with a view to their own convenience and to the interests of the public. Before this came out he had been repeatedly applied to by chemists throughout the country to know how a solution of acetate of morphia could be made capable of being used for this purpose, the attempt to do so by dissolving commercial acetate of morphia having always failed. With regard to larch bark he might say the same as in the case of areca nut, it was for medical men to say what they would prescribe. Next came the solution of citrate of magnesia, and here again was introduced a very efficient, elegant, and agreeable purgative, not before in use in this country. The term citrate of magnesia was justified by its composition, and he entirely disagreed with Mr. Carteighe on this subject. The *Liquor magnesiæ citratis* was precisely what its name indicated, and a better name could not have been adopted. It would have been very objectionable to give such a name as purgative lemonade, or anything of the kind. The whole of the ingredients constituted citrate of magnesia, with the exception of a little flavouring matter. Next came *Oleum phosphoratum*. The formula had long been used on the Continent, and he knew of no better mode of making it. He had made it over and over again, and had not found the oil become viscid, at any rate, not to such an extent as to interfere with its use, even after being kept nearly twelve months. The only object of heating the oil was to drive off the water, though in some samples of oil it also rendered a portion of albuminous matter insoluble and precipitated it, so that if after it had been heated it was filtered, it would be more likely to form a permanent solution of the phosphorus. Then it was said, why make it of the strength? The fact was, as originally proposed, he had made it of the strength suggested, one grain in 100 minims, but he was afterwards called upon to introduce a formula for a phosphorus pill. The physicians decided what they wanted to have, and as they required phosphorus both in the liquid and solid form, he was asked to devise a formula by which it could be administered in both ways. Just at the time a paper was published by Mr. Abraham, jun., of Liverpool, in which he indicated balsam of tolu as a suitable vehicle for phosphorus, and he at once saw there was a manifest advantage in this balsam over any other resin that he knew of, viz., that whether in the solid or liquid state it was heavier than water, so that the solution could be made without any exposure of the phosphorus to the air, thus preventing any oxidation. He contended that this was a perfectly practical process, and the best yet devised for diffusing phosphorus in a form in which it admitted of administration in the solid state. He could only say to Mr. Martindale, if he found any difficulty in effecting a mixture of the wax and the resin to try again, and that if he availed himself of the proper time and temperature, when the wax was just soft, but not fluid, there would be no difficulty in getting the ingredients to unite. The great advantage was that from beginning to end the phosphorus never came in contact with the air, and was thoroughly dissolved or diffused throughout the mass, it did not much matter which. It was said, however, it did not dissolve in the stomach; and if that was the case, some remedy might be found for it, either as suggested by Mr. Gerrard, the addition of a little sugar, or some other method. This could be done at the time of dispensing. If it were done when the pill mass was made it could not be kept without change. According to the formula here given, however, it was perfectly stable for any length of time, and when prescribed could be mixed with any ingredients necessary to render it soluble in the intestines, if such should be required, which he doubted. The process for pepsin had been strongly criticised, and he must say that a more absurd and, indeed, more disgraceful criticism he had never heard uttered by a gentleman desiring to occupy a respectable position. He, also, had made pepsin, perhaps even more extensively than Mr. Smith, and he was prepared to say that that made by the process given in the Pharmacopœia was the only kind he should be prepared to recommend, and the only form in which it could be presented to the medical profession with satisfaction. There had been processes proposed for procuring it in the liquid state, but they were not reliable, and this was the nearest approximation to pure pepsin. Compound scammony pill was the name adopted instead of compound jalap pill, as first suggested, for the pill of jalap and scammony resin, with soap and ginger. Certainly it was a desideratum to have a purgative pill containing no aloes, and no one had proposed a better formula. It had been said that this was not the proper time for making suggestions, but to this he would reply that long ago he had explained as fully as possible what was proposed to be done, and had asked over and over again for the assistance of practical gentlemen in the matter. They did not render it then, and now they said this was not the time to make suggestions, and it was no use asking their opinion. Of course not, and their opinion was not asked, but they came forward and volunteered it, not having given it when it was asked months and months ago. Among compound powders they had *Pulvis elaterii compositus*, to which he believed no exception had been taken, and every practical man who had spoken of it said it was a valuable addition. It had been asked why sulphur and fennel had been left out of the *Pulvis glycyrrhizæ compositus*. He had a note from Dr. Quain, which would explain the reason why. But, it might be asked, why should they be put in; why should they make a useful preparation an offensive one; was there any necessity to make those to whom it was administered a nuisance to all their neighbours? That was the view taken of it by the Medical Council. If sulphur were required it could easily be prescribed; but it was not in accordance with senna as an adjunct, and therefore was omitted. With regard to fennel, some liked it and others did not, and it was felt that those who wanted it could order it, but if introduced it was not so easy to take it out. Nothing had been said against the vegetable juices of belladonna and hyoscyamus, and why should they wait three or four years as suggested, if there were an opportunity of introducing them now? Next came syrup of chloral which had been described as too thin and not flavoured as it should be. He would leave Dr. Quain to answer that, but he might say that it was the medical men who considered it was not desirable in administering half a drachm of chloral to be obliged at the same time to give three or four drachms of sugar, when they found that a solution of hydrate of chloral in a much weaker syrup, would keep perfectly well. The physician ordering it might prescribe what flavour he liked, but many preferred it without flavouring at all. Lastly came the tinctures; one gentlemen had said that the ammoniated tincture of quinia was not aromatic enough, but if that were so, let them add what was required in prescribing it. This was a formula in extensive use already in Edinburgh and elsewhere, and any absence of flavouring could easily be remedied. With regard to the tincture of fresh orange

peel, he must admit that he had fallen into a little error which he must take the responsibility of in the process indicated for making it; but the formula now given was not the original one, as had been pointed out by Mr. Bottle at the previous meeting when drawing attention to the discrepancies between the two copies he produced, though for some reason or other this remark has been kept out of the Journal, either by the reporter, editor, or sub-editor, possibly because it did not tend to support the views of some parties. He must admit that the addition of spirit to make up the quantity was an error, but the fact was that was done in committee about twelve o'clock at night, while considering a great number of suggestions coming from different parts of the country, for the work was not completed without practical pharmacists having been consulted. He was sorry Mr. Carteighe was not consulted, but certainly many others were, twenty-four copies having been sent out to members of the Medical Council, especially for the purpose of being put in the hands of their pharmaceutical friends and getting all the advice and assistance they could. He was sure neither the President nor Mr. Squire, nor many other pharmacists, would say that practical pharmacists had not been consulted, for some of the most eminent had had the work put into their hands with a request that they should suggest any improvements. The result was that at the last meeting the committee had a bundle of letters from various sources, and all the suggestions had been attended to, except where one was answered by the others. He regretted that the tincture of fresh orange peel was a subject which last came under attention; and it was suggested that the wording of the formula should be assimilated to others in the Pharmacopœia, where the quantity was directed to be made up by the further addition of spirit, and in a weak moment he passed it, which he admitted was an error. But it was a slight and very unimportant error, and he was certain that if any twenty gentlemen present set about making it, they would not experience the difficulty mentioned by Mr. Umney, unless they used an hydraulic press in the process. However, that was the only error he admitted from beginning to end of the work; and that being so, he thought he might justly appeal to the meeting for exoneration from the very serious charges which had been urged. In conclusion, he read a note which he had received from Dr. Quain, regretting he was not able to be present that evening, as he certainly should have made some remarks on the observations previously made, because he saw in them too much tendency to consider the Pharmacopœia as intended rather for the use of pharmacists than of physicians. For instance, it was said that the syrup of chloral did not look like a syrup; but who cared what it looked like if it were suitable for prescription? and as it was made previously, 30 grains of chloral were given in 3 drachms of dissolved sugar, which was a most objectionable dose of sugar to be put into the stomach. Comments had also been made on the strength of the hypodermic solution of morphia; but it should be known that $\frac{1}{6}$th of a grain in each minim, as recommended by some pharmacists, was too large a dose for a first injection; hence it was better that $\frac{1}{12}$th grain strength should be made, and two minims used if necessary. The sulphur and fennel were left out of the compound liquorice powder because they were objectionable, and the fluid extract of liquorice, as now ordered, was very far superior to the black stuff melted and diluted, as some persons had suggested.

Mr. Umney said Professor Redwood had not referred to the curd soap. Did he find it soluble in spirit? because he (Mr. Umney) found it insoluble.

Professor Redwood said he found it perfectly soluble. With regard to the suppositories, the new processes were simply given as alternatives. A good deal of discussion had taken place some time ago as to what could be used as a substitute for cocoa butter in making those articles; medical gentlemen recommended soap, and his own opinion went in the same direction. He considered soap an unobjectionable vehicle, though there might be cases in which something else would be preferable. There were also other reasons why curd soap was introduced, which would be more apparent when a new edition of the Pharmacopœia came out.

Dr. Paul begged to say, in reference to one remark of Professor Redwood's, that according to his view of the duty appertaining to the editorial department of the Society's Journal, it was not competent for either the editor, sub-editor, or anyone else, to keep out or introduce into it anything with the object of supporting the views of any particular party. Such an act would be a gross dereliction of duty on the part of an editor, and he would emphatically say that nothing of the kind had taken place. He believed what was inserted in the Journal was simply a faithful report of what had taken place.

Professor Redwood said he had referred to the remarks made by Mr. Bottle on the discrepancies he observed between the two copies which had got into his hands; all of which were reported, except the one instance which would have formed a sort of excuse for the little error which had been referred to with regard to the tincture of fresh orange peel. He had no doubt it arose from some accident.

The President said at that late hour he would not pretend to go into the merits of the discussion which had just taken place, but must say he did not approve of Mr. Smith's paper, and must express his regret at its tone. He felt sure that it must have been written in haste, and that Mr. Smith, on consideration, would not have sent it. For himself, he was for making additions to the Pharmacopœia at any time when necessary, and should like the proposed additions to be brought before the meetings of the Pharmaceutical Society for discussion, in order that the formulæ might be as perfect as possible. That being the last evening of the Session he would call upon all the gentlemen present to do what they could in writing papers during the recess for discussion in the next session, which he was sure would be gratefully accepted by the chairman of the evening.

Provincial Transactions.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

On April 27th, 1874, a special meeting of this Association was held, Mr. H. J. Masters in the chair.

The minutes and list of donations having been read by Mr. G. C. Druce, Mr. Masters congratulated those members who had recently passed their examinations.

Discussion then ensued as to the destination and time for the annual botanical ramble. Eventually it was decided to fix May 15th, 1874, for the date, and Bow Brickhill Heath and Woburn Abbey, for its destination. The president said how pleased they would be to see any old members or friends of the Association on the occasion. Those willing to attend were requested to meet at Bletchley station, L.N.W.R., at 8.52 a.m., first sending word to the secretary of their intention to be present.

It was then arranged to have a morning botanical ramble once a fortnight.

The apprentices who intended competing for the Herbarium prize were requested to send in their names at once, as unless three competed no prize would be given.

Mr. G. C. Druce then read a paper on Indigenous Botany, which will be printed in a future number.

The discussion was long and interesting, and, after the usual vote of thanks, the meeting terminated at an unusually late hour; the attendance having been remarkably good.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

The fifth ordinary monthly meeting of the session took place at 37, Blackfriars Street, on Tuesday evening,

April 28. It had been announced that, in the absence of any special lecturer for the evening, the meeting would be of a conversational character, and members were invited to introduce any subjects of general interest for discussion. The attendance was, however, small.

A series of dried and mounted indigenous medicinal plants of the British Pharmacopœia, presented to the Association by Messrs. Butler and Mc Culloch, was placed on the table; and a vote of thanks, proposed by Mr. Brown and seconded by Mr. Woolley, was awarded to the donors.

Mr. Benger drew attention to a recent fatal case of poisoning by arseniuretted hydrogen, which had occurred in Messrs. Calvert's Laboratory, and urged the importance of extreme caution in the application of Marsh's test. Mr. Siebold said he had specially cautioned his class on this point when treating of the detection of arsenic.

This being the last meeting of the winter session, arrangements for the summer months were discussed, and it was resolved to open the rooms on Tuesday and Friday evenings only till further notice.

Students could, however, obtain the keys at any time by applying to the Secretary. Mr. Siebold's lectures would conclude about the fourth week in May, and an examination for prizes would then take place in the various classes.

SUNDERLAND CHEMISTS' ASSOCIATION.

The annual meeting of the above Society was held on Wednesday, April 29th, when the following officers were elected for the ensuing year :—

President, Alderman Thompson ; Secretary, Mr. J. J. Nicholson ; Treasurer, Mr. R. Robinson ; Council—Messrs. J. Harrison, C. J. Lord, H. Thompson, Priestly, Mitchinson, Nasbet, Sayer, Sharp, Turnbull, Chapman.

In the course of a discussion which ensued with regard to a proposed scale of prices for dispensing, Mr. J. R. Thompson read the following paper on the subject :—

In considering the question of prices, it is well to remember that it is a subject surrounded with many difficulties. Difference of neighbourhood and difference of style in conducting the pharmacy will necessarily tend to difference of charges. The plan proposed by your committee, of making the size of the vessel containing the medicine determine the price, I think faulty, and extremely artificial. The same remark applies to the division of medicines (for the purpose of charging) into the several classes of mixtures, drops, lotions, injections, gargles, draughts, pills, powders, ointments. It does not seem to be founded on principles either philosophical or commercial. Every dispenser of medicine knows with how much more trouble, and with what an extra expenditure of time, generally, a box of pills is made than a mixture of whatever size. Yet medicine in the form of pills is recommended to be charged at the rate of 1*d.* per dose, while that in the form of mixtures, 2¼*d.* In other words, a less expensive medicine is to be charged more than double one of greater cost. It may, perhaps, be said that the public is more willing to pay for mixtures than for pills. To such a suggestion I would reply that its willingness to do so arises from ignorance of the above facts, and, as a reform is contemplated, it might be well to correct an impression so erroneous. At any rate, it is unworthy an intelligent body of men to bind themselves to a practice so unequal. The use of a private price mark seems to me superfluous, and in some respects objectionable ; superfluous, because there is no reason for hiding from the purchaser that an understanding exists among members of the profession and trade as to the scale of remuneration ; objectionable, as it might facilitate rather than prevent a practice of underselling, which, it is hoped, no member of our body would willingly adopt. Fewer objections, I think, are to be found in the following plan. In dispensing from prescription let the charge be made up of a fee, plus the retail price of the ingredients used. By this method the dispenser will be paid in each case for his professional skill, and also the tradesman for his goods, while the customer will be charged in proportion to what he receives. A not undesirable variation would thus arise in the price of medicines, which would do more to acquire the confidence of the public than one fixed charge for medicine, however different.

LEEDS CHEMISTS' ASSOCIATION.

The sixth monthly meeting of this Association was held in the Library, at the Church Institute, on Wednesday, April 29, 1874, the President, Mr. Freshfield Reynolds in the chair.—The business of the evening was commenced by the Honorary Secretary reading the minutes of the last meeting, which were confirmed.—Mr. Taylor then proposed and Mr. Watson seconded, "That the Honorary Secretary write to the Pharmaceutical Society, tendering their thanks for the PHARMACEUTICAL JOURNAL for the past year."

A paper was then read by Mr. E. Yewdall on the Adulteration Act, and how it affected the chemist and druggist. On the conclusion of the paper a discussion was carried on by several members of the trade. A vote of thanks was then passed to Mr. Yewdall, on the motion of Mr. Payne, seconded by Mr. Hallowell.

HULL CHEMISTS' ASSOCIATION.

At a Committee Meeting of the above Association, held on the 4th inst., the following resolution, proposed by Mr. Earle, and seconded by Mr. Myers, was carried unanimously.

"That the Government having appointed a commission to inquire into the working of the Adulteration Act, this Committee, having in view the annoying and unfair proceedings which have, from time to time, been instituted under the Act, respectfully urges upon the Council of the Pharmaceutical Society the necessity of taking such steps as may be advisable for protecting the fair interests of the trade ; especially with respect to the retailer being held responsible for other than his own acts. That this Committee is further of opinion that the 24th clause of the Pharmacy Act of 1868 is amply sufficient for the protection of the interests of the public in the sale of drugs."

ASSOCIATION OF CHEMISTS AND DRUGGISTS OF IRELAND.

The monthly meeting of the above Association was held in the Society's rooms, Molesworth Street, on Monday, May 4th. Mr. E. M. Hodgson, President, in the chair.

The minutes of the last meeting having been read and confirmed, and several new members proposed, the President said that the principal business of the evening was to hear the report from the deputation which waited on the Apothecaries' Company at the request of the Association. He believed that their position with that Company had been much changed since the last meeting. The main object of the deputation was to ask the Apothecaries' Company to join the Association in a deputation to the College of Physicians, to discuss the proposed Pharmacy Bills. The Apothecaries' Company, however, declined. Dr. Leet informed the deputation that he had forwarded their Bill, as approved by the Association, to the Attorney-General for Ireland ; but it transpired that, according to Dr. Leet's statement, there were some trifling alterations: these alterations had been inserted to please some of the northern apothecaries. On looking into these trifling alterations, he (the President) thought them not trifling, but of vital importance, and that the meeting should discuss those clauses that night.

The Secretary then read the clauses, as in the Bill approved of by the Association of Chemists and Druggists, and then as altered by the Apothecaries' Company. The Apothecaries' Company had taken the liberty of changing clause 3, relating to the constitution of the board of examiners under the Act. In the Bill agreed to by the Society, the board of examiners was to consist of the Governor or Deputy Governor with six members of the Court of the Apothecaries' Hall, and six members to be chosen by

the Association of Chemists and Druggists of Ireland; instead of the latter is inserted—six Apothecaries (not members of the Court of the Hall) chosen from the Apothecaries of Dublin.—This alteration was unanimously objected to, as the examiners under that provision would be the very men whose interest it would be to keep out the chemists and druggists; and it was considered that an examining body so constituted could not have the confidence of the members of that Association.

Mr. O'Brien read correspondence which had taken place between the Apothecaries' Hall and the Association, in 1870, and remarked that they were in no better position now than they were three and a half years ago. He had no faith in the Apothecaries' Company, and did not believe that body had any desire for any alteration in the existing pharmacy laws; he believed the Apothecaries' Company were trifling with them.

Mr. Holmes remarked that if the Apothecaries' Company had forwarded the altered Bill to the Attorney-General, stating that that Bill was agreed to by the Association of Chemists and Druggists of Ireland, they had simply stated what was not true; and he proposed that the Secretary be requested to communicate at once with the Attorney-General, and inform him that the Bill forwarded to him by the Apothecaries' Company had not the approval of that Association, but that the Association would use every means in its power to oppose it (in its present form); a copy of this resolution also to be forwarded to the Secretary of the Apothecaries' Company. The resolution was carried unanimously, and the proceedings terminated.

Parliamentary and Law Proceedings.

Poisoning by Carbolic Acid.

An inquest has been held at Battersea by Mr. Carter, Coroner for East Surrey, upon the body of George Cannon, aged 14, who had poisoned himself by drinking carbolic acid. Evidence was given that the deceased was seen by a child to pour some carbolic acid out of a bottle and drink it. Two hours afterwards his brother, Mr. Matthew Cannon, manager of Beaufoy and Co's chemical works, Battersea, found him lying insensible in the kitchen. His daughter told him that deceased had taken some carbolic acid, and he immediately sent for a doctor. Deceased recovered consciousness and told witness that he had taken half a cupful of carbolic acid, but did not know it was such nasty stuff. Witness tried to ascertain why he had drank it, and deceased replied that he did not know. Witness did not think deceased was aware of the poisonous nature of the fluid. The carbolic acid had been used as a disinfectant (there having been scarlet fever in the house) and had been left in the bedroom with the cork out. Deceased could read the Testament, but, perhaps, could not read the label on the bottle. Deceased said nothing to lead witness to suppose he had taken the acid with a view to poison himself. The lad died about fifteen hours after drinking the poison.

The Coroner remarked that the word "Poison" was not on the label, and suggested that in future enactments it should be ordered that poisonous substances, of whatever nature, have a label with the word "Poison" affixed to them whenever sold to the public. He had had recently several cases before him of poisoning caused by carbolic acid, and in each the bottles were not labelled "Poison."

Mr. Toone Smith, surgeon, said he was called to deceased about three hours after he had taken the poison, and found him in a state of collapse and almost pulseless; the surface of the body was cold, the pupils of the eyes contracted, the lips slightly livid, and a strong odour of carbolic acid pervading the place. He administered an emetic, and mucilaginous and oleaginous drinks. He asked deceased why he had taken the poison, and he replied that he had been in the habit of taking small doses of physic for fun; and witness did not believe, from his manner of answering, that he thought it would cause death.

The Coroner having commented upon the evidence, the jury returned a verdict of "Death by Misadventure."

Charge of Poisoning by a Liniment.

At the Dale Street Police Court, Liverpool, on Monday, April 27th, before Mr. Raffles, Eliza Hales, a girl 14 years of age, was charged with having administered a poisonous substance to the infant child of William Henry Duckett.

It was stated that on Saturday morning the prisoner was employed by Mrs. Duckett to do some housework. There was a bottle containing a liniment marked "poison," on the mantel-piece, and Mrs. Duckett cautioned the prisoner not to have anything to do with it. During the morning Mrs. Duckett alleged that the prisoner had tried to defraud her of a penny. Some time afterwards the baby was heard crying, and on Mrs. Duckett's sister going to see what was the matter, she found the tube of the feeding bottle out of the child's mouth. She tried the tube under the impression that it would not draw, and then discovered that something had been mixed with the milk. She told the prisoner that she must have put something in the bottle, and prisoner denied that she had done so, but said that Mrs. Duckett herself had mixed something with the milk in order to avoid paying the sixpence which the prisoner was to receive for cleaning. An examination subsequently made showed that a portion of the liniment had been mixed with the milk. Nobody had actually seen the prisoner put the liniment in the feeding-bottle, but nobody else was there to do it. The prisoner was remanded, and Mr. Raffles said he would accept two bails of £25 each for her appearance.—*Liverpool Daily Post.*

Chemists and Druggists, and the Adulteration Act. The Sale of Milk of Sulphur.

Mr. Hannay had before him, at Worship-street Police-court, on Tuesday last, two summonses taken out by direction of the authorities of Hackney parish, against two gentlemen carrying on business as chemists and druggists—Mr. Nicholls, of 99, Wick-road, South Hackney, and Mr. Maizey, of 2, Market-road, Cassland-road, South Hackney—charging them with selling, as unadulterated, a certain drug or article usually taken as a medicine, to wit, milk of sulphur, which was adulterated, contrary to the statute. With respect to these, Mr. Watts, the sanitary inspector, said that on behalf of the parish he desired to be allowed to withdraw. Notice of intention to make this application had been given to the defendants.—Mr. Wontner, jun., who appeared for the gentlemen summoned, desired to be heard on their behalf. —Mr. Hannay asked if he objected to the withdrawal, or if he desired to be prosecuted.—Mr. Wontner thought that if the parish, having taken out the summonses, now desired to withdraw, they should at least pay the costs to which they had exposed the defendants. The question, he said, which would be raised in this case had been already decided before Mr. Arnold, at the Westminster Police-court. His clients were not charged with the adulteration but, in fact, with not manufacturing in accordance with the British Pharmacopœia. The decison of Mr. Arnold, given last November, expressed the great hardship to which, in his opinion, the defendants were put, and the authorities appeared anxious to lay down the law that drugs should be manufactured according to the British Pharmacopœia or not at all.—Dr. Tripe, medical officer of health and analyst for the Hackney parish, desired, in the interest of the public, to explain the matter; but Mr. Wontner objected to Dr. Tripe being heard. He thought that a public body like the Hackney Vestry might appear professionally, and at least make up their mind whether they intended to appear or not.—Mr Hannay said that, as the defendants had notice of the intended

withdrawal, he, Mr. Wontner, need not have attended.—Mr. Wontner, while admitting this, said that it was usual to carry out the instructions to attorneys, once given. It was a great hardship on the defendants, after being put to the expense of instructing him, Mr. Wontner, to be told a week afterwards that all that expense and all that trouble was thrown away, because the parish did not intend to proceed.—After some further discussion, Mr. Wontner said that if the parish objected to pay the costs he would make them a present of the amount. At the same time he desired to publicly protest against such hasty proceedings on the part of such public bodies, who desired to hold up the drugs of the British Pharmacopœia as the only good drugs.

Adulteration of Milk.

On Saturday last, at the Greenwich Police Court, Mr. Daniel Phillips, farmer, appeared to an adjourned summons (see before, p. 866), at the instance of the Lewisham District Board of Works, charged with selling milk with an admixture of water. The case had been adjourned because the accuracy of the analysis of the milk, made by Mr. Heisch, of Middlesex Hospital, was disputed; and it was stated that skilled and scientific evidence would be called to show that, unless an analysis of milk was commenced within six hours after being taken from the cow, no analysis could be relied upon.—Mr. Balguy now asked whether this evidence was forthcoming.

Mr. G. Gates said he was the son-in-law of the defendant, and a master at the Merchant Taylors' School. He had taken a sample of the same milk to Professor Barth, analytical examiner to the Royal Academy of Arts, but could not obtain an analysis of it. He knew some little himself about chemistry, and did not believe that any difference could be found between water found in pure milk and water that might form an admixture.

The defendant was put into the witness-box, as was also his clerk, and both deposed to having about a pint and a half of the same milk placed in a bottle, and given to the last witness; and a milk dealer named Robinson also deposed to purchasing 65 gallons of milk daily at defendant's farm, and said he never was complained against.

Mr. Balguy asked if there was any scientific evidence that could be called.

Mr. C. J. Stewart was then tendered as a witness, to give his opinion upon the notes entered in a book by Dr. Heisch, of the analysis in question. He said he was chief assistant to Dr. Bernays, professor of chemistry at St. Thomas's Hospital. Examining the entries, he said he found 8 per cent. of cream, which was a fair amount of cream, and fat normal. The solids were marked 6·46. His opinion, from the notes, was that the analysis was not sufficiently completed.—Mr. Collins, for the prosecution, declined to put any other question to this witness, who answered that both Dr. Heisch and Dr. Attfield were gentlemen of great experience as analysts.—Mr. Balguy said, to his mind, there could be no doubt that where 25 per cent. of water was deposed to have been found, there must have been an admixture of water; and there would be a fine of 5*l.*, and 2*l.* 2s. for two attendances of Dr. Heisch, and 2s. cost of the summons.—*Standard.*

Adulteration of Butter.

George Andrews, West Fields, Barnes, was charged at the Wandsworth Police Court, before Mr. Bridge, with selling butter which proved to be adulterated. The defendant said he was not aware it was adulterated. Mr. Cook, the inspector, said on the 13th inst. he sent to the defendant's for half a pound of butter. The messenger paid 8*d.* for it. The certificate of the analyst was produced, stating that the butter was adulterated with 27 per cent. of water. Mr. Bridge said in making butter there must be water. Mr. Cook: Not to that extent. Mr. Bridge said his notion of making butter was that water had to be squeezed out of it. It was not an adulterated article unless water was put into it. It was simply not squeezed out enough. Under the third section, any person who shall sell any article of food or drink, or any drug, knowing the same to have been mixed with any other substance, with intent to increase its weight or bulk, was liable. The complainant had taken out the summons for selling adulterated butter. Mr. Cook submitted that the mixing of water increased the bulk. Mr. Martin, the usher, said he was in the business for a number of years. Water could not be added after the butter was made. Mr. Bridge said it could not be called adulterated because the water was not squeezed out. He dismissed the summons.

The *Wandsworth and Battersea District Times*, in remarking upon this and other cases, calls attention to the convenience of having an erudite usher in a police court, who is able to assist "his worship" when he fails to grasp the technicalities of a case.

Correspondence.

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

Pharmaceutical Qualifications.

Sir,—Zaccheus is quite right with regard to his statement respecting applications for assistants. He may derive consolation from an anecdote of Napoleon. The Emperor was trying to reach a book from too high a shelf, when his Secretary interfered, saying, "Laissez moi, Sire; je suis plus grand que vous." The reply was, "Vous voulez dire plus haut."

But there is a much more serious matter. I read in the same number of the Journal an advertisement for a thoroughly competent assistant, *single-handed*. Is not this a case in which the Council might interfere?

Lævo-gyrite.

"*Loudon.*"—(1, 2 and 3). We are not competent to say what are the most practically useful works on these subjects. (4) 'How Crops Grow,' published by Macmillan; (5) Bentham's 'Handbook of the British Flora'; Hooker's 'Student's Flora of the British Isles'; Bentley's 'Manual of Botany.' (6) We know of no preventitive; as a remedy, try dilute solution of ammonia.

"*Figitum.*"—Several papers upon the subject have been published in former volumes of this journal, and a *résumé* of them, with references, was published in vol. i. of the present series, pp. 421 and 481.

"*Botanist.*"—We should recommend you to consult a cabinet-maker.

"*Rosarum.*"—(1) The form is quite correct, and in accordance with the rule followed in other parts of the Pharmacopœia. (2) We cannot supply the information; but possibly it might be obtained by applying to the Registrar.

"*Percontator.*"—(1) See vol. i. of present series, p. 897. (2) Apply at Apothecaries' Hall.

J. Evans.—Made by dusting sand or emery over paper thinly coated with glue.

A. D. C.—(1) Tincture of Turpentine—

Venice Turpentine	℥iv.
Rectified Spirit	Oj.

(2) Pil. Aloes et Myrrhæ, B.P.

W. Trevaskis and *J. Polley.*—Your communication should have been sent direct to the publishers.

We have received the reports of meetings of the Liverpool Chemists' Association and the Glasgow Chemists and Druggists' Association from the respective Secretaries; but in consequence of the length to which the report of the meetings of the Pharmaceutical Society extend, we have been compelled to defer their publication until next week.

Communications, Letters, etc., have been received from Mr. Southall, Mr. C. Cotterell, "A Dispenser," "A Pharmacist," "Excelsior," "Erin," "Inquirer."

MEDICINAL PEPSINE AND ITS RELATION TO THE PEPSINE OF THE PHARMACOPŒIA.*

BY JOHN ABRAHAM.

We have long been familiar with the name of "Pepsine;" and now we find it in the Additions to the Pharmacopœia, it is incumbent on us to inquire whether the article which we supply is in conformity with the new and legal standard.

Although the medicine to which the name is now authoritatively given cannot be considered a pure proximate principle, it will not be found, I fear, that the commercial article commonly supplied conforms to it.

A reference to the formula will show that it does not contain any starch, but starch is usually present in the commercial preparations.

Pepsine was introduced into medical use in France, and a form for it is given in the French Pharmacopœia. A solution is made by digesting the mucous membrane of the stomachs of animals in water. A precipitate is thrown down by the addition of acetate of lead, and the lead having been separated by means of sulphuretted hydrogen, the solution is supposed to contain the active agent. If this is evaporated to dryness, a gummy mass is obtained, not very suitable, it has been thought, for medicinal use. Starch is therefore previously added, perhaps also some acid, and a dry powder of starch with pepsine, commonly called pepsine, is obtained.

Another article is also in the market, called *Pepsina Porci*. A formula for this was furnished by Dr. Beale, and the method of the Pharmacopœia corresponds to it, but with this difference, that the Pharmacopœia authorizes the use of the stomach of the pig, of the sheep, or of the calf. The glandular stomach of any one of these may be scraped, the fluid rapidly dried at a temperature not exceeding 100° F., and the product called "pepsine." According to Dr. Beale it contains the gastric juice, with much epithelium from the glands and surface of the mucous membrane.

I have no intention of inquiring now which of these preparations is the *best*. I wish simply to call attention to our responsibilities in the matter.

The difference between the two is very apparent when they are looked at through the microscope, as you will see by means of the two instruments and samples on the table.

Sample No. 1 is a preparation made according to the Pharmacopœia, prepared under my own direction; Nos. 2 and 3 are commercial specimens of Pepsina Porci, and they greatly resemble No. 1; Nos. 4 and 5 are specimens of commercial "pepsine." You will see that they are loaded with starch.

You have no need of a microscope to ascertain this. Mix a little with water, boil, and add a drop of solution of iodine, and the blue colour will give an unfailing proof if starch be present.

But there may be no starch and the preparation may look perfecly right, and yet be inert. Nothing but the physiological test—its power to dissolve albumen or animal fibre—can show its value.

Our responsibility, however, remains the same, even should it prove that the active principle diluted with starch is better than the active principle diluted with the mucus with which it is mixed when obtained, as directed in the Pharmacopœia, by scraping the glandular coat of the stomach.

But I think it right to add that not only do the microscopical appearances of the commercial pepsines of the pig correspond to that of the Pharmacopœia, but, so far as my opportunities of examination have extended, they bear best the Pharmacopœia test, which is, their power to dissolve the albumen of the egg.

* Paper read before the Liverpool Chemists' Association.

THE ASH AND EXTRACT OF TEAS.

BY G. W. WIGNER.

(Public Analyst for Greenwich, Plumstead, and Woolwich Districts).

Some months since, Mr. Wanklyn published the average percentages of ash from a few samples of tea, and Mr. A. S. Wilson has since published the analysis of the ash of nine more samples. Having examined the ash of a large number of samples of tea, and in most cases determined the proportions of the ash soluble in water and in acid, I think the results will be of use for comparison.

The determinations of *soluble* ash have been made by boiling in water, filtering, and igniting and weighing the insoluble residue, the latter being afterwards boiled in hydrochloric acid to separate the silica. The aqueous solution has in most cases been titrated for total alkali, which has been calculated as potash.

The 24 samples in the following list were all obtained from original chests, as imported. They vary in price from No. 3 and No. 13, which were sold at 3*s.* per lb., to No. 1, which is stated to have been sold at $1\frac{3}{4}d.$ per lb. in bond. This sample consists entirely of very small broken particles of leaves.

TWENTY-FOUR SAMPLES OF GENUINE TEA, AS IMPORTED.

Number.	NAME OF TEA.	Total Ash.	Ash Soluble in Aqua.	Ash Soluble in Hydrochloric Acid.	Silica.	Alkali in Ash calculated as Potash.
1	Siftings	5.55	3·16	2·14	·25	
2	Gunpowder	5 73	3·08	2·25	·40	
3	Ditto	5·71	3·35	2·16	·20	
4	Ditto	5·72	3·29	2·12	·30	
5	Congou	5·60	2·75	2·52	·33	1·50
6	Ditto	5·58	2·99	2·20	·39	1·65
7	Ditto	5·73	2·67	2·43	·63	1·36
8	Pekoe	5·89	2·86	2·49	·54	1·64
9	Mixed	5·74	2·78	2·36	·60	1·60
10	Congou	5·59	2·91	2·22	·46	1·78
11	Ditto	5·62	3·01	2·16	·45	1·71
12	Ditto	5·49	2·98	2·11	·40	1·42
13	Ditto	5·58	2·86	2·25	·47	1·67
14	Gunpowder	5·92	2·87	2·44	·61	1·79
15	Ditto	5·65	2·85	2·02	·78	1.62
16	Bohea	5·46	3·06	1·96	·41	1·60
17	Black Tea	5·74	3·18	2·36	·20	1·30
18	Ditto	5·68	2·98	2·15	·55	1·72
19	Ditto	5·56	3·02	1·97	·57	1·76
20	Ditto	5·49	2·94	1·90	·64	1·69
21	Ditto	5·54	3·26	2·04	·24	1·36
22	Ditto	5·99	2·81	2·17	·71	1·40
23	Ditto	5·69	3·35	2·13	·16	1·88
24	Ditto	5·53	3·32	2·04	·17	1·60
	Average	5·66	3·01	2·21	·41	1·62

The deviations from the averages are comparatively

small in these samples, the maximum variations being —in total ash, ·33 per cent.; in soluble ash, ·34 per cent.

The next 12 samples are of what would be considered good tea, but as I have not received them from the importers, I cannot say that they are in the same state as reeeived here; several of them were indeed sent to me as "mixed tea."

TWELVE SAMPLES OF TEA FROM RETAIL DEALERS.

Number.	NAME OF TEA.	Total Ash.	Ash Soluble in Aqua.	Ash Soluble in Hydrochloric Acid.	Silica.	Alkali in Ash calculated as Potash.
25	Black	5·31	3·29	1·89	·13	1·83
26	Green	5·23	2·87	2·07	·29	1·93
27	Broken Congou	5·20	3·33	1·70	·17	1·54
28	Mixed	5·48	2·45	2·29	·74	1·51
29	Ditto	5·54	3·22	1·24	·08	1·75
30	Ditto	6·14	2·68	2·78	1·68	1·56
31	Ditto	6·12	2·88	2·71	·53	1·71
32	Ditto	6·07	2·73	2·75	·59	1·71
33	Ditto	6·20	2·70	2·84	·66	1·48
34	Ditto	6·05	2·99	2·21	·85	1·83
35	Black	6·31	3·23	2·37	·74	1·42
36	Ditto	5.60	3·55	1·83	·22	1·75
	Average	5·77	2·99	2·22	·56	1·67

The average of these is rather higher, and the deviations from it are greater. I attribute this to the circumstance that several of the mixed teas contained small proportions of Caper and other heavily-faced teas. The maximum deviation in total ash is ·54 per cent.; in soluble ash, ·56 per cent.

The next four samples are in the same condition as imported, but of exceptional character, high price, and avowedly used only for mixing with other teas. The variations from the average will be seen to be excessive, although the average itself is similar to the other samples.

GENUINE TEA OF EXCEPTIONAL CHARACTER, AS IMPORTED.

Number.	NAME OF TEA.	Total Ash.	Ash Soluble in Aqua.	Ash Soluble in Hydrochloric Acid.	Silica.	Alkali in Ash calculated as Potash.
37	Orange Pekoe	5·11	3·15	1·60	·36	1·88
38	Indian Pekoe	5·61	3·56	1·63	·42	1·75
39	Indian Twankey	5·00	2·34	2·18	·48	1·42
40	Summer Shoots	6·55	2·62	2·99	·94	1·33
	Average	5·57	2·92	2·10	·55	1·59

The average of the 40 samples is as follows :—

Total ash	5·68	per cent.
Ash soluble in water	3·00	„ „
„ „ „ acid	2·20	„ „
Silica	·48	„ „
Alkali in ash, calculated as potash	1·62	„ „

The proportion of alkali in the ash varies from 1·30 to 1·88 per cent.

The iron was only determined in a few cases.

The next list includes 21 samples, all of which are more or less adulterated.

ADULTERATED OR SPURIOUS.

Number.	NAME OF TEA.	Total Ash.	Ash Soluble in Aqua.	Ash Soluble in Hydrochloric Acid.	Silica.	Alkali in Ash, calculated as Potash.
41	Caper	15·42	2·24	3·40	9·78	1·21
42	Ditto	2·13	1·62	5·78	4·73	2·10
43	Ditto	10·11	·76	1·09	8·26	
44	Ditto	17·13	2·43	2·86	1·84	·35
45	Ditto	7·03	3·00	2·64	1·39	
46	Ditto	6 94	2·66	2·61	1·67	1·50
47	Gunpowder (special)	2·94	·47	4 60	37·87	
48	Gunpowder	47·01	2·74	3·38	·89	1·44
49	Ditto	6·53	3·19	2·56	·78	1·57
50	Ditto	8·05	3·08	3·55	1·42	·94
51	Ditto	5·04	3·00	1·81	·23	1·54
52	Ditto	6·66	2·80	2·99	·87	1·00
53	Hyson	7·87	2·11	4·16	1·56	·90
54	Congou	5·62	2·27	2·59	·76	1·46
55	Ditto	6·27	2·48	2·90	·89	
56	Ditto	6·38	1·57	3 51	1·30	1·62
57	Ditto	6·01	2·32	2·56	1·13	1·45
58	Ditto	5·72	2·49	2·56	·67	
59	Spent leaves	3·34	·41	2·37	·50	·43
60	Ditto	3·53	·80	2·60	·13	·89
61	Mixture of 40 per cent. Exhausted leaves No. 60, with 60 per cent., Mixed Black Tea	4·64	1·98	2·50	·16	1·15
	21 Samples Average	8·78	2·12	3·00	3·66	9·30

No. 47 is a remarkable specimen. It contains small stones of an average weight of about ·15 grain, fairly uniform in size, mostly wrapped in the leaves and is very heavily faced. It was taken from the top of a chest as imported. Obviously, this sample and No. 43 consist mainly of exhausted leaves re-dried and coloured.

No. 56 contained a very large proportion of exhausted leaves.

Nos. 48 to 53 were all most grossly faced; not with the ordinary slight facing, but with as much colour as could be made to adhere.

No. 54 had been wetted and re-dried.

No. 55 consisted mainly of stalks.

Nos. 57 and 58 contained excessive proportions of stalks.

Nearly all these samples contained leaves which were not tea leaves. Nos. 59 and 60 are ordinary samples of exhausted tea leaves from my own use.

No. 61 is an artificial mixture of exhausted leaves with good mixed tea, to show the effect on the ash.

The averages of this series are of course of very little value, owing to the various classes included in it.

Some of these samples have been extracted with boiling water, and the extract dried and weighed.

These determinations have been made on powdered tea, since it is not practicable to take a small sample (10 grains) fairly from a whole leaf tea. The extract has been dried at 212° and weighed, and then fully ignited and re-weighed.

WEIGHT OF EXTRACT OF TEAS.

Number.	NAME OF TEA.	Aqueous Extract dried at 212°.	Ash of Extract.
1	Siftings	34·40	5·35
3	Gunpowder	43·70	4·30
4	Ditto	34·51	3·25
5	Congou	27·80	3·00
6	Ditto	30·10	4·54
7	Ditto	27·60	3·80
8	Pekoe	35·16	3·86
9	Mixed	23·93	3·65
10	Congou	31·09	4·37
13	Ditto	25·08	3·66
15	Gunpowder	30·54	4·24
17	Black	30·66	4·21
22	Ditto	26·04	3·38
35	Ditto	31·68	4·53
36	Ditto	35·68	6·44
38	Indian Pekoe	41·65	4·60
39	Indian Twankey	39·53	4·93
40	Summer Shoots	38·03	4·98
41	Caper	34·58	4·18
47	Gunpowder (special)	20·35	3·90
52	Ditto	36·70	4·25
53	Hyson	34·70	5·00
56	Congou	27·86	4·80
60	Spent leaves	8·53	1·53
61	Mixture of 40 per cent. exhausted leaves No. 60, with 60 per cent. Mixed Black Tea	23·78	3·43
	Average	31·35	4·16

These results are far from regular, and the determination of extract does not appear to be of much value in judging whether a tea is adulterated.

The mixed black tea in No. 61 sample gave nearly 36 per cent. of extract.

The exhausted leaves are of course very different in result; but when the leaves have been re-gummed the difference is far less, as for instance in sample 56.

It will be seen that No. 47, the *special* gunpowder, gives a full proportion of extract, though it is entirely a spurious tea. Yet there may be special cases in which this determination would be of value.

These adulterated samples must not be viewed as a fair average of commercial samples, since several of them were procured for me at my request by an experienced tea buyer as samples of the worst tea imported.

NOTE ON A SOPHISTICATION OF PAREIRA ROOT.

BY JOHN MOSS, F.C.S.

(Late Demonstrator in the Laboratory of the Pharmaceutical Society.)

It was my intention, at the last evening meeting of the Pharmaceutical Society to have brought before the notice of the members present a sophistication of pareira brava which has not, so far as I know, been previously announced. With this object two specimens had been placed on the table, but the press of other matter crowded out every opportunity of speaking about them.

The specimens were taken from a bale of pareira brava, the contents of which were professedly the root only of *Chondodendron tomentosum*; a cursory inspection, however, was sufficient to show the presence of two totally different structures. One of these, which is hard, heavy, and of a dark brown colour, is plainly the root described by Mr. Daniel Hanbury;* the other, which is lighter in weight, paler in colour, and much less compact in texture, is as evidently a stem—for the majority of pieces are covered with an easily seen bark, the hue of which is variegated by whitish patches of microscopic lichens and occasional green tufts of moss. A comparison of this stem with an authenticated specimen in the museum of the Pharmaceutical Society, leaves no doubt that it is derived from *C. tomentosum*. On the pieces of stem presented by Messrs. Corbyn and Co., the characteristic warts are shown in a marked manner.

The stem is sickly sweet, yet slightly bitter in taste. In the root the bitter taste is very much intensified, and indeed predominates over every other. This difference is best noticed by appropriate comparison of the respective infusions.

The object of this note is to induce pharmacists to examine their stock of pareira, and so prevent the substitution for the root, of the much less active, if not altogether inert, stem. In my opinion, few parcels will be found free from the admixture here described; in the first place, the admixture occurs in original packages, and in the second, it is very unlikely that experience of this kind is confined to one house. I may say in conclusion that two bales, the aggregate contents of which were 137 pounds, gave 73 pounds of stem—over 50 per cent.

CHEMICAL ANALYSIS OF JABORANDI.†

BY M. RABUTEAU.

Some leaves of "jaborandi" which had been received from Dr. Coutinho (see before, p. 850) by M. Rabuteau, have been submitted by him to a chemical and physiological investigation, from the report of which the following particulars are taken:—

The jaborandi leaves have an odour difficult to define, but which recalls to a certain degree that of dry herbs or hay. This odour, which is faint when the leaves are intact, becomes more manifest when the leaves are bruised. The taste also is weak; it is, however, slightly bitter when the leaves are masticated.

Fourteen grams of leaves, reduced to a coarse powder, were submitted to distillation with 200 grams of pure water, the heat being continued until about one-third of the water had passed over. The liquor so obtained exhaled strongly the odour of the leaves, and had a very slight peppery taste; it was colourless and presented a scarcely perceptible turbidity, but no globules could be seen floating on the top. Treated with phosphomolybdic acid, the double iodide of mercury and potassium, or with solution of iodine in iodide of potassium, it did not give any precipitate or turbidity. Consequently the odour of the leaves would appear to be due to a volatile principle, and further, the liquid obtained by distillation does not contain any volatile alkaloid.

The water which had not passed over was separated from the leaves and filtered. It was of a red brown colour, and presented also the odour of the leaves; but it had a bitter taste. It gave no precipitate with either the iodide of mercury and potassium or with solution of iodine in iodide of potassium, showing the absence of any alkaloid. Phosphomolybdic acid, it is true, produced a dirty green turbidity; but vegetable infusions generally are clouded by this reagent, although they may not contain any alkaloid. Further, the application of Stas' test

* PHARM. JOURN., Aug. 2, 1873, p. 81, and Aug. 9, p. 102.

† Abstract of paper in *L'Union Pharmaceutique*, vol. xv. p. 120.

to the liqnor that remained with the leaves in the retort, failed to reveal the presence of any organic base.

Finally, the aqueous liquid which did not distil over was evaporated to dryness. The residue was brown, bitter, and very soluble in water. It was treated with boiling alcohol, which only dissolved a part, and filtered. The alcoholic liquid was bitter, whilst that which remained on the filter was brown, but had no bitterness.

From these experiments, it would appear that the jaborandi leaves have an odour due to a volatile principle which is not analogous to the essential oils contained in aromatic plants. It has a bitter taste, due to a principle soluble in water and in alcohol, which can be separated easily by heating the aqueous extract of the leaves with alcohol. Lastly, the leaves do not appear to contain any alkaloid. The author, however, does not consider the investigation conclusive, in consequence of the small quantity of leaves operated upon.

M. Rabuteau had intended to await a further supply, to study the effects of the bitter substance which he looked upon as the active principle. Meanwhile, having seen M. Gubler's report, which has previously been noticed in these pages, and although he had but eleven leaves, weighing 2·90 grams, at his disposal, whilst from the above results, added to the fact that the leaves when masticated only slightly increased the flow of saliva, he had not much faith in the properties attributed to the drug, he resolved to experiment with them upon his own person. The 2·90 grams were therefore reduced to powder, and, about ten o'clock in the evening, he prepared from them about an ordinary tea-cupful of infusion. This he took when nearly cold, one half alone and the other half with the addition of a little sugar. The sugar, however, was scarcely necessary, since the taste of the infusion was not disagreeable. Ten or fifteen minutes after M. Rabuteau had drank this infusion his forehead became moist, and he went to bed. The sweating came on shortly afterwards, and at the same time an abundant salivation, which continued during nearly two hours. The sweating began to diminish about an hour and a half after the commencement of the experiment, and ceased at nearly the same time as the salivation. The buccal temperature was noted during the experiment, and was found to oscillate between 28·8°C and 37·1°C, the thermometer being placed under the tongue. There was, therefore, scarcely any abnormal heat. Nevertheless the temperature was highest when the effects of the medicine were most active, about three-quarters of an hour after the infusion had been taken. After changing his wet shirt about midnight, the author slept well.

M. Rabuteau states that he has experimented upon himself with a considerable number of medicaments, but has seldom been so surprised as on this occasion; and he agrees with M. Coutinho, that the jaborandi is a powerful and energetic diaphoretic, sialogogue, and sudorific.

The botanical description of "jaborandi" (*Piper jaborandi*), a shrub found in the forests of Brazil, translated from the *Diccionario de Botansia brasileira*, is appended to the paper. It will not, however, be forgotten that M. Baillon is of opinion that the leaves received from Dr. Coutinho do not belong to a Piperaceous plant at all, but to one in the order Rutaceæ, which he identifies as *Pilocarpus pinnatus*, Linn.

THE USE OF SULPHIDE OF SODIUM IN TANNERIES.

One of the earliest processes in the preparation of hides for tanning is the removal of the hair. This is sometimes effected by inducing a slight putrefaction, which loosens the epidermis and renders the hairs easily detachable. But in this country the method usually adopted is to place the hides in a large vat or pit containing milk of lime, in which they are frequently moved so as to allow the lime to act equally on every part. After from sixteen to twenty days the hair is easily removed by a blunt scraper.

In Germany, Austria, and Belgium, however, the trade is reported to have all but abandoned the old methods of unhairing, in favour of one in which sulphide of sodium is the depilatory agent; the sulphide of sodium in a crystalline form being now especially manufactured for the purpose in Germany. The process is modified in various ways to meet the peculiarities of the material operated upon. Sometimes, where it is necessary that the hair should be removed as quickly as possible, as in the case of sole leather, the hides are painted with a paste consisting of one part of crystallized sulphide of sodium and three parts of lime. The hides are covered with damp matting to prevent the drying of the paste, and in fifteen or twenty hours the process is complete, and the hides can be unhaired. In other cases the skins are steeped in a solution of sulphide of sodium (1lb. to 100 quarts), when the time required is two or three days. Where the hides are to be unhaired by hand, it is necessary that they should be first well rinsed in water; and the men employed in the laying on of the paste are usually provided with india-rubber gloves, on account of its corrosive properties.

NOTE ON ERGOT AND ITS PREPARATIONS.*

BY EDWARD R. SQUIBB, M.D.

There is, perhaps, no better example of the unity of pharmacy with practical medicine than is seen in a review of the career of ergot in the 'Materia Medica.' The relation is a closer one than that of interdependence, and the support of a common interest from different bases of support. It is rather the relation of a single cause to a single effect. If knowledge and progress in medicine may be represented by light, then the correlation of electricity, magnetism, and heat in lighting up the universe may not unfairly represent the correlation of pathological research, chemistry, and pharmacy in therapeutics.

From 1807, when Dr. Stearns, of Saratoga County, recalled professional attention to its use in medicine, its history in the 'Materia Medica' is most varied and interesting; and, from a simple parturient and supposed example of a specific effect upon a single organ, it has come to be applied upon a broad general principle, and is already sufficiently studied to extend its utility beyond anything that could have been foreseen. If the influence of pharmacy could be subtracted from this beneficent result, as it cannot be, it is highly probable that the remainder would be comparatively small. The ergot in substance, or by infusion, or by tincture, could have advanced slowly, if at all, to the present state of knowledge in its application. Professor Procter, in a paper published in the Proceedings of the American Pharmaceutical Association in 1857, p. 127, was the first to give uniformity and permanence to any preparation of ergot; thus rendering its systematic and accurate administration practicable by so simple a proceeding as the addition of an acid to preserve it from those changes and uncertainties which, for half a century, had stood in the way of any very accurate investigation of its nicer therapeutic effects. Various investigations, chemical and pharmaceutical, had gradually led to this, but the various extracts, fluid and solid, and the various preparations under the name of ergotin, had all seemed to partake of the perishable nature of the drug in substance, so that the administration could be neither accurate nor uniform. And without this factor of tolerably fixed and known quantities in dosing, effects must always be liable to such confusion and uncertainty as to render the difficulties of accurate investigation almost insurmountable.

Although it may be quite true that when the life of one, or the lives of two human beings depend upon the parturient effects of a dose of ergot, there is no better practice, nor any that is so safe, as the use of fresh ergot in freshly made powder; yet experience has abundantly

* Paper read before the American Pharmaceutical Association at Richmond, Va., September, 1873.

shown that it is upon the age and condition of the ergot, rather than upon its being ergot, that the safety depends, and that this age and condition can rarely be known with that certainty which is necessary when human life depends upon it. Hence it is that the elements of greatest importance in the use of ergot, as indeed of the whole materia medica, are to get the drug in good condition, and then to preserve its activity from change, so that its quantities may be uniform; and this is pharmacy.

Modern investigation and experience have shown that the principal and prominent effect of the administration of ergot to human beings, in adequate quantity, is to cause contraction of the involuntary or unstriped muscular fibre wherever this is found. The gravid uterus being constituted principally of this variety of muscular tissue, this was the organ upon which its effects were first observed, and it was long used as a parturient, both by empirics and by the medical profession, before its more general effects were recognized. One of the most important deposits of unstriped muscular fibre is that which constitutes the middle coat of the arteries; and any agent which causes contraction in this, diminishes the quantity of blood which passes through the vessels and so modifies the nutrition of diseased parts. Hence the uses of ergot in cerebral and spinal congestions, in capillary hemorrhages, in bloody tumours, and especially in tumours and hemorrhagic affections of the uterus, such as fibroids, polypi, etc. As a parturient, a single dose or two is sufficient, and it matters little in what form or how that is given, if the quality be assured and the quantity sufficient. But for many of the other uses it requires to be taken for weeks or months in full and frequent doses, as the only means of keeping up its effects until the cure is established, and hence the prime necessity for a stable and uniform preparation of the drug.

The first requisite to any trustworthy preparation of ergot is, of course, a uniform good quality in the drug, and this is by no means easy to attain. The American market is now overstocked with ergot at extremely low prices. Tons of it might be had at sixteen to eighteen cents per pound, but it is all so small as to render it almost certain that it is from oats, barley or wheat, rather than from rye, while its deficiency in odour and taste, and its uncleanness, forbids the idea of its being trustworthy. Most of it is imported in bags, and thus only by chance can arrive in proper condition. Much of it is contaminated with the seeds of various weeds, and requires much labour in cleaning, as the weed-seeds are often very bitter, and may be poisonous. It is not unfrequently wormy, or bears the marks of having been cleaned from worms and worm-dust to improve the chances of sales and profits. Occasional lots, and these often large lots, look as if they had been washed, and suggest the idea of having been partially exhausted for the making of some of the so-called "ergotins." Hence it may be easily understood that to obtain a uniform supply of good ergot is a very difficult matter, even with the screw of price entirely taken off. Throughout the present crop the writer has paid various prices, from 1·25 dollars down to twenty-two cents, without always being able to get what was desired, though always on the alert in a large market, and always in the presence of far lower prices. Many good authorities state that wheat and oat ergot is as good as that from rye, and some even give the preference to that from wheat; but after many years of pretty close observation, the writer has failed to convince himself that these cheaper varieties are as good. They are certainly very inferior in odour and taste, and it is not an unfair inference, nor without natural analogy, that it finds better conditions for growth in its original and more natural habitat in the paleæ of the rye, where it certainly grows most vigorously.

The existence of one or more active principles in ergot, which may be isolated for therapeutic use, has been very generally believed; and various substances have been extracted and sold under the name of ergotin, those of different makers having different properties and different doses, but all producing some of the effects of ergot, though in very different degrees. After a careful attention to the literature of this subject, and comparing it with the results which seem to have been realized in practice by experience, the writer does not believe that there is an active principle separable from ergot which, in any proper sense, represents the drug. Like senna, rhubarb, and many other drugs, its effects seem to be dependent upon a natural association of its various separable elements. If this be true, there is no such thing as ergotin, and the various substances so called only represent the activity of the drug as they represent more or less perfectly its entire composition. Of course certain of its constituents, such as lignin, starch, fixed oil, gum, etc., are known to be inert, and such being excluded by the choice of a proper menstruum for extracting it, the nearer its preparations come to representing or containing all the remainder of the drug the better. The molecular constitution of the active portion of the drug seems, however, in its natural condition, to be loose, and like a slow fermentation, to be undergoing slow molecular changes, so that by age its peculiar activity is slowly diminished until finally lost. This process of change seems to be arrested by acids, just as many other delicate slow changes are; and whether this be effected by the substitution of a more permanent acid for a less permanent one, in one or more salts, as has been suggested by Professor Procter, but not distinctly proved, or how it is effected, seems as yet unknown. It is, however, well established that the addition of about one per cent. of acetic acid, which is added to the officinal fluid extract of 1860, renders this liquid preparation permanent; at least the writer has known the same preparation to be continuously used as a parturient for six years, without apparent change in activity, though watched closely for such change throughout the time, until the parcel on trial was all used. The ergot in the grain, however well kept, is known to become inactive without known change in appearance, though the sensible properties, such as the odour and taste, may, and probably do, change. Ergot in powder is known to diminish in activity much more rapidly than when in grain, and probably soon becomes inert. The tincture and wine of ergot are believed to change, though more slowly than the ergot in substance, whilst the extracts and so-called "ergotins" are all supposed to change more rapidly than the tincture. Much of this latter, however, is traditional, rather than exact knowledge, and must be presented as such.

There can probably be no better preparation of ergot than the officinal fluid extract of the U. S. Pharmacopœia of 1860.* The formula for this was published by Professor Procter in the Proceedings of this Association in 1859, and the writer has made it continuously by this formula ever since. From this experience in making, which now amounts to many thousands of pounds, and from frequent opportunities of hearing of its activity and its effects, as well as of its permanency, the above statement of its value is made up. When given in frequent large doses for a long time, however, as is required for many of the more modern uses of the drug, it becomes very disagreeable, and occasionally deranges the stomach, producing nausea, loss of appetite, and consequent debility. Occasional intermissions in its use, with other suggestions of care and

* In the last revision of the U. S. Pharmacopœia the formula and process for this fluid extract have been materially changed; first, by the introduction of glycerin, and next by adding the acetic acid to the preparation after the percolation, instead of percolating the drug with an acidulated menstruum. It is difficult to account for these changes in a preparation so well established and so well tried without known complaint. The addition of glycerin may have been to bring it into uniformity with other fluid extracts—a uniformity of very doubtful utility at best—but the change in the use of the acetic acid seems still more objectionable. The present officinal fluid extract will not serve to make the solid extract from.

skill, will often relieve the stomach for a time without material intermission in the effects. It has also been often and much used by hypodermic injection, generally through the integument of the abdomen, in order to relieve the stomach, and it generally acts promptly and energetically when thus used, though in smaller dose; but from being loaded with organic matter, and containing alcohol and a little free acetic acid, it is very apt to produce small abscesses, and thus cause much suffering. Indeed it is by no means well adapted to hypodermic use, and such use of it has always been discouraged by the writer.

(*To be continued.*)

IS PETROLEUM "EXPLOSIVE"?

It may be news to some of our readers that a select committee of the House of Commons has just been sitting, with a view to thoroughly inquire into the subject of "Explosive substances," and at their last sitting petroleum was incidentally mentioned. Sir John Hay was in the Chair, and he shortly examined Major Magendie, government Inspector of Gunpowder Factories, as to the "explosibility" of petroleum. Sir J. Hay said that he noticed that petroleum had not been included amongst explosive substances. He desired to know whether or not there was any necessity for so including it. To this Major Magendie replied, that he was not exactly aware how it was possible to include petroleum in the Act for explosive substances. Practically speaking, it was not an explosive substance, but when the temporary vapour which it gave off became mixed with a certain portion of atmospheric air, then an explosive substance was formed. He further stated that petroleum was much the same as coal-gas, which in itself was not explosive, but became so when combined with atmospheric air; but petroleum was not *per se* an explosive substance at all, and therefore could not more properly be legislated upon as an explosive substance than coal-gas could be legislated upon in a similar manner. Indeed, if explosions which had been attributed to the presence of petroleum were necessarily included in a Bill professedly drawn up for explosive substances, precisely the same argument would apply to steam and compressed air, and even to flour mills, because explosions had been known to occur in the last mentioned establishments. He also pointed out that petroleum was legislated for in a special Act of Parliament, which regulated the trade in the article; as to the sufficiency of this enactment, that of course was another question, but in his opinion that Act was much in advance of the Gunpowder Act. Further he stated, that, in the event of its being shown that the existing legislation as to petroleum was inadequate to the purposes in view, and consequently required amendment, the matter must be dealt with quite independently of such legislation as was deemed necessary for explosive substances, inasmuch as the provisions of the Gunpowder Act would undoubtedly be unfitted in their application to petroleum.

After this expression of opinion from Major Magendie, the subject of petroleum was not again mentioned.

THE ADULTERATION OF MUSTARD AND COCOA.

Our readers are aware that since the present Adulteration Act has come into operation, great attention has been directed to the manufacture of mustard and cocoa; and important evidence was given on the subject before the select committee of the House of Commons, on Monday last. Mr. Colman, the well-known mustard manufacturer, in the course of a long examination, said that there are two processes for the manufacture of mustard, one of which produces pure mustard, and the other, mustard mixture, or what may be termed mustard condiment. The only ingredient which enters into the manufacture of pure mustard is the flower of the white and brown mustard seed; while to make mustard condiment, there is an addition of a little wheaten flour and turmeric, and, if it is desired to produce a very cheap article, some manufacturers use a small proportion of chilies or cayenne. Mr. Colman stated that the object of the manufacturer in mixing wheaten flour is to improve the article, to soften its flavour, to prevent fermentation, and to enable him to utilize a cheap description of seed. According to his experience, perfectly pure mustard does not so well please the public palate as the mustard mixture ordinarily sold. In the manufacture of mustard, he further stated, it is important that there should be a preponderating quantity of brown seed, or else mustard of superior quality cannot be obtained. In consequence of the operation of the Act, his firm adopt the plan of supplying their customers with a printed label stating that there are other ingredients used; but some magistrates held that this was not sufficient, under the Act, to protect the retailer, and that a verbal declaration is necessary. He further testified that the operation of the Act has had a very disturbing influence on the trade, and he contended that mustard should be exempt from the Act altogether, because the quality of the article at present produced could not be improved upon. As to the idea that the retailers adulterated the article, he emphatically denied it, as it would not pay them to pursue such practices. If the Act must apply to mustard at all, a notice-label such as he had mentioned should be sufficient to protect the sale on the part of the retailer. He also mentioned that it is possible to have a chemically pure mustard which is inferior to the best mixed mustard—that is, mustard into the manufacture of which other ingredients have entered.

The next article upon which evidence was taken was cocoa. The first witness examined was Mr. Fry, a well-known cocoa manufacturer. He said that the mixed cocoas are sold as distinct preparations, and have been so sold for a long time. More cocoa is sold prepared with other ingredients than in its pure state; he attributed this to the fact that the manufactured cocoa is more convenient for the use of the public, and, generally speaking, more wholesome. The principal ingredients used are sugar and arrowroot, or sago; and some descriptions are flavoured with aromatic substances, such as vanilla, which is very expensive. One of the chief objects of combining arrowroot and sugar in the manufacture of cocoa, is to render the article soluble, or, as this term had been objected to as not chemically accurate, he would say miscible. "Soluble," however, as applied to cocoa, is used in the popular sense. He also stated that he did not consider the cocoa trade should have been brought under the operation of the Act, because the article is not in any way fraudulently made, but is sold honestly as the article which it really is. He was not particularly desirous of any alteration being made in the law, because in the prosecutions against the retailers for selling cocoa, the decisions of the magistrates had uniformly been in their favour; but if any new Act was to be passed, it was desirable that a notice-label, stating that the article was a mixture, should avoid the liability of the retailer being prosecuted. He also mentioned that these mixed cocoas are largely used by the working classes, and in that respect are more or less valuable as a substitute for intoxicating drinks. Evidence generally corroborative of that given by Mr. Fry, was given by Mr. Holm (of the firm of Dunn and Hewett), who expressed the opinion that the consumption of the prepared cocoas had been slightly checked by the Act, although this did not appear from the Board of Trade returns, as the consumption of eating chocolates had of late greatly increased. He further stated that the cocoa manufacturers are placed in what he termed a middle position; on the one hand they were desirous of protecting the public from fraud, and on the other they were desirous of protecting the retailer from any undue annoyance.

No other evidence was taken upon the subject, and the committee adjourned.

The Pharmaceutical Journal.

SATURDAY, MAY 16, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE THIRTY-THIRD ANNIVERSARY OF THE PHARMACEUTICAL SOCIETY.

THE Report of the Council, which before this time should have reached the hands of all the Members and Associates in Business of the Pharmaceutical Society, will have intimated to them that the meetings in connection with the Thirty-third Anniversary will take place during the coming week. First in importance is the Annual General Meeting, which will be held in the Society's house, Bloomsbury Square, on Wednesday at noon, when the Report will be submitted for approval, and the members present will be afforded an opportunity of expressing their opinions upon the various topics mentioned in it. Although there does not appear to be any subject that will rival in interest those which have given a spice of excitement to the annual meetings of the last two years, the important step taken by the Council with regard to the School of Pharmacy is now submitted for a formal ratification at the hands of the members; whilst their opinion is also sought upon a proposal for the establishment of extra scholarships, made by a gentleman whose name is closely associated with the subject of pharmaceutical education.

Those gentlemen who, on both or either of the previous occasions, visited Sydenham to dine with the members of the Society and their friends, will have gladly noted that this "institution" shows signs of vigorous life. Probably, as the time has now passed for the returns to be made by the Stewards, most of those who wish to be present next Tuesday evening have already secured tickets. Should there be any, however, who have not done so, we are authorized to state that some tickets may still be had by applying *immediately* to the Honorary Secretaries, Messrs. RICHARD BREMRIDGE and MICHAEL CARTEIGHE, 17, Bloomsbury Square.

With regard to the Conversazione, nothing further need be said than that it will be held on Wednesday evening, and that the entertainment at South Kensington promises to be as brilliant as on any previous occasion. For the convenience of intending visitors, however, they are reminded that the officials at South Kensington will not undertake the charge of hats, and that programmes of the music are provided and should be obtained by each visitor upon entering the Museum.

INTERNATIONAL CONGRESS OF PHARMACISTS AT ST. PETERSBURGH.

AT the close of the Third International Pharmaceutical Congress, which was held in Vienna in 1869, it was resolved that the next meeting should take place after the lapse of three years. A committee was appointed to decide upon the place of meeting, and to make the necessary arrangements. But, *l'homme propose et Dieu dispose*. Three years passed away, and 1872 entered into a heritage of ill-feeling between the scientific men of France and Germany, that made it hopeless to expect their co-operation in such an enterprise. However, time, the healer of all ills, has been at work, and the committee has come to the conclusion that this year the deferred Congress may be advantageously held.

As many of our readers are aware, St. Petersburgh is the city chosen for the place of meeting, and the Organization Committee has issued a circular to all the recognized pharmaceutical societies of the different countries, informing them that the Congress will commence on the 13th of August next (1st of August, o. s.), and inviting them to send representatives. The subject was under the consideration of the Council of the Pharmaceutical Society at their meeting last week; but, in consequence of the pressure of more urgent business, a decision as to what course should be taken was deferred until June. In the meantime, however, it may help to give a more concrete form to the speculations of some fortunate pharmacists who are looking forward to a continental ramble in the autumn, as well as prove of interest to others who will have to stay at home, if a few lines are devoted to an epitome of the proposed proceedings of the Congress.

Four questions are at present announced for discussion: (1) How far does the personal responsibility of the Assistant Pharmacist extend, in the exercise of the duties of his calling? (2) How may the Apothecaries' Committee of Revision be most advantageously organized? (3) Is it necessary that a professorship of pharmacy should be held only by a pharmacist? (4) Has not the time come for the institution of an International Pharmacopœia? In the event of any Society wishing to propose other questions for discussion, it is requested that notice be given to the Committee before the 27th of June. At previous Congresses the business has been confined to the discussion of questions similar to the foregoing; but, with the object of making the present gathering as profitable as possible, it is proposed on this occasion, in addition to the ordinary general meetings, to hold two further sittings for the purpose of scientific discussions.

In the transaction of the ordinary business, only deputies from pharmaceutical unions and societies recognized by their respective governments, and holding a written authorization from their Society, can take part and vote. Every such Society has the right to

send a deputy, with the power of voting; if the society consists of more than one hundred members, it has the right to send an additional deputy for each hundred. All members of pharmaceutical societies, however, are invited to attend the sittings, and to take part in the discussion at the scientific meetings. In the discussion, speakers will be allowed to use the German, English, French or Russian languages, and the purport of the various speeches will be translated into the "business language," which will be selected by a vote of the majority.

The programme of the Congress, subject to alteration, extends from Wednesday, August 12th, when there will be a reception of the foreign visitors and a social meeting in the evening, to Tuesday, August 18th, on which day the final sitting of the Congress will be held. The Ordinary Meetings will be held on Thursday the 13th, Saturday the 15th, and Tuesday the 18th; the Scientific Meetings on Friday the 14th and Monday the 17th. Sunday will be devoted to sight-seeing, visiting the various churches, etc., and a trip to Peterhof by steamer in the afternoon. Other visits and excursions are allotted to Friday the 14th and Monday the 17th, and on Saturday the 15th there will be a banquet. During the Congress there will also be an Exhibition of Drugs, Chemicals, etc., to which pharmacists of all nations are earnestly invited to contribute.

In order that the visitors may be lodged during their stay in St. Petersburgh as conveniently and economically as possible, the Organization Committee have entered into an agreement with the proprietor of the Demuth Hotel, Stallhofstrasse, according to which all members of the Congress will be provided by him with rooms at considerably reduced prices. Persons wishing to avail themselves of this arrangement are requested to communicate with the Committee before the 9th of August. During the Congress the office of the Committee will be at the Hôtel Demuth, but previous to the 12th of August it will be in the premises of the Pharmaceutical Society, Wosnessensky Prospect, Haus Schkljarski, Nr. 31, Quart. Nr. 18, and intending visitors are invited to forward any inquiries to that address.

Such are the principal points of interest in connection with the Fourth International Pharmaceutical Congress; and although international congresses have not hitherto attracted the amount of attention from British pharmacists which is perhaps due to them, whilst St. Petersburgh does not lie in the ordinary track of their footsteps, we are not without hope that there will be more than one of our countrymen amongst the visitors privileged to receive the greetings of the white-rosetted organization committee on the arrival of the foreign train in St. Petersburgh on the 12th of August.

Amongst the names included in the list of candidates, selected and recommended by the Council of the Royal Society for election as Fellows, we notice that of Henry Bowman Brady, F.L.S., well known to our readers by his services to the Pharmaceutical Society, and as the late President of the British Pharmaceutical Conference; and that of John Eliot Howard, F.L.S., who is a member of the firm of Messrs. Howard & Sons, of Stratford, and whose researches upon the *Cinchonas* have contributed so much to their successful acclimatization in India and other countries.

On p. 926, will be found a clause in the Metropolitan Buildings and Management Bill,—recently introduced into the House of Commons by the Chairman of the Metropolitan Board of Works,—which relates to the storing of chemicals. The Bill has been referred to the consideration of a Select Committee.

The Corporation of Colchester has appointed Mr. John Wiggin, F.C.S., Pharmaceutical Chemist, Public Analyst for that borough.

Transactions of the Pharmaceutical Society.

BENEVOLENT FUND.

Subscriptions Received During March and April, 1874.

London.

	£	s.	d.
Adlington, W. B., 1A, Weymouth St., Portland Place, W.	0	10	6
Akhurst, W. E., 60, Silchester Road, Notting Hill, W. ...	0	5	0
Anderson, Alexander, 277, Oxford Street, W.	0	5	0
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Cheetham, W. H., 22, Commerce Place, North Brixton, S.W.	0	10	6
Chemists' Ball, Committee of	21	0	0
Cocksedge, H. B, 20, Bucklersbury, E.C.	0	10	6
Colchester, Wm. M., 2, Crown Street, Hoxton Square, N. ..	0	5	0
Colchester, Wm. M., jun., 2, Crown St., Hoxton Square, N.	0	5	0
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Cooke, John, 126, Hoxton Street, N.	0	10	6
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Eade, George, 72, Goswell Road, E.C.	1	1	0
Eade, James, 72, Goswell Road, E.C.	1	1	0
Edwards, William S., 14, Etham Place, Old Kent Rd., S.E.	0	5	0
Elvey, Thomas, 8, Halkin Street, West, S.W.	1	1	0
Eminson, J. M. O., 79, Abbey Road, St. John's Wood, N.W.	0	5	0
Evans, H. Sugden, 60, Bartholomew Close, E.C.	1	1	0
Eve, Charles, Plough Court, Lombard Street, E.C.	1	1	0
Field, William, 83, Brompton Road, S.W.	1	1	0
Fincham, Robert, 57, Baker Street, W.	1	1	0
Foott, R. R., 8, Stockbridge Terrace, S. W.	0	10	6
Fowler, Stanley, 36, Elgin Crescent, W....	1	1	0
Froom, W. H., 75, Aldersgate Street, E.C.	1	1	0
Garner, Thomas, 75, Allen Road, Stoke Newington, N. ...	0	10	6
Gedge, William S., 90, St. John Street, Clerkenwell, E.C....	0	10	6
Glover, George, 19, Goodge Street, W.	1	1	0
Golding, William, 172, Albany Street, N.W.	0	5	0
Goodchild, R. S., Well Street, Hackney, E.	0	5	0
Gorton and Sons, 144, High Street, Whitechapel, E... ...	1	1	0
Green, M. H., Parliament House, Peckham, S.E.	0	10	6
Greenish, Thomas, 20, New Street, Dorset Square, N.W....	1	1	0
Griffiths, John, 41, Clerkenwell Green, E.C....	0	10	6
Gristock, Thomas, 42, South Street, Manchester Square, W.	1	1	0
"G. B."	0	5	0
Hanbury, Cornelius, Plough Court, Lombard Street, E.C.	1	1	0

Handley, Charles, 45, High Street, Stoke Newington, N.... 0 10 6
Harris, D. R., 55, St. James's Street, S.W. 1 1 0
Harvey, Edward, 6, Giltspur Street, E.C. 1 1 0
Henty, H. M., 19, High Street, St. John's Wood, N.W. ... 0 5 0
Hickey, E. L., 199, King's Road, Chelsea, S.W. 0 10 6
Hickley, Thomas P., 297, Edgware Road, W. 0 10 6
Hill, A. S., Atkins Road, Clapham Park, S.W. 2 2 0
Hodgkinson, Charles, 127, Aldersgate Street, E.C. 0 10 6
Hodgkinson, G. A., 1, Amherst Road East, Hackney, E.... 0 5 0
Hodgkinson, Prestons and King, 88, Leadenhall Street, E.C. 2 2 0
Hodsoll, Thomas W. H., 17, Cross Street, Hoxton, N. ... 0 10 6
Hora, Henry W., 58, Minories, E. 1 1 0
Howell, Maurice, 61, High Street, Peckham, S.E. 0 10 6
Huggins, Richard, 235, Strand, W.C. 0 10 6
Hunt, Charles, 29, Chapel Street, S.W. 0 10 6
Johnson, Robert D., 59, Camberwell New Road, S.E. ... 0 10 6
Jones, Frederick, 175, Kentish Town Road, N.W. 0 5 0
Jones, F. W., 11, Norton Folgate, E. 0 10 6
Jones, Henry Stevens, 139, Fulham Road, S.W. 0 5 6
Jones, William, 8, Richmond Terrace, Shepherd's Bush, W. 0 5 0
Jones, W., 172, New Bond Street, W. 0 5 0
Jones, W. J., 3, Newland Terrace, Kensington, W. 0 10 6
Jull, Thomas, 2, Moreton Street West, S.W. 0 5 0
Kemp, Robert, 205, Holloway Road, N... ... ... 0 10 6
Kent, Thomas, 226, Blackfriars Road, S.E. 0 10 6
Kent, Thomas R., 103, Westminster Bridge Road, S.E. ... 0 5 0
Knight, James, New Park Road, Brixton Hill, S.W.... ... 0 10 6
Lacy, Benjamin W., 129, High Street, Kingsland, E. 1 1 0
Large, John H., 65, New North Road, N. 0 10 6
Laws, J., 111, Church Street, Marylebone 0 10 6
Lewinton, A. B., 14, Cleveland Street, W. 1 1 0
Lidwell, J. E., 130, High Street, Notting Hill, W. 0 10 6
Lindsay, George W., 23, Stockbridge Terrace, S.W. 0 5 0
Little, Henry, 82, Seven Sisters Road, N. 0 10 6
Long, Henry, 48, High Street, Notting Hill, W.... ... ... 1 1 0
Luff, Richard, 1, Bute Street, South Kensington, S.W. ... 0 10 6
McCulloch, Frederick, 13, Hart Street, Covent Garden, W.C. 1 1 0
MacGeorge, William, 346, Essex Road, Islington, N.... ... 0 10 6
Malden, William W., 195, Brompton Road, S.W. 1 1 0
Manley, William F., 35, Camden Grove, Peckham, S.E. ... 0 10 6
Martindale, William, 10, New Cavendish Street, W. 0 5 0
May, John, Garden Wharf, Battersea, S.W.... ... ... 0 10 6
Merrell, James, 1, Queen's Terrace, Camden Villas, N.W. 1 1 0
Millington, Edward, 98, Queen's Road, Dalston, E. 0 10 6
Mitchell, John, Upper Street, Islington, N. 0 10 6
Mould, Samuel, 21, Moorgate Street, E.C. 0 10 6
Mundy, Alfred O., 11, Norton Folgate, E. 0 10 6
Musket, A. C. 64, Park Street, Southwark, S.E.... ... ... 0 10 6
Muter, Dr. John, Kennington Cross, S.E. 3 3 0
New, Walter, W., 238, Essex Road, N. 0 10 6
Nicholson, Frederick, 216, St. Paul's Road, Highbury, N... 1 1 0
Nind, Geo., New Wandsworth, S.W. 0 10 6
Norburn, A. H., 92, St. John's Road, Hoxton, N. 0 10 6
North, G. T., 36, High Street, Bow, E. 0 10 6
Orpe, Thomas M., 329, Old Kent Road, S.E.... ... ... 0 10 6
Owen, John, 51, Holloway Road, N. 1 1 0
Owen, Samuel, 114, High Street, Clapham, S.W.... ... ... 0 5 0
Pass, Horatio, 245, Wandsworth Road, S.W. 0 10 6
Pattison, George, 139, St. John Street Road, E.C. 1 1 0
Pepper, John, 237, Tottenham Court Road, W. 0 10 6
Pond, George P., 68, Fleet Street, E.C. 0 5 0
Pound, Matthew, 60, Leather Lane, E.C. 1 1 0
Pratt, Edmund, 8, Upper Berkeley Street, W. 1 1 0
Price, J. M., 290, Brixton Road, S.W. 0 10 6
Quinlan, Joseph, 59, Barnsbury Road, N. 0 10 6
Readman, Henry, 18, Mortimer Street, W. 0 5 0
Roach, H. W., 8, St. James's Street, S.W. 0 10 6
Robbins and Co., 372, Oxford Street, W... ... . 2 2 0
Rogerson, W. J., 5, Coleman Street, E.C. 1 1 0
Rose, Alfred, 441, Edgware Road, W. 0 10 6
Rouse, Frederick J., 114, High Street, Clapham, S.W. ... 0 10 6
Rowe, Robert, South Kensington, S.W.... ... ... 0 10 6
Rowntree, Thomas, 1, Westbourne Road, Barnsbury, N. ... 0 10 6
Sandy, F. W., 390, Walworth Road, S.E. 0 10 6
Sangster, Arthur, 66, High Street, St. John's Wood, N.W. 1 1 0
Schacht, William, 6, Finsbury Place South, E.C.... ... ... 0 10 6
Schweitzer, J., 79, Pavilion Road, Sloane Street, S.W. ... 2 2 0
Scrase, Richard, 130, High Street, Notting Hill, W. 0 5 0
Shaw, Charles, 85, Edgware Road, W. 0 10 6
Shephard, Thos. F., 37, All Saints Road, W. 0 10 6
Slipper, James, 86, Leather Lane, E.C.... ... ... 0 10 6
Smith, W. F., 280, Walworth Road, S.E. 1 1 0
Sparrow, W. C. F., 5, Pimlico Road, S.W. 1 1 0
Steel, Frank W., 285, Liverpool Road, N. 0 10 6
Stevenson, William L., 165, Edgware Road, W. 0 10 6
Stickland, W. H., South Kensington, S.W. 0 10 6
Story, H. W., 43, Fish Street Hill, E.C 0 10 0
Streater, James H., 3, Sloane Street, Knightsbridge, S.W... 0 10 6
Street, George, 265, Whitechapel Road, E. 0 10 6
Strickett, John, 161, St. George's Road, Peckham, S.E. ... 0 10 6
Taplin, W. Gilbert, 75, Hampstead Road, N.W.... ... ... 1 1 0
Taylor, Geo. S., 13, Queen's Ter., St. John's Wood, N.W. 1 1 0
Taylor, Horatio, 39, Ledbury Road, Bayswater, W. 0 5 0
Taylor, Matthew, 6, Rye Lane, Peckham, S.E. 0 10 6
Taylor, Thomas, 81, High Street, Peckham, S.E. 1 0 0
Thomas, Henry, 7, Upper St. Martin's Lane, W.C. 1 1 0
Thorn, John James, 338, Oxford Street, W.... ... ... 0 10 6
Tibbs, Frederick, 81, Chalk Farm Road, N.W. 0 10 6
Tippett, B. M., 3, Sloane Street, S.W. 0 10 6
Tomlinson, T., 2, Lower Seymour St., Portman Square, W. 1 1 0
Treloar and Son, 69, Ludgate Hill, E.C.... ... ... 1 1 0
Turner, Charles E., 63, Great Russell Street, W.C. 0 10 6
Turner, Edward A., 118, Ballspond Road, N. 0 10 6
Turton, Randolph, C., Lansdowne Road, S.E. 0 5 0
Umney, Charles, 40, Aldersgate Street, E.C.... ... ... 0 10 6
Walker, Charles, 133, St. George Street, E. 0 5 0
Wallis, G., 13, Victoria Gardens, Ladbroke Road, Notting Hill, W. 0 5 0
Ward, Charles F., 1, Lower Grosvenor Place, S.W. 0 5 0
Ward, Francis, 1, Lower Grosvenor Place, S.W.... ... ... 0 5 0
Wastie, F., 183, Lower Kennington Lane, S.E. 0 10 6
Weston, S. J. 151, Westbourne Terrace, W. 1 1 0
Westrup, J. B., 76, Kensington Park Road, Notting Hill, W. 0 10 6
Whincup, W., 404, Essex Road, N. 0 10 6
Wickham, Wm., 509, New Cross Road, S.E. 0 10 6
Williams, J. J., 13, Desborough Place, Harrow Road, W. 0 10 6
Williams, W. J., 137, Cannon Street, E.C. 0 10 6
Wise, Walter, 43, Duke St., Manchester Square, W. 0 10 6
Wood, Edward, 20, Sussex Street, S.W. 0 10 6
Wootton, Alfred C., 44, Burghley Rd., Highgate Rd., N.W. 1 1 0
Wootton, William, 33, Liverpool Road, N. 0 10 6
W. T. C. 0 10 6
Wyatt, F. J., 43, Norland Road, Notting Hill, W. 0 5 0
Wylde, G. M., King's Road, Chelsea, S.W. 0 10 6
Young, George, 12, Ebenezer Terrace, Millwall, E. 0 5 0

COUNTRY.

Aberaman, Sims, W. 0 5 0
Aberdare, Thomas, Watkin J. 0 10 6
Aberdeen, Davidson, Charles 0 10 6
Abergavenny, Ackrill, George 0 10 6
,, Wyke, Jacob 0 5 0
Aberystwith, Davies, R. J.... ... ... , ..., 0 5 0
,, Wynne. E. P.... ... ... 0 10 6
Abingdon, Ballard, Walter... ... ... 0 5 0
,, Preston, A. P. 0 10 6
,, Smith, W. F. 0 5 0
Accrington, Cooper, Mark 0 5 0
,, Marshall, G. 0 5 0
Acton, Jackson, Christopher 0 10 6
Alfreton, Robinson, J. S. 0 10 6
Ampthill, Allen, George 0 10 6
Ashbourne, Bradley, Edwin S.... ... ... 0 10 6
Ashford, Stedman, Wm. 0 10 6
Ashton-under-Lyne, Bostock, Wm. 0 10 6
,, Waterhouse, Jabez 0 10 6
Atherton, Warburton, Thomas 0 5 0
Axminster, Pryer, W. S. 0 5 0
Banbury, Ball, George V. 0 10 6
Bangor, Roberts, Meshach... ... ... 1 1 0
Barnet (*New*) Young, R. F. 0 10 6
Barnsley, Tomlin, A. R. 0 5 0
Barnstaple, Goss, Samuel 0 10 6
,, Hames, John 0 5 0
,, Page, Charles 0 5 0
,, Partridge, James 0 5 0
,, Symons, Wm. 0 5 0
Barrow-in-Furness, Barrow, Francis C.... ... ... 0 5
,, Kerruish, Edward J. 0 5 0
,, Samson, Edwin 0 5 0
,, Steel, Thomas... ... ... 0 5 0
Barton-on-Humber, Crowder, C. H.... .. .. 0 10 6
Basingstoke, Meatyard and Sapp 1 1 0
,, Woodman, George... ... ... 0 5 0
Bath, Barnitt, F. 0 10 6
,, Capper, Edmund 0 5 0
,, Dunn, Richard 0 5 0
,, Dutton, C. H. 0 5 0
,, Goodman, D. H. 0 5 0
,, Harding, R. O. 0 10 6
,, Hughes, J. E. 0 5 0
,, Merrikin, J. B 0 5 0
,, Pinch, James E. 0 5 0
,, Pooley, J. C. 0 5 0
,, Thomas, H. J. 0 10 6
,, Toone, J. V. 0 10 6
,, Tylee, J. P. 0 10 6
,, Walker, H. J. 0 5 0
,, Williams, C. G. T. 0 5 0
,, Wilson, Joseph... ... ... 0 5 0
Batley, Barrington, W. 0 5 0
Batley Car, Fryer, John 0 5 0
Beaumaris, Slater, John 0 10 6
Beckenham, Day, Thomas S. 0 10 6
Bedford, Anthony, J. L. 0 10 6
,, Corrie, Mrs. J. A. 0 3 0
,, Corrie, A. H.... ... ... 0 1 0
,, Ekins, John 0 5 0
,, Taylor and Cuthbert 0 10 6
,, White, J. L.... ... ... 0 5 0
Belfast, Abernethy, John 0 2 6
,, Green, Thomas 0 2 6
Belper, Bowler, W. S. 0 5 0
Berkeley, Bell, E. C. 0 10 6
Berkhampstead, Rippon, R. O.... ... ... 1 1 0
Beverley, Morley, Joseph 0 10 0

Bewdley, Newman, Robert	0	10	6
Bicester, Sandiland and Son	0	10	6
Bideford, Cadd, William	0	5	0
,, Hogg, Thomas	0	5	0
,, Joce, James	0	5	0
Binbrook, Maughan, Samuel	0	10	0
Birkenhead, Dutton, John	1	1	0
Birmingham, Beech, Joseph	0	10	6
,, Churchill, John	0	10	6
,, Clayton, F. C.	0	10	6
,, Coulson and Jacombs	0	10	6
,, Cornforth, Edwin	0	2	6
,, Cross, E.	0	2	6
,, Foster, A. H.	0	5	0
,, Holdsworth, T. W.	0	10	6
,, Lucas, Joseph	0	10	6
,, Pegg, Herbert	0	10	6
,, Southall, Son and Dymond	1	1	0
,, Wilcox, G.	0	5	0
Bishop's Castle, Davies, Edward	0	10	6
Blackheath, Lavers and Son	1	1	0
Blandford, Groves, W. E.	1	1	0
Bodmin, Williams, Joel D.	1	1	0
Bourne, Mills, R. M.	0	5	0
Bournemouth, Amoore, Herbert	1	1	0
,, Duncan, Alexander	1	1	0
Bourton-on-the-Water, Griffin, Henry S.	0	10	6
Boston, Fowler, W. R.	0	10	6
,, Allen, Thompson	0	5	0
,, Marshall, Robert	0	5	0
Bradford, Harrison and Parkinson	2	2	0
,, Hick, George	0	10	6
,, Hick, Joseph	0	10	6
,, Newbould, Thomas A.	0	10	6
,, Rimmington, F. M.	0	10	6
,, Rogerson, H. G.	1	1	0
,, Rogerson, M.	1	1	0
,, Sowden, Samuel	0	5	0
Bridgend, Lloyd, John	0	5	0
Bridgnorth, Steward, William	0	10	6
Bridport, Beach and Barnicott	1	1	0
,, Beach, James	0	10	6
,, Tucker, Charles	0	10	6
Bridlington, Smith, John	0	1	0
,, Woodliffe, Alfred	0	2	6
Bridlington Quay, Dickins, John	0	2	6
Brighton, Bradley, T. D	0	5	0
,, Bateman, J. M.	0	10	6
,, Barton, Charles	0	10	6
,, Barton, Henry	0	10	6
,, Billing, Thomas	0	10	6
,, Cornish, William	0	5	0
,, Else, William	0	10	6
,, Foster, Frederick	0	10	6
,, Glaisyer, Thomas	0	10	6
,, Gwatkin, James T.	0	10	6
,, Haffenden, Thomas	0	10	6
,, Hickley, G.	0	10	0
,, Hornsby, G. G.	0	5	0
,, Kemp, John	0	10	6
,, Lescher, J. S.	1	1	0
,, Long, H.	0	10	6
,, Pears, Kilby	0	10	6
Bristol, Ackerman, T.	1	1	0
,, Butler, Samuel	0	10	6
,, Freestone, T. M.	0	10	6
,, Hatch, R. M.	1	1	0
,, Hodder, Henry	0	5	0
,, Long, J. T.	0	10	6
,, Schacht, G. F.	1	1	0
,, Sircom, Richard	0	10	6
,, Stoddart, W. W.	0	10	6
,, "C. H."	0	5	0
Bromley (Kent), Baxter, W. W.	0	10	6
,, ,, Shillcock, J. B.	0	10	6
Bromyard, Jones, Charles	0	5	0
Bruton, Hill, Richard	0	5	0
Brynmawr, Evans, A. E.	0	5	0
,, Jones, A. M.	0	10	6
Buckingham, Kingerlee, George	0	10	6
,, Sirett, George	0	10	6
,, Sirett, George B.	0	10	6
Bunlingford, Bray, William	0	5	0
Burnham Market, Spencer, W. H.	0	5	0
Burry Port, Olive, W. T.	0	10	6
Bursl m, Blackshaw, Thomas	0	10	6
,, Guest, G. C.	0	2	6
,, Leicester, Thomas	0	10	6
Burton-on-Trent, Wright, George	0	10	6
Bury St. Edmunds, Floyd, James	0	10	6
,, Youngman, Edward	0	2	6
Buxton, Ball, Edwin	0	10	6
,, Barnett, Alexander	0	10	6
Caistor, Levick, G. A.	0	4	0
,, Watmough, G. C.	0	5	0
Cambridge, Deck, Arthur	0	10	6
,, Field, E.	0	5	0
Cannock, Wrighton, T. H. G.	1	1	0
Canterbury, Amos, Daniel	0	10	6
,, Gardner, A. W.	0	5	0
,, Thomas, James	0	5	0
Cardiff, Coleman, E. J.	0	10	6
,, Prust, Richard	0	5	0
,, Thomas, Morgan	0	5	0
,, Williams, Thomas	0	10	6
Carlisle, Foster, James	0	2	6
,, Hallaway, John	0	5	0
,, Parker, Edward	0	5	0
,, Sawyer, James	0	5	0
,, Todd, J.	0	5	0
Carnarvon, Jones, John	0	5	0
Castlebar, Devers, H. J.	0	10	0
Chapel Allerton, Entwisle, Joseph	0	10	6
Chatham, Crofts, H. C.	0	10	6
,, Lamb, T. C.	0	5	0
,, Tribe, John	0	10	6
Chelmsford, Baker, C. P.	0	10	6
,, Baker, G.	0	10	6
,, Seaton and Metcalfe	1	1	0
,, Tomlinson, James	1	1	0
Cheltenham, Fletcher and Palmer	1	1	0
,, Wilks, M.	0	5	0
Chertsey, Boyce, George	0	5	0
Chesterfield, Greaves, A. W.	0	10	6
,, Greaves, A.	0	5	0
,, Greaves, W. S.	0	5	0
Chester-le-Street, Greenwell, R. H.	0	10	6
Chew Magna, Milton, Thomas	0	5	0
Chichester, Long, W. E.	0	10	6
Chipping Ongar, Chapman, R. J.	0	10	6
Chipping Sodbury, Jones, Richard	0	10	6
Chislehurst, Beaumont, C. F. J. B.	0	10	0
Christchurch, Edey, George	0	10	6
Chulmleigh, Joint, R. J.	0	6	0
Cockermouth, Straughton and Brown	0	10	0
Coleford, Cheese, Henry	0	10	6
Collingham, North, Scruton, P. D.	0	5	0
Coltingham, Lister, George	0	10	6
Coventry, Hinds, James	0	10	6
,, Wyleys and Co.	1	1	0
Crediton, Smith, A.	0	5	0
Crewkerne, Pearce, Joseph	0	5	0
Croydon, Clarke, A. H.	1	1	0
,, Clarke, Josiah	0	10	6
,, Gill, W. H.	0	10	6
,, Long, Henry	0	10	6
Darlaston, Parker, William	0	10	6
Darlington, Best, George	0	5	0
Dartford, Armitage, E. H.	0	10	6
Deal, Green, John	0	10	6
Denbigh, Edwards, William	0	5	0
Deptford, Lockyer, George	0	10	6
Derby, Frost, Georgo	0	10	6
Desborough, Yeomans, G.	0	5	0
Devizes, Portbury, G. H.	0	5	0
Devonport, Coke, R. S.	0	5	0
Dewsbury, Fryer, John	0	5	6
Diss, Masson, George	0	10	6
,, Smith, T. W.	0	5	0
Doncaster, Dunhill, Son, and Shaw	1	1	0
,, Hough, William	0	10	6
,, Howorth, James	0	10	6
,, A Friend	0	5	0
Dover, Bottle, Alexander	1	1	0
,, Cotterell, W. H.	0	5	0
,, Forster, R. H.	0	10	6
,, Hambrook, J. B.	0	5	0
,, Peake, Henry	0	5	0
Dudley, Dennison, Matthew	0	5	0
,, Hollier, E.	0	10	6
,, J. F.	0	10	0
Dunfermline, Seath, Alexander	0	5	0
Ealing, Hayles Brothers	1	1	0
Earlestown, Peake, A.	0	5	0
Eastbourne, Tate, E. P.	1	1	0
Eccleshall, Smith, E. R.	0	5	0
Edinburgh, Baildon, H. C.	1	1	0
,, Buchanan, James	1	1	0
,, Duncan, Flockhart and Co.	1	1	0
,, Fairgrieve, Thomas	0	10	6
,, Gilmour, William	0	10	6
,, Macfarlan and Co.	2	2	0
,, Macfarlane, A. Y.	0	5	0
,, Mackay, John	1	1	0
,, Raimes, Blanchard and Co.	1	1	0
,, Robertson, James	0	10	6
Eltham, Mellin, C. J.	0	5	0
Elsecar, Butterworth, F.	0	5	0
Everton, Blundell, John	0	10	0
Evesham, Dingley, R. L.	0	5	0
Exeter, Brailey, Charles	0	5	0
,, Bulley, W. H.	0	2	6
,, Butland, Charles	0	2	6
,, Bromfield, C.	0	5	0
,, Collett, Charles B.	0	5	0
,, Cooper, George	0	10	6

Exeter, Husband, M.	0	10	6
,, Lake, J. H.	0	5	0
,, Napier, G. L.	0	5	0
,, Pasmore, George	0	5	0
,, Stone, John	0	5	0
,, Walton, Ralph	0	10	6
Falkirk, Murdoch, David	0	10	6
Falmouth, Newman, W. F.	0	5	0
Fareham, Franklin, A.	0	10	6
Filey, Robson, J. B.	0	5	0
Folkestone, Harwood, Charles	0	5	0
Fordingbridge, Haydon, F. W.	0	5	0
Forest Hill, Furze, Mrs.	0	10	6
,, Simpson, Thomas	0	5	0
Forfar, Rankin, J. A.	0	5	0
Fowey, Gould, R. G.	0	5	0
Gainsborough, Forrest, R. W.	0	10	6
Gateshead-on-Tyne, Dickinson, J. S.	0	10	6
,, Elliott, Robt.	0	10	6
,, Garbutt, C. D.	0	10	6
,, Greenwell, W. C.	0	5	0
Glanmor, Harries, Joseph	0	5	0
Glasgow, Apothecaries' Company	1	1	0
,, Brodie, Robert	0	5	0
,, Clarke, J. A.	0	10	6
,, Currie, John, 311, Sauchiehall Street	0	5	0
,, Dickie, James	0	5	0
,, Fairlie, James	0	5	0
,, Fenwick, John	0	5	0
,, Flint, C. B.	0	10	6
,, Frazer, Daniel	1	1	0
,, Harrower, Peter	0	5	0
,, Kinninmont, Alexander	0	10	6
,, McDonald, H. S.	0	5	0
,, Pettigrew, J. W.	0	5	0
Glastonbury, Mayhew, Thomas	0	10	6
Gloucester, Berry, Edward	0	5	0
,, Curtis, A. A.	0	10	0
,, Franklin, J.	0	5	0
,, Stafford, William	0	10	6
Gomersal, Parkin, W.	0	2	6
Gosforth, Gaitskell, J.	0	5	0
Gosport, Betts, William	0	5	0
,, French, Benjamin	0	10	6
,, Hunter, John	0	5	6
,, Mumby, Charles	0	10	6
Grantham, Gibson, J. B.	0	10	6
,, Hall, Thomas	0	10	6
,, Welborn, George	0	5	0
Grays, Soole, J. H.	0	10	6
Grimsby, Great, Cook, Robert, sen.	0	10	6
Greenwich, Howard, George	1	1	0
,, Tugwell, W. H.	0	10	6
Haddington, Mather, Mrs. E.	0	5	0
Halesworth, Gostling, J. H.	0	5	0
Halifax, Dyer, William	0	5	0
,, Swire, Jabez	0	5	0
Ham Street, Buss, Thomas S.	0	5	0
Harlow, Campion, Robert	0	10	6
Harrogate, Coupland, Joseph	0	10	6
,, Davis, R. H.	0	5	0
,, Greenwood, Charles	0	10	6
,, Taylor, J. H.	0	10	6
Hastings, Keyworth, G. A.	0	10	6
,, Rossiter, Frederic	0	5	0
Haverfordwest, Saunders, D. P.	0	10	6
Hawkhurst, Pridgeon, W. J.	0	5	0
Hay, Davies, J. L.	0	5	0
Headingley, Rowling, Samuel	1	1	0
Hebden Bridge, Hey, T. K.	0	10	6
,, Hey, David	0	10	6
Heckmondwike, Stephenson, J N.	0	5	0
Hedon, Soutter, J. S.	0	10	6
Hemel Hempstead, Bass, J. T.	0	10	6
Hertford, Lines, George	0	10	6
Heywood, Beckett, William	0	10	6
Hirwain, Sims, Joseph	0	10	6
Hollingwood, Garlick, John	1	1	0
Holsworthy, Oliver, J. G.	0	5	0
Holt, Cooke, William K.	0	10	0
Honley, Thackray, Henry	0	5	0
Horsham, Williams, Philip	1	1	0
Howden, Saville, John	1	1	0
Huddersfield, Fryer, Henry	0	10	6
,, Higgins, P. S.	0	10	6
,, Kaye, Homor	0	2	6
,, King, William	0	10	6
Hull, Allison Brothers	1	1	0
,, Anholm, A.	0	10	6
,, Bell, C. B.	0	10	6
,, Desforges, J. H.	0	5	0
,, Dixon, Joseph	0	5	0
,, Dobson, J. B.	0	5	0
,, Dyson, George	0	5	0
,, Earle, Francis	1	1	0
,, Fisher, J. R.	0	5	0
,, Gibson, C. P. (Trustees of late)	0	5	0
,, Grindall, W.	0	5	0
Hull, Hall, H. R. F.	0	5	0
,, Hammond, W. H.	0	2	6
,, Hart, G. W.	0	10	6
,, Kellington, M. L.	0	10	6
,, Kirton, J. B.	0	10	6
,, Liddell, Henry	2	2	0
,, Milner, J. G.	0	5	0
,, Myers, George	0	10	6
,, Piek, Richard	0	5	0
,, Smith, Anthony	0	10	6
,, Smith, J. F	0	5	0
,, Staning, William	0	5	0
,, Stoakes, B. M.	0	5	0
Idle, Hopton, Edwin	0	5	0
Ilkeston, Potts, Richard S.	0	10	6
Ipswich, Anness, Samuel R.	0	10	6
,, Callaway, L.	0	10	6
,, Chapman, Henry	0	10	6
,, Clarke, C. J.	0	10	6
,, Clifton, E.	0	5	0
,, Cornell, William	1	1	0
,, Hill, William	0	5	0
Jedburgh, Rawdin, Joseph	0	5	0
Jersey, Piquet, J.	0	5	0
Kaffraria, Daines, Thomas	1	1	0
Kelso, Cameron, W.	0	10	6
Kendal, Hind, T. W. L.	1	1	0
,, Severs and Bateson	1	1	0
Kenilworth, Barton, H. Emlyn	0	5	0
Kettering, Anonymous	0	5	0
Kidderminster, Bond, Charles	0	10	6
,, Evans, Joseph James	0	5	0
,, Haddock, B.	0	10	6
Kimbolton, Gudgeon, G. B.	0	5	0
Kingsbridge, Balkwill, Joseph	0	10	0
King's Lynn, Allen and Willis	0	5	0
,, Atmore, George	0	5	0
,, Bailey, William	0	2	6
,, Bishop, Mary	0	5	0
,, Cocher, John Aickman	0	5	0
,, Cumine F. H.	0	5	0
,, Smith, Samuel Fuller	0	2	6
,, Wigg, William Carter	0	5	0
Kingswinford, Williams, J. B.	0	5	0
Kinver, Welch, John J.	0	10	0
Kirby Moorside, Lumley, W. T.	0	5	0
Kirkby Lonsdale, Harrison, William	0	10	6
Lancaster, Parker, William	0	5	0
Landport, Haekman, L. L.	0	10	6
,, Perfect, George	0	5	0
Langholm, Rome, R. M.	0	2	6
Launceston, Eyre, J. S.	0	10	6
,, White, Thomas	0	10	6
Leamington, Barnitt, John	0	10	6
,, Caswell, Edward	0	10	6
,, Cutting, James	0	10	6
,, Davis, Henry	0	10	6
,, Jones, S. U.	1	1	0
,, Newby, C. A.	1	1	0
,, Pullin, W. H.	0	10	6
,, Sansom, Henry	0	5	0
,, Sargent, J. C.	0	10	6
,, Stanley, Herbert	0	10	6
,, Wright, W. F.	0	10	6
Leatherhead, Hewlins, Edward	0	10	6
Ledbury, Stringer, A.	0	5	0
Lee, Cole, A. C.	1	1	0
Leeds, Bilborough, J. B.	0	10	6
,, Child, Thomas	1	1	0
,, Exley, George	0	5	0
,, Goodall, Backhouse and Co.	2	2	0
,, Harvey, Thomas	1	1	0
,, Hirst, Brooke and Hirst	2	2	0
,, Iredale, Thomas	0	5	0
,, Jefferson, Peter	0	10	6
,, Longley, J. W.	1	1	0
,, Payne, John	0	5	0
,, Pierson, Clement	0	5	0
,, Reynolds, Freshfield	0	10	6
,, Reynolds, Richard	1	1	0
,, Sagar, Henry	0	5	0
,, Smeeton, W.	0	10	6
,, Taylor, Samuel	1	1	0
,, Taylor and Fletcher	1	1	0
,, Woolford, James	0	5	0
,, Yewdall, Edwin	0	10	6
Lees, Marlor, Jabez	0	5	0
Leicester, Berridge, Alfred	0	10	0
,, Broof, Richard	0	10	6
,, Butler, T. E.	0	5	0
,, Clark, W. B.	0	10	6
,, Cooper, Henry	0	5	0
,, Cooper, Thomas	0	10	6
,, Harvey, W. R.	0	10	6
,, Hodgson, C. G	0	5	0
,, Jackson, John	0	5	0
,, Miller, Thomas	0	5	0
,, Porter, John	0	5	0

Leicester, Rice, R. S.	0	5	0
,, Salisbury, W. B.	0	10	6
,, Ward, Stephen	0	5	0
Leigh, Bennett, J. W.	0	5	0
Lewes, Head, John	0	10	6
,, Martin, Thomas	0	10	6
,, Saxby, Henry	0	10	6
Lewisham, Clift and Crow	1	1	0
Lincoln, Kemp, John	0	10	6
,, Tomlinson, C. K.	0	10	6
Liskeard, Elliott, S.	0	5	0
Liverpool, Barber, G.	0	10	6
,, Billington, Frederic	0	4	0
,, Buck, R. C.	0	5	0
,, Butler, C.	0	10	6
,, Clay and Abraham	1	1	0
,, Collier, James	0	2	6
,, Fergusson, John	1	1	0
,, Flint, John	0	10	0
,, Greenall, A.	0	10	0
,, Hocken, Joshua	0	5	0
,, Hunt, Thomas	0	10	6
,, Jones, O. L.	1	1	0
,, Parkinson, R.	0	10	6
,, "S.M."	1	1	0
Llandilo, Hughes, Thomas	0	10	6
Llangollen, Jones, Humphrey	0	5	0
Llansilin, Roberts, W. C.	0	2	6
Long Sutton, Sutterby, J. N.	1	1	0
Loughborough, Paget, John	0	5	0
Louth, Hurst, John	0	10	6
,, Hurst, John B.	0	10	6
Lymington, Allen, A. U.	0	5	0
,, Madge, J. C.	0	10	6
,, Peat, Walter	0	10	6
Macclesfield, Bates, W. J.	0	10	0
,, Oldham, G.	0	5	0
,, Wood, Rd.	0	10	0
Machynlleth, Thomas. T. W.	0	5	0
Maidstone, Rogers, Wm.	0	10	6
Maldon, Ibbs, J. T.	0	5	0
Malvern (Great), Burrow, Messrs.	1	1	0
,, Francis, Geo.	0	5	0
Malvern Link, Wakefield, C. H.	1	1	0
Malvern Wells, Bladon, W. G.	0	5	0
Manchester, Benger, F. B.	0	5	0
,, Blyton, John	0	5	0
,, Carter, William	0	10	6
,, Cockshott, J.	0	10	6
,, Cowgill, B. A.	0	5	0
,, Darling, Wm.	1	1	0
,, Gibson, Robert	1	1	0
,, Hart, James	0	10	6
,, Jackson, Thomas	0	10	6
,, Johnson, T. S.	1	1	0
,, Lcete, W. W.	0	10	6
,, Marsden, T. B.	0	10	6
,, Maunder, Robert	0	10	6
,, Mitchell, John	0	10	6
,, Mumbray, H. G.	0	10	6
,, Paine, Standen	0	5	0
,, Pratt, G. W.	0	10	6
,, Ritson, John	0	5	0
,, Terry, Thomas	0	5	0
,, Walsh, Edward	0	10	6
,, Wealthall, A	0	10	0
,, Wilkinson, George	0	10	6
,, Wilkinson, William	1	1	0
,, Wright and Barnaby	1	1	0
Margate, Candler, J. T.	0	10	6
Market Drayton, King, W. G.	1	1	0
Marlow, Foottit, C. M.	0	5	0
Matlock Bridge, Hodgkinson, J. S	0	10	6
Mexborough, Shields, R. J.	0	5	0
Middlesborough, Smith, C. S.	0	5	0
,, Taylor, W. R.	0	5	0
Morecambe, Gardner, T.	0	10	6
Morpeth, Elliott, E.	1	1	0
Neath, Hayman, Alfred	1	1	0
Newcastle-on-Tyne, Mann, Robert	0	10	6
,, Potts, Thomas	0	10	6
,, Proctor, Barnard S.	1	1	0
Newcastle-under-Lyne, Cartwright, William	0	10	6
Newport, I. of Wight, Millidge, W. H.	0	5	0
Newtown, Morgan, Richard	0	10	6
Northampton, Dadford, Thomas	0	10	6
,, Mayger, W. D.	0	10	6
,, Merrick, Thomas G.	0	10	0
,, Shipman, John J.	0	10	6
No thleach, Howard, J. H. H.	0	5	0
Northwich, Lee, W. W.	0	5	0
Norwich, Caley, Albert Jarman	0	10	6
,, Cooke, William	0	5	0
,, Corder, Octavius	0	10	6
,, Cossey, John	0	5	0
,, Sutton, Francis	0	10	6
,, Woodcock, P. D.	0	10	6
Norwood (Upper), Izod, Jas.	1	1	0
Norwood (Upper), Palmer, F.	0	5	0
Nottingham, Atherton, J. H.	0	10	6
,, Beardsley, John	0	5	0
,, Dennis, J. L.	0	10	0
,, Fitzhugh, Richard	0	10	6
,, Jackson, Roberts	0	5	0
,, Lomas, J.	0	5	0
,, Mayfield, J. T.	0	10	6
,, Smith, William	0	5	0
,, White, Frank	0	10	6
,, Williams, W. P.	0	10	6
Nunhead, Green, Samuel	0	5	0
Oakham, Wellington, James M.	0	10	6
Oldham, Bagshaw, W.	0	10	6
,, Glover, John Smith	0	5	0
,, Hargraves, H. L.	0	10	6
,, Henthorne, Joshua	0	10	6
,, Shepherd, James	0	10	6
,, Wilson, Alexander Greaves	0	5	0
Ongar, Ward, D.	0	10	6
Oswestry, Vaughan, David	0	10	6
Oundle, Turner, Robert	0	10	6
Oxford, Hitchcock and Sons	1	1	0
,, Houghton and Sons	0	10	6
Partick, Rait, R. C.	0	5	0
Pembroke Dock, Andrews, Charles	0	5	0
Pendleton, Robinson, Benjamin	0	5	0
Penrith, Bowron, John	0	5	0
Penzance, Harvey J. S.	0	5	6
,, Shakerley, Benjamin	0	2	6
Peterborough, Bright, Richard	0	10	6
Plymouth, Burdwood, James	0	5	0
,, Essery, William	0	5	0
,, Marsh, John,			
,, Northcroft, Jonathan	0	5	0
,, Sloggett, Thomas Chubb	0	5	0
,, Steele, Samuel	0	10	6
Pontypridd, Bassett, Charles	1	1	0
Portobello, Kemp, David	0	10	6
Portsoy, Clark, James	0	10	6
Preston, Hogarth, W.	0	10	6
,, Sharples, George	0	5	0
Pudsey, Walker, Joseph	0	10	6
Putney, Farmer, John	0	5	0
Pwltheli, Pughe, R. O.	0	2	6
Radford (New), Patchitt, E. C.	0	10	6
,, Jenkins, John Thomas	0	5	0
Ramsgate, Balch, Edwin	0	5	0
,, Fisher and Son	2	2	0
,, Morton, Henry	0	5	0
Reading, Bradley, Charles	0	5	0
,, Hayward, W. J.	0	5	0
,, Ridley, Charles Henry	0	5	0
,, Timothy, Thomas Morris	0	5	0
Redditch, Mousley, William	0	5	0
Reigate, Forbes, William	0	10	0
Retford, Baker, William	0	10	6
Rhyl, Foulkes, W. H.	0	10	6
,, Jones, Ellis P.	0	10	6
Richmond (Surrey), Clarke, Thomas M.	0	10	6
,, Hopwood and Son	1	1	0
Richmond (Yorks), Bridges, G. A.	0	5	0
,, Thompson, Thomas	0	10	6
Ripon, Judson, Thomas	1	1	0
Rochdale, Booth, James	0	10	6
,, Highley, William	0	5	0
,, Jones, John	0	10	6
,, Lord, Ellis	0	5	0
,, Robinson, Ralph	0	10	6
,, Taylor, Edward	0	10	6
,, Whitehead, John	0	5	0
Rochester, Harris, Henry William	0	10	6
Romford, Lasham, John W.	0	10	6
,, Petwee, Edward	0	10	6
Rothesay, Duncan, William	0	5	0
,, Macintosh, A.	0	5	0
Royston, Matthews, Ernest	0	10	6
Runcorn, Whittaker, William	0	10	6
Rusholme, Sylvester, Paul	0	5	0
Rye, Waters, W. A.	0	5	0
Ryde, Dixon, Henry	0	10	6
,, Flower, Thomas S.	0	5	0
,, Gibbs, William	0	10	6
,, Pollard, H. H.	0	10	6
,, Taylor, Richard	0	10	6
,, Wavell, John	0	10	6
St. Albans, Martin, H. G.	0	10	6
,, Myers, Lancelot	0	5	0
,, Roberts, Albinus	1	1	0
St. Day, Corfield, Charles	0	10	6
,, Corfield, Thomas J. T.	0	10	6
St. Neots, Hunts, Dring, William	0	10	6
Saltash, Mathew, William H.	0	5	0
Saltburn-by-the-Sea, Taylor, William	0	5	0
Salford, Hall, Joseph	0	10	6
,, Manfield, John W.	0	10	6
,, Pearson, H. R.	0	10	6
,, Whittaker, Ellis	0	10	

Salisbury, Atkins, Samuel R.	0	10	6
Sanquhar, Pendreigh, J. C.	0	5	0
Scarborough, Fryer, Charles	0	10	6
,, Jones, Alfred	0	5	0
,, Whitfield, John	1	1	0
Seaccmbe, Holt, R. W.	0	5	0
Selby, Burton, John	0	2	6
,, Colton, Thomas	0	2	6
,, Cutting, T. J.	0	5	0
,, Glew, William	0	2	6
Shaftesbury, Powell, John	0	5	0
Shanklin (I. of Wight), Brown, A. H.	0	10	6
Sheepshed, Moore, Thomas	0	5	0
Sheffield, Baker, William	0	10	0
,, Clayton, William	0	10	6
,, Crawshaw, Henry	1	1	0
,, Cubley, G. A.	0	10	6
,, Dobb, John T.	0	10	6
,, Ellinor, George	0	10	6
,, Hudson, Fretwell	0	10	6
,, Jervis, William	1	1	0
,, Jennings, John E. H.	0	10	6
,, Malcham, Henry	0	10	6
,, Priestley, Henry	0	10	6
,, Radley, W. V.	1	1	0
,, Thickett, Robert	0	10	6
,, Wilson, Edward	1	1	0
Sherburn, Dove, J.	0	5	0
Shields (South), Forrest, Robert	0	10	0
,, Hudson, Thomas	0	5	0
,, Mays, R. J. J.	0	10	6
,, Noble, John	0	5	0
,, Raffle, William	0	10	6
,, Riddle, Joseph	0	10	6
,, Rowell, Robert	0	5	0
,, Taylor, James	0	10	6
Shildon, Veitch, T. D.	0	10	0
Shrewsbury, Blunt, Son, and Co.	1	1	0
,, Cross, W. G.	0	10	6
,, Cross, W. G., jun.	0	10	6
,, Goucher, John	0	10	0
,, Salter, Joseph B.	0	10	6
Sittingbourne, Rook, Edward	0	10	0
,, Gordelier, P. W. G.	1	1	0
Seaford, Heald, Benjamin	0	10	6
Slough, Griffiths, Richard	0	10	6
Somersham, Goodenough, J.	0	10	6
Southampton, Hughes, John H.	0	5	0
,, Randall, W. B.	1	1	0
,, Stewart, Edward H.	0	5	0
Southmolton, Swingburn, R. H.	0	5	0
South-ea, Cruse, Thomas H.	0	10	6
,, Rastriek and Son	0	10	6
Southport, Ashton, William	0	10	6
,, Ellis, George	0	5	0
,, Johnson, Edward	0	5	0
,, Sykes, T. H.	0	10	6
,, Walker, William H.	0	10	6
Spalding, Asling, Brelsford	0	5	0
,, Swift, Francis	0	10	6
Spilsby, Rainey, E.	0	10	6
Stacksteads, Turner, James	0	5	0
Stafford, Averill, H. A.	1	1	0
,, Averill, J.	1	1	0
Stamford, Dickinson, F.	0	10	6
,, Patterson, George	0	10	6
,, Rees, T. G.	0	5	0
Stirling, Duncanson, William	0	10	6
Stockport, Kay Brothers	1	1	0
Stone, Slater, Thomas	0	10	6
Stranraer, Dorman, James	0	10	6
Stourbridge, Bland, Jno. H.	0	10	6
,, Burgess, William	0	5	0
,, Clark, Thomas P	0	5	0
,, Hughes, Samuel	0	10	6
,, Jones, R. G.	0	5	0
,, Loverock, Henry	0	5	0
,, Morris, A. P.	0	10	6
,, Perks, Francis	0	10	6
,, Whitwell, George	0	5	0
Stratford (Essex), Holford, T. C.	0	10	6
Stroud, Coley, S. J.	0	10	6
Sunderland, Fairley, Thomas	0	5	0
,, Nicholson, J. J.	0	10	6
,, Sharp, David B.	0	10	6
,, Walton, John	0	10	6
Sutton Coldfield, Smith, William	0	10	6
Sutton-in-Ashfield, Littlewood, John O.	0	5	0
,, Littlewood, S	0	5	0
Swansea, Finch, Albert H.	0	5	0
,, Grose, N. M.	0	10	6
,, Harris, James	0	7	6
,, Powell, David	0	5	0
,, Williams, John T.	0	10	6
Sydenham (Upper), Lang, William	0	10	6
,, ,, Pocklington, James	0	10	6
Taunton, Fouracre, Robert	0	10	6
,, Gregory, George Henry	0	5	0
Taunton, Hambly, Charles Joseph	0	10	6
,, Kirkpatrick, S.	0	5	0
,, Morgan, Philip Henry	0	5	0
,, Prince, Henry	0	10	6
,, Redman, Sidney	0	5	0
,, Woollatt, Richard	0	5	0
Teignmouth, Cocking F. J.	0	5	0
,, Cornelius, Joseph	0	10	6
Thornton, Waddington, B.	0	5	0
Thrapston, Pars. Robert C.	0	10	6
Tipton, Briggs, James	0	5	0
Torpoint, Down, Richard H.	0	10	6
Torquay, Cocks, John W.	0	5	0
,, Guyer, James B.	0	5	0
,, Riches, Thomas	0	5	0
,, Smith, Edward	0	5	0
,, Sloman, Richard	0	5	0
Torrington, Fowler, Henry	0	5	0
,, Handford, Edwin	0	5	0
Tottenham, Bentley, W. J.	0	10	6
Tow Law, Rutherford, E.	0	5	0
Truro, Feaver, S.	0	10	6
,, Richards, J. E.	0	2	6
,, Serpell, S.	0	10	6
Tunbridge Wells, Arnold, Spencer	0	10	6
,, Gardener, Charles	0	10	6
,, Dunkley, Edward	0	10	6
,, Harris, H.	0	5	0
,, Howard, Richard	0	10	6
,, Sells, Robert James	0	10	6
Twickenham, Bishop, Thomas	0	10	6
,, Peake, H. F.	0	10	0
Uddingston, Walker, Thomas	0	10	6
Uttoxeter, Johnson, John B.	0	10	6
Ventnor (I. of Wight), Weston, Charles	1	1	0
Wakefield, Chaplin, John L.	0	10	6
,, Duffin, Thomas	0	10	6
,, Taylor, John	0	10	6
Walsham (North), Bailey, G. W.	0	5	0
Ware, Medcalf, Benjamin	0	10	6
,, Medcalf, B. P.	0	10	6
Warminster, Humby, L. W.	0	5	0
Watertoo, Pheysey, Richard	1	1	0
Watford, Chater, E. M.	1	1	0
,, Chater, M. T.	0	10	6
Watton, Vincent, L. A.	0	2	6
Weaverham, Manifold, John J.	0	10	6
Wellington (Somerset), Langford, John B.	0	10	0
Wells (Somerset), Slater, Jonathan	0	5	0
Westbury, Taylor, Stephen	0	4	11
Whitby, Corner, Thomas B.	0	10	6
,, Stevenson, John	0	10	6
Wigan, Polding, Peter	0	10	6
Winchester, Powell, E. F.	0	10	6
Windsor, Boyce, John Pierce	0	10	6
,, Collins, Henry George	0	5	0
,, Crook, Edward	0	10	6
,, Griffiths, Alfred William	0	10	6
,, Leigh, John	0	10	6
,, Russell, Charles J. L.	0	10	6
,, Weller, George	0	10	6
Witney, Fox, Charles James	0	5	0
,, Purdue, Thomas	0	5	0
Woking, Dawson, Alfred	0	10	0
Wolverhampton, Cannell, W.	0	10	6
,, Gow, Alexander	0	10	6
,, Perkins, John	0	10	6
,, Stanway, Edward T.	0	10	6
Woodbridge, Betts, John	0	10	6
Woolwich, "H."	0	2	0
,, "H. C."	0	1	0
,, Rastrick, John A.	0	10	6
Worcester, George and Welch	1	1	0
,, Whitfield and Son	1	1	0
,, Witherington, Thomas	1	1	0
Worksop, Baxter, George	0	5	0
,, Jones, George W.	0	5	0
Wrotham, Romans, Thomas W.	0	10	6
Yarmouth, Great, Goggs, N. W.	0	5	0
Yeadon, Blatchley, T.	0	10	6

DONATIONS.

TOWN.

	£	s.	d.
Turnham Green, W., Wooster, J. R.	5	5	0
St. Paul's Churchyard (5) *E.C.*, Leath and Ross	2	2	0
Great Russell Street (33), *W.C.*, Davenport, John T.	5	5	0

COUNTRY.

	£	s.	d.
Penzance, Cornish, Henry R.	5	5	0
Liverpool, Clay, Robert	5	5	0
Barnsley, Suteliffe, John C.	2	2	0

ERRATUM.

No. 201, page 881, col. 2, line 3, *for* Patman, Francis Thomas, *read* Patman, Frederick Thomas.

NORTH BRITISH BRANCH, EDINBURGH.

The Annual meeting was held in the Soeiety's rooms, St. Giles street, on Monday, May 11th, at 12 o'cloek. Mr. Young, President, in the Chair. The Secretary read the following:—

Annual Report, May, 1874.

"The Council of the North British Braneh have again as usual to present their Report for the past year.

"They have much pleasure in testifying to the suceess whieh has attended the oecupation of the Soeiety's rooms in St. Giles street. In all departments, whether in referenee to the conduet of examinations, as a museum, library, or as affording opportunities for study, the change has been beneficial, while, when used for evening meetings during the winter, the rooms have been well and fully attended. Sinee they were opened in November, 1872, 1332 visits having been paid; 874 of this number have visited the rooms between 1st January and 31st Deeember, 1873. These visitors were chiefly young men preparing for their different examinations.

"Hitherto the rooms have been found fairly eonvenient for earrying out the examinations of the Soeiety. Having in view, however, the greater stringency in the future of the practieal working in the chemieal department, both in minor and major examinations, as well as the neeessitous eall for inereased aeeommodation in eonnection with museum and library, it was thought advisable that steps should be taken to give up the present rooms, by taking advantage of a break in favour of the Soeiety occurring at Whitsunday first, and thus getting quit of the lease whieh, if not done *now*, would bind the Soeiety in its oeeupation five years longer. Aeeordingly, arrangements have been made, with the eoncurrenee of the London Council, to remove on the 25th May, now approaching, to more eommodious premises in the west end of George Street; and where, in a suite of three apartments, there will be available 50 per eent. more wall and floor space, with every eouvenience for the ereetion of a laboratory and dispensing eounter for the use of the Board of Examiners; while, from the lofty nature of the eeiling, better and more comfortable spaee will be available for the evening seientific meetings.

"A glanee at the weekly journals will show that our evening gatherings have been, both in point of interest and attendanee, a fair average. The Couneil tender their best thanks to those gentlemen who have so kindly taken part in these proeeedings; and special thanks to Mr. Jamie, of Singapore, who, while so far distant from Edinburgh, should yet have so substantially and so handsomely remembered the museum of the Society. In like manner they offer to those who have eontributed to the library, and partieularly notiee the liberal presentation made, during the winter, by Mr. D. R. Brown, of Edinburgh, of so many volumes, a list of whieh was published at the time when they were presented.

"The examinations have been more numerous during last year. The date for the preliminaries are of eourse fixed, being held throughout Great Britain on the first Monday of eaeh quarter, eommencing with January. During 1873, 167 offered themselves for this examination, with a large pereentage of failures. For the Modified, 21 candidates came before the Board, 76 for the Minor, and 10 for the Major, or in all 274. Throughout all these examinations, failures bulk very largely, and it is with mueh regret that the Council have to record this faet.

"The Couneil take this opportunity of again thanking Mr. Hills, the London president, for his liberal gift to the North British Branch, whereby from funded property to the extent of £5 annually they are enabled to bestow a prize of books at the board meetings in Edinburgh, to each eandidate who passes highest in honours in the Minor Examination.

"The diffieulty in connection with the best form of provineial education appears to be as great as ever, while the Council feel that the reeent proposal to establish scholarships at a large annual outlay to the Society is not at all likely to be produetive of satisfactory results. There seems also to be grave objections to centralize the real means of education; beeause the Couneil think it would not be an easy matter for all young men in the country to go to large towns, and there spend time and money to gain a knowledge of the different departments, apart from the routine of the daily shop and counter practice. Some such neeessity may yet eome, but the Couneil think it is too premature to make such a course at present imperative.

"The Supplement to the Pharmacopœia has been published, and must be in the hands of most pharmaceutists by this time. The eontents will therefore tell their own tale; but the Couneil eannot help thinking that in some respeets the additions are a mistake, as likely to lead to eonfusion without any corresponding benefit.

"The Council express a hope that, in the eourse of this session of Parliament, and espeeially now that a eommittee has been appointed, and is already sitting, something may be done to modify the praetical working of the Adulteration Aet: feeling assured that, in its applieation to many artieles, its scope and intention have been very seriously misunderstood.

"A Juries Bill is now going through the House; and the Couneil feel hopeful that steps may be taken to obtain an extension of its operation to Seotland in referenee to the exemption from jury service of all pharmaceutieal ehemists as well as ehemists and druggists. This the Council think might be effeeted in one of two ways, either by the introduction of a speeifie elause in the proposed bill or a short special Aet of Parliament extending the privileges of the bill to Scotland. For many years parties in Seotland have suffered under the anomaly by whieh pharmaceutical chemists, beeause residing in Seotland, fail to partieipate in the boon aeeorded to their brethren in the south; and trust that the present session of Parliament may be able to put this matter on a fair and proper footing. The Couneil understand that their Seeretary has reeently been in eorrespondenee with the members for the city and eounty, as well as with the Lord Advocate for Seotland, on the subjeet; and thus, through the influenee of the latter there is a prospeet of due attention being given to this subject, and with some hope of suecess.

"The Council eannot elose this report without referring to the great loss whieh not only the Society but pharmaey generally has sustained in the death of three very well known and mueh respected members of the Soeiety, Messrs. Meggeson, Morson, and Henry Deane. The grave had scareely closed over the remains of George Meggeson, who died at a very advaneed age, well known and mueh respeeted by all who were privileged to have his aequaintance, when the announcement was made of the deeease of Thomas N. Morson, and within only a few days thereafter, all were startled to know that Henry Deane had also passed away. The Couneil feel that this is neither the time nor place to record all that these two latter well-known men have done for pharmacy, and can therefore only express grief at their removal from this their seene of active labour. As examiners and ehief office bearers in the early days of our Society, they did much to further its true interests; while among seientific eireles at home and abroad their names were widely known and deservedly esteemed.

"In eonelusion, the Council have now to intimate that, as promised last year, a new system of electing members of Council in Edinburgh has this day to be inaugurated. Cireulars have been sent out to all members of the Society, as well as to associates in business throughout Scotland, who, having paid their annual subscriptions previous to the printing of the same, have been asked to vote for 15 out of 23 names submitted; and it will now be for the meeting to ascertain by the voting papers who are to be the members of Council in Edinburgh for the year 1874-75."

After a few remarks from one or two members, Mr. W.

Aitken moved the adoption of the report, which was seconded by Mr. J. Macdonald, and carried unanimously.

The envelopes containing the voting papers were then opened in presence of the meeting, and a committee appointed to examine and sum up the votes. This having been done, the following were declared duly elected as Councillors for 1874-75, as they stood highest on the list. The names are given alphabetically :—W. Ainslie, H. C. Baildon, G. Blanshard, J. Buchanan, D. R. Brown, T. Davison (Glasgow), W. Duncanson (Stirling), D. Frazer (Glasgow), J. Fairlie (Glasgow), W. Gilmour, A. Govan (St. Andrew's), J. Heron, D. Kemp (Portobello), A. Kinninmont (Glasgow), and J. R. Young—in all 15. Mr. Gilmour was then proposed as Chairman and Mr. Kinninmont as Vice-Chairman for 1874-75. Both these appointments, as well as that of Mr. John Mackay as Secretary, were carried unanimously and with acclamation.

The committees were to be settled at the first meeting of the new Council.

Mr. Mackay proposed a vote of thanks to Mr. Young for his conduct in the chair, referring in a special manner to his services to the Society, to which Mr. Young replied, and thus brought the meeting to a close.

Provincial Transactions.

GLASGOW CHEMISTS' ASSOCIATION.

The annual Business Meeting of the Association was held in Anderson's University, on Wednesday, 15th April, at 9 p. m., Mr. John Currie, President, in the Chair.

The minutes of previous meeting having been read and adopted, Mr. Fairlie then, in the name of Messrs. Evans and Company, Liverpool, presented the Association with one of their first class "Pharmacy" microscopes, and it was agreed "that the Secretary be instructed to forward the sincere thanks of the Association to Messrs Evans and Company for their most seasonable present."

Business connected with the Library was then brought forward; when it was resolved that a sub-committee of three be elected to make the necessary arrangements for establishing the Library, but that nothing be finally settled without the sanction of the Council.

The following gentlemen were elected Library Sub-Committee :—Messrs. J. M. Fairlie, Wm. Whyte, and Alexander Kinninmont.

It was also agreed that the Library fund should be banked, and drawn upon as required.

The Secretary then read the following report :—

"The session commenced on the 1st of October, 1873, with an address by the President on 'Education connected with the trade.' On the 29th of the same month we were favoured with a highly interesting lecture by Dr. Wood Smith on 'The Circulation of the Blood.' The attendance of members on this occasion was very good. On November 26th we had a lecture from Dr. Nairne on 'The Brain and Nervous System.' This lecture was illustrated by means of anatomical specimens. We held our fourth meeting on December 24th. The business done consisted in making the necessary arrangements for the annual festival; that being done, the remainder of the evening was devoted to a discussion on 'The Adulteration Act,' Mr. Kinninmont being the chief speaker. The fifth general meeting was held on the 21st of January, 1874, when we were honoured with an exceedingly interesting lecture by Professor Thorpe, on 'The Life and Scientific Works of the late Thomas Graham.' The lecture was profusely illustrated by experiments, and it may truly be said that those members who were absent from that meeting certainly missed a great treat. On the 18th February the evening was mainly devoted to a discussion on Mr. Hunter's motion connected with the Library, and which, as most of the members are aware, has resulted in the collection by subscription of about £40, which the Council trust may be further increased by a grant from the Pharmaceutical Society. The last general meeting was held on the 1st of April, when the Association was favoured with a lecture by Dr. Fergus, on 'Pure Air and Water.' The Doctor showed how, by the aid of 'Nessler's solution,' the presence of sewage in water might be detected, and he also gave the formula for the test solution.

"Your Council are not in a position to say that the present session has been a very remarkable one, but they can say that it will be long remembered on account of its giving birth to the Library; and they feel confident that if we go on accomplishing as much every session as we have done during the last few sessions, we shall in a few years have great reason to congratulate curselves on the progress we have made. Your Council trust that the time is not far distant when the Association may have the pleasure of meeting in a Hall of its own, but although this is 'a consummation devoutly to be wished' still it can only be brought about by the united effort of every member of the Association; and as we all know that to gain the object that we have in view, namely the acquiring a Hall of our own, will be to incur a considerable additional expense, it behoves us to endeavour to add to our list of members; because it is only by so doing that we can carry on the work commenced in connection with the Library to a successful issue, and we know that there are many masters and assistants in the city who do not belong to the Association, and who by a little persuasion might, we think, be induced to join us. My own individual opinion is this, that, until we have the great majority of both the masters and assistants in our ranks, the Association will never be in a thoroughly flourishing condition; and I consider it a sure sign of disease when any Association, either secular or sacred, has to depend for its main support on a few influential members, because I shall ever hold it as truth that forty customers at 1*s.* each show a much securer state of trade than four at 10*s.* or two at 20*s.* each."

The Treasurer, Mr. McKenzie, submitted the financial statement, which showed that there had been an income of upwards of £50, including Library fund.

The report was adopted.

The following report of the Assistants' Branch was then read by its Secretary.

"As secretary of the Junior Section of this Association, I am, with the senior secretary, expected to give a *résumé* of our past year's proceedings.

"As you are aware, this is the first year of our existence as a junior section of this Association; and although the success attending our efforts has not been so great as we anticipated, nor as I think we had a right to expect, still, we must not repine. Most undertakings have a small beginning, and assuredly our beginning has been small enough, whatever our future success may be. However, the Society has reason to congratulate itself on the amount of talent, hitherto undeveloped, with has developed itself during the session in the meetings of the junior section, talent which, had we remained in our former position as one Association without two sections, would have remained undiscovered.

"But other means, as well as the absence of our seniors, combined to bring the assistants out of themselves; by the munificence of one of our members, a master whose name I may not mention, our Council have been able to offer the members of the junior section a prize or prizes for the best papers on trade subjects, subject to such rules and regulations which the donor as donor had a right to lay down.

"Our Council, while not undervaluing the handsome offer, have determined, with the kind permission of the donor, to leave it over for another season; as, considering the smallness of attendance, and the small numbers of papers given, they feel that they could not consistently come to a conclusion. But the gentleman, on being informed of the circumstance, is so pleased with the exertions of the assistants that he has expressed his willingness to give

each of the essayists a volume, which he will accordingly do. The papers given were five in number, the essayists and subjects being as under : Mr. J. Hunter (Modern Relations of Organic and Inorganic Chemistry) ; Mr. J. Foster (Animal Substances as used in Medicine and the Arts); Mr. W. Currie (Iodine); Mr. W. Bray (Mercury and its Preparations); Mr. J. Mc Gunndech (Drugs and Druggists).

"Our attendance has been, as I have said, small; the number on the roll being 26, average attendance scarcely half. But our Council think the reason is not far to seek, and explain it in this way : that on account of the visible declension of the early closing movement, assistants cannot, after closing at nine (minus their tea), come to our meetings, nor can we expect them.

"Let us hope, then, by next season we may resort again to early closing, and then, with time, books, cabinet and microscope at our disposal, I am afraid the Council will have to make a virtue of necessity and look for larger premises."

The election of office-bearers then took place (prior to which the Secretary said that he did not intend to seek re-election), which resulted in the following returns :—

President, Mr. John Currie; Vice-President, Mr. W. Whyte; Secretary, Mr. J. M. Fairlie ; Treasurer, Mr. W. McKenzie ; Council, Messrs. T. Davison, J. A. Clarke, R. Brodie, A. Paterson, G. Garry, J. Jaap, J. Fenwick, A. Paul, D. Frazer, W. Greig, A. Kinninmont, and R. C. Rait ; Auditors, Messrs. R. S. Dun, and J. Fotheringham.

The concluding remarks of the Chairman terminated the proceedings.

LIVERPOOL CHEMISTS' ASSOCIATION.

The thirteenth general meeting of this Association was held on April 24th, 1874, at the Royal Institution. Dr. Charles Symes occupied the Chair.

There was a very fair attendance.

Mr. John Abraham read a paper on "Medicinal Pepsin," which is printed at p. 909.

Mr. James T. Armstrong, F.C.S., read the following paper, sent to the Association by Dr. J. M. Milne, of Glasgow, entitled "Notes on the Analysis of Char : "—

We live in an age of investigation. New theories are being constantly propounded with astonishing assiduity. Fortunately, however, such theories have to undergo the test of severe criticism, under which many of them, remarkable only for their absurdity, are immediately consigned to oblivion.

In no case, perhaps, are criticisms more severe than when the subject under discussion belongs to the domain of chemistry. Here, at least, the theorist must be prepared to have his opinions sifted to the utmost by a host of fellow scientists, who, as a rule, are not too tolerant of any ideas but their own. Probably, after all, it is a good thing that such is the case. Its good results are visible in the high degree of accuracy to which analytical chemistry, for example, has now attained. Even in the so-called "commercial work," the highest degree of accuracy compatible with the limited time usually available for such analyses is demanded, and processes which but a few years ago were considered reliable for practical purposes, are now discarded as erroneous.

Manufactured chemicals of all sorts being usually sold and valued according to the amount of pure substance present, the analytical chemist occasionally finds his results called in question to an extent which becomes extremely annoying. From a commercial point of view, it is of course the seller's interest to have results as high as possible, while the buyer prefers them low. Those analytical processes which are now proved to give results too high, are often still preferred by the seller, while the buyer shows a predilection for those methods which err on the opposite side. Perhaps, therefore, we can scarcely wonder at the existence of what are called "High Chemists" and "Low Chemists," while at the same time we deplore the condition of things which gives rise to them.

The analyst, therefore, who uses only such methods of whose accuracy he is conscientiously convinced, often finds himself in the position of the man who tried to please everyone and pleased no one. It is to be regretted that professional analysts are not more united as to the adoption of various analytical methods. How often do we find processes, considered accurate by one chemist, completely ignored by others. Such a state of matters is by no means satisfactory.

Might not a remedy for this be found in an understanding among analysts, by which only those methods should be employed which are recommended by a majority as standing all the tests available for ascertaining their accuracy ? I make this suggestion, in the hope that attention may be more fully drawn to it by societies such as this. The discrepancies in many of our "commercial analyses of the same sample" is a crying evil, and demand the attention of every chemist who desires to uphold the dignity of our science. The foregoing remarks have recently suggested themselves to me, and although, perhaps, not strictly belonging to the subject under consideration, I do not consider them out of place here.

The application of animal charcoal to the purposes of sugar refining, has rendered its accurate analysis a matter of great importance to the refiner. It is a good thing to know that manufacturers of all kinds are becoming more and more alive to the superiority of chemical knowledge and rigid chemical analyses over the old rule of thumb methods of manipulation which have, in many cases, so long prevailed

The present communication contains the results of a number of careful experiments made on char with the view of testing the accuracy of some statements which have been lately made regarding the determination of some of its constituents—more particularly the presence of soluble organic matter and the estimation of water in new char. The correct determination of the latter ingredient has been a source of no small discussion; and as char is usually sold under a stipulation that it shall not contain over a certain percentage of water, the chemist to whom the question may be referred has of course to contend with the opinions of the buyer and seller. The latter usually considers 212° F. the proper temperature for such a determination, while the former is disposed to insist on a higher one. With such differences of opinion the analyst *ought* to *have nothing* to do. His duty is to make every determination according to the method, or at the temperature, which, from his own observations and those of others, he believes to give the most accurate results. Of course, if a sample is brought to him with the request that he determine the amount of water *at* 212° F., that is quite another question, and is not to be confounded with the actual amount of water in the sample.

Two papers on the above subject have recently appeared in the *Chemical News*, viz., one by Mr. J. L. Paterson (vol. xxvii., p. 111), and a short review of the same by Mr. A. S. Wilson (vol. xxvii., p. 225). A somewhat lengthy discussion on the same subject has also been carried on in the pages of the *Greenock Sugar Trade Review* between Mr. Paterson and Mr. Murphy, of Liverpool.

In one of his replies to Mr. Paterson, Mr. Murphy makes the somewhat startling announcement, that water with which new char has been treated is *strongly alkaline*, and will therefore *dissolve appreciable quantities of organic matter from a paper filter*. He thus accounts for the soluble organic matter found by Mr. Paterson in his experiments. I must confess that I, for one, have yet to learn that the water from new char is *strongly alkaline*—much more that it will *dissolve filter paper*. In order to set aside all doubt on the subject, however, the following experiment was made : 5 grms. of a sample of new char were treated with water, and the liquid filtered without

the use of paper, the neck of the funnel being stopped with recently ignited asbestos. The filtrate, which was quite colourless, and only *very feebly alkaline*, was carefully evaporated to dryness in a weighed platinum basin; the residue dried at 130° C., weighed, and cautiously ignited. The contents of the basin blackened quite perceptibly; and on the ignition being completed and the capsule weighed, the loss was found to be ·112 per cent., a result corresponding very closely with that given by Mr. Paterson in his paper.

Although the moisture in samples of old char. can be correctly determined at 212°F., it is well known that this temperature is quite inadequate for the expulsion of *the whole* of the water from new char. In his instructions for the analysis of bone-black, Fresenius gives 160°C. to 180°C. (320°F. to 356°F.) as the temperature at which the moisture should be estimated. A few years ago, Dr. Wallace, in a paper on "Animal Charcoal" gave it as his opinion that a temperature of not less than 350°F. was necessary. Very recently, J. Walz, writing in the "Zeitschrift für Analytische Chemie, von Dr. C. R. Fresenius, Zwölfter Jahrgang, Zweiter Heft, 1873, states that a temperature of 121°C. (250°F.) for four hours, or a period of 24 hours in the exsiccator, is sufficient to drive off all the moisture from bone-black. Mr. Paterson, however, considers 350°F. much too high, and sufficient to destroy a portion of the organic matter. He considers that five hours in the water bath, at 212°F. is all that is necessary, and asserts that char, during the process of pounding, always loses water. Now, while it is quite possible that long continued grinding in a warm atmosphere may have that effect, it is difficult to understand that a porous substance like charcoal, which retains water somewhat persistently, should lose some of it during the short time necessary for reducing it to powder. On the contrary, we should rather expect a slight increase. That this is really the case, the results of Mr. Wilson's experiments, as well as my own, seem to demonstrate. The following experiments were made with reference to this part of the subject :—

A—(1) A sample of new char was taken, and one half reduced to powder; both were placed in tightly corked bottles : 2 grammes of each were weighed out and kept in the water bath, under precisely similar conditions. The loss of weight was as follows :—

	Unground.	Ground.
After 1 hour	4·67 per cent.	4·92 per cent.
,, 3 hours	4·85 ,, ,,	5·09 ,, ,,
,, 5 ,,	there was no further loss in either case.	

(2) 1·2802 grammes of the same sample was heated in an ordinary air bath, at different temperatures as under :—

	Unground.
At 350°F., for 15 minutes, the loss was	6·11 per cent.
,, 400°F., ,, 10 m. longer, ,, ,, ,,	6·78 ,, ,,
,, 450°F., ,, 10 ,, ,, ,, ,, ,,	6·85 ,, ,,
,, 500°F., ,, 10 ,, ,, ,, ,, ,,	7·36 ,, ,,

(3) 2 grammes of the sample were placed in a platinum boat, and introduced into a glass tube about nine inches long. The tube was then placed in an air bath made for the purpose, and one end attached to an apparatus for drying the air previous to entering the tube. To the other end a weighed Chloride of Calcium tube was attached, and this again was placed in communication with one arm of a Staedler's aspirator, by means of which a uniform and well regulated current of dry air could always be obtained. The air bath was heated by a small Bunsen burner, the temperature being registered by a thermometer passed through the lid. For temperatures not over 350°F., a ⊥ shaped glass tube is useful, the thermometer being passed through a cork; but for higher temperatures a plain tube is to be preferred.

A great number of experiments were made with this apparatus, in order to determine the water by direct weighing, some of the results of which are given below.

Two grammes heated in the air current—

	Unground.	Ground.
At 350° F., for 15 minutes, gave	6·50 p. c.	6·52 p. c.
,, 450° ,, ,, 10 ,, longer, ,,	7·01 ,,	7·07 ,,
,, 500° ,, ,, 10 ,, ,, ,,	7·17 ,,	7·19 ,,

B.—(1) Another sample of new char (foreign) was subjected to the same mode of treatment.

Two grammes of the unground sample, placed in the water bath, lost—

In one hour	3·23 per cent.
,, two hours	3·29 ,, ,,
,, four ,, ...	3·31 ,, ,,
,, five ,, ...	3·38 ,, ,,

After five hours there was no further loss.

(2) The same quantity was placed in the air bath.

At 250° F. for 15 minutes, the loss was	3·92 p.c.
,, 350° ,, ,, 30 ,, longer, ,, ,, ,,	4·51 ,,
,, 450° ,, ,, 30 ,, ,, ,, ,, ,,	5·01 ,,
,, 500° ,, ,, 30 ,, ,, ,, ,, ,,	5·22 ,,

Two grammes heated directly to—

500° F., for 20 minutes, lost	5·43 per cent.
500° F., for 20 minutes longer, ,,	5·08 ,, ,,
500° F., for 10 ,, ,, ,,	5·28 ,, ,,

(3) Two grammes, heated in air current—

At 250° F., for 15 minutes, gave	4·17 per cent.
At 350° F., for 15 minutes longer, gave	4·62 ,, ,,
,, 525° ,, ,, 5 ,, ,, ,,	5·22 ,, ,,
2 grms. at 350° F., for 15 m. gave	4·61 ,, ,,
2 ,, ,, 450° ,, ,, 10 m. longer, ,,	4·81 ,, ,,
2 ,, ,, 500° ,, ,, 5 m. longer, ,,	4·92 ,, ,,
2 ,, ,, 450° ,, ,, 30 m. gave	5·03 ,, ,,
2 ,, ,, 450° ,, ,, 20 m. gave	5·24 ,, ,,
2 ,, ,, 500° ,, ,, 15 m. longer, ,,	5·29 ,, ,,

Two grammes were taken, as before, but in this case the loss of weight was also found by weighing the residue in the boat, which was placed in a glass tube, closed by a cork.

	Gain in $CaCl_2$ tube.	Loss from Residue.
At 500° F., for 10 minutes, . .	5·40 p. c.	6·63 p. c.
,, 500° F., ,, 15 ,, . .	5·47 ,,	—
,, 500° F., ,, 20 ,, . .	5·55 ,,	6·98 ,,
,, 525° F., ,, 5 ,, longer,	5·65 ,,	7·22 ,,
Two grammes—		
At 500° F., for 20 minutes, . .	5·35 ,,	6·03 ,,
,, 500° F., ,, 30 ,, . .	5·37 ,,	6·21 ,,

From an examination of the above results we are justified in concluding—

1st. That the water in a sample of new char is sensibly increased by the process of pounding, instead of being diminished.

2nd. That a temperature of 212° F. is quite inadequate for the determination of the water in such samples.

3rd. That there is a loss on heating in the air bath up to 500° F.; and that, if heated in the air current, there is a gain in the $CaCl_2$ tube up to that temperature, showing that even at 350° F. the water is not completely expelled.

The determination of the water by direct weighing is, of course, to be preferred to the ordinary air bath, which, at the higher temperatures, usually gives too high results. The difference between the gain in the $CaCl_2$ tube and the loss of weight from the residue, shows that the loss is not entirely water. I would recommend heating in the air current for say 30 minutes, as giving reliable results.

Both papers resulted in an animated discussion, and a vote of thanks to the writers brought the meeting to a close.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, May 7th, 1874. Professor Odling, F.R.S., President, in the Chair. After the customary business, four papers were communicated to the Society: the first on "The Action of Ammonia on Phenyl and Cresyl Chloracetamide," was read in French by the author, Dr. D. Tommasi; the second was entitled "Researches on the Action of the Copper Zinc Couple on Organic Bodies: Part VII., on the Chloride of Ethylidene and Ethylene," by J. H. Gladstone, F.R.S., and A. Tribe, F.C.S. The authors find that these two isomerides behave differently when treated with the couple; the latter splitting up into ethylene and chlorine, whilst the former gives zinc chlorethylate, $\left.\begin{matrix}C_2H_5O\\Cl\end{matrix}\right\}Zn$. Mr. Charles E. Groves then read a "Note on the Preparation of Ethyl Chloride and its Homologues." He finds that when hydrochloric acid is passed into a boiling solution of zinc chloride in alcohol, the latter is completely converted into ethyl chloride; other alcohols, such as the methyl and amyl, under similar treatment, yield the corresponding chlorides. The process was shown in action during the reading of the paper. The last communication was a "Note on a new Mineral from New Caledonia," by Mr. A. Liversidge. The meeting finally adjourned until Thursday, May 21st, when there will be a lecture on "The Sewage question, from a Chemical point of view," by W. H. Corfield.

Parliamentary and Law Proceedings.

Proposed Regulations as to the Storing of Chemicals in the Metropolis.

The following clause occurs in the Metropolitan Buildings and Management Bill, which has been introduced into the House of Commons by Colonel Hogg, the Chairman of the Metropolitan Board of Works:—

29. "It shall not be lawful for any person to deliver, receive, or keep any quantity greater than that from time to time prescribed by bye-law of the Board under this Act of any of the following articles, namely—petroleum, phosphorus, mineral oil, turpentine, resin, tar, pitch, paraffin, naphtha, varnish, fireworks, matches, sulphuric acid or other mineral acid, or chemicals of an inflammable nature, into or in any building other than a fire-resisting building, or a cellar, or a room on the basement storey of a building, or a room on the ground storey of a building having a cellar or vault immediately under it, covered with such arching as is required for support of floors in fire-resisting buildings.

"It shall not be lawful for any person to deliver, receive, or keep, any quantity exceeding *half a ton* of saltpetre or nitrate of soda into or in any building other than a building approved by the Board as fit for that purpose; in which case no goods other than saltpetre or nitrate of soda shall be delivered, received, or kept, into or in the same building.

"If any person acts in any manner in contravention of this section, he shall be deemed guilty of an offence against this Act, and shall for every such offence be liable, on summary conviction before a magistrate, to a penalty not exceeding *fifty pounds*, and to a further penalty not exceeding *twenty pounds* for every day on which the offence continues after notice thereof served on him by the Board."

Alleged Improper Use of an Ointment.

At an inquest held at Radcliffe, respecting the death of George Nuttall, a collier, who was severely burnt by an explosion of gas at a colliery, at Ontwood, the widow of the deceased, said that up to the previous Tuesday her husband seemed to be going on very well, but on that day Mr. Chisholm, the assistant to Dr. Sellers, brought some ointment, which he spread on some cloths, and after they were applied to deceased he became very ill, and his agony was such that he begged for the cloths to be taken off. He afterwards became delirious. Some of the ointment got on her hands and blistered them.

James Olive said he assisted to take the cloths off the deceased, and as some of the ointment got on him it blistered his hands also.

Dr. Sellers was then sent for, as was also Mr. Chisholm.

Dr. Sellers said that the ointment was the same as that recommended for burns by Dr. Smith, of Manchester, as well as Dr. Lund. It contained a little carbolic acid, which was put in to keep down the stench from the sores; but that would not produce the effects deposed to by Mrs. Nuttall and Olive. It was largely used in cases of burns at the Manchester Royal Infirmary. The ointment was made up by his assistant.

Mr. Chisholm produced the pot of ointment sent for use in Nuttall's case, and said it was composed of wax, resin, oxide of zinc, and two drachms of carbolic acid. There was nothing in it which would produce blisters on the flesh of a healthy person. The use of such ointment was the proper treatmeat in cases of burns. He had no objection to allow his hand to be covered with it in the presence of the jury. Mr. Dickinson, the Government mine inspector for the district, applied some of the ointment to his finger, but it did not produce any prejudicial effect. In answer to the coroner, Mr. Chisholm said he was quite sure that the ointment was made up according to the proper formula, and that no mistake occurred in compounding it.

After some further evidence the inquest was adjourned, in order to admit of a *post-mortem* examination being made, and the Coroner ordered the medicine and ointment used in the treatment of the deceased to be analysed in the meantime.

Prosecution under the Adulteration Act.

Adulteration of Milk.

Mr. John C. Ford, farmer, Welshampton, Shropshire, was summoned before Mr. Raffles at Liverpool, at the instance of the health committee, for selling adulterated milk. The defendant, it seemed, supplied milk to Mr. Breakell, wholesale milk dealer, Copperas-hill and Pitt-street. On the 15th ult., the inspector of nuisances took a sample of milk from one of the defendant's cans on its arrival at Lime-street station. The sample was analysed by Dr. Browne, borough analyst, who found that it contained seven parts of water to one hundred parts of the poorest milk, and was very deficient in cream. The defendant did not deny the accuracy of Dr. Browne's analysis, but said that he had only just commenced to sell milk, and had confided that part of his business to a manager. There had been no adulteration of the milk within his knowledge; but Mr. Raffles told him this was immaterial.

In answer to Mr. Raffles, Dr. Browne stated that the defendant's milk was 20 per cent. poorer than the average of milk sold in Liverpool; but country milk was, in his opinion, generally poorer than town milk.

Mr. Raffles asked how he accounted for this.

Dr. Browne said that in towns, cows were fed upon richer food than in the counfry—they were mere machines for producing milk. In the country, cows got more watery food than in towns. The defendant's milk was 10 per cent. lower in quality than the poorest country milk he had ever seen.

Mr. Raffles remarked that the case was not so bad as it first appeared; the amount of adulteration did not appear to be large. He could not, however, impose a smaller penalty than 40s. and costs.

Extra costs, making the total costs £2 4s. 6d., were granted.—A summons which had been taken out against Mr. Breakell was now withdrawn.

BOOKS RECEIVED.

THE ORGANIC MATERIA MEDICA OF THE BRITISH PHARMACOPŒIA SYSTEMATICALLY ARRANGED; together with Brief Notices of the Remedies contained in the Indian and United States Pharmacopœias. By W. SOUTHALL, F.L.S. London: J. and A. Churchill. 1874. From the Author.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at the Twenty-First Annual Meeting, held at Richmond, Va., September, 1873, also the Constitution and Roll of Members. Philadelphia. 1874.

THE SPECIFIC ACTION OF DRUGS ON THE HEALTHY SYSTEM; an Index to their Therapeutic Value, as Deduced from Experiments on Man and Animals. By ALEXANDER G. BURNESS, M.B., etc., and F. J. MAYOR, M.R.C.V.S. London: Baillière, Tindall and Cox. 1874. From the Publishers.

Obituary.

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

On the 1st May, Mr. Henry Fowler, Pharmaceutical Chemist, of Great Torrington, Devon. Mr. Fowler had been a member of the Pharmaceutical Society since 1853.

On the 13th March, 1874, Mr. John Griffith Hughes, Chemist and Druggist, of Thornbury, Gloucestershire. Mr. Hughes was a Member of the Pharmaceutical Society.

On the 24th April, 1874, Mr. Capel Thomas Lechmere, Chemist and Druggist, of Fown Hope, Herefordshire.

On the 25th April, 1874, Mr. Charles Quested Baker, Chemist and Druggist, of Margate.

On the 22nd March, 1874, Mr. F. De Carle Smith, Chemist and Druggist, of Norwich.

On the 10th May, 1874, Mr. Joseph Brayton Mossop, Chemist and Druggist, of Longsight, Lancashire.

Notes and Queries.

THE ACID OF BALSAM OF TOLU.—Various statements have been made as to the organic acid obtained when balsam of Tolu is digested in boiling water; it being usually represented to be a mixture of benzoic acid, with more or less cinnamic acid. By treating some specimens of crystallized acid so obtained with a titrated alkaline solution, and making a calculation based upon the respective equivalents of the two acids, M. Carles has come to the conclusion (*L'Union Pharmaceutique*, xv., 82) that it does not consist of a mixture, but is pure cinnamic acid.

CEMENT FOR AFFIXING LABELS TO TIN OR OTHER METALLIC SUBSTANCES.—Mr. E. B. Shuttleworth has found (*Canadian Journ. Pharm.* vii. 306) that the incorporation or trituration of dry wheaten flour with a mixture of tragacanth mucilage and honey improves its tenacity for the above purpose, and causes it to dry more quickly:—

Tragacanth mucilage. . . .	10 parts.
Honey.	10 „
Dry wheaten flour.	1 „

FLUORESCENCE OF THE ACID RESIDUE FROM THE MANUFACTURE OF ETHER.—The extraordinary fluorescent appearance of the sulphuric acid remaining at the close of the operation of making ether is referred to by Mr. E. B. Shuttleworth (*Canad. Journ. Pharm.* vii. 306), as likely to be of interest to those engaged in researches on fluorescence. The fluorescence of this residue is very intense. Viewed by reflected light, the liquid is of a deep green colour and appears to be perfectly opaque; by transmitted light it is brownish red. The degree of fluorescence appears to be influenced by impurities in the alcohol treated by the acid, the intensity increasing with the proportion of impurities present. Methyl compounds, especially, have an intensifying effect.

Correspondence.

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

THE ADDITIONS TO THE PHARMACOPŒIA.

Sir,—I am amazed at the excessively irate and personal tone of Dr. Redwood's remarks on Wednesday evening last. The discussion upon the Addendum was, it must be admitted, in the main, adverse to the new work. Dr. Redwood, it seems, attributes some of the criticisms to some sort of animus, or piqued or jealous feeling. When such eminent pharmacists as Mr. Williams says that in the formula for acetic ether, the only chemical in the Addendum, "there was an omission of a serious nature;" when another equally accomplished pharmacist states that "the description of acetic ether in the Addendum is inaccurate;" when Mr. Martindale says of one preparation that the mode of conducting the process is "positively deleterious," and stigmatizes another form as one of a "misleading character;" when another gentleman, Mr. T. H. Williams, had tried for several hours to make carbolic acid suppositories according to the Addendum, and had completely failed; when, in point of fact, every speaker had some objection to raise, or unfavourable comment to make; and when, on the other hand, not a single voice—save Dr. Redwood's—is raised in defence of the Addendum, clearly enough such an unanimous consensus of opinion cannot reasonably be set down to any personal feeling whatever, but must have a much more solid basis than Dr. Redwood would fain believe. That the Medical Council, cognizant of the great value of the Doctor's assistance in the compilation of the British Pharmacopœia, very much relied upon the learned professor to arrange the practical portion of the Addendum is highly probable; and the Doctor, knowing this, possibly feels very much annoyed that the whole thing is not quietly swallowed, without fuss or comment, like a sugarplum, by the whole body of pharmacists.

I see no other explanation of the Doctor's dislike to the criticism and free handling the Addendum has received. Such weakness as that displayed by Dr. Redwood when he asserts that the critics are actuated by "an animus most clearly explained" by their "not having had a finger in it" is almost incredible in one occupying so exalted a position, and would be unpardonable in any one else. If these remarks are in any way intended to apply to me, I give them a *most emphatic denial*. I had neither expectation nor desire to be consulted respecting the contemplated Addendum. This is obviously the *rôle* of those veteran pharmacists whose practical experience is far more extended than mine, and consequently of far greater value. At the same time I shall always reserve to myself the privilege of criticizing, in any way I may think fit, either the Pharmacopœia or its Addendum, notwithstanding Dr. Redwood's somewhat rude insinuation.

And now, just a word as to my note. It was written offhand, and perhaps on that account does not possess that ponderous, somnolent, dreary decorum of language the usages of our evening meetings seem to demand. However, as the wording has in it nothing worse than a vein of banter, plainly to be seen—of course very uncommon, and doubtless to many minds highly improper on such solemn and momentous occasions—I can only express my regret that the same has, very unintentionally, been the cause of so much irritation. ὃ γέγραφα γέγραφα.

Not a single word or phrase was intended by me to disparage the great services rendered by Dr. Redwood; indeed, I hope I have too much respect for a veteran pharmacist, no matter how much I may differ from him, to permit such an idea to enter my mind.

Putting aside the phraseology, the gist of my note was in accordance, I believe, with the views of the most practical

pharmacists. 1st, That the Addendum is not up to the mark, that it contains grave errors, some omissions, and many useless forms. 2nd, That the time has arrived when the abilities of the most accomplished men amongst us, could, with manifest advantage, be made use of in the important matter of compiling a Pharmacopœia.

Dr. Redwood takes special exception to my remarks on the pepsine formula, dubbing them "disgraceful." I see nothing "disgraceful" about them, and, to my mind, they are certainly not a tithe so "disgraceful" as the ill-judged and out-of-temper speech of the Doctor. Turning to page 864 of the present volume of the Journal, Dr. Symes says of this same formula, that "the worst form had been chosen," "the process for its preparation was exceedingly crude, and the product disgusting." This is just what everybody knows, who has had anything to do with pepsine.

EDWARD SMITH.

THE NEW PREMISES OF THE NORTH BRITISH BRANCH.

Sir,—At the last meeting of Council in Bloomsbury Square, Mr. Williams is reported to have said that his reason for bringing forward the matter of the change of rooms contemplated by the North British Branch, was the statement made by one of the gentlemen who formed the late deputation to London, "that in the new premises there would not be accommodation for conducting the examinations, especially in practical chemistry."

The subject was only incidentally alluded to at the meeting in London, and this may explain the cause of misunderstanding; but most certainly any expression of opinion by the deputation, consisting of Mr. Tait and myself, as to unsuitableness of premises, referred to those at present occupied by the North British Branch, and not to the new premises.

The undersigned are quite at a loss to account for the erroneous impression made on the mind of Mr. Williams, and they cannot help expressing regret that such a misunderstanding should have arisen.

WM. GILMOUR.
WILLIAM TAIT.

Edinburgh, 12th May, 1874.

THE REMUNERATION OF ASSISTANTS.

Sir,—The remarks made by Mr. Young in his Presidential address commend themselves not only to the future but the present generation of Chemists. It is a bitter satire that young men should be asked to give an utterly disproportionate amount of time and money to arrive at a position in which they will be badly paid for responsible duties which, from late hours, are made unnecessarily irksome to them. It is very obvious from the paucity of assistants that many young men have and are quitting so beggarly requited an occupation; and the exceedingly limited number of educated lads coming into the business is equally evident. The principals, with very truth, say they cannot afford to pay more; and until they show more respect for themselves than is evinced by the present miserable system of petty charges for skilled labour, and the small-souled jealousy of one another gives place to feelings of a less selfish character, they are not likely to be able to do so, even if all the letters of the alphabet were appended to their names.

With the exception of a small number of men residing in fashionable localities and well-to-do towns, the majority of Chemists live by a trade: and not one hundredth part of the information insisted upon, can or ever will be applied to the trade (for such it is) of Chemist and Druggist. Do we then work to live and keep our families? or is the contemplation of symmetrical rows of extract pots and tincture bottles, containing the choicest results of pharmaceutical skill, sufficient to afford sustenance for the souls and bodies of the Pharmaceutists of the future? I fear this would neither keep the wolf nor tax collector away from the door.

Let some amount of consistency be shown on this education question, or we shall find we have improved the Chemists' Assistant off the face of the earth and be left to drudge alone ourselves.

A PHARMACIST.

THE SALE OF BENZINE.

Sir,—There is a section of the Petroleum Act under which druggists may keep Benzine without a licence, provided it is kept in vessels holding not more than a pint and that the aggregate quantity does not exceed 3 gallons. I took occasion recently to enquire of my Insurance Company if I might keep Benzine, under the above condition, under my policy of "single hazardous" insurance. They replied in the negative, and on a second application refused to allow me to keep even so small a quantity as one dozen two-ounce bottles. So that it appears, wishing to keep Benzine, I must either pay more insurance or render my policy void by violating its conditions; the quantity of Benzine I sell being very small.

Under the above circumstances, I have decided to give up the sale of Benzine and at present sell another article. What have my brother druggists to say on this subject?

CHEMICUS.

[**** In order to avoid the risk of vitiating his policy, we think it would be advisable for "*Chemicus*" to ascertain whether the objections of the Insurance Company to Benzine extend also to the other article,—which is probably a preparation consisting mainly of the light spirit of petroleum.—ED. PH. J.]

"LEGS" *versus* "EXAMINATIONS."

Sir,—I was very glad to see a letter from "Zaccheus" on the above subject, as I have reason to believe there are many pharmacists who would do well to show greater partiality for examined men than for six-footers.

The latter class of gentlemen, knowing that they can always obtain a good situation, with salary to match, are sometimes, and I think very frequently, tempted to defer going through the examinations, until, perhaps, they are little inclined for study; so *they* are not much benefited by this favouritism on the part of men in business.

Talking to an assistant (age about 25) whose chief qualification lay in his having attained the height of 5 feet 11 inches, I presumed to look up and ask him when he intended to get through the "Preliminary, etc." "Oh," he replied, "I shall do all three at once when I want to go into business," giving me at the same time the names of some of the leading London chemists, who, he said, would just as soon engage an unexamined man as an examined one. However, I have not seen his name in the Journal since I spoke to him, and that is two or three years since.

Why is it, too, that chemists having branch businesses will sometimes place in them unqualified gentlemen to take charge of them? Is the only answer to be "legs?"

Perhaps some of our enlightened chemists would take advice from a little fellow, and think on these things.

EXCELSIOR.

X. Y. Z.—(1) Composition and parsing. (2) We do not know. (3) The examination begins and ends on the same day. (4) *Chrysosplenium oppositifolium.*

"*Excelsior.*"—There is no limitation of age until the 31st December, 1874, but after that date no person is to be "admitted to the Major or the Minor Examination who shall not have attained the full age of twenty-one years."

A. B. C.—It may be ordered through most stationers or booksellers.

W. T. Green.—15 to 20 per cent.

"*Inquirer.*"—Benzol is used for this purpose; and the light oil of petroleum, or coal oil, would probably be equally serviceable.

"*Asbestos.*"—No.

J. B.—According to the Calendar, rather more than three hundred.

X.—(1) See the answer to "*Excelsior.*" (2) There is no law at present to prevent him doing so.

A. P. S.—We understand the meaning of the statement is as you suppose.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Wellborn, Mr. J. A. Cope, Mr. A. Wilson, Dr. Macadam, Mr. F. Dicks, "Erin."

THE ANNUAL DINNER.

The Third Annual Dinner of the Members and Friends of the Pharmaceutical Society took place on Tuesday, the 19th, and was in every respect equally successful with its predecessors. The scene of the festivities was, as heretofore, the saloon at the Crystal Palace; and it would indeed be difficult to find a more eligible spot for this annual reunion than the spacious and elegant room at the south end of the Palace at Sydenham. The chair was occupied by Mr. T. HYDE HILLS, President, who was supported on the right and left by Dr. Greenhow and Victor De Meric, Esq., President of the Medical Society, and there were also present Dr. Langdon Down, Professor Redwood, Professor Bentley, Dr. Richardson, Mr. Henry Watts, etc., etc. The number of gentlemen present was 237.

Grace having been said by the Rev. J. Nicholson,

The PRESIDENT then said: As this meeting is for social intercourse and enjoyment, it is not my intention to give many toasts, or to bore you with long speeches. But there are certain toasts which we as Englishmen and Pharmacists feel it our duty, as well as our pleasure, to observe, the first of which is—"The health of Her Majesty our Queen." Her Majesty takes so much interest in everything that elevates and improves the condition and adds to the prosperity of the people, and has so much consideration for the welfare of her subjects, that I feel sure the toast will be received most heartily. Before giving it, I will venture to allude to the marriage of the Queen's second son, His Royal Highness the Duke of Edinburgh, with the only daughter of our Imperial guest, the Emperor of all the Russias, an alliance which I hope will not only be for Her Majesty's comfort and happiness, but also one to promote the advantage and mutual good understanding between the two countries, as well as that of the whole world. The toast is—"Her Majesty our Queen," with three times three.

The toast having been drunk with enthusiasm, the President said the next toast I have the honour to propose is that of "Their Royal Highnesses the Prince and Princess of Wales, their Royal Highnesses the Duke and Duchess of Edinburgh, and the other members of the Royal Family." The Royal Family are much amongst us, doing all they can, and interesting themselves on all occasions for the advancement of science and art, and the education of the people; besides this, they exert themselves in trying to improve the condition of the necessitous and unfortunate, and I am sure you will agree with me that they all fill their respective positions with much credit to themselves and great advantage to the community. I therefore give you the toast—"Their Royal Highnesses the Prince and Princess of Wales, their Royal Highnesses the Duke and Duchess of Edinburgh, and the other members of the Royal Family, wishing them all health, happiness, and prosperity," with three times three.

The Vice-President, Mr. ALEXANDER BOTTLE, proposed the next toast "The Medical Profession." He said no one in the room could hold in higher honour than he did the profession to which they all owed so much; a profession whose members were always with them in time of sickness, and even at the closing scene of all, and whose duties were in his view second in importance to none. Without saying one word in disparagement of the army or the navy, he would claim for the medical profession that its duties were equally onerous and equally well performed. During the last few months they had heard a great deal of the gallant army which had done so much at Coomassie: but did not the medical staff attached to that expedition do as much as either the army or navy? Did not they face yellow fever, and death in all its forms, equally with any other branch of the service? In the House of Peers the Church, the Army, the Navy, and the Law were represented, but where was the Medical profession? Was not that profession equally entitled to be represented in such an assembly? He hoped the day was not far distant, therefore, when members of the medical profession would hold life peerages, at any rate, and take their places side by side with the others he had mentioned.

Mr. VICTOR DE MERIC, in responding, said he could only do so, in the presence of so many other members of the profession, as the representative of one of the oldest medical societies in the metropolis. The speech of Mr. Bottle had aroused a new ambition in his breast, and if the prospect of a peerage was as yet not very near, he could not but feel flattered at the way in which the toast had been proposed and received. It showed the goodwill existing between the two professions, which might indeed be said to go hand in hand, neither being able to go without the other. The medical profession had certain duties to perform, and he hoped they discharged them on the whole with credit to themselves and for the benefit of the public at large, but they would be helpless without the aid of the pharmacist. There had been times in the history of the medical profession when it had been attempted to relieve them from all necessity for seeking the aid of the pharmacist. There was a time when every disease was to be cured by cold water; and there was another time when infinitesimal doses were advocated; and what would have become of pharmacy if rational medicine had not triumphed? Fortunately good sense and reason had triumphed, and both professions still went hand in hand together. He considered it a great honour to the members of the Pharmaceutical Society that they owed their present standing and position before the world entirely to their own voluntary exertions, which could not be said of any of the medical corporations, all of which had been founded by monarchs or governments. In behalf then of his friends and himself, he begged to return his most hearty thanks for the kind manner in which the toast had been received.

Dr. GREENHOW said it was his privilege to propose the toast of the evening—"The Pharmaceutical Society of Great Britain." It was one which deserved to be well received; and, from the position he occupied in relation to it, he was able to confirm, and even to add to, what had been so well said by the preceding speaker. The Pharmaceutical Society was about entering on its thirty-third or thirty-fourth year, and had therefore attained mature age. After many years, during which the Society had endeavoured to raise the calling of the pharmaceutical chemist by means of voluntary examinations, but during which persons were allowed to exercise that calling without any qualification whatever, and the business was, in fact, in many country towns monopolized by grocers, the Government saw fit to entrust to the Society the duty of examining all who should in future commence business as chemists and druggists; and, in order to provide an additional guarantee that this duty should be properly performed, had further seen fit to appoint a Visitor of these examinations, and the choice of the Privy Council had fallen upon himself. He had accepted the appointment with some little hesitation, feeling the position to be a somewhat invidious one, but his experience of the last five years had shown him that his fears were groundless. Not once had he had occasion to express disapproval of any proceedings on the part of the Board of Examiners; on the contrary, they had conducted the examinations in the most admirable manner, not beginning too stringently, but gradually, year by year, improving the examinations, until very shortly they would be everything which could be desired. He had found also that, so far from being looked upon as a spy or an intruder, his visits had been welcomed, his suggestions had been cordially received, and his position had enabled him to form many valuable friendships which he hoped to retain even after his official connection with the Society had ceased. He had often had occasion to remark and admire the wonderful patience and good feeling with which the examiners went on examining men whom they knew would be infallibly plucked. He had for his own part always endeavoured to co-operate with the Society in carrying out the true intent and meaning of the examinations, viz., that every man who undertook these duties, so important to the public and the medical profession, should be properly qualified; and, these duties being practical, he

was glad to see that the examinations also had become more practical. They wanted gentlemen who were perfectly masters of the British Pharmacopœia, conversant with drugs, able to distinguish the genuine from the spurious and the pure from the adulterated; and also able to ascertain, by testing, the nature of chemical substances, and to determine by volumetric analysis the strength of certain solutions which were liable to variation. All these were points which the examiners had borne in mind; and, seeing how well they had begun, he might venture to predict that they would go on well, that there was a great future before the Society, and that the calling would ultimately be raised to a position it had never held before, except in the case of a few princely houses in the metropolis. There always had been men of science, and of eminence, in the pharmaceutical body, men who had taken their place side by side with the first men of science of the day; and he doubted not that this which had hitherto been the exception would hereafter become more frequent. He was heartily glad to see that two gentlemen out of the fifteen selected by the Royal Society for the honour of a fellowship this year were pharmaceutical chemists, a matter of which the whole Pharmaceutical Society might well be proud. In conclusion he begged to couple with the toast the name of the President, Mr. Hills, whose genial and sterling qualities were known to all.

The toast having been drunk with great enthusiasm,

Mr. Thomas Hyde Hills said: On behalf of the Pharmaceutical Society and myself, I beg to thank Dr. Greenhow for the kind manner in which he has proposed the toast, and the hearty way in which it has been received. Having commenced the evening by telling you that I did not intend to bore you with long speeches, I shall adhere to what I said, the more so as most of the gentlemen here are members or associates of the Society, and consequently must know the position and working of the Society as well as I do. At the same time I will remind the company that, although much has been accomplished, much remains to be done; and we must not relax our efforts to carry out the original design of the founders, of having every dispenser of medicine an examined man. I therefore call upon you to support the executive of the Society in carrying out the work so ably commenced by the founders, many of whom, I am sorry to say, have been taken from among us since our last anniversary.

Dr. Richardson, F.R.S., in proposing the last toast, said: If "to do good by stealth and blush to find it fame" were a worthy ambition, it certainly had been fulfilled by the body whose welfare he had to propose, "The British Pharmaceutical Conference." He well recollected the birth of the Conference at Newcastle, having just then been emancipated from the throes of a long research into the physiological action of a very important chemical body—nitrite of amyl. As he was leaving the lecture room, he heard for the first time that a section of the Pharmaceutical Society was about to devote itself to the study of scientific pharmacy by means of a yearly meeting. He little thought at that time, and he believed few of his own profession thought even now, of the wonderful labours which had since been performed by that Conference. But those who had watched the change in pharmaceutical matters during the last twenty or thirty years had seen something really startling. The alligator stuffed was gone, Friar Lawrence's basket was forgotten, and the old gentleman who mixed snuff with his liquorice powder was heard of no more. On entering a pharmaceutical establishment now you found everything well ordered, the chemicals well arranged, and a dispatch before unknown. On talking to the dispenser, you found him, as a rule, equal in his own way to other men of science—a man who could speak on chemistry on equal terms, and sometimes even better than the physicians themselves, who could define drugs by their chemical formulæ, who could give you information with regard to botanical history, and who might perchance touch on the physiological ground, and point out with acumen not only who were the men who were advancing medicine by a study of therapeutics, but also the experiments by which these sciences were advanced. What was the cause of this remarkable advance throughout all parts of England? It needed only a glance at the transactions of the Pharmaceutical Conference, and the whole thing was plain. After looking over the series of questions proposed for investigation, he could say that no Society, not excluding the Royal Society itself, was showing in a more simple, manly, or business-like way the progress of science than the Pharmaceutical Conference. Many men of science were not sufficiently men of business, and in their scientific pursuits failed to keep a faithful and accurate record of their work; but this business element, which pharmacists could not escape from, seemed to him to enter so forcibly into their scientific work, that it would by-and-by make their investigations of greatest importance in all matters relating to therapeutical medicine. In wishing success to the Conference, therefore, he was only wishing success to his own profession, and he must repeat Dr. Greenhow's congratulation at the election this year of two members as Fellows of the Royal Society. A former President of the Conference, Mr. Daniel Hanbury, was a distinguished Fellow of the Royal Society; and he well recollected that gentleman putting into his hands, at the meeting of the British Association at Exeter, the first specimen of chloral which reached this country. On the success of pharmacists depended largely the success of the physician. Those who were experimenting in medicine felt day by day, and hour by hour, that without the aid of the pharmacist, to produce for the world the weapons which they (the experimentalists) forged, they never could be practically successful. He was sure that if the whole profession of medicine were present, they would join with him in wishing "Success to the Pharmaceutical Conference." He begged to couple with the toast the name of the Treasurer, Mr. Schacht.

Mr. Schacht, in responding, said he much regretted the absence of the President, Mr. Groves, not only because he was one of the brightest ornaments to pharmacy, but because if he had been present it would have fallen to his lot to have responded to this toast, which had been so flatteringly proposed by Dr. Richardson. He (Mr. Schacht) did not quite understand why, as Treasurer, he should be called upon, unless it was considered that, having so little to do he must have something to say. However, he highly appreciated the honour of being allowed, even for a few minutes, to represent that which he considered to be a most important section of the pharmaceutical body; though he could not help feeling during Dr. Richardson's speech something like a twinge of conscience. He had been more than once credited with being the parent of this Conference, and with so fair an offspring it was only natural that he should cling somewhat tenaciously to every title which he might possess to such a distinction. At the same time, his original idea was not precisely that which subsequently obtained; it having been rather that the Pharmaceutical Society itself should peregrinate, and that as it visited the various great centres of pharmacy throughout the country it should put forward for discussion all subjects in the least degree interesting to pharmacists. Other men, however, took up the subject, such men as Brady, Reynolds, and Attfield, all of whom, he was sorry to say, were absent on that occasion, and they saw a possible way of escaping from the elements of difficulty, if not of danger, which appeared to attach to his original proposition, by separating the subjects which might have involved difficulties from those which were free, and they had more or less carried out their object. He, however, true to his old instinct, had been, he feared, somewhat guilty of marring their intended efforts in that direction, having been as great a sinner as any in introducing discussions on subjects which were not simply scientific; still, he hoped no great mischief had been done up to the present time, and he was anxious now to make somewhat of a recantation of his old doctrine—having come gradually to the con-

clusion that it would be very much better for the interest of pharmacy if the operations of the Conference were more limited to subjects of a purely scientific and practical value, avoiding any discussion of those allied subjects which, for distinction, might be called pharmaceutical politics or ethics. He was all the more inclined to say this after what they had just heard, which was extremely gratifying, that their labours in a pure scientific direction had been recognized outside of their own body, at the hands of the medical profession, and more eespcially by that section of it which was itself distinguished for its scientific reputation. He could not help thinking that there was a great and high future for the Pharmaceutical Conference, and that that high altitude would be obtained by their devoting all their energies to the pursuit of pure scientific pharmacy.

During the evening the band of the Royal Horse Guards, under the direction of Mr. Charles Godfrey, played a choice selection of music.

THE COMMITTEE ON THE ADULTERATION ACT.—EVIDENCE RESPECTING THB SALE OF DRUGS, ETC.

Some important evidence was given on Thursday last before the Select Committee of the House of Commons, appointed to inquire into the Adulteration Act, as to the adulteration of drugs, and as to the manner in which chemists and druggists have been, and are likely to be, affected by the operation of the Adulteration Act. Mr. CLARE READ presided.

The first witness examined was Mr. HORNER, who, in reply to the Chairman, said: I am a wholesale druggist, more especially connected with imported goods than manufactured articles. It appears that under the Act it is not necessary that a guilty knowledge should be proved to constitute the offence. Many drugs are imported into this country in an impure condition; few, indeed, as imported, would be absolutely pure. For instance, take such an article as scammony; 80 per cent. of resin in it would be considered very good. This article is used principally as a purgative in combination with other things. Considering the countries where these drugs are prepared, you can scarcely expect the natives to take such care in the collection of the article as would prevent any extraneous mixture getting in. Absolute purity is almost an impossibility. It would be incorrect to say that the bulk of the articles are intentionally adulterated, because in many cases the adulteration creeps in during collection, while many articles are adulterated in other ways. Opium is adulterated. There is a sale of opium in the City to-day, which is adulterated; if pure, the article would be worth 32*s.* per pound, but, as it is not pure, it will sell for about 7*s.* 6*d.* per pound. It will be bought by morphia makers, who will make as good a commercial article out of it as though they paid a higher price. Musk is imported much adulterated. As to resins and gums, it is also a fact that they come into this country much mixed with other ingredients—others kinds of gums. Gum arabic I may instance. I think a most important article to be taken is sulphate of quinine, because it is so largely used. It was formerly made from one description of bark—calisaya. Now a great number of other kinds of bark are brought to this market, containing a very much smaller amount of quinine, but they are sold for their value, and the quinine is extracted from them. If you were to prohibit the use of such bark, the country would go without quinine, because the bark from which it is supposed to be got does not exist in sufficient quantity. There are some drugs imported into this country which are certainly impure—some by accident, some by the process of manufacture, and some by the fraud of the original collectors. I think that the articles most adulterated are liquids—essential oils. They are more easily adulterated, and have been especially so since there have been no duties. When there were duties upon these articles, the merchant who imported them did not care to pay the duty upon a low quality of article. There is no doubt those duties were a great protection at that time. Still, we should not like to go back to them. In my opinion, the Adulteration Act presses harshly upon the vendors of goods, though, as far as the wholesale houses are concerned, the operation of the Act has not been felt by them; but we have seen cases where it has pressed hardly upon those who dispensed medicines. Some chemicals are liable to rapid decomposition. The retailer has been the person who has been injuriously affected by the Act. In regard to protecting him from selling an article which has been adulterated abroad, I think the retailer seldom gets an article in that state, as the wholesale houses take care to supply him with an article of good quality by assorting these goods for him. For instance, myrrh, brought here in its original state, will be mixed with several kinds of gums; but the retailer does not get these, as the gums are eliminated. Without the intervention of the wholesale houses, I do not suppose the retailer would ever be able to get a really good article. The wholesale dealer acts as a protection to the retailer, to a great extent, against adulteration. I think it should be necessary in these cases to prove a guilty knowledge on the part of the seller. I don't think there should be any prohibition of these adulterated drugs coming to this country. London being the great drug-market of the world, to do that would probably put difficulties in the way of business and would greatly interfere with trade. The greater portion of these drugs are re-exported, not taken for home consumption. The United States consume drugs largely, and get them from this country. I am not sufficiently cognisant of the matter to be able to suggest any alterations in the Act. I think there should be somebody or other to whom the discrepancies of analysts should be referred. The analysts are very uncertain in their operations. I think referees should be appointed, who ought to be consulted and give advice before prosecution. As to the sort of referees, if there were three or four competent persons appointed, one by Government, I think it would be a good thing, and they should all be chemists.

Examined by Mr. WELBY:—As to the methods of collecting these articles, a great many of them are brought from very out-of-the-way places, India or Arabia, and probably there are various trees producing gums in the same place, and the drugs are collected in a very careless manner. With regard to the barks from which quinine is extracted, they are not sold as quinine. The quinine is extracted from them. I do not think there is any adulteration after the goods leave the importer.

Examined by Sir H. PEEK: I am not aware that there is a laboratory at Somerset House. The oil from sweet and bitter almonds is very different. When the sweet almonds are the dearer, bitters are mixed in, and *vice versâ*, and it is perfectly impossible by the eye to distinguish the sweet from bitter almonds. There is a large consumption of opium in this country, but not in proportion to the population. The consumption of opium is nothing like so large here as it is in the United States. Of course the principle of opium is morphia. That is nearly all made in this country. I cannot say anything as to whether a person taking a dose of London-prepared opium and a dose of Scotch opium would get twice the strength in the former case.

Examined by Mr. GARNIER: Scammony is a great deal adulterated before it comes to England. I don't think it is adulterated here. There have been some prosecutions at Glasgow, and fines were, I believe, imposed. It came out there that out of seventeen samples of scammony none were pure. The commoner kinds, called skillet, contain 60 or 70 per cent. of flour.

Examined by Mr. MUNTZ: I certainly think it is desirable that a prescription made up in one part of the country should have the same effect as that made up in another part. I believe it is a common case not to find it so. There are large manufacturers of medicines from

drugs in this country. These medicines are made for London, for the provinces, and for exportation. I do not know the relations of purity in the goods made for London, the provinces, or for exportation.

Re-examined by Sir H. PEEK: The object of the manufacturers in using goods of low quality is to produce an article at a low price. The Government use, for postage-stamps, etc., the cheapest kind of gum—dextrine—but I cannot say that some of the gum is so bad that people have got disease of the mouth through wetting the stamps with their tongue.

Mr. HODGKINSON (Aldersgate Street), examined by the Chairman, gave the following evidence: I have heard the evidence of the last witness as to adulteration, though I should not call it adulteration. It is more of a mixture—mixed accidentally. There is a certain amount of mixture in scammony which is not adulteration. As far as we are concerned, the Act does not touch us at all. Generally speaking, with regard to the adulteration of drugs, it is done abroad; though, of course, there are people who are mean enough to adulterate their things here. Opium is very largely adulterated abroad. As mentioned by the last witness, there is a sale in the City to-day of opium which will not fetch more than one-fourth of the value of good opium. I would not prohibit the importation of these impure drugs, because that would drive them away from this market to some foreign market—Hamburgh, perhaps—and the drugs of this country would be in a worse position, because the very best as well as the worst sorts come here; but in that case we should have to depend upon the Continent, and we should not be able to choose the best sorts, which are now usually retained by the merchants in this country. The most impure qualities are purchased for abroad by foreign buyers. The foreign buyers are more numerous than the English buyers. I agree with Mr. Horner that the wholesale dealers are the means of procuring for the retailer better goods. The great number require assorting before they are of any use. Myrrh, for instance, consists of all sorts of gums. These are all cast out, and the retailer only gets myrrh. The same remark applies to several other things. I have no fault whatever to find with the Act, and, so far as we are concerned, its operation has not been in any way injurious.

Examined by Mr. MUNTZ: Since the duties have been taken off, London is the great drug-market for the world. I do not think it is at all desirable to have any inspection or interference with the trade at all. At the same time I agree that the prescriptions made up in one part of the country should have the same effect as in another. There is much more equality than there was formerly—say ten years ago. As a rule you will find that prescriptions are much the same in one place as another. In this respect there has been a great improvement of late years. I assume adulteration as being quite a distinct matter from accidental mixture. We get drugs from abroad in both these conditions,—drugs accidentally mixed, not pure, but still a fair standard of quality. On the other hand, we get them notoriously adulterated.

Examined by Mr. COLMAN: The Act does not touch our trade at all. It touches the retailer, not the wholesale dealer. The Act practically passes over the wholesale man, and seizes upon the retailer.

Examined by Viscount BARRINGTON: My view of adulteration is that it is a thing purposely done for the sake of increasing profits. An article may not be pure, and still not be adulterated, because the mixture may be accidental, and not to any great extent. If we received these drugs impure, we should try that they did not get to the retailer in that way. Chloroform, I should say, is not adulterated. I never heard of chloroform being sold which contained little or no chloroform, and if there had been such a thing, probably I should have heard of it.

By Dr. BRADY: There is a good deal of opium consumed in our fen counties, but not so much as formerly, the sanitary state of the country having been improved. The class of opium consumed there is fully up to the ordinary standard. The retail druggists do not adulterate their goods. I should say that druggists, as a body, are much too respectable for anything of the kind. The fact of prescriptions differing to some extent, may be accounted for by the drugs becoming stale.

By Mr. BACKHOUSE: I do not believe there is any extensive system of adulteration carried on in this country, either by the manufacturer or seller.

By Mr. GARNIER: Alluding to the case of scammony adulterated with flour, I do not think any respectable druggist has any business with it, unless he may have some nostrum of his own in which he may mix the article, and that is the way the cheaper kinds of scammony are got rid of. I am aware of one druggist having been fined at Glasgow for selling scammony adulterated with flour. I have not heard of any convictions in London.

By Sir H. PEEK: I should not call accidental mixture an adulteration. If scammony only contained 78 per cent. I should not call it an adulterated article, though I should say it was not up to the standard. But it would not necessarily be adulterated. It would be worth no one's while to reduce an article two per cent.

By Mr. HEYGATE: The relations of opium are uniform now, and have been since 1867. Calomel is the same thing all over the country.

By Mr. WELBY: The country chemist in a small town may not have such advantages as the London chemist, who conducts a larger business, and has a better selected stock, and his articles are fresher. Still, I think there is very little difference between them. A good country druggist would supply you with drugs of equally good quality as those you would get in London. He certainly might easily do so if he chose to take the trouble.

By Sir H. PEEK: Expensive drugs do not deteriorate so much. Opium would be opium years afterwards, though it might get drier. Castor oil is frequently placed by chemists so that the rays of the sun may draw the colour out, but, supposing the bottles were to stand there for a couple of months, it would not alter the medicinal properties of the article.

By Mr. MUNTZ: Ipecacuanha, properly kept, would keep a long time, though if not thoroughly dried it would become mouldy. James's powder, such as used in the navy, would not be adulterated. A country chemist, if he were a respectable man, would not sell another article for this.

Re-examined by Mr. WELBY: I do not think country druggists are considered so much inferior to those of London. The country druggist can get the best article if he is disposed to pay the price. It depends entirely upon the man himself. If he is a good druggist he will give you quite as good an article as you will get in London. In London, you are quite as liable to get the very worst article as you are in the country. Less drugs are now purchased from the grocers in the country, because the grocers have no right to sell drugs, and I think the sale of drugs has been taken out of their hands almost entirely since the Pharmaceutical Society obtained its charter. The grocers' drugs were very inferior to the druggists', as they kept them so long that they spoiled.

By Dr. BRADY: We send a great deal of drugs to Ireland. In Ireland there are the apothecaries, who are allowed to dispense prescriptions, and the chemists, who are not allowed to dispense. From the apothecaries you can get very good drugs. The chemists there buy cheaper things to sell to the poor.

Sir H. PEEK: If I understand this gentleman right, an article which the druggist may lay in perfectly pure, for want of sale, twelve months hence may render him liable to prosecution.

Witness: I do not go so far as that. That is an extreme case. He may keep an article long enough to deteriorate. He would be punished then, I suppose, not for the badness

of the article, but for his want of judgment in not throwing it away.

Mr. CARTEIGHE (Dinneford and Co., Bond Street) was next examined by the Chairman. He said: I am a pharmaceutical chemist. With regard to the deterioration of chemicals and pharmaceutical preparations, there are a certain number of very important articles which do materially deteriorate without becoming absolutely bad, from wanting in a certain strength, that strength being one of the properties for which the original substance was used or prescribed. That arises in the nature of things. A formidable article to mention is prussic acid. It is ordered that a weak solution of that article shall be sold of a certain strength—2 per cent. of hydrocyanic acid and 98 per cent. of water. Inasmuch as this acid is extremely volatile, it follows that such a preparation, unless it were kept in a sealed tube, would lose a portion of its volatile contents; and a medicinal preparation of prussic acid actually having been dispensed this morning might to-morrow morning be deficient in strength. Ultimately it may go on until there is none of the original acid in it. Chlorinated lime is also largely sold by druggists for disinfecting purposes. Its value depends upon the volatile constituent, chlorine, and this volatile substance disappears, day by day, as the jar is opened in the ordinary course of sale. Under the Act as it at present stands, it could be held that a druggist is liable for selling chlorinated lime which did not contain the standard amount of volatile chlorine. In other words, a *bonâ fide* seller might to-day sell this article which is fresh brought in from the manufactory perfectly good, and in a few days it would be a little less good, though not bad, and ultimately it would lose the whole of its volatile properties, if it had not been properly protected. There is a preparation of soda—chlorinated soda—which is used in medicine, and sold also for disinfecting purposes. It seems difficult and very hard, to insist that a druggist should be held responsible for the strength and so-called purity of an article so liable to change. Then there are a number of essential oils—essence of lemon is a case in point. It is a substance used in confectionery and in domestic cookery very largely, and it has the habit, if I may so express it, of changing into a substance closely allied to it chemically, but practically very different in itself. Under certain circumstances, it may change into or become contaminated with turpentine, and this change may take place within a comparatively short period, and may not come to the knowledge of the seller. Various essential oils used for flavouring are what we call oxidized, slowly burnt up. In short there are in the druggist's shop a certain number of articles which cannot, and, in my judgment, should not be liable to a hard and fast law. They can be only dealt with by the intelligence of the person who sells them; and there must be a certain margin of purity or impurity allowed, or a certain discretionary power invested in those who have to prosecute under these circumstances. Purity is quite a comparative term. As druggists, we have to do very rarely with purity. The Act assumes that there is such a thing as purity, but I submit that there is no such thing. Thus, as to pure water, it is very difficult to obtain it and retain it pure for any length of time. Therefore, I hold that purity is a comparative term as applied to water, and in a large measure to many of the preparations sold by druggists. In such a case as effervescent citrate of magnesia, there is a different signification attached to it by the public than in the chemical terms. Those names have got into use, and the public ask for the articles by the name which they have been accustomed to; and notably, as regards citrate of magnesia, a druggist was fined for selling an article which he presumed was the article required. In fact, druggists are, to some extent, the interpreters of the language of the public as between themselves and medical men, who use special technical names. Take the case of quinine. If a person came into the establishment with which I am connected, and asked for an ounce of quinine, he would not get quinine. He would get sulphate of quinine, that is to say, quinine plus something else. We should assume that to be the preparation required. It has certain advantages over other preparations, and it is the article mostly required, and popularly known by the public as quinine. Under the Adulteration Act I understand a case has been brought forward where a chemist has been fined or reprimanded for selling this sulphate of quinine for pure quinine. There is no fraud in selling these articles in their ordinarily accepted names, and it is in many cases a great convenience to the public. I think it is desirable that we should have a better definition of adulteration; it is a question of degree. As chemists, we cannot deal with it under any other head. It is desirable to appoint certain skilled persons, with proper chemical knowledge, as referees. I should say, if possible, a chemist with a knowledge of pharmacy, a medical man, and with him some technical man, possibly engaged in business connected with pharmacy. The Pharmaceutical Society has, since its establishment, done all it could to discourage the adulteration of drugs. Practically, the Pharmaceutical Society, since its foundation thirty-three years ago, has been the Adulteration Act for its own class, and has materially improved the condition of chemicals and pharmaceutical preparations throughout the country. The great object has been to educate the sellers, so that they might know something of the materials in which they are in the habit of dealing. With regard to the relative strength of drugs in different parts of the country, they should certainly be the same throughout the country. Before the year 1864, there used to be three distinct Pharmacopœias. The Phamacopœia is the orthodox book by which the dispenser of medicine works. By these books some of the preparations varied in strength, but in the year named, a book called the British Pharmacopœia, in contradistinction to those of London, Edinburgh, and Dublin appeared, and by an Order in Council, this was made the recognized book throughout the United Kingdom. Since then there has been a greater uniformity of preparations. There have been cases of hardship where the retailer has been prosecuted under this Act. These have been very serious for the chemists. As members of the Pharmaceutical Society, our view is that our reputation is worth more than that of an ordinary dealer. If a chemist is charged with what the Act calls adulteration, he loses the confidence of his customers, and loses his repute, even though he shows that there was no real adulteration; but it is so difficult to explain these technical matters to the magistrates, that the case may be withdrawn, or he may be convicted; as in the case of the citrate of magnesia, the seller was convicted of selling an adulterated article. If a chemist is indicted for adulteration his customers would think him incompetent, and fear that he possibly might poison them by making mistakes. In fact the question comes much further home as regards our class than as regards any other class; and, as members of a Society for the prevention of adulteration, we think it is rather hard that we should be at the mercy of a hard and fast clause of the Act, as it stands. As the Society has certain powers now, one way of meeting the difficulty would be, besides having skilled assessors, to allow the Pharmaceutical Society to proceed in the matter, and fine the delinquent in the first instance, and if he were very troublesome, strike his name off the Register. It is possible that the powers of the Society might be extended in this way with advantage. It should not be incumbent upon anybody to prosecute upon the mere certificate of an analyst. Supposing an analyst found there were 79 per cent. of resin in scammony, he would be bound to certify accordingly, and a prosecution might result, whereas there should be some person competent to say that there was in this case no adulteration. There should be either certain power in the hands of the Pharmaceutical Society itself, or some assistance got from it in these cases, or there should be a Central Committee, one member of which should be a

professional chemist, one a medical man, and the third a man knowing something of pharmacy, and with a business knowledge.

Examined by Mr. WELBY: As a matter of fact, any person coming to our establishment for quinine would get sulphate of quinine. The sulphate is a more manageable salt, generally used in chemistry. It is the quinine which is always ordered by medical men: the other is seldom used. The pure article would be a great deal dearer and more troublesome to manipulate.

By Sir H. PEEK: I am aware that there is a very good laboratory at Somerset House. I dare say that it might be made, with some necessary alterations, to answer the purpose of a central authority. I think the character of a chemist in these cases more valuable than the character of a grocer; because the grocer, if convicted, can set up again under another name, but the chemist has no such facility. There is no register of grocers. Whether a person be a grocer or a chemist, the mere indictment is the real evil.

By Mr. GARNIER: The Pharmaceutical Society has not made any suggestions as to the remedy of the Act in its corporate function. That would imply that the Society was averse to it, whereas it is most desirous to encourage the sale of pure things, and it is anxious to assist the Government in this respect.

By Mr. MUNTZ: Pharmacists are now an educated class. The assistants are much better than they used to be. There have been cases of poisoning of recent years. Accidents will occur. I think it would be a good thing for assistants of dispensers to pass an examination, as on the Continent. With regard to prescriptions dispensed in town and country, my experience has shown me, of late years, that there is no difference. There are perfectly competent men throughout the country who keep perfectly good preparations. Essence of lemon left to itself will turn into turpentine.

Mr. WILLIAMS, examined by the Chairman, said: I am pharmaceutical chemist and a manufacturer of chemicals. I agree generally with the evidence of Mr. Carteighe. I may explain that the use of technical terms must be taken in a wide sense. The use of certain terms is perfectly understood by chemists, but not understood by the public, and when they use them they generally make a mistake. I think we should have a definition of adulteration, so as to exclude those quibbling prosecutions which have taken place. Some of the prosecutions have been merely upon technical points, which have nothing to do with adulteration. I see no harm in using technical terms known to the public; in fact, they are necessary, as the public will not learn the more scientific terms.

By Mr. MUNTZ: Prescriptions should be made up exactly as medical men write, and in accordance with the Pharmacopœia. The effect of the prosecution in the citrate of magnesia case was that the man had to leave his shop, and the children cried after him, "There is the man who adulterated his drugs."

By Dr. BRADY: Since the establishment of the Society, the calling or profession of the chemist has gradually improved. The drugs which are now used are more carefully prepared than they were twenty or thirty years ago.

By Sir H. PEEK: The present system of analysing will never work satisfactorily. There are too many analysts, and they are not sufficiently remunerated for the onerous duties which they perform.

Mr. SANDFORD, examined by the Chairman, said: I am a pharmaceutical chemist. I see the necessity not so much to remedy the Act as the application of it. I think it is positively necessary that there should be a guilty knowledge on the part of the seller. Certainly I do not think it is wrong to sell preparations under their conventional terms. With regard to the citrate of magnesia case, there was no fraud at all. Wilful admixture should be punished. A better definition of adulteration should be decided upon. It would be advisable to have some referees, as has been suggested.

By Mr. MUNTZ: In scammony 80 per cent. is considered a high quality. If a druggist sold scammony containing only 40 per cent. he should be punished.

Sir H. PEEK: Can you imagine the analyst stretching a point to show himself a very clever fellow?—Yes, I can imagine such a case.

By Mr. WELBY: As we are subject to such penalties under the Pharmacy Act, it is only fair that we should not be liable under the Adulteration Act.

The Committee then adjourned.

At a previous sitting, on Monday last, the Committee took evidence respecting the adulteration of tea. Two witnesses—representatives of the tea trade—gave evidence generally to the effect that green tea must not be considered to be adulterated because it is "faced," that the analysts did not possess any very profound knowledge of the article, that they had in consequence most materially differed in their certificates of analyses, and that all tea should be examined in bond, and no spurious tea be allowed to pass into consumption. It was mentioned incidentally that the retailers do not adulterate, that the adulteration is performed in China, and chiefly is to be found in the Caper tea which comes from the Canton district. Mr. Cadbury, of Birmingham, then gave evidence with regard to the manufacture of cocoa. He is an advocate for the sale of pure cocoa, unmixed with sugar and farina, and contends that the ordinary cheap soluble cocoas should be classed under the category of "choco late," and should not be allowed to be sold as cocoa at all. In his opinion the addition of starch renders cocoa heavy and indigestible, and the cocoa would be better without it. He mentioned that in France the law enacts that the percentage of starch should be stated on a label, and he recommended that the same practice should be adopted in this country. He did not think it necessary that the proportion of sugar should be stated. With regard to the ingredients in soluble cocoas, he informed the Committee that there is about fifty per cent. of cocoa, about twenty per cent. of starch, and thirty per cent. of sugar. Pure cocoa, from which the fat had been extracted, was largely sold and consumed in this country, and he thought that the demand would increase. He did not believe that any of the leading manufacturers had been guilty of adulteration. By extracting the oil of the cocoa he gave it as his opinion that the value of the article was increased as a nitrogenous food, and that it was rendered more valuable as a flesh-former.

The committee, on the conclusion of this evidence, opened up entirely new ground, by commencing to explore the mysteries of the milk trade.

Mr. Barrow, manager of the Express Country Milk Company, said that he was in favour of prohibiting the sale of skim milk. There was a great difference in the milk of different cows—that was as to the percentage of water it contained. The addition of water was very easily detected. As to making a verbal declaration at the time of sale, he did not think that would work altogether satisfactorily, as people would object to taking water away in the jug; the milkman might have a printed label outside his cans, stating whether he sold milk and water or skimmed milk, etc. As to the analysts, he complained that they did not seem to know much about milk. The milkmen were desirous of having some certain standard of purity by which they could guide themselves, but the analysts did not seem to be able to fix upon any such standard. He thought such a standard should be arrived at, if possible. He was of opinion that it would be a more equitable thing if tradesmen could get analyses made at the same price as was paid under the Act. It would be advisable to take samples of milk for analysis at the railway stations when it reached town, and he thought an inspector should be appointed for that purpose, so that the source of supply might be kept pure. The majority of analysts gave such decisions that he had not much faith in them, but there were some very clever men amongst their ranks.

The Pharmaceutical Journal.

SATURDAY, MAY 23, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ANNUAL MEETING.

THE Annual Meeting of the Society, which has taken place this week, cannot be characterized as having been other than tame if it be compared with its immediate predecessors. Fortunately, we have no longer spirited dissensions on the subject of poison regulations, nor are we agitated by those feminine distractions which occupied so much time last year. The Council Report, it is true, dealt with two subjects of great importance to the trade at large and to the Society's future—education and the management of the Benevolent Fund—but neither of these subjects roused the meeting to anything like animated discussion. Even the altered condition of the School of Pharmacy failed to elicit any remarks.

We should be loth to attribute this reticence on the part of members of the Society to mere apathy or indifference, and are more disposed to regard it as an indication of the general acknowledgment that the present is a period of transition in which it is especially suitable to work and wait—to work individually, so far as may be in one's power towards the attainment of those objects which led to the formation of the Society, and to wait collectively until prevailing conditions shall have been so modified by individual efforts for advancement as to coincide more satisfactorily with the aspirations of the Society's founders.

But, while recognizing this feeling as one which we believe to be prevalent among even the most active-minded members of the Society, we cannot refrain from expressing some regret that the proceedings of the present annual meeting have presented a somewhat stereotyped character. Mr. ATKINS, in moving the adoption of the Report, was, of course, true to the project in regard to which, we are glad to say, he has nailed his colours to the mast—viz., the enforcement of an adequate scholastic examination as an indispensable qualification for the admission of apprentices to the business of the pharmaceutist. This is a point to which we are disposed to attach especial importance, as one lying at the very outset of the path towards an elevated condition of pharmacy. No better evidence of the fact can be needed than the record of failures in the Society's Preliminary examination, and this is more especially the case when it is considered that the candidates presenting themselves for this examination are not for the most part lads seeking to ascertain and test their fitness for entering upon that course of practical training and special study which alone can render them competent to carry on the business of pharmacy with credit or profit to themselves and with due advantage to the public. Much more frequently those who come up for this examination have already spent several years in the attempt to obtain a knowledge of the business. The fact that so large a proportion of these candidates fail to satisfy the present meagre requirements of the Preliminary, is a sufficient proof that in very many instances the pharmaceutical career is entered upon without proper preparation, and without that amount of elementary education which is, as a rule, essential for success.

While agreeing thoroughly with Mr. ATKINS in the opinion that the passing of the Preliminary examination should be invariably made a condition of admissibility as an apprentice, we are equally disposed to go with him in urging that it is desirable this examination should be discontinued by the Pharmaceutical Society, as soon as circumstances will permit; inasmuch as it is in no sense technical or professional, but purely scholastic and literary. We trust that when the time comes for making a bye-law to this effect, there may be a provision that certificates of competent legally constituted bodies shall be accepted for this examination, and that the production of such certificates may be made as compulsory in regard to apprenticeship as registration under the Pharmacy Act is in regard to commencing business as a pharmacist.

In the remarks which fell from Mr. PICKERING on the subject of provincial education, we were glad to recognize indications of a more correct view of the case than we have hitherto been able to give him credit for. The next best thing to being right is to confess one's error, and it must be admitted Mr. PICKERING very gracefully acknowleged that the shortcomings in regard to provincial education were not, as he once supposed, solely attributable to the Council of the Society.

Mr. VIZER'S remarks on the administration of the Benevolent Fund were of the same tendency as those he made last year. In most other respects he agreed with the Report, and as to education he expressed his desire to see the standard raised rather than lowered.

Among the other subjects discussed, the most important were the new Scholarships proposed by Mr. SCHACHT, and the Adulteration Act in its operation on chemists and druggists, on both of which we hope to have something to say very shortly.

The question whether there should be an increase in the number of annuitants from the Benevolent Fund was also discussed again, though in a manner somewhat vague and inconclusive. This was probably due to a feeling that the decision of this question was more a matter for the Council than for the General Meeting.

THE CONVERSAZIONE.

On Wednesday evening, after the Annual Meeting of the Pharmaceutical Society, the usual Conversazione was held in the South Kensington Museum, the use of which was again kindly granted by the Lords of the Committee of Council on Education. The reception commenced at Eight o'clock, and three thousand one hundred and fifty visitors responded to the invitation of the President and Council, being a larger number than on any previous similar occasion. During the evening the band of the Royal Horse Guards performed a choice selection of music in the large court, and some glees and madrigals were beautifully sung to successive audiences in the Lecture Theatre.

THE LIVINGSTONE MEDICAL MISSION INSTITUTION.

Evangelical enterprise among the heathen has hitherto been successful in proportion to its adoption of medicine as an auxiliary. With the view of tightening the bonds between the medical and the theological functions of the missionary, an institution was founded in Edinburgh some thirty-three years ago; for eighteen of which it numbered as one of its members the late Dr. Livingstone. Its success in training the medical missionary has been such that many applicants for admission are attracted to its halls—more in fact than it can accommodate. By the death of Livingstone, an excellent opportunity presents itself of adding to its resources while suitably commemorating that distinguished man. It has been proposed to found, on the basis of the existing institution, a new and larger one to be called the "Livingstone Medico-Missionary Institution," wherein a greater number of young men can study with increased facilities. The sum of £10,000 will be required for the building. Of this, £1,000 has been already subscribed; and we hope that the remainder will come in with an alacrity worthy of the twofold object contemplated. When we consider how much science owes to the educated, particularly the medically-educated, traveller—how our knowledge of plants, drugs, and natural history in general has been extended by the missionary explorer, from the days of the Jesuit propagandists downwards—we can scarcely be wrong in anticipating that among the subscribers to the "Livingstone Medico-Missionary Memorial," not a few will be votaries of medicine in all its departments, and include the scientific pharmacist as well as the enlightened physician.

The vacancy in the Philadelphia College of Pharmacy, occasioned by the sudden death of Professor Procter, has been filled by the appointment of Mr. Joseph P. Remington as Professor of Pharmacy. Mr. Remington, whose name will be familiar to our readers as a frequent contributor to pharmaceutical literature, has had the advantage of acting for some years as lecture assistant to the late Professor Parrish and Professor Procter.

On Thursday evening the consideration of the Juries' Bill in Committee was resumed in the House of Commons. When clause 72 was reached, the Committee decided to report progress. There still remain thirty-three clauses to be considered.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

May 12th, 1874.

Present—Messrs. Buchanan, Gilmour, Kemp, Kinninmont, Tait, and Young.

Professor Maclagan was also present on behalf of the Privy Council.

MINOR EXAMINATION.

Nine candidates were examined. *Three* failed. The following *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

*Shum, Arthur George .....Edinburgh.
Jeanes, George .....Alverthorpe.
Munday, John .....Bridgnorth.
Equal. { Gordon, John .....Aberdeen.
Equal. { Drysdale, Joseph .....Edinburgh.
Guy, William Adolphus .....Kemberton.

The above names are arranged in order of merit.

MODIFIED EXAMINATION.

Four candidates were examined. *Two* failed. The following *two* passed, and were declared qualified to be registered as Chemists and Druggists:—

Harding, George ....Dartford.
Parry, William .....Liverpool.

EXAMINATIONS IN LONDON.

May, 1874.

Present on the 13th — Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Cracknell, Davenport, Gale, Hills, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

14th — Messrs. Allchin, Barnes, Benger, Bottle, Carteighe, Corder, Cracknell, Davenport, Gale, Linford, Martindale, Schweitzer, Southall, Taylor, and Umney.

15th — Messrs. Allchin, Barnes, Benger, Bottle, Carteighe, Corder, Cracknell, Davenport, Gale, Martindale, Schweitzer, Taylor, and Umney.

Dr. Greenhow was present on the 13th on behalf of the Privy Council.

MAJOR EXAMINATION.

Four candidates presented themselves. *Two* failed. The following *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Cleave, Samuel Whiteway .....Bodmin.
Hall, Edwin .....Weston-super-mare.

MINOR EXAMINATION.

Seventy-eight candidates presented themselves for examination. *Fifty-nine* failed. The following *nineteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

*Overton, John.....Bristol.
Gooding, Henry .....Woburn.
North, Josiah .....Reading.
Smith, Alfred .....Nottingham.
Starling, William Egerton .....Tunbridge Wells.
Lovegrove, George Elliott .....York.
Illsley, Thomas Brown.....Belper.
Fryer, Arthur ....Ayston.
Cassie, Ralph James Forbes Leith .....Aberdeen.
Stanley, Thomas .....Alcester.
Grove, Harry Nicholas .....Walsall.
Barton, William .....Preston.
King, George.....Surbiton.

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* Passed with Honours.

Baldwin, Arthur Henry .....Clifton.
Elliott, William Thomas .....Stowmarket.
Equal. Gardner, Edward .....Pendleton.
Equal. Good, George Arthur .....Weston-super-mare.
Equal. Holt, William .....Blackburn.
Equal. Knight, William .....Hinckley.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's Examination:—

Certificate of the College of Preceptors.

Harrison, Frederick .....Brighton.

Certificate of the University of Cambridge.

Axford, John William.....Coventry.

MEETING OF THE COUNCIL,

May 20th, 1874.

MR. T. HYDE HILLS, PRESIDENT, IN THE CHAIR.

MR. A. BOTTLE, VICE-PRESIDENT.

Present — Messrs. Atherton, Betty, Brown, Frazer, Greenish, Hampson, Mackay, Owen, Radley, Robbins, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick, and Williams.

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

Cleave, Samuel Whiteway.
Hall, Edwin.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

Hall, Edwin .....Bretforton.
Hulme, Richard Gleave .....Pau.
Kirton, Christopher Henry.....Hull.

Chemists and Druggists.

Baker, Frank.....Sandwich.
Doughton, Thomas William ...Notting Hill.
Thomas, William .....Builth Wells.

ASSOCIATES.

The following, having passed their respective examinations, and being in business on their own account, were elected "Associates in Business" of the Society.

Minor.

France, Joseph .....Rotherham.
Jeans, George .....Martock.
Ness, Thomas Henry.....Torquay.

Modified.

Halley, Alexander .....Glasgow.

The following, having passed their respective examinations, were elected "Associates" of the Society :—

Minor.

Barton, William .....Preston.
Elliott, William Thomas .....Stowmarket.
Gardner, Edward .....Pendleton.
Gooding, Henry .....Woburn.
Grove, Harry Nicholas.....Walsall.
Holdgate, Arthur .....King's Lynn.
Hoyles, George.....Lincoln.
Lovegrove, George Elliott .....York.
North, Josiah .....Reading.
Starling, William Egerton .....Tunbridge Wells.
Walmsley, Robert .....Clitheroe.
Wood, Henry T. Gibbons .....Hull.

Modified.

Parry, William .....Liverpool.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary Examination, were elected "Apprentices or Students" of the Society :—

Allatt, Arthur Edward.....Bradford.
Bartlett, Hubert .....London.
Berry, Henry Burton .....Gloucester.
Biggs, Walter Lyle .....Hampstead.
Clay, William .....Cromford.
Dewhurst, Thomas .....Preston.
Ellis, George .....Banff.
Franciosi, Eugène Auguste de...London.
Gamble, Arthur Gompertz .....Grantham.
Gibson, John Hanson .....Leeds.
Hanham, John .....Irlams o' the Height.
Hirst, Francis .....Highbury.
Jones, Jabez A. .....Birmingham.
Laslett, Thomas George ..... Hull.
Page, Joseph ....Willenhall.
Parkinson, Frederic William ...Peterborough.
Phethean, James .....Bolton.
Redford, George Alfred .....Liverpool.
Roberts, Thomas ....Margate.
Silvers, William Brighton .....Camberwell.
Stuart, Frederick .....Great Yarmouth.
Walker, William .....Aberdeen.
Weedon, Joseph .....Crawley.
West, John Lever .....Ashby-de-la-Zouch.
Westerman, Arthur .....Wakefield.

Several Members and Associates who had neglected to pay their subscriptions on or before April 30th, as specified in the bye laws, were restored to their former status, subject to the payment of the subscription for the current year and a fine of half the same amount.

An Associate of the Society before July, 1842, was restored to his former status upon payment of the current year's subscription and a fine of five guineas, and was afterwards elected to membership.

The names of Henry Wakefield, of 3, Hedgerley Park Terrace, Turnham Green, and Thomas Shields, of 78, South Street, Greenwich, were restored to the Register of Chemists and Druggists.

Mr. SAVAGE said a question had been mooted, whether it would not be desirable to call a special meeting of the new Council immediately on their election, for the purpose of choosing a President and Vice-President for the ensuing year.

Mr. WILLIAMS said these elections were so important that they should not be conducted in any informal manner.

Mr. SAVAGE said he made the suggestion in order to prevent informality, because until the meeting in June there was neither President nor Vice-President, which might be inconvenient in case it were necessary to summon either the Council or the Parliamentary Committee for any special purpose.

Mr. W. SCOTT BROWN remarked that the same question had been mooted previously, when he had expressed the opinion, to which he now adhered, that it was undesirable to have any special meeting. The delay would hardly be more than eight or nine days, and the new Council required a little time for consideration before making their selection.

After some further conversation, in the course of which the President remarked that if re-elected on the Council he would endeavour, with the aid of the Vice-President and officers, to carry on the business of the Society satisfactorily until the next meeting of the Council, it was decided to adhere to the established practice.

The Council then adjourned to the Annual Meeting.

THE THIRTY-THIRD ANNUAL GENERAL MEETING OF THE PHARMACEUTICAL SOCIETY.

Wednesday, May 20th, 1874.

MR. THOMAS HYDE HILLS, PRESIDENT, IN THE CHAIR.

The Thirty-third Annual General Meeting of the Members of the Pharmaceutical Society of Great Britain was held at 17, Bloomsbury Square, on Wednesday, May 20th, at twelve o'clock.

The SECRETARY having read the notice convening the meeting,

The PRESIDENT said that, before rendering the Annual Report of the Council, he would take advantage of his position as President to say a few words, and would commence by expressing his sincere regret—a regret which he felt confident was shared by his fellow-members of the Pharmaceutical Society, and all connected with Pharmacy—at the loss of their old friends, Thomas Newborn Robert Morson and Henry Deane. Both gentlemen had associated themselves with the Society from its commencement, and remained firmly attached to its fortunes until their deaths. Much had been written respecting these two worthy men in the PHARMACEUTICAL JOURNAL and the *Chemist and Druggist*, and he would not say more than again express his deep regret at their loss. Peace to their memory!

But since coming to the meeting he had received the following letter from Mr. Thomas Morson:—

"124, Southampton Row, May 20th.

"To the Council of the Pharmaceutical Society,—

"In accordance with a wish I have cherished in my mind ever since the death of my beloved father, I have now the pleasure of presenting his portrait to the Society. That many friends who have been associated with him in the establishment of the Society, and who still survive him, may recognize in that portrait the likeness of an old friend, and recall to their minds the remembrance of many pleasing hours, is the sincere wish of

"Yours very respectfully,

"THOMAS MORSON."

Mr. Morson was a very old friend, not only of the Society, but of himself personally, and therefore he might be pardoned a little emotion on such an occasion. He would now move that the Society accept, with grateful thanks, this tribute of friendship from the late Mr. Morson's son, which he believed might be taken as a pledge that the latter gentleman would still continue to do all he could for the advancement of the Society.

The VICE-PRESIDENT said he had much pleasure in seconding this proposition, with a view to having on the walls of the Society such a pleasing reminiscence of one who had laboured so long for the Society.

Mr. SANDFORD said, as an old member, he trusted he might be allowed to add a word or two in remembrance of his two dear friends who were gone. It needed nothing to recal Mr. Morson to their minds, or the great work he had done to advance the Society; but he looked with great pleasure on the portrait now placed before the meeting, and he thought it impossible to produce a better likeness. What he rose especially to say, was this, that this beautiful portrait had been painted from a photograph taken some years ago, when all the members of the Council were photographed by Messrs. Maull and Co., and he thought it would be a very pleasant thing if the same gentleman who had been so successful in this case were asked to paint a similiar portrait from the photograph which they possessed of Mr. Deane. Mr. Deane had been a President of the Society. He had done as much as any one to perfect the examinations, and to bring the Board of Examiners into training, and if the members could, among themselves, arrange for having such a portrait painted, he thought it would be a very suitable companion to the picture now before them.*

The motion was then put, and carried unanimously.

The PRESIDENT, continuing, said he would also mention the names of two other gentlemen who had been taken from them during the year, who had once been members of the Council, and had always taken great interest in the Society, Messrs. Lea and Meggeson. He might also say a few words on a subject alluded to in the Report, namely, early closing, which, he was glad to say, was increasing among their body. His own opinion was that they had inflicted these long and tedious hours of business upon themselves, and it would be their own fault if the evil was not rectified. He would not say that patients should not be supplied with medicine or anything else they might require, after certain hours, but he would suggest that all gentlemen should follow the example of those who advocated and practised the early closing movement. In reference to this subject he might mention that he himself, in conjunction with some of his neighbours, had tried the experiment of putting up the shutters at any earlier hour, thus giving the public an unmistakable sign that they wished to curtail as much as possible the hours of ordinary business, and he had had no reason to be dissatisfied with the result. With respect to the Adulteration Act, a select Committee of the House of Commons was at present sitting to consider it. The Council of the Pharmaceutical Society were not unmindful of the interests of the trade with respect to it, and evidence would probably be given on the following day before the Committee. The Juries Bill was also at present in Committee, and if it passed, as he hoped it would, they would be able to congratulate chemists and druggists, as well as pharmaceutical chemists, on being exempted from serving on juries.

It was agreed that the Report, copies of which had been previously printed, and circulated amongst the members, should be taken as read.

REPORT OF THE COUNCIL.

THE year of office on which your Council have now to report has been marked by some important changes, concerning which it is satisfactory to have this opportunity of conferring with the general body of the Society.

Not forgetting the fact that the Pharmaceutical Society was established "*for the purpose of advancing chemistry and pharmacy, and promoting an uniform system of education of those who should practise the same,*" your Council have, after due deliberation, so altered the course and conduct of the educational establishment committed to their care as to bring it more strictly into accord with the altered circumstances of the Society.

In 1841, and for some years after, it was absolutely necessary in promoting Pharmaceutical education, that the Pharmaceutical Society should itself provide a school, there being no systematic course of instruction then in existence whereby students could acquire that amount of professional knowledge which the founders had declared to be absolutely necessary, as well for the safety of the public as for the advancement of pharmacy. But as that advancement, promoted by the efforts of the Society, became recognized by the medical profession, and by the legislature as a natural sequence, circumstances very materially changed.

*At the close of the meeting, several gentlemen expressed a desire to carry out this proposition by a subscription limited to one guinea from each subscriber, and gave their names as a commencement. Mr. Sandford took charge of the list, and will be glad to receive communications from others who may be anxious to join in this mark of respect to Mr. Deane.

The Charter of 1843 established the Society on a permanent basis, but left it a *voluntary* institution. It gave power to the Council to fix the qualification of members, and to examine all candidates for admission, but as membership of the Society secured no privileges beyond the bounds of the body corporate, it mattered little to a chemist and druggist, so far as the right to carry on his business was concerned, whether he enrolled himself as a member or not.

The Pharmacy Act of 1852 carried matters a little further, by creating and protecting the title of Pharmaceutical Chemist—a title which became so recognized and appreciated by the public as to acquire a material value.

Although the assumption of that title was voluntary, and consequently education was voluntary also, this may be said to have been the commencement of the change in the position of the Society to which allusion has been made.

In the year 1868, an immense addition was made to the powers of the Pharmaceutical Society; so great indeed that no person could, after the Pharmacy Act of that date came into full operation, "*sell, or keep open shop for retailing, dispensing, or compounding poisons, or assume or use the title 'Chemist and Druggist,'*" unless previously examined and registered according to the provisions of that Act.

This was the crowning point in the change which had been going on from the foundation of the Society. Membership of the Society was still voluntary, but examination was compulsory, and therefore education became necessary to enable a man to commence business. In the meantime other public opportunities of studying chemistry and pharmacy had arisen, and, as attendance at a special school was not enforced by law, it became a question whether the Society should continue *commercially* interested in one from which students would pass to an Examining Board appointed by its own Council.

The further question arose whether at the present time it was desirable to continue or discontinue the practice of giving instruction to students at an unremunerative charge. Such a system in the early days of the Society was wise, politic, and even necessary; but the propriety of its continuance had become problematical.

In considering these matters, the Council decided that, although it was one of the objects of the Society *to promote Pharmaceutical education*, it was not its duty *to defray the cost of educating young men coming into the trade.*

In carrying out this decision, it was however desirable to give the fullest effect to the appliances for education existing in Bloomsbury Square, and to ensure a school at which students might have the means of obtaining the necessary instruction under the Professors who had hitherto so ably conducted the classes.

The proceedings of the Council respecting the new arrangements have been fully reported. They may be summarized by the assurance that, whilst relinquishing all contingent financial advantage, and reducing the outlay of the funds of the Society to a definite annual charge, the Council still retains its controlling authority over the system of instruction pursued in the school.

The Finance Report now before you must not be taken as a guide to calculate the future cost of the School of Pharmacy; it is the statement of the receipts and expenditure of the year 1873, and consequently embraces part of a session under the old system.

It is yet too early to judge of the results likely to arise from the recent change. The number of students attending the lectures in both classes has been below the average of former years, but in the earnestness of their endeavours to profit by the instruction given, a marked improvement has been reported. In the laboratory, Professor Attfield has had the usual average number in his class.

Your Council have observed with regret, a large number of failures among the candidates presenting themselves for examination.

Month after month the examiners have been engaged for three, four, or even six days, and though many good men passed, a very large percentage of the candidates has been rejected.

Time, it is hoped, will correct this state of things, which throws so much additional and unpleasant labour on the examiners, and is so discreditable to the candidates.

The Council would once more urge upon Masters the desirability of requiring all youths, before entering upon their apprenticeship, to pass the Preliminary Examination, or an examination by one of the recognized Boards now working in all parts of the country.

Were such a custom general, a better hope would exist that the young men introduced into pharmacy would, by their proved superior school training, be capable of pursuing their pharmaceutical studies to such good purpose as to be able to pass the Minor and the Major Examinations with credit, and that thus this somewhat unfortunate condition of things would disappear.

It is of the utmost importance in the future of the Society that the Major Examination should be passed, as from pharmaceutical chemists alone can Examiners be chosen, and, after a certain time, Members of the Council elected.

An important change has been effected in conducting the Preliminary Examinations.

Nearly five years ago, in order to save candidates the trouble and expense of a journey to London or Edinburgh, it was arranged that by means of written papers sent from the Boards of Examiners, the examination might take place, so far as the candidates were concerned, in any town in which a local secretary of the Society resided. Objections arose to this system, and after very careful consideration of the subject, and a due investigation as to the requirements of each district, certain centres have been chosen at which these examinations will in future be conducted. It was deemed right that the candidates, instead of being brought to the house of a local secretary, should assemble in some room elsewhere, convenient for the purpose, thus removing the liability of the superintendent being interrupted in his supervision by the ordinary calls of business; and that the persons superintending these examinations should be in some slight way remunerated for their trouble. This will add weight and value to the examinations without causing unreasonable trouble to the candidates.

It will be remembered that some years since the library was thrown open in the evening, but as so few readers attended, the practice was discontinued.

Recently, however, the "early closing" movement has spread among chemists, and in the hope that assistants and apprentices liberated earlier from

Dr. FINANCIAL STATEMENT, from January 1st to December 31st, 1873. Cr.

	£ s. d.	£ s. d.
Balance in Treasurer's hands, Jan. 1, 1873		836 14 3
Balance in Secretary's hands, Jan. 1, 1873		29 14 8
Life Members' Fund:—		
Fees	5 5 0	
Interest	88 13 9	
		93 18 9
Government Securities:—		
Interest	427 5 2	
Sale of £700 New 3 per Cents	639 13 6	
		1066 18 8
Subscriptions:—		
1848 Members, Pharmaceutical Chemists	1940 8 0	
778 ,, Chemists and Druggists	816 18 0	
54 Entrance Fees	113 8 0	
371 Associates in Business	389 11 0	
681 Associates not in Business	357 10 6	
727 Apprentices	381 13 6	
		3999 9 0
Arrears		56 14 0
Fines on Arrears		7 17 0
Registration Fees:—		
54 Pharmaceutical Chemists, Major Examination	283 10 0	
456 Chemists and Druggists, Minor Examination	1436 8 0	
75 Chemists and Druggists, Modified Examination	78 15 0	
821 Apprentices, Preliminary Examination	1724 2 0	
1123 Examination Fees	1179 3 0	
27 Registration Fees as Chemists and Druggists	141 15 0	
3 Restoration Fees	3 3 0	
10 Jury Certificates	0 10 0	
		4847 6 0
Laboratory:—		
Fees	412 5 0	
Breakages	5 19 7	
		418 4 7
Lecture Fees		49 7 0
Stationery—Sale of printed matter		29 18 10
Register—Sales		158 10 0
		£11,594 12 9

	£ s. d.	£ s. d.
Advertisements		1 8 6
Annuity—Dr. Redwood		100 0 0
Carriage		3 7 9
Certificates of Death		11 4 3
Commission—Collecting Subscriptions (London)		40 0 0
Conversazione	219 4 6	
Pharmaceutical Meetings	25 11 10	
		244 16 4
Examiners, Boards of:—		
England and Wales	1246 8 1	
Scotland	147 6 6	
	1393 11 7	
Deputation to the Board in Scotland	32 18 8	
		1426 13 3
Fixtures and Fittings		88 16 9
Furniture		30 14 2
Government Securities—Purchase of £2500 New Three per Cents.		2312 10 0
Grants to Provincial Associations		40 0 0
House Expenses		206 14 2
Journal—Balance of Account		985 17 1
Laboratory:—		
Fees received by the Society for Session 1873-74, handed to Dr Attfield	96 4 0	
Director's Salary	150 0 0	
Percentage on Fees to end of Session 1872-73	101 16 10	
Less percentage on the fees handed to Dr. Attfield	1 0	
	77 15 10	
	227 15 10	
Demonstrator's Salary—Three Quarters	90 0 0	
Assistant Demonstrator's Salary—Three Quarters	39 7 6	
Porters' Wages to end of Session 1872-73	80 13 0	
	437 16 4	
Chemicals, &c. do. do.	201 15 5	
		735 15 9
Law Costs		163 18 11
Lectures:—		
Professor of Chemistry and Pharmacy	300 0 0	
Professor of Botany and Materia Medica	300 0 0	
Subscription to Royal Botanic Gardens	21 0 0	
Prize Medals, Chemicals, Diagrams, Drawings, etc.	50 13 8	
		671 13 8
Library		54 5 4
Museum:—		
Curator's Salary	150 0 0	
Specimens and Sundries	52 18 7	
		202 18 7
Expense of the Society in Scotland—Grants for current expenses made during 1873		142 9 4
Postage		256 1 5
Repairs and Alterations		767 18 9
Rent, Rates, Taxes, and Insurance		394 9 4
Returned Subscriptions to Associates		23 15 6
Stationery, Engraving, Printing, and Office Expenses		429 2 9
Salaries:—		
Secretary and Registrar	450 0 0	
Assistant Secretary	237 10 0	
Clerks and Servants	767 17 9	
		1455 7 9
Messrs. Johnson, Cooper, and Wintle (Accountants)		15 15 0
Sundries		22 13 2
Register—Cost of Publication		195 11 6
Travelling Expenses (Country Members of Council)		331 2 6
Refreshments for Council		47 1 4
Local Secretaries' Expenses		10 4 1
Balance in Treasurer's hands (December 31, 1873)		162 2 9
Balance in Secretary's hands (December 31, 1873)		20 3 1
		£11.594 12 9

BENEVOLENT FUND, 1873.

Dr.

	£	s.	d.	£	s.	d.
Twelve Annuitants, each receiving £30	360	0	0			
One quarter's payment to Lady Day (Annuitant now deceased)	7	10	0			
Three quarters' payment to Michaelmas (Annuitant now deceased)	22	10	0			
Two months' payment to Christmas (Two annuitants elected October, 1873)	10	0	0			
				400	0	0
Proportion of rent paid on behalf of a widow of a late Chemist and Druggist				10	2	6
Widow of a Registered Chemist and Druggist, London	15	15	0			
Registered Chemist and Druggist, Kingstanley	10	0	0			
Registered Chemist and Druggist, Liverpool	10	0	0			
Widow of a late Member at Walmer	20	0	0			
Registered Chemist and Druggist at Plymouth	10	0	0			
Widow of a late Member at Old Basford	20	0	0			
Registered Chemist and Druggist at Chelsea	10	0	0			
Widow of a Registered Chemist and Druggist at Louth	10	0	0			
Registered Chemist and Druggist at Carmarthen	10	0	0			
Ditto ditto (second grant)	5	0	0			
Widow of a Registered Chemist and Druggist at Wigan	10	0	0			
Orphan Daughter of a late Member at Southampton (sixth grant)	10	0	0			
Member residing at Clapham (third grant)	10	0	0			
Registered Chemist and Druggist, Woolwich	10	0	0			
Widow of a late Annuitant, London	10	0	0			
Ditto ditto Jersey	10	0	0			
Registered Chemist and Druggist, Daventry	10	0	0			
Registered Chemist and Druggist, Hamilton (second grant)	10	0	0			
Registered Chemist and Druggist, Lower Norwood	10	0	0			
Widow of a Registered Chemist and Druggist, Stoke Ferry	10	0	0			
Registered Chemist and Druggist at Bristol	10	0	0			
Registered Chemist and Druggist at London	10	0	0			
Widow of a late Member, Ossett	10	0	0			
Widow of a late Member, Yoxall	10	0	0			
A late Member, Halifax	10	0	0			
Registered Chemist and Druggist, Leicester	10	0	0			
Registered Chemist and Druggist, Sheffield	10	0	0			
A late Member, Dublin	10	0	0			
Widow of a Registered Chemist and Druggist, London	10	0	0			
Ditto ditto ditto	10	0	0			
Widow of a late Member, London	20	0	0			
Widow of a Registered Chemist and Druggist, Nottingham	10	0	0			
				350	15	0
Postage and Telegrams	9	1	3			
Stationery and Printing	25	9	0			
				34	10	3
Purchase of £1,043 19*s.* 7*d.* Consols				965	0	0
Balance due to Secretary (January 1st, 1873)				0	10	5
Balance—Cash in Treasurer's hands, Dec. 31st, 1873				223	11	0
				£1989	9	2

Cr.

	£	s.	d.	£	s.	d.
Balance in Treasurer's hands, Jan. 1st, 1873				683	19	5
Dividends on Invested Capital				390	18	1
Donations	70	7	0			
Subscriptions	743	11	3			
				813	13	3
Legacy—Mrs. Waugh				100	0	0
Balance due to Secretary, December 31st, 1873				0	13	5
				£1989	9	2

We, the undersigned Auditors, have examined the accounts of the Pharmaceutical Society, as presented in the Financial Statement and Benevolent Fund Account, and find them correct; and that there was standing to the account of the Society, at the Bank of England, on the 31st December, 1873:—

General Fund Life Members' Fund	New 3 per Cts.	15,000	0	0		
		3,000	0	0		
					18,000	0 0
Benevolent Fund Pereira Memorial Fund	Consols	13,743	9	7		
		100	0	0		
					13,843	9 7
Secretary's Casual Relief Fund—Consols					105	0 0
Hills Prize Fund—Russian Bonds					300	0 0
Bell Memorial Fund—Consols					2,050	0 0

FREDERICK ANDREWS,
FREDERICK BARRON,
WILLIAM HODGKINSON,
EDWARD HORNER,
WILLIAM SQUIRE,
Auditors.

March 27th, 1874.

business would take advantage of the time so gained for reading and study, the Council resolved to place, not only the library, but more recently the museum also, at their disposal, from 7 to 10 o'clock, p.m.

To render the library available for the use of the Society as far as possible, the librarian has been authorized to defray the cost of carriage of books borrowed by members and associates in business residing in the country, either to them or from them, as may be most convenient; the circulation of books has thereby been increased.

A new and complete catalogue of the library has been published; one of the museum, enriched by short descriptive notes, is in course of preparation.

A proposition to found Scholarships from the funds of the Society has recently engaged the attention of the Council, such scholarships to include a complete course of instruction in the Society's School and a money grant of some definite amount towards the necessary expenses of the student during the term. It has been suggested that young men throughout the country would be stimulated by the hope of gaining at once an honourable distinction and the means of prosecuting their studies in the Laboratory at Bloomsbury Square, that education would thereby be generally advanced, and therefore that the necessary outlay would be a justifiable expenditure of the means at disposal. The question is most important, and the mention of it in this report will probably elicit an expression of opinion at the Annual Meeting which will enable your future Council to judge whether or not the measure would be sufficiently appreciated to justify its adoption.

It will be seen by the financial report that the donations and subscriptions to the Benevolent Fund in 1873 did not exceed, indeed did not quite equal, those of 1872. Your Council regret that there is not a more general support in a matter so important, not only to members of the Society but to all on the Register of Chemists and Druggists. In the correspondence which has appeared in the JOURNAL respecting this Fund, some of the writers have stated their opinion that there is no necessity to subscribe to it; others attribute to the Council a parsimonious spirit in administering relief to the necessitous. Your Council may say with confidence that no deserving case has ever been denied relief.

It must have been observed by the discussions in the Council, that some members are anxious to enlarge the number of annuitants, departing from the hitherto prevailing custom of electing no more than the interest on the invested capital will provide for, making the permanence of their annuities in fact dependent on the annual subscriptions. The decision on this point will, of course, be in the hands of the incoming Council, who will be called on next month to "*determine as to the expediency (financially) of electing pensioners in the month of October.*"

A pensioner once elected should never be allowed to doubt the permanence of the grant, and to prevent that doubt arising, if the new proposition be accepted, the subscriptions must, by sustained effort, be kept up, as the funded capital must ever remain intact. This is indeed a weighty matter for consideration.

During the past year prosecutions have taken place under the Adulteration Act, and an interpretation has been put on some of its clauses, contrary in spirit to the intention of the promoters of the Bill when before Parliament. It would be in entire opposition to the principles of the Pharmaceutical Society to connive at the sophistication of drugs, or even to encourage the use of those of an inferior quality; but it must have been observed with regret that vexatious proceedings have been instituted, in which some of the magisterial decisions, although *technically* right, have been *equitably* wrong.

There is some probability that an amendment of the Act will be made in due time, as the matter has been brought forcibly before the Government; and a Select Committee of the House of Commons has been appointed to inquire into the subject. It will be the duty of your Council to submit to that Committee a representation of those points in the Act which press unfairly on Chemists and Druggists.

The "Juries' Act Amendment Bill," brought in by the Attorney-General last session, fell through, but another has been introduced to the House of Commons which contains a clause exempting Chemists and Druggists from service on juries.

Notice has been given by Sir John Lubbock of his intention to introduce a "Shop Hours Regulation Bill." That must also be watched, to prevent the passing of any such restrictions as those he would have placed on trade in his Bill of 1873.

The obituary of the Society for the past year shows but too plainly that death has been active amongst us. In addition to the loss of an unusually large number of members, we are also deprived of the good counsels of some of our earliest friends and most able and zealous supporters—of men who assisted at the foundation, and largely contributed to the successful rearing of the superstructure of this Society. No less than four, who formerly held seats at this Council, have passed away during the year. Mr. Lea, of Worcester, who for four years was an active member; Mr. Meggeson, whose services to the Society, particularly on the Finance Committee, will be remembered, was so well known that his name must be familiar to all; Mr. Morson; and Mr. Deane.

The two last named gentlemen were so actively engaged, and so long conspicuous in the interests of pharmacy, not only as members of Council, but also as Examiners, that more than a passing allusion to them is demanded. It may be said they were both men of world-wide reputation, and all must join in lamenting the loss in them of two of the brightest ornaments that ever adorned our ranks, two in whose practice the *trade* of a chemist and druggist was indeed raised to a *profession*.

When they first became connected with the drug trade, it was overcast by the dark shade of ignorance, but theirs were not minds to rest content in that gloom, and by their inherent love of science, and wisdom in applying science to the common things of life, they were mainly instrumental in dispelling it.

Men of less generous spirit would have been content with a position rendered the more distinguished by their superiority to the generality of their fellows. Not so Mr. Morson and Mr. Deane. As soon as the opportunity offered, they, with William Allen, Jacob Bell and others, some whom we have lost, some whom we yet retain among us, worked nobly through the means of this Society to elevate all chemists and druggists to the higher level which they now occupy, and, although not for the last few years Members of Council, never ceased in their interest for the well-being of the Pharmaceutical Society, in which their names must ever be held dear, and your Council can-

not close this report without thus placing on record a tribute to their memory.

The following registers were placed before the meeting:—

Register of Members, Associates and Apprentices of the Society.
Register of Pharmaceutical Chemists.
Register of Assistants.
Register of Apprentices or Students.
Under the Pharmacy Act, 1852.
Register of Chemists and Druggists.
Under the Pharmacy Act, 1868.

Mr. S. R. Atkins (Salisbury) moved the adoption of the Report in the following words :—

"That the Report of the Council now read be received and adopted, and printed in the Society's Journal and Transactions."

He said the Report, as a whole, was pre-eminently satisfactory, though he would not say that it was not open to criticism on some points, either with regard to the elegance of its diction or subjects which might afterwards have to be debated. Still, as a terse, condensed expression and *résumé* of the position, and anticipations of the future, it commended itself to his own judgment. There was one point, however, to which he wished to call special attention, and that was the present position of the Preliminary examination. He would remind the meeting that the Preliminary examination had passed through at least two, and was about to enter upon its third aspect or quarter, and his desire was that it should as soon as possible enter upon its fourth and final one. Its history was briefly this: In the earlier days they were accustomed to send their apprentices to clergymen, ministers, schoolmasters, or graduates of the universities, who had a reputation for sound scholarship, to be examined in these matters, and although he had known a great many youths go up to be examined very few were refused; from which it appeared that either the young men of that day must have been marvellously clever, or the net of to-day must be marvellously fine in its meshes, as so many were rejected, and he was afraid the truth was but too evident. The second phase of the subject was that they were about to quit, and he believed it had worked fairly well. He hoped nothing he had said would lead to the inference, and he wished most emphatically to disclaim that in the brief paper he sent to Bradford last year he wished to convey the slightest idea that the examination had not been fairly and honestly conducted by the Local Secretaries, for he believed it had worked fairly well. But it was now about to pass into the third aspect, which was an alteration in detail from No. 2. He desired to see something different altogether with regard to the Preliminary examination. It was purely a scholastic or literary, in no sense a technical or professional one. It ought to be strictly preliminary, which unfortunately very often it was not, or at least it was preliminary only to a deal of disappointment and heartrending dissatisfaction on the part of parents, guardians, and youths, since more than 50 per cent. failed. Strictly, it should be preliminary to a chemist having anything to do with the training a young man for pharmacy. He thought the corollary attached to that proposition was that it should be conducted by bodies purely scholastic and literary. He knew the objection which had been raised to this, namely, that if there were now 50 per cent. of failures what would they be if all the candidates were obliged to be examined by the universities whose examinations were much more difficult? He was quite aware of that; but he was prepared with an answer which he hoped would disarm the objection thus naturally raised. He had recently been taking into his counsel an able schoolmaster in his own town, whose school was affiliated with the College of Preceptors, and he found there were three grades of examination connected with that body. The first grade had four special subjects, but did not include Latin. In an appendix, however, to the instructions, he found that the Pharmaceutical Society accepted a certificate in either of the three grades, if only Latin were added to it. His suggestion, therefore, was that the examinations of this body should be accepted, in place of Preliminary Examination conducted by themselves; and he should be prepared at a later opportunity to move a resolution to that effect. He might, before sitting down, be allowed to pay a passing tribute to the memory of the two great men who had passed away. Of Mr. Morson, he could not speak with anything like personal acquaintance, having only met him on one occasion in the country. But from Mr. Deane he had received a great deal of encouraging assistance; and he believed one of the last acts of his life was to write him a kind letter, in which he said: "Dear Atkins—Persevere in your view of the Preliminary Examination."

Mr. Jameson (Hastings) seconded the resolution.

Mr. A. Pickering (Hull) said that, financially, the Report was again a success, which he was very glad to see, but there were one or two matters which were to his own mind subjects of regret. Before entering upon them, however, he felt that they owed a debt of gratitude to the members of the Council, especially the London members, for the very large amount of time they had devoted to the interests of the Society. The Report itself was pregnant with many subjects of importance to the rising generation; particularly the allusion in the fourth page to the large number of failures amongst the candidates, but he thought that result was partly owing to the injudicious rules and regulations in years gone by, respecting grants made for provincial pharmaceutical education. He found, however, that these injudicious rules were now at an end, and that the Council were desirous and anxious to utilize their means as far as possible for the promotion of pharmaceutical education in the country. As he had had occasion to take the Council to task previously for their niggardliness in this respect, so he must say he now felt ashamed that so small a portion of the funds had been applied for by provincial members for the purpose of advancing the education of those committed to their care. He trusted, however, that in the next Annual Report a great improvement in that respect would be noticed. Another passage in the Report referred to the importance in the future of young men passing the Major examination, but he thought there was room for more than one view on that subject. No doubt it was a source of regret that so few, comparatively, presented themselves for the Major examination; but before censuring them they must bear in mind the position which pharmacy occupied in this country, and he would ask whether there was any legitimate prospect to a young man who qualified himself by passing the Major examination, of obtaining any sort of return for his trouble and expenditure. He looked upon pharmacy in its present position as a disgrace to the intelligence of the country, and to the Government. If a young man had passed his Major examination he had not that position given to him by the Government which he ought to occupy. He did not say this without being prepared to prove it, and there could not be a stronger proof than was seen in the appointment of public analysts. Hitherto a pharmacist had stood a very poor chance indeed of being elected to that office, and where he had been elected, ten months had elapsed before the appointment had been confirmed. His own opinion, however, was that there was no man so well qualified for such an appointment as a man who had studied in that institution and had passed his Major examination. He was persuaded that the Government never intended that persons should be appointed public analysts, whatever might be the letters which they put after their names, who avowed before a magistrate that they never knew there was any other Pharmacopœia in existence in England than the British Pharmacopœia of 1867; who had never heard of the one of 1864, and had no notion of there having been such a thing as a London Pharmacopœia. He considered such a

man utterly unfit for the appointment; but such men did hold the office, and evidence had been given in courts of justice which had been the laughing-stock of every pharmacist in the country. He alluded to the cases of sweet spirits of nitre and milk of sulphur; and when it was considered that the very lives of their fellow creatures were dependent upon the reports which these public analysts put forward, he thought it was only proper that those who appointed them should take care that they were fully qualified to discharge the duties. Pharmacy in this country was in a very different position to that which it held on the Continent, where there was a broad line of demarcation drawn between the prescriber and the dispenser. Why should they not have a College of Pharmacy as well as a College of Physicians and of Surgeons. Had they a College of Pharmacy, and did the College of Physicians place pharmacy in the care of that college, they would never have seen such an abortion, for it deserved no other name, as the British Pharmacopœia of 1864. He believed pharmacy would never occupy its true and legitimate position, until a broad line was drawn between the practice of medicine and that of pharmacy; and when that was done there would be more inducement to young men to pass the Major Examination. A proposition had been made to form scholarships from the funds of the Society, and if there were means at command he did not see that there could be any objection to it. But before that object was attempted, he thought they ought to place themselves in a different position from that in which they were at present. He trusted much more would be expended throughout the country in promoting the welfare of the junior members of the trade. Another clause of the Report referred to the Benevolent Fund, as to which he had expressed his opinion on previous occasions. He had no doubt that if the investments were varied they might with advantage increase the number of annuitants 25 per cent.; he wished the Benevolent Fund every success, but at the same time it was a source of regret to see so large an amount of money invested to produce so small a return. He was one who thought that they might, even without varying the investments, increase the number of annuitants out of the donations and subscriptions, though he did not suppose it would be desirable to absorb the whole casual income in that way. He believed there was now a Parliamentary Committee sitting to consider the Adulteration Act, and he thought it was much to be regretted that the adulteration of drugs should have been included by Parliament with food and drink in that Amended Act, because a great deal of the annoyance and injustice which members of the trade had suffered from had been caused by incorporating the Pharmacy Act of 1868 with the Adulteration of Food and Drink Act. If such public analysts were to be appointed in future as had been in the past, it was quite necessary that either some Committee or Council of the Society should be appointed to supervise the prosecution of those charged with adulterating drugs; since there were many drugs imported in an impure state, and it would be impossible for retail chemists to analyse every article they received into their shops. Many men were incapable of doing it, and if they were their whole time would not be sufficient for the purpose. He hoped, therefore that the Council would endeavour to obtain such an alteration of the law that the pharmacist, whenever he might err, should be prosecuted by his own Society, and not by a man who averred that he did not know there was any difference between the sweet spirits of nitre of the London Pharmacopœia and the spirit of nitrous ether of the British Pharmacopœia of 1867.

Mr. Vizer (London) said there was nothing in the Report but what he could fully agree with, and he was happy to see so satisfactory a one published. At the same time he desired to draw attention to one paragraph regarding the examinations, in which surprise was expressed at the number of failures. That, he thought, might be very easily explained, inasmuch as they were so close upon the time when an alteration would take place in the character of the examinations; and this induced a large number to present themselves who were really not at all competent to pass. He had always been an advocate for a very fair examination being passed, and had no idea that they should lower the standard of qualification; indeed, he would rather see it increased, believing that was the best way to obtain the esteem and respect of the public, and in the end to become more fully recognized by those in higher positions. As had been said with regard to the Pharmacopœia, no doubt it was a pity that the body of practical pharmacists had not been more thoroughly taken into council as to the preparation of a work on which so much depended. Another passage in the Report expressed a desire to elicit the opinion of the meeting on the subject of establishing scholarships, and he must confess his own opinion was against them. He did not see that at the present time there was a sufficient demand on the part of the students for such a measure, especially when he recollected that only last year it was stated that the Senior Bell Scholarship had been given up in consequence of only three having been granted since the year 1861. That of itself, he thought, showed there was not that hankering desire on the part of young men for a higher-class education which they would all delight to see. It might be, perhaps, accounted for to a large extent, by the expense necessarily involved in young men giving up so much time to the extra work, without any tangible prospect of an immediate return; because it costs a young man a great deal of money to come up to London, and spend his time in the Laboratory for several months; and he somewhat agreed with Mr. Pickering on that point, that, if there were funds to spare, he would rather see them more liberally given to provincial associations. In that way young men would be able to prosecute their studies in their immediate neighbourhoods, and would be more encouraged than by being induced to come to London. With regard to the Benevolent Fund, he could not agree with Mr. Pickering, except that no doubt the money might be better invested. He had no sympathy with the idea of electing annuitants to be paid out of the subscriptions. Without reiterating what he said last year, it was palpable and self-evident to his mind that to elect annuitants on the small precarious income from subscriptions which they now received of £743, would be a most dangerous proceeding, and he should decidedly object to it. The Report mentioned that the Council, in June, would have to decide upon the expediency of electing annuitants in October. He should like to know if that meant that there was not sufficient money funded to supply the annuities.

Mr. Sandford said there was no positive law forbidding the Council to elect annuitants on what might be called the subscriptions, but it had been the custom hitherto to elect no more annuitants than the funded property would provide for. It was for the Council every June, according to the regulations, to say whether or not annuitants should be elected in the following October.

Mr. Vizer said he should reiterate his objection to annuities being paid out of subscriptions, and he only had one word more to add, viz., to express his hearty concurrence with what had been so well said by the President and other gentlemen, with regard to the loss sustained by the Society in the death of two of its most valued members. With regard to Mr. Deane, he could fully endorse what had been said of him; he had received many a mark of kindness from him, and had always looked up to him as one of the pattern men of pharmacy. He thought, therefore, the suggestion made by Mr. Sandford was a very excellent one; and it had also occurred to him whether the pages of the Journal might not be sometimes embellished by such a likeness of deceased notabilities, accompanied by a short biography; not as a commercial transaction, but simply as a mark of respect, which the members could keep by them.

Mr. Slipper (London), referring to the question of the

Adulteration Act, and a case reported in the JOURNAL a few days ago of a prosecution in Glasgow, said it appeared to him a most monstrous case. The analyst, or someone on his behalf, sent to purchase from a retail chemist an ounce of a drug, scammony, which he should think was not required in ounce packets by one person in a million. He thought it a monstrous thing to prosecute the vendors of such a drug by way of protecting the British public from being supplied with adulterated articles, and to prosecute persons for adulteration which they had not committed, having sold the drug just as they had received it from the wholesale house. It was quite a different thing in making up a prescription. If precipitated sulphur were ordered in a prescription, of course they must use it according to the British Pharmacopœia, but if a customer asked for milk of sulphur it was a different thing. The public had been used to buy this and mix it with treacle, milk, and other things; and if they purchased the precipitated sulphur they got a thing they did not like, and which they often brought back, saying it was not the right article. About two years since he had introduced the legitimate *Sulphur præcipitatum* in his business to sell retail, but repeatedly he had it brought back again; and he was therefore obliged to sell the milk of sulphur, as a commercial article which pleased his customers. Mr. Pickering regretted that more pharmacists had not been appointed public analysts. He feared that had arisen in some measure because as yet there were not a very large number of such persons who were qualified to fill that position. He believed, however, that if young men would take more advantage of the opportunities now afforded them of increasing their scientific knowledge, they would stand a very good chance of obtaining offices of that kind; but, at present, there would be great difficulty in some districts in finding a fit person for such a position, more especially on account of such gentlemen being retail shopkeepers in the locality. Some members of the Society, however, had been appointed to this office, and, from all he had heard, had filled it with great credit to themselves. He did not think there was any feeling against pharmacists, provided they were thoroughly qualified. If, however, aspirants to such positions would not take the trouble to attain that knowledge which it was in their power to obtain when they were young: if they would not go in for the Major examination and pass it, they could not expect to fill such positions as Mr. Pickering had referred to, but the blame would be to a great extent upon themselves. Many young men of the present day seemed as if they wanted a nurse to take care of them—as if that Society was to feed them all their lives; they did not seem to have the necessary energy to make their own way as such men as Mr. Morson and Mr. Deane had done; in fact. they seemed to want to be crammed with knowledge rather than to acquire it for themselves. They had more time now for study than formerly, salaries were larger, and would be larger still, but the number of open shops, he believed, would be less; in fact, he considered the whole trade was in a state of transition, and this ought to be borne in mind, and young men ought to make use of the advantages offered to them. With regard to the Benevolent Fund, he was sorry to see that it did not increase as it ought; and it had occurred to him that the annual dinner might be made subservient to that object. He believed there were many sources from which they might get some assistance if an effort were made on the occasion of this annual dinner, and that perhaps £200 or £300 a year might be obtained in that way.

Mr. MACKAY begged to draw particular attention to the paragraph in the Annual Report with reference to the proposition to found scholarships. He was not quite certain whether the members present understood the position in which the Council stood with reference to that very important subject; but it might be gathered by reading the following passage from the Report:—"The question is most important, and the mention of it in this Report will probably elicit an expression of opinion at the Annual Meeting which will enable your future Council to judge whether or not the measure would be sufficiently appreciated to justify its adoption." He might say that the question had occupied the attention of the past Council for some considerable time, and the reason for its being brought so prominently forward in the Report was simply that the Council was a good deal divided in opinion as to the propriety of founding these scholarships. He had no hesitation in saying for himself, that, whether returned to the next Council or not, he decidedly objected to the proposal; and if time allowed, he might give very good and sufficient reasons for holding this opinion. One important reason was that, as a Society, they really had not funds. Before building a house it was necessary to see that you had a good sound foundation on which to erect the walls, but glancing at the accounts he could not see that they had money enough to found these scholarships. He said so because, on going back two or three years, it appeared that their annual income during that time had been of a very exceptional character. He would not analyse the sums, because he hoped the Annual Meeting would, before separating, give a decision upon the principle; and if it was the desire of the majority that the scholarships should be instituted, it would be for the future Council to determine as to the details. The original idea of Mr. Schacht in bringing this subject forward was that there should not be fewer than ten or twelve of these scholarships; but, looking at it as an £ *s. d.* question, it appeared that this would cost, roughly, between £600 and £700 per annum. This amount looked large, and he believed the Council pretty well decided that it was too great a sum, and therefore it had been proposed that the number should be cut down; but there were others on the contrary who desired to see the number even increased. He wished to impress on the meeting the desirability of giving a clear indication to the next Council what this meeting wished them to do; and if favourable, leave it to them to work out the details. His objection to the proposed scholarships were: first, want of funds; and next, that the money, if at command, would be spent injudiciously. He could not conceive what advantage it would be to a young man to give him the sum of £60 a year with which to come, perhaps, from some district in Wales or the farthest part of Scotland to London, there to study, pay his fees at our own school, and manage to live on the balance, equal to about £30; though he feared it would be more like starving than living. He had a notion that the money could be spent in a much better way than by founding scholarships. They all knew the old story of the waggoner who invoked the assistance of the gods to get his wheel out of a rut; he was told to put his shoulder to the wheel, and having done so he was much more successful than in his invocations. Now, he thought the funds of the Society had not been spent so well as they ought to have been, in really promoting pharmaceutical education. He would not not say whether it was the fault of the Council or of the Provincial Associations, but he regretted it exceedingly; and to come back to the story of the waggoner he thought the members might help themselves very much in the way in which many members, as well as chemists and druggists, had already done. To illustrate this, supposing a lad applied to be taken as an apprentice, he would of course enter on trial; but before he passed the threshold he might be told, If you like the business after one or two months' trial, and if the intended master is pleased with you, then before you are bound you must undergo the Preliminary Examination of the Society; and when the deed of indenture was drawn up, not only should the young man be bound to pass the Preliminary, but both the young man and the master might equally bind themselves to this extent—that if there were lectures, either in the town or within an easy distance, the young man should be bound to attend, and the master in turn should be bound to give him time and opportunity to do so. No doubt it would be said that was all very well in large towns, but what

was to be done in small towns and villages? They must follow the same principle. In such cases he considered the master was honestly and fairly bound to give a young man time to read and study, so that when he came to the close of his apprenticeship he might be able, if he liked, to migrate to some large centre, and to take advantage of such courses of lectures as might be given there. This practice had been followed for many years in Edinburgh, and with the very best results. For his own part, he thought that the Council should give assistance by money grants wherever it was asked, and as liberally as possible, provided there was evidence given that such grants would be properly used. In some arguments at the Council Board, the proceedings of the Royal Commission on scientific instruction had been several times referred to, and he thought the following extract from the Report of the Commission worth reading to the meeting. It bore the names of the Duke of Devonshire, Sir John Lubbock, Sir J. K. Shuttleworth, W. Sharpey, T. H. Huxley, G. G. Stokes, H. J. S. Smith, and B. Samuelson:—"With regard to Provincial Museums it is recommended that in connexion with the Science and Art section of the Education Department, qualified naturalists be appointed to direct the collection of specimens, in order to supply whatever deficiences exist in the more important Provincial Museums; and also in order to organize Typical Museums, to be sent by the Department of Science and Art into the provinces, to such Science Schools as may be reported to be likely to make them efficient instruments of scientific instruction. That a system of inspection of Provincial Museums be organized, with a view of reporting on their condition, and on the extent to which they are usefully employed, and whether the conditions of the loan or grant from the Department of Science and Art have been fulfilled." He thought there was something there which the future Council might operate upon with good effect. He maintained that in places throughout England, Scotland, and Wales, where there was a desire to promote the education of young pharmacists, each individual case should be judged on its own respective merits, and such assistance given as would be satisfactory. The chief requirements, perhaps, being the establishment of a fair museum of drugs and chemicals, comprehending good and bad specimens, and various other preparations likely to interest young pharmacists; and, if possible, a small well-selected library, with, above all, a free room where these young men could meet and study and do good for themselves and others. This system had now been fairly tried on a large scale in Edinburgh. Since November, 1872, the result had been that they had had between 1400 and 1500 visits from young men who had highly appreciated the use of the museum, reading room, and library. During the last year they had nearly 900, and the numbers were going on increasing. Of course, this was viewing the system he advocated under the most favourable circumstances, because Edinburgh was really a large centre, and being a recognized branch of the Society, with examining powers, many young men were induced to visit the city; but he quite thought some such arrangement as he had hinted at, differing only in degree, might be adopted with very good results in many of the smaller towns, and he really thought that would be money well spent.

Mr. Humpage (London) said the remarks of Mr. Mackay so completely commended themselves to his judgment that he was quite persuaded it was the right thing to do. With regard to the scholarships, his impression was that a great deal more had been done for the young men than they had done for themselves. When it was thoroughly understood, as it has been understood now for some time, that young men had to be examined before they were entitled to a certain position, it was not right for them to be apprenticed without being properly educated in the first place, and then to demand that that Society should give them the instruction which they ought to have had before entering upon the threshold of business. And, pained as one was to look through the Journal month after month and see the numbers rejected, he could not help feeling that this was the result of ignorance. A short time ago he had been speaking to a gentleman in a respectable position in the country, about a son, 21 years of age; and asking him a few questions, he found that he knew nothing at all of science, even as it was found in the Pharmacopœia, for the father said he should send him up to London, when he could spare him, for six weeks, in which time he would be licked into a condition to pass the examination. He did not of course assent to that view, but he was immediately told that A., B., and C. had done so. He could only say that if they had done so, having gone up with such a small amount of education as this young man had of a pharmaceutical character, they had deceived the examiners. He hoped, therefore, the Council would keep the examiners up to the mark. If the gate might be called six feet high now, he should prefer, if any alteration were made, that it should be raised to seven feet, and by persevering in that course he believed the evil would be remedied. It ought to be felt by the young men throughout the trade generally that if a youth was apprenticed he would have such an examination to pass, and that he must study—that he must, from the first week he entered upon it, be learning something. The only maxim in such cases was *nulla dies sine linea*. Let him add every day a trifle to his knowledge, and at the end of his apprenticeship he need not fear the examiners. For instance, he knew a young man who came from the provinces about a year and a-half ago, having had but a very indifferent education. But, at that time the Preliminary examination being much milder, he succeeded in passing it, and during his apprenticeship he looked well into his Pharmacopœia, and not only so but he purchased a collection of specimens which he studied as he read, and so made himself acquainted with them. When he came to London and applied for a situation, he said he must have a little time for study—that he should like to go to Bloomsbury Square one morning a week, and go through the Museum and pick up what information he could. The principal, appreciating this kind of spirit, gave him the time and at the end of nine months he actually had the assurance to present himself to the examiners, and he passed in honours without having attended one lecture. He therefore maintained that it was the young men's own fault that they so frequently failed.

Mr. Wiggin (Ipswich) said he had not intended to offer any observation, but, as one of those ogres who had been so fearfully depicted by Mr. Pickering, namely, a public analyst, he felt bound to make one observation. Having been in association from the very commencement with the Society, he ought to know what its objects were in some degree, and one of them was the improvement of the retail trade and the improvement of the quality of the drugs sold to the public. The Society had up to the present done that to a great degree, as none knew better than those who were in the retail trade thirty years ago. Now some gentlemen found fault with prosecutions for selling milk of sulphur, but it was notorious that in many instances it contained 50 per cent. of sulphate of lime. So that they were poisoning the public by selling such an article as a preparation of sulphur, when it was not. The spirit of nitre was an open question, but a great deal was to be said on the other side, and he certainly thought the Society would not be doing its duty if they did not in every way assist the Government in ensuring that the drugs sold to the public were of such a kind that they might place reliance upon them. The fault had been laid on the wholesale houses, and in that room 20 years ago the same gentlemen were considerably attacked on the same score. He thought it was not entirely their fault, but that of people who wanted 1*s.* 6*d.* for 1*s.* If the wholesale firms were paid the price of a genuine article, they could sell it as well as what they did in many

cases. He must therefore take exception to the expression in the Report that vexatious proceedings had been instituted, in which some of the magisterial decisions although technically right had been equitably wrong. He confessed he did not understand what that meant. If a thing were sold to the public as a genuine article, which is proved to be adulterated, then it was equitably wrong; but as equitable meant right he did understand the exact meaning of the phrase.

Mr. WATTS (London) suggested that there should be periodical meetings of the members of the Society held, in which these subjects might be discussed, as they affected the trade very largely, and if in order he would move a resolution to the effect later on.

Mr. STACEY (London) said there were two or three matters mentioned in the Report, all touching on the education question, which was a large one, and he thought they should all be considered together. Mr. Pickering had remarked that there was no return for those who passed the Major examination, but it struck him that the return and the benefit to such was in their own breast. They must never forget that the education given in that Society could not teach a man how to make his business successful; it could not teach him habits of business, and whatever examination he passed it did not follow that therefore he would be a better tradesman or that he would obtain a larger return. He might be more successful in his business if he combined the requisite qualifications with good scientific knowledge; but the real return was the knowledge which he acquired, together with the honour and position which it gave him. With regard to the scholarships, it appeared to him that this was only part of the large question of education which he was not prepared then to enter fully into, but it had often struck him that the Society did not take it up as a whole and as the scope of the question demanded. Mr. Pickering had thrown out the idea of a College of Pharmacy, but that would be going beyond anything they had at present, and he believed the subject of education was one which the Council would have great difficulty in dealing with piecemeal. There was the matter of the Minor and Major examinations, in which there were differences of opinion; there was the important question of the Preliminary examination, and there was this question (of still greater importance in some minds) of the scholarships. His own opinion most decidedly was that the Society was not in a position at present to found these scholarships; that it was neither ready in a pecuniary nor in an educational point of view. The Report referred pretty fully to the question of the Benevolent Fund, on which a great deal had been both said and written for some time past. It appeared to him the first requisite was to understand clearly the meaning of an annuity. He took it you could not grant an annuity from any other than invested property, and he did not imagine there was a man of business connected with the Society who would think it possible to grant an annuity without the certain means of doing so. That point, therefore, seemed to settle itself. But he would be inclined to go a little further, seeing the general feeling of the Society, and, if practicable, he would throw out a hint to the Council that there should be two columns of subscriptions—one for the annuitants' fund, to be invested, and another column for annual grants. This might possibly produce a great deal more assistance, and so carry out better the objects of the fund. When there were hundreds and thousands ready to give 10*s.* or £1 for the purpose of the annual grants, it seemed a pity that it should not be obtained and appropriated under the direction of the Benevolent Fund Committee.

Mr. GUYER (Torquay) wished to put one question with regard to the scholarships. Did the Council intend, if these scholarships were founded, to have a consolidated fund for the purpose; or was it the intention to pay them out of the revenue; and if they adopted the latter mode, was it certain that they would be able to maintain them? If not, it seemed to him a great fallacy to establish scholarships for a few years and then have to abandon them. On the other hand, if they were to have a consolidated fund, how was the money to be raised, unless some generous individuals would come forward with large endowments? With regard to education generally, he thought the examinations were not at all too low at present, and that in time they might be raised to a higher level. They would never succeed as a pharmaceutical body, until they compelled young men not merely to come up and pass their examinations, but also to go through a certain career of study at recognized schools of pharmacy. His own impression was that, instead of masters having apprentices with premiums, it would be far better for all parties if the lads were to undergo twelve months' special study before entering the business, and then be apprenticed without paying any premium. It had also been said that young men were being educated too highly, and that they did not like to go into small towns afterwards. But look at the medical profession, which set a bright example in this respect. You never heard any of them complain of having to go and do the work of charity in small hamlets and villages, even after passing the highest medical degrees. If they could do so, surely the young men who came there and passed their examination might be content to do their work for a few years in small towns.

Mr. SCHACHT desired to say a word or two on the question of the scholarships, particularly as he regretted to find that, so far, every observation made had been in opposition to it. All the written criticisms, all the suggestions, all the spoken criticism, and all the mild applause which he had heard, had indicated a feeling against the proposed scholarships. Of course, if that were the general verdict of the trade, he was the last man to say a single word more upon the subject. Indeed, supposing that day that anything like an opinion was distinctly stated that the Society had better wipe its hands of the subject of education altogether, the future Council would know a little more clearly what to do; and he, in common with Mr. Mackay, hoped the meeting would be very clear indeed in their expression of opinion on this matter. But before that was done, he wished to say one word upon the scheme as conceived in his own mind, as there seemed to be a little want of accuracy about it. It had been contended that the Society should not institute these scholarships until it had done more for the abstract question of provincial education. But the notion, as conceived by himself, was, that this was only one of the processes, and one of the most commendable, for accomplishing that object. He had already introduced one scheme, which fell to the ground, tending in that direction, but the difficulty then felt was exactly the same as was felt now. They could not teach in many centres directly, but his idea was that they might promote education in various centres indirectly. That scheme was thought to be too elaborate, and he must say he felt his ardour somewhat damped by finding that not a single individual gave him any aid in that effort. Every criticism was adverse, but no one suggested a better scheme. Another effort was now made, and he found himself, unfortunately, in the same position. He did not complain, however, and if it was understood that nothing of this sort was wanted, he should be delighted to sit still, and save himself both time and thought upon it for the future. But he should wish it to be clearly understood what the question was. They felt it was impossible to teach directly, but it was thought they might promote education indirectly in some way. This proposal was simply that of offering so many prizes, and was the same as had been universally adopted for the development and promotion of education in the whole history of civilization. If it did not commend itself to the Society, let it drop; but there was nothing exceptional in it, nor was there anything problematical about it. Certain prizes were offered, and, of course, a great many would contend for them. A great many ran in a race, although one only obtained the prize. He believed it

often happened that perhaps thirty horses ran for the Derby, though only one could be the winner; but the matter did not stop there. How many were trained? He was not much of a sportsman, but he believed that sometimes as many as 150 entries were made; and the effects were not limited to even that number, because years before that trainers had been directing their energies to the obtaining of this great prize. In the same way the prize of a scholarship, or a medal, or anything of that kind, though only obtained by one, conferred a benefit on a great number, because many actually competed, and many more probably commenced training for the competition, even if they did not continue to the end. That was the result he hoped to see from the establishment of these scholarships. Then, it was said they could not afford them; but for the last three years they had funded about £1500 a year. This appeared by the figures, and he saw no reason to doubt that the income would be maintained, and that something like £700 or £800 a year might not only be depended upon, but would be largely increased. Such a scheme would appeal to the intelligence of everyone who had hitherto been deterred by want of sympathy, and very likely the subscriptions would be largely increased, because a large amount of interest would be enlisted, and it would strengthen their hands in every direction. This difficulty about means had been pretty well ventilated in the Council; and he thought it was pretty much agreed that there was no reason to dismiss the scheme on that account.

Mr. ATKINS said he should like Mr. Schacht to explain his scheme as shortly as he could, in order that they might understand what was proposed. He hoped, also, that Mr. Schacht would not think they were unmindful of his great efforts, or that he had not the sympathy of the whole body of pharmacists with him. The very criticism, in fact, which had been bestowed upon his work was the very best compliment which could be paid to it.

Mr. SCHACHT said the suggestion first occurred to him in this form, that they should grant a number of scholarships consisting of free access to the teaching in that institution, and a certain money grant to enable the students to avail themselves of that teaching. The fees for the instruction would be about £30, and if that were supplemented by a money grant of about an equal amount, it would be a handsome prize to offer. Even if it would not pay for every expense to which the student would be put, it would largely assist him, and he did not see that it was any argument against such a scheme that they did not pay every expense. He believed if a fair number of these prizes were offered, a large number would strive to obtain them, and thus a great start would be given to the educational effort throughout the country.

Mr. STODDART remarked that in his opinion the word "Scholarship" was the great stumbling-block on this question. Mr. Schacht, with himself and others in Bristol, had been striving earnestly for some time to do what they could for the education of young men, and he thought they had been as successful as any other city in the kingdom. They found, in their experience, however, that it was difficult to get young men to come to classes merely from the love of study, and that about three-fourths wanted some further inducement. If he understood rightly, Mr. Schacht's idea was to furnish them with this inducement. He might as well mention that having for two years omitted giving prizes, they found that the young men had not shown that energy which they did when prizes were offered. In the present year, prizes were again given, and they saw that the same feeling which existed in a small degree had grown to a much stronger one, and those who came to the classes took greater interest in them and had derived much more benefit. He had seen fifteen students, each of whom had a good-sized memorandum-book filled from beginning to end with notes they had taken of the instruction given them, and he believed if the examiners could look through those books they would find they had written very full notes on all the subjects which had been taught. It was evident that this was so, because it had been the custom each week to ask questions on the subject of the previous lesson, and about 60 per cent. were found to answer very fairly. The idea was to stimulate these young men, and the details formed a secondary point. It was suggested to give £30 for the fees, and £30 for lodging and expenses, and he thought there could be no doubt that this would afford a considerable stimulus to education in the provinces. Of course in the country they could not afford to pay professors, and therefore had to do the best they could. Before sitting down, he must make one remark with reference to the Adulteration Act and the milk of sulphur question. It had been said that even fleas had smaller fleas to bite them, and it appeared that this milk of sulphur was sometimes adulterated, for he had had four samples come under his notice which would not burn at all, there being no less than ninety per cent. of impurities. He had always sold precipitated sulphur and had found no complaints. With regard to wholesale houses, he thought, if they were fair and honest to themselves and gave their orders without asking the price, no wholesale house would deceive them. But if you told a man who had three prices that you must have the lowest, you could not expect to get a good article.

Mr. ROBBINS, as one who had brought forward the question of the Benevolent Fund at the Council Board, said he should wish to make a remark or two upon it, though he had not come prepared to go into it fully, as it was not going to be decided by that meeting. He had taken considerable pains to go into the matter, though he had not the data with him. Some gentlemen had been very emphatic upon the point that it was quite absurd to grant annuities unless they had funded property to the necessary amount. Having gone into the question very narrowly, and examined what was being done by other societies, he found they departed from that rule; for when they had provided a considerable amount of funded property, they judged what number of annuitants they should put on according to the annual income they received; and they were safe in so acting, because each year, after they got a certain number on their list, they could depend on a certain number dying off. His proposition at the Council had been one of a very mild character. Finding at the first meeting that only one annuitant was proposed to be elected, although there were five applicants, he certainly thought they could do more, and suggested that two might be elected, but was then told there was not sufficient funded property for the purpose. Fortunately for the applicants, one poor widow died shortly after, and gave another chance, so that two were elected; and the same thing would occur in the present year. He had shown by figures that if two annuitants were added every year, the number would scarcely ever reach to twenty; and, having taken the statistics of other societies, he found in one case where they had put on something like 208 annuitants, they derived the greater portion of their income from annual subscriptions, and that the deaths each year amounted to about fifteen per cent. Therefore, if they elected only two annually, the number would scarcely reach twenty, and they had ample funds for that purpose. It was evident that they had not sufficient annuities for the wants of the Society, but at the same time they had a larger sum than was necessary to give casual relief, and he came to the conclusion that the greatest benefit was conferred by granting annuities, and not by giving doles. If you gave a small sum, sufficient to carry a person on for twelve months, they felt uncertain what they were to do at the end of that time. But if there were a deserving case it should be taken in hand at once, and by granting an annuity the poor individual would feel he was provided for for life, and they would be doing a real benefit. As it was, they had a large surplus of funds which was doing no good, and they were restricted in its application, simply from adopting this policy of not granting annuities out of annual subscriptions. He

had shown by figures that if they put on annuitants to the number of twenty they would only add £180 a year to the present expenses; and as the subscriptions amounted to something like £800 a year, this would be less than one-fourth of their revenue. He had also shown that if they only employed the money received more liberally, almost any amount could be obtained which was wanted. The Society had now been established something like thirty-three years; but it started with the idea that before it did any good it must have £10,000 invested. The consequence was that only during the last five or six years had any annuities been granted, and before that time the subscriptions were about £70 or £80 a year. Out of that they gave away something like £50 or £60, so that there was an increase of about £20 every year. Immediately, however, the funded property was sufficient to grant annuities, the subscriptions came in much larger; showing that if they only did good with the money, pharmacists, or any one else, would come forward to assist. A great many people had spoken to him on the subject, saying they did not care to subscribe when their money was simply taken and invested. They liked to see someone enjoying it. He had also endeavoured to show that if annuitants to the number of twenty were elected, and the subscriptions ceased entirely, so that they had to pay all the annuitants out of capital already accumulated, taking the average deaths which would occur, and putting them down at a lower standard than he had done, in five or six years the number would be reduced to fourteen, as at the present, and the capital would not be diminished by more than £700. This showed that there was no real danger of the invested capital suffering. He thought, however, it would be a mistake to elect a large number at once, they should elect two every year until they had twenty annuitants. At any rate the matter might be safely left in the hands of the Council, for he had never come across a more careful body of men with regard to money. Whatever their decision might be, he had now done his duty in the matter, and he had one satisfaction at least, namely, he found that during the last year a sum had been given away more than double the amount of that of any former year.

Mr. CARTEIGHE suggested that the question of scholarships, and provincial education generally, be referred back to the Council. He had always understood that the Council of twenty-one members, elected by such a large constituency, were intended to carry out the work which was given to them, and as an individual he objected year by year—for this was the second instance of the kind—to have questions submitted for the consideration of the whole body of members. The members could not, collectively, not having all the facts before them, give to such subjects that consideration and judgment which the Council could, and he should be very sorry for the proposal of Mr. Schacht to be entirely negatived at the time when their laboratory was far from full, and when the state of general education was rather low. He hoped, therefore, the subject would not be summarily dismissed.

Mr. URWICK said he considered the whole of the arguments had been against Mr. Schacht's proposal, therefore, if the Council wished to learn the opinion of the meeting, it ought to be further argued. He, himself, after giving a great deal of consideration to the subject, sincerely sympathized with Mr. Schacht in this scheme, which was a system that had always been found to answer, wherever there was a school or a college. It was intended to lead young men to study, because it was found that lads, up to a certain age, had not in them sufficient determination to keep them to work of this kind. It was very often not until they attained the age of twenty or twenty-one that they felt an ambition to get on, when, perhaps, the opportunities were no longer available.

Mr. BURDEN (London) thought it would hardly be safe to give any annuities for which they had not funded stock to insure their payment. But there was one point in connection with the Benevolent Fund, which he thought open to improvement. One of the applicants this year had been a pharmaceutical chemist for six years, but he had been waiting until he attained a certain age before he could apply for an annuity, although his case was a very hard one, he having been deprived of his sight, and thus prevented from earning his own living. He thought that in a case like that the Council might allow the election to take place at once.

The PRESIDENT said he would make one or two observations on the discussion before putting the resolution. In the first place, he wished to know from Mr. Stoddart whether he had ever applied to the Council for aid for the Bristol Association. On receiving a reply in the negative, he said then they had no reason to complain. He never knew of any application which had not received the best attention of the Council, and in almost every case a grant was made. With respect to what Mr. Pickering said about the Major examination, he considered it very important that every one who had any brains should pass that examination. He always looked upon it that their business was one which did not require capital so much as brains; in fact, a man who had brains had capital, and could make his own position. He was happy to inform Mr. Pickering that two members of the Society had just been elected fellows of the Royal Society, and a third had been so honoured for some time. There was, therefore, every inducement for a man to come forward and do all he possibly could; and after taking such a position he could not only place himself high in the scientific world, but, generally speaking, he could so apply that science as to benefit his own pocket. He did not himself approve of the idea of connecting the annual dinner with the Benevolent Fund, but the Secretary was always ready to receive any donations from gentlemen who had money to spare, and he would remind them that there was also what was called a Casual Fund, which the Secretary had been instrumental in forming, and which would be all the better for a little assistance. With regard to the case mentioned by Mr. Burden, the Council were obliged to obey the regulations as to age, but the person referred to might have applied earlier, and he would then have received a grant although he could not have been elected as an annuitant.

The resolution was then put, and carried unanimously.

Mr. URWICK said he hoped it would be understood, with regard to the question of the scholarships, that there was no lack of funds.

Mr. PICKERING begged to say one word in explanation, namely, that he never had been in the habit himself of selling adulterated drugs, and did not keep milk of sulphur on his premises.

Mr. WATTS said he should like to move that periodical meetings of the Society be held, to take into consideration trade questions.

The PRESIDENT said he, and the members of the Council, had already quite sufficient work to do, and he hoped nothing more would be put upon them. The ordinary monthly meetings of the Society were open to discussions on all matters affecting the trade.

Mr. ATKINS then moved—

"That the Preliminary Examinations of the Pharmaceutical Society of Great Britain be discontinued after the year 1876, and that the certificates of legally constituted examining bodies be accepted in lieu thereof."

He said that, if such a resolution were passed, it would go as an instruction to the incoming Council to take the necessary steps. He must say that he most earnestly sympathized with Mr. Schacht in his noble effort to promote the spread of education, and it was only a question of detail on which he differed with him. He rather agreed with the suggestion which had been made, that the whole matter should be remitted back to the incoming Council. But, with regard to the Preliminary Examinations, having turned the matter over very carefully in his own mind, he thought it would be far better conducted by scholastic bodies outside their own Society, like the Universities and the College of Preceptors.

Mr. SLIPPER seconded the motion. He thought such a plan would be more satisfactory to all parties, and it had been already adopted by the Veterinary College.

Mr. HAMPSON thought this motion was somewhat out of order, no notice having been given of it; and it was a matter of such great importance that he thought that course should have been adopted, in order that many gentlemen not then present might have had an opportunity of discussing it.

Mr. SCHACHT also urged on Mr. Atkins the desirability of withdrawing his motion. It was, perhaps, a little uncourteous in him to do so, after the kind expressions Mr. Atkins had used towards himself; but the consideration which weighed with him was this, they were all exceedingly anxious that every youth who was taken as an apprentice should pass the Preliminary examination, and that being so, he thought they should not put the slightest impediment in the way of that being done. For that reason he had done all he could to make the number of centres appointed for conducting these examinations as large as possible; because, as they had no legal power to enforce such a regulation, the least they could do would be to put no impediment in its way. It was a matter which had been urged repeatedly. It was perfectly optional for those who preferred it, to pass the examination of any of those bodies, but in many cases it would be very difficult for youths to do so. It was to meet those cases that the Preliminary examination was continued, and he therefore urged that, at any rate at the present time, it would be inopportune to pass such a resolution.

Mr. SANDFORD said several members of the Council were very anxious to adopt a resolution of this kind when the bye-laws were altered. It had been suggested that Mr. Atkins was not in order, but he might easily become so by prefacing the resolution with the words, "That it is desirable." It was not competent to the meeting to say it should be done, because that could only be regulated by a bye-law.

Mr. ATKINS said he should be very happy to adopt the suggestion of Mr. Sandford, as he only wanted to elicit the feeling of the great body of pharmacists, in order that the incoming Council might know what their opinion was. He was very glad to say that, by means of argument and discussion, the desirability of the Preliminary being passed before apprenticeship was generally acknowledged through the trade. His one point was that, this being a strictly literary and scholastic test, it should be conducted by literary and scholastic bodies.

Mr. BROWN suggested that if the motion were carried in its present form it would appear rather dictatorial to the incoming Council, who would feel bound to immediately take the subject into consideration, and alter the regulations in accordance with it. He would suggest, therefore, a further alteration, by which the resolution, if carried, would simply request the incoming Council to take into consideration the desirability of pursuing the course recommended.

Mr. URWICK said he upheld as strongly as anyone the desirability of youths passing the Preliminary Examination before being apprenticed, but no notice had been given of this motion, which, although it would not much affect London members, might very materially affect the chemists and druggists in the country, and therefore he hoped it would not be pressed.

Mr. ATKINS said he had accomplished what he wished in bringing the subject forward, and as he had no wish to divide the meeting, he would withdraw the motion.

The Scrutineers to examine the voting papers for the election of Members of Council and local secretaries, were then appointed.

Mr. WATTS moved a vote of thanks to the President and Vice-President for their services during the past year, which was carried by acclamation.

The meeting was then adjourned until Friday at eleven, to receive the Report of the Scrutineers.

ADJOURNED MEETING.

Friday, May 22nd, 1874.

MR. THOMAS HYDE HILLS IN THE CHAIR.

The Scrutineers brought up their report as follows:—

SCRUTINEERS' REPORT.

We, the undersigned Scrutineers appointed at the Thirty-third Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following:—

Voting Papers received		1166
Disallowed from informality		15
Votes registered		1151
Received by post too late	57	
Sent under cover to the Secretary	9	77
Unsigned by Voters on envelopes	11	

Hills	1047	Owen	502
Sandford	1018		
Schacht	1010	Baildon	405
Mackay	994	Atkins	391
Bottle	976	Stacey	383
Stoddart	857	Preston	333
Sutton	835	Chipperfield	320
Frazer	813	Freeman	278
Robbins	796	Baldock	260
Williams	778	Thomas	256
Hampson	762	Turner	241
Shaw	661	Fowler	236
Rimmington	599	Broad	198
		Bower	175

FREDERICK ANDREWS, *Chairman*
GEO. S. TAYLOR.
GEORGE MEE.
M. E. FOSTER.
T. HOWARD HALL.
ROBT. RICHMOND, JUN.
SYDNEY PLOWMAN.
ALEXANDER B. LEWINTON.
H. W. POUND.
EDWARD L. CLEAVER.
THOMAS JULL.
GILES YARDE.
WILLIAM GULLIVER.
JOSEPH KETTLE.
JOSEPH LEAY.

May 21st, 1874.

The Chairman then declared the Council for the ensuing twelve months to consist of the following members:—

COUNCIL.

ATHERTON, JOHN HENRY, Long Row, Nottingham.
BAYNES, JAMES, 24, Waterworks Street, Hull.
BETTY, SAMUEL CHAPMAN, 6, Park Street, Camden Town, N.W.
BOTTLE, ALEXANDER, 37, Townwall Street, Dover.
BROWN, WILLIAM SCOTT, 113, Market Street, Manchester.
FRAZER, DANIEL, 113, Buchanan Street, Glasgow.
GREENISH, THOMAS, 20 New Street, Dorset Square, N.W.
HAMPSON, ROBERT, 205, St. John Street Road, E.C.
HILLS, THOMAS HYDE, 338, Oxford Street, W.
MACKAY, JOHN, 119, George Street, Edinburgh.
OWEN, JOHN, 51, Holloway Road, N.
RADLEY, WILLIAM VALENTINE, 74, Market Place, Sheffield.
RIMMINGTON, FELIX MARSH, 6, Ivegate, Bradford.
ROBBINS, JOHN, 372, Oxford Street, W.
SANDFORD, GEORGE WEBB, 47, Piccadilly, W.
SAVAGE, WILLIAM DAWSON, 4, Park Road East, Brighton.
SCHACHT, GEORGE FREDERICK, 7, Regent's Place, Clifton.
SHAW, JOHN, 24, Great George Place, Liverpool.
STODDART, WILLIAM WALTER, 9, North Street, Bristol.

SUTTON, FRANCIS, Bank Plain, Norwich.
WILLIAMS, JOHN, 16, Cross Street, Hatton Garden, E.C.

There being only the requisite number of candidates (five) for the office of auditors, the Chairman declared the following duly elected for the ensuing twelve months :—

AUDITORS.

ANDREWS, FREDERICK, 23, Leinster Terrace, Hyde Park, W.
BARRON, FREDERICK, 2, Bush Lane, E.C.
HODGKINSON, WILLIAM, 127, Aldersgate Street, E.C.
HORNER, EDWARD, 20, Bucklersbury, E.C.
SQUIRE, WILLIAM, 5, Coleman Street, E.C.

The Scrutineers also handed to the President their report of the return for the election of Local Secretaries.

Mr. ANDREWS said that this year was somewhat remarkable from there having been a larger number of candidates for election on the Council than in any former year, with one exception. It appeared to him a matter of regret that many members did not take the trouble to vote, and that many who evidently had the desire had deprived themselves of their privilege, either by sending their papers later than the time legally required, by not enclosing them in their official envelopes, or by not erasing a sufficient number of names.

The Secretary remarked that there had been 3200 voting papers issued.

Mr. ANDREWS could only account for so few being returned by the fact that the business of the Society had been satisfactorily conducted by the Council; and he congratulated the meeting upon the difference there was between the present time and twenty years ago, when there had been the large number of candidates, to which he had previously referred. Then, all was disquietude and anxiety; now everything was working harmoniously and, he believed, beneficially.

Mr. RIMMINGTON proposed a vote of thanks to the Scrutineers.

Mr. GREENISH, in seconding the motion, remarked that he had formerly, for three years, acted as Chairman of Scrutineers, and one of the most important and arduous duties in connection with the Society was that of the Scrutineer. He thought some greater acknowledgment than a mere vote of thanks was due to those gentlemen for their services.

The SECRETARY observed that on the present occasion the Scrutineers were occupied continuously from ten a.m., until nearly six p.m., and that the work was really very exhausting.

A vote of thanks to the Chairman was passed by acclamation, and the meeting separated.

Parliamentary and Law Proceedings.

MISTAKE IN LABELLING A BOTTLE. — CENSURE OF A MEDICAL ASSISTANT.

On Wednesday, May 13, an inquest was held at Masborough, respecting the death of Mr. William Raybould. It appeared from the evidence that for the past seven years Mr. Raybould had suffered from heart disease, and had been attended for that complaint by Messrs. Robinson and Knight, surgeons, of Rotherham. On the previous Monday, the deceased's symptoms became worse, and his wife consulted with Mr. Knight, who prescribed for him. He ordered two kinds of medicine to be prepared, one to be taken by the deceased, and the other, containing belladonna, to be applied externally. These were made up by his assistant, Mr. William Brent. On Tuesday morning, shortly before six o'clock, the deceased had a severe attack of angina, and took some of the medicine which was labelled to be taken internally. According to the testimony of Mrs. Raybould, some of the liquid was spilled from the glass in which it was administered, and the deceased took at most only about a tea-spoonful. He gradually became worse, however, and lapsed into a state of semi-unconsciousness. Mr. Knight was sent for, and was in attendance soon afterwards. While in the room where Mr. Raybould was lying, Mr. Knight happened casually to look at the medicine bottles which were on the mantel-piece, and found that the labels had been transposed, that directing internal application having been put on that which ought to have been applied externally, and *vice versâ*. After making inquiries, which showed that the deceased had taken some inwardly, Mr. Knight, without alarming either the dying man or his wife, at once took possession of the bottles, and proceeded with haste to his surgery, where he procured a stimulating draught to be administered. He returned to Mr. Raybould—who had vomited—to whom he gave the mixture he had brought. The deceased, however, did not recover from the state of exhaustion into which he had fallen, and died about half-past eleven o'clock the same morning. Mr. Knight, after consultation with Mr. Robinson, gave the bottles as they were when he first took possession of them, to Mr. Inspector Hey, whom he informed of the facts of the case. The Coroner, Mr. Dossey Wightman, was at once communicated with, and he ordered that a *post-mortem* examination should be made.

Mr. H. J. Knight, surgeon, of Rotherham, said: I have attended the deceased about seven years for heart disease. I prescribed for him, but did not see him on Monday, when his wife consulted me. I saw him about ten o'clock on Tuesday morning, when I was called in. I found him in a state of great exhaustion. It was then my opinion that it arose from heart disease, and it is my opinion now. I prescribed for him then. I had not looked at the medicine bottles then. I gave him some brandy. I saw on looking at the bottles on the mantel-piece that the labels had been reversed, which I had not seen before. I asked Mrs. Raybould if he had been sick, and she said he had. I did not tell her then because so little had gone, and I thought it would only agitate her more. I went away and got some medicine, and returned and administered it. I stayed with the deceased until he died at half-past eleven o'clock.

The coroner: Was there anything at all in the manner of his death which suggested to you that he died from anything else than heart disease?

Witness: I should not have thought so unless I had seen the bottles; but I thought it only right and proper, as there had been a mistake, to bring the matter forward.

The Coroner: Then I may say that in your opinion all the symptoms were consistent with heart disease.

Witness: Yes.

The Coroner: Is it probable that the medicine given in mistake accelerated death?

Witness: It might.

The Coroner: If he only swallowed a tea-spoonful?

Witness: If he swallowed a tea-spoonful of the mixture it might possibly have accelerated his death.

Mr. William Bent deposed: I have been in the service of Messrs. Robinson and Knight for three months. Previously I had been in the service of Mr. Brown, near Manchester, for about four years, off and on; and also of Mr. Clarke, of Manchester, for about eighteen months. I was apprenticed to my uncle, who was a surgeon at Manchester. I prepared the medicine in these two bottles from a prescription of Mr. Knight's. I put the labels on. They are not labelled correctly. The label on the smaller one should have been on the larger one. I did it in mistake, I am sorry to say. While I was dispensing the medicine an urgent case came from the Holmes, and my having to catch a train to go thither caused me to be in a hurry, and hence the mistake. The smaller bottle was for outward application. I am not aware that I had previously made up medicine for the deceased. I never made a mistake of this kind before.

Mr. W. H. Pearce, surgeon, of Rotherham, deposed: I made a *post-mortem* examination of the body this morning

with Dr. Hardwicke. The cause of death is disease of the heart in the great vessels. I do not find anything different from ordinary cases of heart disease. His taking the medicine in the way named might possibly have hastened his death, but I found nothing to show that it had done so. His stomach was slightly turgid. That might have arisen from his taking the wrong medicine. That medicine might have been the exciting cause of death, but not the predisposing cause. There was only a small quantity of fluid in the stomach, which smelt strongly of camphor, which Mr. Knight stated had been given as an antidote. The small bottle contains belladonna, of which I found none in the stomach.

Dr. Hardwicke coincided with the statement of Mr. Pearce as to the result of the *post-mortem* examination.

The Coroner then said that after the evidence of the medical men who had made the *post-mortem* examination, the jury could come to no other conclusion than that death had resulted from natural causes. There was no doubt that Mr. Bent had done a very careless thing in labelling the bottles wrongly, and he got out of a very fearful position very easily indeed. It might have been a very serious matter for him—he might have caused the death beyond all doubt of a human being. It was often his (the Coroner's) duty to censure people very severely; but in the present case, Mr. Bent being a man of education and experience, he hoped it was not necessary to do so, for he must feel what a position he had placed himself in. He hoped it would be a caution to him as long as he lived. If the evidence had been different—if the doctors had proved and stated that in their opinion the deceased had died in consequence of taking the medicine from the bottle wrongly labelled, he (Mr. Bent) would have been placed in a very undesirable position. He (the Coroner) did not think he ought to conclude the inquiry without saying that the conduct of Mr. Knight in the matter had been very praiseworthy. It would have been a very simple and easy thing for him to have taken these bottles away and given a certificate to the effect that death had resulted from heart disease. Mr. Knight, however, acted as every honourable and upright man should do, and gave the bottles to the police and informed them of the circumstances of the affair. There was very great credit due to Mr. Knight, and he (the Coroner) was very glad that nothing more serious had arisen from the matter.

The jury then returned a verdict of "Died from natural causes."

Dr. Hardwicke, addressing the Coroner, said that no doubt the attention of Mr. Bent had been drawn away from the bottles he was labelling, and he had got confused.

The Coroner said: That might be an excuse, but it did not exonerate him from blame.—*Rotherham and Masbro' Advertiser.*

Correspondence.

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

The Ash and Extract of Teas.

Sir,—In my note on the ash and extract of teas, published in your issue of last week, a few of the figures in the tables have been misplaced. Will you allow me to correct them, as follows?—

No. 29 sample,	Silica should be	1·08
,, 30	,, ,, ,, ...	·68
,, 42 Caper,	Total Ash ,, ...	12·13
,, 44	,, ,, ,, ...	7·13
,, 47 Gunpowder,	,, ,, ...	42·94
,, 48	,, ,, ,, ...	7·01

G. W. Wigner.

May 18th, 1874.

The Recent Discussion on the Additions to the Pharmacopœia.

Sir,—As a very old member of the Pharmaceutical Society, I venture to trespass on your space with a few thoughts suggested to me by the unfortunate discussion at the last of the evening meetings of the session which has just closed. It may be said that I should have taken the opportunity to express my opinion at the time of the meeting; in reply I can only excuse myself by saying that, although in the house early for the purpose of attending that meeting, I was prevented, by unavoidable circumstances, entering the theatre until after nine o'clock, when Mr. Smith's paper had been read, Mr. Carteighe's remarks were concluded, and Mr. Bland was finishing his speech. The opening of the discussion on the Additions to the Pharmacopœia, therefore, only came before me in print.

Now, Sir, I have always regarded the "evening meetings" as a very important institution, tending to mutual improvement, by affording means of an interchange of ideas, not only among members of our Society but also between pharmacists and the medical profession, many of whom have from time to time joined in our discussions, and many more of whom have doubtless perused the reports of those discussions in the pages of the Pharmaceutical Journal. I believe those evening meetings have greatly contributed to the better understanding which has grown up between prescribers and dispensers during the last thirty years, and I greatly regret that in endeavouring to shake off "*that ponderous, somnolent, dreary decorum of language the usages of our evening meetings seem to demand,*" Mr. Smith should have been betrayed by the spirit of "*banter*" far enough to write down—not to utter in haste—remarks which were fairly taken by Professor Redwood, and may also be regarded by those members of the Medical Council who have sat on the Pharmacopœia Committee, as an attempt to bring both the book of Additions and its authors into ridicule. Had Mr. Smith applied that ability he is so well known to possess fairly in criticism of the articles now introduced, as Mr. Umney did at a previous meeting, not a word could be said to deprecate such a proceeding; the fullest, freest, most open discussion of that kind is desirable, and I venture to believe would be acceptable to the Pharmacopœia Committee.

It seems, however, that the object was rather to prove that persons possessing more pharmaceutical knowledge than can be expected of physicians should be called to aid in compiling a Pharmacopœia. As an abstract proposal that may be right enough, and is already recognized by the Medical Council. I had the honour of a seat in the Pharmacopœia Committee, which was appointed by our own Society at the instigation of the College of Physicians, and afterwards placed in communication with the Medical Council; therefore I know how extensively our work was recognized and adopted in 1864. After that, what happened? Why, the Medical Council, to whom alone the law gives the authority to issue a Pharmacopœia, committed the work to only *four* of their members, and to those four were added, as assistants, Mr. Warington, of the Apothecaries' Hall, and Dr. Redwood, our own professor of pharmacy. Surely practical pharmacists were recognized and consulted there! If we take Dr. Redwood's account of the manner of proceeding lately adopted, I think it is pretty certain that the four-and-twenty copies of the *proposed* Additions were quite as extensively submitted to pharmacists as to physicians for approval.

Far be it from me, Sir, to object to a wider circulation of any future proposals; but I ask whether, if Mr. Smith's paper be taken as indicating the tone and temper of the Pharmaceutical Society, a request for such an extension of mutual goodwill and confidence between us and the Medical Council, or profession generally, is likely to be conceded?

George W. Sandford.

*** In consequence of the length of the reports of the annual meeting, etc., we are compelled to postpone the publication of several communications.

Communications, Letters, etc., have been received from Mr. Byles, Mr. J. McGill Murdoch, Mr. H. Chapman, Mr. C. Gerring, Mr. J. Whitfield, Mr. R. J. Shields, Mr. H. Barton, Mr. F. W. Fletcher, Messrs. Young and Postans, Mr. J. W. Lloyd, Mr. J. Barton, Mr. G. Welborn, Mr. H. S. Ellison, Mr. T. Hopkinson, Mr. A. Squire, "Sigma," "Pharmacist from 1842," "Spes," "A Titan," "Botanist," "Palmam qui meruit ferat," "Alpha," "Morphia," "Inquirer," C., G. T. D., T. P. B., J. B.

PILL COATING.

BY J. A. COPE.

The introduction of pills covered with a tasteless kind of enamel, which is perfectly soluble and harmless, is certainly a step towards elegant pharmacy, and has many great advantages over the old method of dusting pills, to prevent their sticking together and to mask the taste. The manufacture of pearl-coated pills has been carried on extensively by several firms during the last few years, and there appears to be a growing demand for the product. The bulk of these pills reach the public through medical men who send out their own medicine, and who, no doubt, are glad to be relieved of the troublesome business of pill-making. And if medical men educate their patients to prefer their pills made tasteless and as attractive as possible, it will not do for pharmacists to be behind the times. They must be able to compete on the small scale with those firms who make it their business.

Medical men are not to be questioned as to the remedies they prescribe, and few pharmacists would care to acknowledge "they did not make their own pills, but obtained them from a reliable source, and believed them to be of the purest ingredients." And it is desirable that even stock pills should be prepared on the premises. The secret of pill-coating does not appear to be in what the coating consists of, which, in most cases, is powdered French chalk, but in the way it is put on.

The following simple method I have found to give very satisfactory results, and produce pills having an elegant appearance which will bear comparison with those now in the market.

The ingredients used are powdered French chalk, and thin mucilage of gum arabic—one part mucilage of the Pharmacopœia and two parts distilled water, answers very well. The apparatus used may be found in any pharmacy, namely, a small evaporating basin, having a flat bottom, capacity eight or ten ounces two covered gallipots, one holding four or six ounces, the other about double that size, and a pill-tray.

The pills to be coated should be of good consistence, not too hard, and rolled perfectly round, to ensure their being a good shape when finished. It is well to use French chalk in the place of starch-powder when rolling them out.

Into the small gallipot put some of the chalk, and into the basin put as much mucilage as may be necessary to thoroughly moisten the quantity of pills to be coated (from six to six dozen pills may be done conveniently at one operation). Next put in the pills and shake them round horizontally until sufficiently moistened, then turn them into the pot containing the chalk, and shake them round so as to get well covered with powder; turn them on to the pill-tray and allow to remain a short time, and lastly place them in the empty gallipot and shake round, so as to polish them and shake off the superfluous powder.

To coat pills by this method occupies about the same time as to silver them, but for stock pills which may have to be kept some time it is better to repeat this process, taking care to have the first coating dry before a second is put on. This will be found to give them a firm pearl-like exterior, which preserves the pills of good shape and consistence, and prevents any change that would be likely to occur through lengthened exposure to the atmosphere.

A few trials will suggest the best way of manipulating, and enable anyone to produce a fair sample of coated pills.

Derby.

Since the above was put into type, we have been favoured with a note on Pill Coating by Mr. John Whitfield, F.C.S., of Scarborough. The details of the manipulation are essentially the same as those described by Mr. Cope; but as the result of experiments in this direction, Mr. Whitfield uses a varnish made as follows:—

Common Amber Resin . .	1 to 2 drachms.
Spirit of Turpentine . . .	1 drachm.
Oil of Geranium	20 minims.
Absolute alcohol	To make 1 ounce.

The oil of geranium may be omitted, or substituted by other essential oils at discretion. The pills should be made as hard as possible.

Mr. Whitfield remarks that some pills take the coating at once, others not so readily. In the latter case the powder should be sifted off, and the varnish applied again exactly as at first. A second coat seldom fails, and it increases the bulk of the pills but slightly. He is of opinion that there can be no objection to the resinous varnish on the ground of insolubility, as he finds when the coated pills are placed in water the covering cracks and exposes the pill more rapidly than sugar coating.

Pills containing much essential oil are not well adapted for coating.

ANALYSIS OF "VANDYKE RED."

BY G. WELBORN.

Vandyke red is a brilliant scarlet pigment, extensively employed both as an oil and water colour, also, in calico-printing and dyeing; and, while its cost is considerably less than vermilion, it almost equals the latter in richness of colour. The following notes give an outline of the method adopted in arriving at its constituents:—

A little of the powder was boiled in water. The liquid was then filtered from the insoluble matter and evaporated to dryness: a slight dirty-white residue was obtained, which did not effervesce on the addition of dilute hydrochloric acid. Ammonic oxalate gave no precipitate in the aqueous solution of the above residue. A concentrated hydrochloric acid solution of the residue gave a purple flame when heated on platinum wire in an air-gas flame.

The latter reaction indicated the presence of a trace of potassium.

A second portion of the powder was completely decomposed on boiling with concentrated hydrochloric acid, with separation of slender white crystals. The supernatant liquid was of a bright pale green colour: this was carefully poured off the crystals and set aside. The crystals were washed with a little cold water, and then dissolved in water: the solution was acidified with hydrochloric acid, and sulphuretted hydrogen passed through it. There was a copious black precipitate, which, separated by filtration and washed, was soluble in boiling dilute nitric acid. Separate portions of the latter solution were treated with the following reagents:—Dilute sulphuric acid and alcohol gave a heavy white precipitate. (These reagents remove every trace of lead from a solution of a lead salt, since the most delicate tests for this metal failed to give any indication of its presence in the filtrate.) Ammonic hydrate, a white precipitate, insoluble in excess. Potassic

hydrate, a white precipitate, soluble in excess. Potassic iodide, a yellow precipitate, soluble in boiling water. Potassic chromate, also a yellow precipitate. The above reactions were confirmatory of the presence of lead.

The green-coloured solution was next examined: it was first diluted with water, then treated with sulphuretted hydrogen to remove a trace of lead: the plumbic sulphide filtered out and rejected. Ammonic chloride, ammonic hydrate, and ammonic sulphide were added to the filtrate. There was a black precipitate: it was filtered out, washed, then dissolved in dilute hydrochloric acid and divided into three portions. Potassic ferrocyanide gave a slight blue colouration only. Ammonic hydrate, a bluish-green precipitate, partly soluble in excess to a pink solution. Potassic hydrate, a bluish-green precipitate, soluble in excess and reprecipitated on boiling. The two latter reactions indicated the presence of chromium.

All metals of the ammonic carbonate group were proved to be absent in the ammonic sulphide filtrate.

Dilute hydrochloric acid changed the colour of the pigment to yellow (that of normal chromate), and this being digested with a dilute solution of potassic hydrate, the original colour reappeared, thus showing that the pigment is basic lead chromate, or, diplumbic chromate.

It is obvious that the above reactions may be employed in estimating the lead and chromium quantitatively. Two grammes of diplumbic chromate were boiled with concentrated hydrochloric acid and alcohol, until complete decomposition was effected. The whole was evaporated to a stiff paste on a sand-bath, washed with alcohol, until the plumbic chloride was pefectly white. (Plumbic chloride is insoluble in alcohol, while chromic chloride is soluble.) The washings were filtered through a tared filter, and evaporated on a water-bath until the residue ceased to lose weight. It was pasty and of a deep green colour, and weighed 0·7 gramme. It was then transferred to a sand-bath and heated carefully, so as to avoid decomposition of the chloride; it was now found to weigh 0·65 gramme.

It was very doubtful if all the water was even then expelled. It is, therefore, preferable to decompose the chromic chloride by ignition in a covered porcelain crucible, and estimate the chromium as chromic sesquioxide.

The plumbic chloride was dried, and found to weigh 2·07 grammes.

The following equation shows the chemical changes involved in the decomposition of diplumbic chromate by hydrochloric acid:—

$$\underset{1061}{2\,Pb_2CrO_4} + 16\,HCl = \underset{1112}{4\,PbCl_2} + \underset{318}{Cr_2Cl_6} + 8\,H_2O + Cl_2.$$

The theoretical yield of plumbic chloride, from 2 grammes of diplumbic chromate is found as follows:—

As 1061 : 2 : 1112 : x = 2·096 grammes. The amount of chromic chloride from a like weight of chromate, is found by the following equation:—

As 1061 : 2 : 318 : x = 0·5994 gramme. It will be seen that these numbers are very nearly those obtained by analysis, and conclusively proves that the compound is "diplumbic chromate."

By the above process, chromic chloride is readily obtained from normal, or diplumbic chromate, in a state of purity.

THE COLLECTING AND MOUNTING OF SEAWEEDS.

In compliance with a request, the information contained in a recent article (p. 754), respecting the preparation of land plants for herbaria, is now supplemented by the following directions for collecting and mounting algæ:—

Collection.—The best places to search are pools among the rocks and mudbanks of estuaries, near the sea. Specimens thrown up on rough beaches are generally too much battered and discoloured. Growing specimens are always brighter in colour. On sandy shores the best specimens will be found floating. The best time to collect is when the tide has just commenced to flow, after the lowest ebb, as the seaweeds are then floated in, in good condition. They are most abundantly found after recent storms. An ordinary fish-kettle or two pickle-bottles may be used to bring the specimens home. These should contain sea-water and a piece of flat green seaweed (*Ulva latissima*), as this keeps the specimens fresher. The olive seaweeds should never be mixed with the red or green species; for some of the former, such as the *Desmarestiæ* and *Ectocarpi*, rapidly decompose the red species. On no account should bleached or battered specimens be brought home; all specimens should be either red, green, purple, black, or olive; no others are worth preservation. It will be well to collect a number of apparently different species before attempting to name any of them.

All specimens should be cleaned at the shore, as far as possible, before putting them into the bottles or fishing-kettles.

Mounting.—The delicate species should be mounted first, as they change colour more rapidly than the others. Sea-water should alone be used in laying out specimens. Two flat white dishes are required—one to turn the algæ into, and the other to lay out the specimens in. This is done by immersing a piece of paper just below the surface of the water, and supporting it by the left hand: the alga is then placed on the paper and kept in its place by the left thumb, while the right hand is employed in spreading out the branches with a bone knitting needle or a camel's hair pencil. If the branches are too numerous, which will be readily ascertained by lifting the specimen out of the water for a moment, pruning should be freely resorted to, as much of its beauty will depend upon the distinctness of the branching; and unless the ramifications be well shown, it is very difficult to name some species. Pruning is best performed by cutting off erect and alternate branches, by means of a sharp-pointed pair of scissors, close to their juncture with the main stem. The floating fragments should be removed, either at once or after laying out each specimen, by straining the water through fine muslin or calico. When the specimen is laid out, the paper should be raised gradually in a slightly sloping direction, care being taken to prevent the branches from running together. The delicate species are much improved in appearance by re-immersing their extremities before entirely withdrawing them from the water. The minute branches are thus floated out naturally, and show the character of the plant. The papers should then be laid *flat* upon coarse bibulous paper, only long enough to absorb superfluous moisture. If placed in an oblique direction the branches are liable to run together.

They should then be removed and placed upon a sheet of thick white blotting paper, and a piece of

washed and pressed calico placed over each specimen, and then another layer of blotting paper above the calico. Several of these layers are then pressed in the ordinary way, light pressure only being used at first. The papers, but *not* the calico, may be removed in six hours, and afterwards changed every twenty-four hours until dry. If the calico be not washed it frequently adheres to the algæ, and if the calico be wrinkled it produces corresponding marks on the paper.

Dudresnaia coccinea should not be pressed, but allowed to dry on the paper. This species will be readily recognized when found, by feeling like jelly, and being so slippery as to be with difficulty picked up.

Wrangelia multifida should be pressed as soon as possible, without draining, or it will change colour.

The *Griffithsiæ* are best laid out by putting the left thumb on a tuft, and flattening it out with a camel's hair pencil.

Coarse black algæ should be soaked in fresh water to remove some mucilage, etc., and then be pressed between two pieces of calico, and afterwards mounted on paper by means of a solution of isinglass or gelatine in proof spirit. Such of the red algæ as do not adhere well may be made to do so by brushing them over with skimmed milk. It must be entirely free from grease, however, or the paper will be marked.

The most convenient sizes of paper to use are those made by cutting a sheet of paper, of demy size, into 16, 12, or 4 equal pieces. Ordinary drawing paper answers the purpose very well. For the herbarium, each species should be mounted on a separate sheet of demy or cartridge size. Toned paper shows off the specimens well, a neutral tint answering best for the olive, pink for the red, and green for the green series. In this way room will be allowed for varieties and abnormal specimens. To render the herbarium complete, specimens with both tetrasporic and capsular fruit should be sought for.

NOTE ON GUTTA-PERCHA.

BY E. COTTERELL.

Gutta-percha has now become official. It is "the concrete juice of *Isonandra gutta*," a tall tree of the sapotaceous order. A tree, which probably numbers 50 summers, is cut down, stripped of its bark, and the juice collected in a cocoa-nut shell or plantain leaf; or else, rings are cut in the bark, about a foot apart, and the sap collected. This is afterwards inspissated by heating it to its boiling point.

Gutta-percha, as imported from Malacca, its native country, contains, as Mr. Umney * very properly observes, several impurities ; which consist of soluble salts, together with some organic matter, such as fragments of the bark, etc. It is purified by rasping with cold, and washing with warm water. Afterwards it is heated to 230°F. to expel the water, which would interfere with its cohesive power ; by being heated it is also reduced to a single mass.

Purified gutta-percha has a density of 0 979, and is a very bad conductor of electricity, for which cause it is so much used for insulating supports in electrical machines and coating the wire of electric cables.

Gutta-percha is not acted upon either by water, hydrochloric or acetic acids, alkaline solutions, or alcohol. Chloroform and benzol are its best solvents: the former is the one selected by the compilers of the "Additions ;" but had benzol been official it would doubtless have replaced it, being cheaper : with chloroform it yields "a more or less turbid solution."

There are three qualities of Gutta-percha imported:—

The best "native," which occurs "in tough flexible pieces, of a light brown or chocolate colour," in pieces of all sizes and shapes.

Inferior "native," which is lighter in colour, and more easily torn in pieces than the above.

The boiled sort, which comes to Europe in oblong pieces ; it probably consists of the two native sorts, boiled together to give it a fine appearance.

Gutta-percha enters into the composition of two official preparations :—

Liquor Gutta-percha, purified mechanically by Carbonate of Lead ; and *Charta Sinapis*, which is an imitation of the justly celebrated Rigollot's mustard leaves.

In 1848, Mr. Acton * after making various experiments with solutions of gun cotton, caoutchouc, and gutta-percha, arrived at the conclusion that a compound solution of caoutchouc with gutta possesses the requisite qualities for preserving the skin against the action of contagious poisons ; and also as a covering for the hands during *post-mortem* examinations.

The various other uses of gutta-percha, as applied to fine arts, etc., do not come within the scope of the pharmacist, and would therefore be out of place in this note.

* *Vide* PHARM. JOURN. 3rd series, No. 197, p. 791.

HOW I PASSED MY MAJOR.

BY OTTO VON ROSE.

There is a wide-spread idea that it is almost impossible to pass the Major examination without going through a course of practical study at some school. Now, as I have succeeded in passing without attending any school whatever, I write these few lines with a view of removing this idea, and in the hope that they may induce a few more candidates to come forward.

I was apprenticed in a thriving suburb of London for a term of four and a half years, in October, 1867. After I had served two years of my time I became anxious about my Minor examination, and on applying to my master for time to study, I was allowed one hour and a half per day, if business permitted. Availing myself of this kindness, I set to work, and in November, 1871, succeeded in passing.

Six months later, on the expiration of my apprenticeship, I determined to become a candidate for the Junior Bell Scholarship ; but in this I was unsuccessful.

Soon after this I applied for and obtained a situation in a first-class pharmacy at the West End, where, through the kindness of the principal, I was allowed to attend the course of botanical lectures at Bloomsbury Square. From this time until after I passed I carefully avoided all newspapers and novels, as liable to distract my attention from study. I studied at least an hour and a half each day, during the whole of last year ; but it was not until after last Christmas that I really set myself to close study. About that time I fitted up for my own use a box containing all the principal re-agents, and with the help of these and a few test-tubes I managed to do some practical

* *Vide* PHARM. JOURN. Vol. viii. p. 297.

work—usually asking a friend for two salts at night, and getting up and finding out what they were before breakfast next morning.

My mornings I divided between practical chemistry and botany. For the study of the latter I bought faded flowers from a neighbouring florist; these answering my purpose as well as fresh ones, and being cheaper.

My evenings I divided between chemistry, materia medica, and pharmacy, always taking a particular subject on a particular night, so as to keep up a systematic course, without which it is impossible to do any real study.

The books I used were 'Attfield's Chemistry,' 'Pereira's Materia Medica' (last edition), 'Fownes's Chemistry,' 'Bentley's Botany,' and the 'British Pharmacopœia.' These books, though few in number, are ample for any student, as it is much better to read one book well than to half read two.

I feel sure that if any one will only adopt a regular system, and stick to it, three months will see him prepared to face the examiners and pass his examination very creditably.

Although I passed my examination without studying at Bloomsbury Square, I would strongly recommend any one who has the time and means at his disposal to do so; but it is especially to those who, like myself, are not able to obtain those advantages, that I have written these few lines of encouragement.

NOTE ON ERGOT AND ITS PREPARATIONS.*

BY EDWARD R. SQUIBB, M.D.

(*Concluded from page* 914.)

Fluid extract of ergot has also been used as a topical application to the os uteri upon cotton-wool, but is inappropriate to such uses on account of the irritant action of the alcohol. Physicians who observe closely, and who by looking for effects get rid of the trammel of arbitrary doses, appear to be most successful in the uses of ergot, and such physicians often, if not generally, use this preparation in much larger quantity than the doses given in the older books. It is most frequently used in females, and for affections of the uterus, and here an excellent indication of its maximum useful effects is easily reached in most cases by the production of uterine colic. In the treatment of fibroids, polypi, etc., it is perhaps the best practice to begin with the standard dose, and increase this until uterine colic occurs, and then diminish the dose so as to come just short of this in the succeeding continuous administration. The dangers of ergotism or ergot poisoning seem to have been overrated, since the writer has diligently inquired for such results from those who use it most largely, but has heard of no instance of hurtful effect. Dr. A. Jacobi, of New York, who has probably used it as frequently and in as large quantities or doses as any one in America, with both adults and children, and who is competent authority, and a close observer, recently replied that he had never seen an instance of ergot poisoning, nor heard of one in the practice of his associates. Notwithstanding this, he and all careful practitioners are always most careful and most watchful in this respect, and probably their exemption from bad effects depends upon their seeing indications of danger before they reach the point of danger. Besides, it is probable that the ergot poisoning described as the result of eating ergotized food, etc., could only occur among an underfed, semi-scorbutic people; or under other conditions not present in cases ordinarily requiring medication by ergot.

* Paper read before the American Pharmaceutical Association at Richmond, Va., September, 1873.

Dr. W. C. Wey, of Elmira, who has also used ergot freely, had at least one case in which it had been used in the treatment of a fibroid tumour of the uterus, with occasional interruptions, by the stomach, hypodermically and topically, during a period of more than two years, not only without poisoning, but with great advantage.

In January of 1869, Professor Langenbeck, of Berlin, first used what is loosely described as an "aqueous solution of secale" by hypodermic injection, in the treatment of aneurisms, with marked advantage. This practice is described in the Berlin 'Klinik Wochenschrift,' and an epitome of the paper is published in 'Ranking's Abstract for July, 1870,' p. 223. In the same Berlin Journal for 1872, Dr. Hildebrandt published the results of hypodermic injections of ergotin in the treatment of uterine fibroid tumours. This paper is epitomized in 'Ranking's Abstract for January, 1873,' p. 248. This treatment when tried in this country seemed to be difficult and uncertain, for want of a trustworthy and uniform preparation which should fairly represent ergot, and be adapted to hypodermic use, and at the request of Drs. J. Marion Sims, of New York, and W. C. Wey, of Elmira, the writer undertook what seemed to be a hopeless task, of making a preparation well adapted to hypodermic use.

Disbelieving in the existence of any separable active principle in ergot at all analogous to the morphia of opium, no preparation seemed available except an extract which should be soluble in an aqueous menstruum. Then knowing the difficulty with which non-diffusible extractive matters are absorbed when deposited in the subcutaneous cellular tissue, and the liability of such matters, however bland, to cause troublesome abscesses, the problem seemed to be impracticable. After a good deal of time and trouble given to the matter, and many complicated trials, which need not be detailed, the best practical result reached was that of making a solid extract of ergot by the evaporation of the fluid extract of the U.S. Pharmacopœia of 1860, at a very low temperature, by mechanical stirring.

If this fluid extract, carefully made by repercolation from good rye ergot, without any heat, be evaporated in a shallow capsule in a bath of water of 50°C.=122°F., by active and continuous stirring, until it is reduced to one-sixth of the weight of the original fluid extract taken, the result will be a spongy extract of a light brown colour, full of air incorporated by the mechanical agitation, and looking a little like pulled molasses candy. This extract has the full odour and taste of the fluid extract, concentrated by condensation, and probably has the full therapeutic value of the ergot from which it is made; and each grain of it represents six minims of the fluid extract, or six grains of the ergot from which the fluid extract was made. It is quite insoluble in cold stronger alcohol, but entirely soluble in diluted alcohol, and also is easily soluble in water, with the exception of an insignificant residue which is easily filtered out. Its solutions are slightly acid to litmus paper, and have their ergot odour strongly increased by the addition of alkalies. The concentrated solution in water is turbid before filtration, but after filtration is of a deep rich garnet brown colour. How this extract or its solutions will keep is of course unknown, but the probabilities of keeping unchanged are quite favourable in regard to the extract, but unfavourable for the aqueous solution. A five-grain pill of this extract of course represents the mean dose of thirty minims of fluid extract, or thirty grains of ergot, and it is not only much more easily taken, but in delicate conditions of stomach is much less liable to produce nausea, loss of appetite, etc. It does not, however, always agree better with sensitive stomachs than the fluid extract, nor does the stomach always tolerate it much longer. Hence it is very desirable often to relieve the stomach altogether for a longer time than the brief intermissions that can be permitted without losing ground already gained by the treatment; and to effect this, hypodermic and topical administration may be resorted to. Hypodermic medication is merely a short cut into the circulation whereby the process of digestion and assimi-

lation and the organs by which this process is affected are avoided, the absorption taking place directly from the cellular tissue. Hence the therapeutic action is more prompt; and in the case of medicines which are liable to decomposition, in the process of digestion, or to loss by entanglement with the fecal matters, smaller quantities are required to produce a given effect. But then, as most medicines are irritant, or at best liable to act as foreign bodies when introduced under the skin, they will more or less frequently cause abscess and painful irritation, and this in proportion to quantity, irritant nature, and their being more or less loaded with matters which are not diffusible. The filtered aqueous solution of this extract of ergot, though not well adapted to hypodermic use, is better adapted to it than the fluid extract, and perhaps is as well adapted as any preparation of the drug can be under the supposed required conditions. Such a solution has been used in this way with variable success. In some hands it seems to have been moderately and usefully successful, in others less so, while in some it has produced abscess so often that it was soon abandoned. The solution may be made of almost any desired strength, but that which seems to have answered best is the same as the fluid extract, or a minim for each grain of ergot represented in the extract. To make this solution, sixty grains of the extract is weighed into a small vessel and dissolved in about four fluid drachms of water by stirring. It is then poured into a small wet filter supported over a vial marked for containing just six fluid drachms, and when the liquid has passed through, the filter is rinsed through with water until the measure of six fluid drachms is reached. This solution should be made every week or two, or in the summer more frequently, until its permanence be ascertained. If desired, it may easily be made of double the above strength by halving the proportion of water, but what is thus gained in the quantity of the injection is perhaps over-balanced by the disadvantages of density in retarding the absorption.

This same solution seems well adapted to use as a topical application; the desired dose being put upon a dossil of cotton-wool, and this applied to the os uteri, with another dossil behind it. It might be inferred that this would be a very imperfect method of administration, and when first proposed by Dr. Wey as an alternative method, the writer predicted its failure, not being then aware of a somewhat similar practice in Germany as long ago as 1836. Dr. Wey, however, succeeded well and produced the characteristic uterine colic within two hours or less. This topical method may also be used by means of suppositories, and the best vehicle for the extract seems to be the mixture of gelatin water and glycerin, which, when in proper proportions, make a very firm jelly, that does not become hard, and keeps indefinitely. Beside, it melts at a gentle heat, and is readily soluble in aqueous liquids. This is but a nicer and more simple form of the compound used for the inking rollers of printers. It seems not improbable that oleic acid might be used as a vehicle for this extract, thus adapting it to dermic adminstration, but as yet no trials have been made.

THE OXIDATION PRODUCTS OF CINCHONINE.*

At the sitting of the Mathematical and Natural History Section of the Royal Academy of Sciences at Vienna on the 16th of April, Professor Hlasiwetz stated the results of an investigation of cinchonine, undertaken by Dr. Hugo Weidel.

Dr. Weidel had previously found that by the oxidation of nicotine with nitric acid, nicotinic acid, a well-crystallized and characteristic acid is formed. He was therefore induced to test chinoline in this respect, and was enabled to establish that it also yielded a similar acid.

* Transactions of the kaiserliche Akademie der Wissenschaften in Wien (1874), p. 78.

After this the cinchonine from which the chinoline had been prepared was tried, in the hope of throwing some light upon the constitution of that and similar vegetable bases, the so-called alkaloids.

In the first place the oxidation of cinchonine by means of nitric acid yielded four acids, the formation of which can be represented by the following equations:—

$$\underbrace{C_{20}H_{24}N_{20}O}_{\text{Cinchonine.}} + 8O = \underbrace{C_{20}H_{14}N_2O_4}_{\text{Cinchoninic acid.}} + 5H_2O$$

$$C_{20}H_{14}N_2O_4 + NHO_2 + 5NHO_3 = \begin{cases} \underbrace{C_{11}H_8N_2O_6}_{\text{Cinchomeronic acid.*}} \\ \underbrace{C_9H_6N_2O_4}_{\text{Chinolic acid.}} \\ 3H_2O + 4NO_2 \end{cases}$$

$$\underbrace{C_{11}H_8N_2O_6}_{\text{Cinchomeronic acid.}} + 2O = \underbrace{C_{11}H_8N_2O_8}_{\text{Oxycinchomeronic acid.}}$$

All these acids are well crystallized and definite compounds, the formulæ of which have been controlled by the analysis of several of their salts. It required a series of tedious experiments to isolate the oxidation products from the crude mixture and to purify them.

The most interesting of these four acids is the cinchomeronic acid, which is distinguished by the fact that by treating it with nascent hydrogen it can be converted into a strong non-nitrogenous tribasic acid, which in its turn can be entirely decomposed by dry distillation into a crystallizable pyro-product, carbonic acid and water.

$$\underbrace{C_{11}H_8N_2O_6}_{\text{Cinchomeronic acid.}} + 3H_2O + 6H = 2NH_3 + \underbrace{C_{11}H_{14}O_9}_{\text{Cinchonic acid.}}$$

$$\underbrace{C_{11}H_{14}O_9}_{\text{Cinchonic acid.}} - CO_2 - 2H_2O = \underbrace{C_{10}H_{10}O_5}_{\text{Pyrocinchonic acid.}}$$

Chinolic acid, the decomposition product of cinchonine, second in importance, has been recognized as a derivative of chinoline. It contains an atom of nitrogen in the form of NO_2.

$$\underbrace{C_9H_7N}_{\text{Chinoline.}} \qquad \underbrace{C_9\left\{\begin{matrix} H_4 \\ OH \\ OH \\ NO_2 \end{matrix}\right\}N}_{\text{Chinolic acid.}}$$

Cinchoninic acid is formed from cinchonine by the substitution of eight atoms of hydrogen by four of oxygen; it is possibly the carboxyl derivative of chinoline if its formula may be halved:—

$$C_{10}H_7NO_2 = C_9H_6N \,.\, COOH.$$

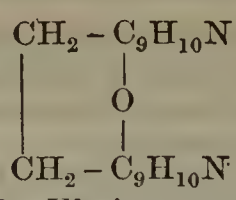
If at present it be not possible from this fact to settle the constitutional formula of cinchonine, it is manifest therefrom that neither is the constitution of chinoline, the chief product of the splitting up of cinchonine, nearer clearing up; and that the non-nitrogenous acid obtained, is not identical with any of the vegetable acids which it may resemble, nor with their derivatives. Its decomposition into pyrocinchonic acid, is analogous with that of citric acid into itaconic acid.

$$\underbrace{C_6H_8O_7}_{\text{Citric acid.}} - CO_2 - H_2O = \underbrace{C_5H_6O_4}_{\text{Itaconic acid.}}$$

$$\underbrace{C_{11}H_{14}O_9}_{\text{Cinchonic acid.}} - CO_2 - 2H_2O = \underbrace{C_{10}H_{10}O_5}_{\text{Pyrocinchonic acid.}}$$

Provisionally, therefore, we must be contented with a hypothetical formula for cinchonine, and as such, and one, moreover, that will serve to suggest further experiments, Dr. Weidel suggests—

* From "cinchonine," and μερος, a part.



By this formula Dr. Hlasiwetz considers that not only the experiments of Dr. Weidel, but also the facts ascertained in former investigations are best explained.

THE MEDICINAL AGENTS OF THE AMERICAN INDIANS.*

BY B. F. STACEY, CHARLESTOWN, MASS.

The query, "What medicinal articles are in popular use among the Indian tribes, and what properties are ascribed to such as are unknown to commentaries?" was proposed at the annual meeting of the American Pharmaceutical Association in 1870 for general acceptance; not having been replied to, it was taken up by the writer this year with the expectation of having a rich field of research. In this he was disappointed; the natural slyness and cunning of the Indian doctors render it very difficult to discover many of their medicines, and from a thorough investigation I am convinced that the list is not lengthy, and that there is but little to be learned from their school of practice or repertoire of medicinal agents. In many tribes more reliance is placed in charms and spells for curing diseases; and even when brought within the influences of civilization, the Indian when sick has refused all medicines, and looked only to incantations and the jingling of bells as a panacea to his ills. They are very prone to hang their faith on all the old traditional remedies of the past, and in many cases it is difficult to induce them to try anything else. It is related in King's American Dispensatory, that J. J. Caldas, pupil of the celebrated botanist Mutis, "who travelled from 1802 for many years in the mountains of Peru, in order to examine the natural history and geographical distribution of the cinchonas," states that the Indians who inhabit those regions, and among whom fever makes sad inroads, will not use it, believing that it heats the blood and the humours; and that the heaviest penalties are often inflicted to compel them to employ it as a remedy; and he remarks "that this prejudice is much against the fact of their ever having been acquainted with its use, as they cling with the greatest obstinacy to their inherited customs, vices, and prejudices." "Ulloa and Humboldt also express the opinion that the Indians were unacquainted with the use of cinchona."

As there is a wider difference in the histological elements, the higher in the scale is animal life, so is there a wider field for disease, and consequently for the action of remedies; we might, therefore, reasonably expect to find from these sources valuable hints, as well as useful adjuvants from aboriginal pharmacopœia, instead of which we have to confess embarrassment and meagre unreliable intelligence. The substance of my investigation only proves how little is known, and ever can be known now, to answer the above question.

Should one desire information concerning legends, religious customs, missions, dress, antiquities, moral or social condition, traditions or official relations with the North or South American Indians, curiosity could more readily be gratified. Observations concerning disease and more especially medicinal remedies, are not so generously recorded, if indeed they were ever at any time made. For one, I was never at any time able to see in the Indian character and life noble traits out-weighing repulsive barbarity. The miserable hordes of degenerate beings, enfeebled but not benefited by society, are quite likely the too common association with our opinion of the Indians; undoubtedly we do not realize the *pride, energy, self-reliance, independence of thought and action* which must have characterized their primitive simplicity. They have been compared in this condition to the cedar trees, withstanding the storms of ages; the dying of the top branches alone showing signs of decay. In one volume I saw at the Boston Public Library, published in the latter part of the last century, it was proved, at least to the writer's belief, that the Indians of the West are descendants of Jacob, and are in fact the long-lost tribes of Israel.

Before the landing of Europeans, the diseases common among the Indians were few in comparison with those which now debilitate their constitutions and thin their numbers. Tribes are mentioned in which never were known to exist any deaf, dumb, idiotic, or cases of insanity; others where only one or two instances of a deaf and dumb child or lunatic. Scrofulous and pulmonary diseases have always existed among them; probably, too, common continued, intermittent, and bilious fevers, dysentery, and rheumatism. Small-pox, however, ophthalmia, and venereal complaints in their most severe and loathsome forms, are the result of their acquaintance with civilized nations. We can imagine these maladies, their nature unknown, attacking a people exposed to storms and winds, liable to colds, with insufficient and unwholesome diet, subjected, too, to extremes of heat and fatigue, carrying heavy burdens—a deer, for example, weighing two hundred pounds—for miles, victims of intoxication and of wounds and internal injuries from fighting, furnishing material for a heightened and fatal virulence. When, too, we learn that one-half their children die before youth, we can realize why Indian tribes are now becoming among the extinct nations of the earth.

It has seemed strange to me, that, in the amalgam of races which serves to constitute the present American character, the Indian has formed so inconsiderable a constituent. Their characteristics would prove quite as desirable as the African, which some philosophers would make us believe is the only remaining element necessary to its perfection.

Where Indian tribes have received treatment from physicians at military and naval posts, the result of their experience with them is, that grave operations in surgery are not well borne, and that doses in minimum rather than maximum quantity produce better results.

The management of disease, when left to native skill exclusively, consists in the use of charms, rude forms of baths, and simple herbs. Their incantations might be compared to homœopathy, often a harmless interference, while nature effects the curative process.

One form of their baths is constructed of a wigwam, covered with hides, some three or four feet in height, in which is a large vessel of water. Into this water are plunged heated stones, and the vapour gives to the patient, seated in the inclosure a most effectual steam bath. Each tribe has its medicine men and women. Powwow, which signifies with us a noise, confusion, is in fact an Indian medical phrase, from their conjurations, attended with great noise and confusion, for the cure of diseases. Powwow is their term for a medical man, who is supposed to exercise domination over nature and the unseen world, uniting the character of priest and prophet, and often that of juggler.

Beth root (*Trillium pendulum*) is much used by the Indian women to promote parturition, uterine hemorrhage, etc.: it is also used in connection with unicorn root (*Aletris farinosa*) as a poultice for scrofula, glandular swelling, etc.

Mulberry leaves (*Morus rubra*), steeped in human urine, for fomentations in orchitis.

Wild cherry bark (*Prunus virginiana*) has always been used by them for its tonic effects, and also in dyspepsia, intermittents, and consumption.

Black cohosh (*Cimicifuga racemosa*) was given in rheumatism and for coughs. For rheumatism they used it in combination with poke-root (*Phytolacca decandra*).

* Read before the American Pharmaceutical Association at Richmond, Va., September, 1873.

Blue cohosh (*Caulophyllum thalictroides*), used by the squaws to ease parturition.

The water avens (*Geum rivale*), prominently mentioned by Dr. Wood, is valued for debility; it would appear the Chippewa Indians employ for the same purpose ragged cup (*Silphium perfoliatum*). The same tribe use yellow lily (*Nuphar advena*) in dropsy.

The well-known golden rod (*Solidago odora*) they use as a beverage in sickness, probably like our tea, for which it has been claimed it is really a pleasant substitute.

Masterwort (*Angelica atropurpurea*) aromatic is used in flatulence and colic. The *Senecio aureus*, a species of groundsel, from its saline taste, was employed externally and internally as an antidote to poisoned weapons.

Sweet clover (*Trifolium pratense*), used by the Penobscot Indians for sore eyes; also made into a salve for burns.

Night-blooming cereus (*Cactus grandiflora*), used by the Mexican Indians in irritation of the bladder, intermittent fever, difficulty in breathing, cough, etc.

The root of the *Actæa nigra*, a variety not noticed in the Dispensatory, a species of baneberry, thus classified because the berries are deemed deleterious, was much esteemed as expectorant and cathartic.

In venereal diseases, for chancre, they employ the actual cautery and a herb called Rosia, resembling, it is said, sarsaparilla.

For gonorrhœa, pills of wild pigeon manure, the therapeuties of which is not stated; also a herb named Chancelayna, which grows plentifully in California, and is a bitter astringent.

Dr. Herbert Miles, Surgeon British Army, relates his experience of the employment of the pitcher plant (*Sarracenia purpurea*) among the Nova Scotia Indians. "It is given in infusion; a large wineglass is taken; the effect of this is to bring out the eruption. After a second or third dose, given at intervals of from four to six hours, the pustules subside, apparently losing their vitality. The patient feels better at the end of each dose, and in the graphic expression of the 'Miemac,' knows there is a great change in him at once." Its action assimilates vaccination, modifies completely the disease, prevents pitting, and renders certain a favourable prognosis for the genuine variola.

Says the Scientific American, "Youpon, or Ilex cassine, a plant indigenous to the Southern States, but found only along the coast, is also used by them as an ingredient of the celebrated 'Black Drink,' which was used by the red men as a medicine, and as a state drink at some of their religious festivals. Youpon is used in some portions of the South as a substitute for tea and coffee and other stimulants; and it is reported to be very beneficial to inebriates who wish to cure themselves of their love for liquor."

Deer's tongue (*Erithroncum*), used by the Missouri tribes for breast complaints.

This brings me to the end of my list as far as I have had opportunity to catalogue.

At the present day, amongst the masses of the people and the uninformed, there is supposed to be a wealth of knowledge among the Indians concerning the treatment of disease, and "Indian Vegetable Pills," "Indian Restorative Bitters," and the host of patent medicines with the Indian prefix, are among the most saleable preparations in the market; and in our large cities there are swarms of advertising quacks, self styled Indian physicians, not one-tenth part of whom have a drop of Indian blood, and some I very much doubt ever saw a genuine "son of the forest." But the name takes; there is much in it, and always will be. Many regard the meadows, hills, and forests as laboratories, from which a medicinal agent for every known disease can be obtained, and suppose that many of these panaceas are known only to our dusky brethren.

ANALYSES OF EWE AND GOAT MILK.

BY DR. STEVENSON MACADAM, F.R.S.E.,
Lecturer on Chemistry, etc.

At the annual general meeting of the Gala Water Farmers' Club, held in the Town Hall, Stow, on Friday, May 1st, Dr. Stevenson Macadam gave an address on "Chemistry in connection with Agriculture," in the course of which he made the following remarks on the composition of ewe and goat milk:—

The nourishing properties of the various natural and artificial feeding stuffs must not only have an important bearing upon the sustenance, growth, and fattening of stock, but also on the quality of the milk yielded by cattle and sheep grazing on different pastures, and feeding on various artificial materials. Every agriculturist knows that there are certain fields where the sheep and lambs thrive better than on other fields; and such difference in the respective sustaining powers of the fields must be ascribed, in great part at least, to the respective qualities of the pastures in these fields—directly available in the grass, and indirectly available in the milk. Through the kind co-operation of my friend Mr. Lyall, of Caddonlee, I have been able to obtain five samples of ewe milk taken direct from the udders of five ewes placed under somewhat different circumstances; and having analysed these samples, I have now the opportunity of giving you the detailed results. I may mention that No. 1 ewe was newly lambed, and had been fed on turnips and second year's grass; No. 2 ewe was fed on second year's grass; No. 3 ewe was on first year's grass; No. 4 ewe was also on first year's grass, but in a different field; and No. 5 ewe was feeding on old pasture, probably 100 years old. Nos. 2, 3, 4, and 5 had been lambed for two to three weeks. The following table gives the principal results of the analyses of these samples of milk:—

ANALYSES OF EWES' MILK.

No. of Ewe.	Specific Gravity of Milk.	Cream per cent., by volume.	Total Solids per cent. by weight.	Solids not fat per cent. by weight.	Fat in Solids per cent. by weight.	Ash in Solids per cent. by weight.
1. Time of lambing...	1032·0	30	25·14	13·52	11·62	0·96
2. Two to three weeks lambed	1043·9	11	16·83	13·29	3·54	0·92
3. do. do.....	1036·2	20	19·83	12·41	7·42	0·98
4. do. do.....	1038·5	12	15·91	12·04	3·87	0·91
5. do. do.....	1027·9	22	18·55	10·48	8·07	0·94
Mean of all trials	1035·7	19	19·25	12·35	6·90	0·94
Mean of milk from Nos. 2, 3, 4, and 5 Ewes, and excluding No. 1 Ewe, being newly lambed	1036·6	16	17·78	12·06	5·72	0·94

It will thus be observed that the ewe milk taken at the time of lambing was extremely rich in solids and fat, and the milk taken from two to three weeks old varied much in quality. Indeed, excluding No. 1 ewe milk, which, being at the time of lambing, must be regarded as exceptionally high, the other samples of ewe milk ranged in specific gravity from 1027·9 to 1043·9; cream, from 11 to 22 per cent.; total solids, from 15·91 to 19·83 per cent.; solids not fat, from 10·48 to 13·29 per cent.; fat in solids, from 3·54 to 8·07 per cent.; and ash in solids, from 0·91 to 0·98 per cent.; whilst the average of the milks from Nos. 2, 3, 4, and 5 ewes, gave specific gravity, 1036·6; cream, 16 per cent.; total solids, 17·78; solids not fat, 12·06; fat, 5·72; and ash, 0·94. I am quite aware that the milk of a single ewe taken from each field must not be held as representing exactly the relative average composition of the milk from the whole or even from a score of the sheep in the respective fields; but taking the results of the analyses of the milks yielded by the ewes at Caddonlee, there can be no doubt that the milk of one ewe differs in quality, and probably also in

quantity, from the milk of other ewes grazing on the same farm and even in the same field. [Immediately after the address, Mr. Lyall, of Caddonlee, stated that probably part of the difference between the quality of the milks yielded by Nos. 3 and 4 ewes, which were both fed on first year's grass, might be due to the fact that No. 3 ewe grazed in a field which had the advantage of facing the south, and where the grass was more succulent and luxuriant, whilst No. 4 ewe grazed in a field lying to the north, and where the grass was not so succulent.]

The variation in the quality of ewe's milk is quite in keeping with the variations observed in the quality of cow's milk, as may be noticed from the following table, which gives the results of a large number of analyses of cow's milk taken from four dairies which supply milk to Edinburgh :—

Average.	Specific Gravity of Milk.	Cream per cent. by volume.	Total Solids per cent. by weight.	Solids not fat per cent. by weight.	Fat in Solids per cent. by weight.	Ash in Solids per cent. by weight.
Dairy						
A. Morning Milk	1031·46	7½	11·827	9·395	2·432	0·70
B. ,, ,, ...	1032·14	8	11·95	9·50	2·453	0·69
C. ,, ,, ...	10 3·0	8	12·36	9·91	2·45	0·69
C. Forenoon Milk.. ...	1032·3	10	13·54	10·41	3·13	0·73
D. Morning Milk	033·5	6¼	11·23	9·36	1·87	0·71
D. Forenoon Milk.....	1031·4	8½	12·58	9·74	2·84	0·71
D. Afternoon Milk ...	1030·8	9	12·43	9·52	2·91	0·72
Average of four dairies, representing forty-six cows and 66 samples of milk	1032·1	8¼	12 27	9·69	2·58	0·71
Differences in quality of milk, including all trials, but excluding partial runnings—						
Lowest	1028·3	5	10·57	8·62	1·56	0·62
Highest	1035·7	11	14·54	11·23	3·47	0 76
Difference	7·4	6	3·97	2·61	1·91	0·14

I have likewise examined, during the last month, five samples of goat milk—No. 1 sample was that taken from a goat—half-bred Egyptian—which had newly kidded ; No. 2 sample was from the same goat on the day after kidding ; No. 3 sample from the same goat during four days thereafter ; No. 4 sample from the same goat on the seventh day ; and No. 5 sample was taken from another goat where the milk was three weeks old. The results of the analyses of these milks were as follows :—

No. of Sample.	Total Solids per cent. by weight.	Solids not fat per cent. by weight.	Fat in Solids per cent. by weight.	Ash in Solids per cent. by weight.
No. 1 Goat Milk.....	29·28	21·52	7·76	1·18
No. 2 ,, ,, ...	19·42	13·58	5·84	0·97
No. 3 ,, ,, ...	18·26	12·51	5·75	0·96
No. 4 ,, ,, ...	16·18	11·52	4·66	0·92
No. 5 ,, ,, ...	13·43	9·12	4·31	0·73
Mean of all trials	19·31	13·65	5·66	0·95
Mean of Nos. 2, 3, 4, and 5, samples, excluding No. 1, being from goat newly kidded	16·82	11·68	5·14	0·89

The specific gravity and cream could only be conveniently taken in the case of No. 4 sample, where the specific gravity was found to be 1033·9, and the cream 13 per cent. by volume. The analyses demonstrate that when the goat drops the kid, the milk is extremely rich, and that the quality comes down day by day, till in three weeks it resembles, in composition, very rich cow's milk. It may be instructive to contrast side by side the quality of average cow's milk, average three weeks old ewe milk, and three weeks old goat milk, and the following table will enable us to do so :—

	Average Cow's Milk.	Average 3 Weeks old Ewe Milk.	3 Weeks old Goat Milk.
Total Solids per cent. by weight	12 27	17·78	13·43
Solids not fat	9·69	12·06	9·12
Fat in Solids	2·58	5·72	4·31
Ash in Solids	0·71	0·94	0·73

It will thus be observed that goat milk is richer than cow-milk, especially in fat, and that ewe milk is decidedly richer than either goat or cow milk on all points. It is probable that a knowledge of this fact may lead to the use of ewe milk by invalids and others desirous of having very rich milk as an article of diet.

INDIGENOUS BOTANY.*

BY G. E. DRUCE.

The advantages of the study of botanical science now scarcely require explanation, nor does its place in our pharmaceutical curriculum need apology ; the advantages are neither few nor small, and the position it occupies is not unimportant. Plant study is the true "open sesame" to the knowledge of botany, which is too often looked upon as a mere jumble of barbaric names strung most uninterestingly together, or as a necessary evil ; a subject to be crammed rapidly, as if it were some disgusting bolus to be got out of sight as soon as possible. Fortunately these opinions are gradually giving way to others more enlightened and true. The scientific names are hard only because they are strange : we do not call the terms capsule or bacca difficult, because we daily apply the first to poppy, and generally misapply the second to juniper ; we do not call the names geranium, camellia, or mignonette difficult, because they are household words ; familiarity with hard names is what collecting plants will bring to the student, till the *Hypericum*, the *Epipactis*, the *Chrysosplenium*, become equally as easy as the foreign ones already mentioned—polysyllables which only a short time before would have so upset mental digestion, that no remembrance of them would be retained save of their length and nastiness. It must not be considered that these long classical names are but a medley of haphazard letters, arranged in a haphazard manner ; on the contrary, they generally express some truth, some peculiarity, some property, hidden in the uncouth word. For instance, what can better explain the habit of the creeping St. John's wort than its specific name, *humifusum*—trailing along ; or is there not something appropriate hidden in the generic name *Erodium*, applied to the hemlock leaves ? Stork's bill—crane's bill—is an English name given to many of the geraniums, from their long fruit like a bird's neck and head—*Erodium* means heron. The *Helminthia* is so called from its *worm*-like fruit, the name recalling the word anthelmintic Names such as *vulgaris*, *arvensis*, *saxatile*, and *uliginosa*, denote frequency of occurrence and place of growth. Thus you would look in fields for *Knautia arvensis* or *Ranunculus arvensis*, on heaths for *Galium saxatile*, or among bogs for *Stellaria uliginosa* : those who have seen the great sheltering leaves of the butter bur can better appreciate the strange name, *Petasites*, derived from a Greek word meaning umbrella, and will not think the name *Lithospermum*—stony nutlets—misapplied to the hard-fruited gromwells.

It will be seen that something more is required of a botanical student than the mere gathering of plants, for that is no higher intellectual effort than collecting postage stamps ; while it requires patient perseverence to name plants with only book aid, yet the progress made, though perhaps slow, must teach one something of the science—must make one wish to know more. Every plant you may gather has something worthy of notice ; the meanest

* Read before the Northampton Pharmaceutical Association, April 27, 1874.

weed or gayest flower presents some peculiarity of structure, some strange habit, use, or property, and it is the discovering these habits, uses, and properties that gives much of the charm to our collections, and greater additions to our knowledge.

Let us take as the type of an order, the daisy—whose generic name, *Bellis*, is derived from a word meaning pretty, and its specific name, *perennis*, on account of its duration of growth—and see if any information is suggested by the "wee pinky tipped" favourite of Burns. Looking at the flower we see an outer ring or whorl of green organs, which looks like a calyx; next comes the pretty white part that forms an apparent corolla, and inside these is a collection of yellow organs which look uncommonly like stamens and pistil. This is a casual but most incorrect description, yet an explanation that doubtless has been given when an imperfect book student has been shown a flower and tried to examine it for, perhaps, the first time. But look at the daisy under a 2 or 3-inch binocular, or with a triplet, and you will say "Why, it looks like a lot of flowers;" and is it not so? Be a vivisector for once, cut out a piece of the yellow centre—disc it is called—and you will see that each yellow piece is really a complete flower, having, it is true, no calyx, but an elegant little funnel-shaped lobed corolla, not divided into petals, *i.e.*, monopetalous. Split open this little yellow corolla and you see some thread-like things called filaments, expanding at the top into what are called anthers. These anthers you see grow together round a central body, which is called a style, and has at the top a viscid space called a stigma; it is here bifid and has plano-convex lobes. This mode of anther growth is called syngenesious. The white ring or ray, apparently consisting of petals, consists really of flowers having no stamens, and the corolla is monopetalous, one side being elongated into a strap-shaped process, which forms the pretty white ray. The green outer organs of apparent sepals are really bracts, arranged in two rows, forming an involucre. The leaves are of a somewhat unusual shape—spathulate. This strange compound growth of flowers upon a common receptacle is called composite, and gives the name to one of the largest and most important natural orders, *Compositæ*, and the still stranger manner in which the anthers grow together round the style, their filaments remaining free, gives the name to one of Linnæus's artificial orders, *Syngenesiæ*. This syngenesious growth of anthers is very characteristic of the *Compositæ*. In other plants of this order, as the dandelion, the calyx is present as well as the corolla, and is that little plume which remains behind upon the receptacle after the corolla has withered and gone, and which the country youngsters blow to see "what's the clock." These plumes form pretty micro-polariscope objects when mounted in balsam; sometines, as in the plume thistles, this pappus calyx is beautifully branched. The fruit is fastened to these little parachutes, which are wafted about hither and thither by every passing breeze, till the rough appendages at the bottom of the fruit fasten it to some convenient anchorage, or drops down some crevice in the parched ground, and at some future period, under auspicious circumstances the seed germinates, grows, and produces a plant. It is not a little remarkable that when ground is turned over, as on railway banks, the most numerous of all the plants which appear are these pappus-bearing *Compositæ*.

But turning from the daisy to the buttercups, a great difference in appearance at once strikes our notice. Let us look at the little celandine, *Ranunculus ficaria*, Wordsworth's "star-like celandine." We see the calyx is formed of separate, distinct sepals, and the corolla with its golden burnished petals also distinct; coming next, situated on the thalamus—marriage bed—are the stamens which scatter the golden dust—pollen—with which the botaniser gets "foot gilt" on passing through the meadows; then next to the stamens in the centre is the compound pistil, consisting of several parts called carpels, and as these are distinct, the pistil is apocarpous; these form when ripe, achenia. The leaves are generally cordate in shape and glossy; the root is tubercular, and, from these tubers being formerly used in hæmorrhoids, the old English name for the plant—pilewort—was given. Another of the *Ranunculaceæ*, the marsh marigold, *Calsha palustris*, the "marish flower" that adorns boggy meadows and brook sides, is also worth notice on account of its green calyx which on expanding changes to burnished gold, making up by its showiness of sepals for the absent corolla. Next, another meadow plant but not resembling the preceding, is the cuckoo flower, *Cardamine pratensis*, In this plant the calyx is divided into four sepals and the corolla into four petals, which are arranged in the form of a Maltese cross. Plants with this cross arrangement frequently belong, and in fact give the name, to the order *Cruciferæ*—cross-bearing. The stamens are six, two being much shorter than the other four, an arrangement called tetradynamous; the two shorter stamens shed their pollen *towards* the stigma, the four longer *from* it. The tetradynamous stamens are very characteristic of the *Cruciferæ*, which is a truly natural order; all the plants in it are wholesome, and many of them possess antiscorbutic properties. The fruit, very rarely produced in this plant, is a siliqua or bean pod, being a long compressed pod with two valves joined to a centre partition by their faces; in the shepherd's purse, *Capsella Bursa-pastoris*, another cruciferous plant, the fruit is a silicula, the term given to a short and broad siliqua; whereas in the swine's cress, *Senebiera Coronopus*, the fruit is indehiscent.

A question often asked by beginners is, Where shall we gather plants? You cannot go anywhere without making some addition to your collection.

> "Everywhere about us are they glowing,
> Some like stars to tell us spring is born,
> Others, their blue eyes with tears o'erflowing,
> Stand like Ruth among the golden corn."

If you choose the meadows, now golden with buttercups, you may find the beautiful meadow saxifrage, *Saxifraga granulata*, with its peculiar root appendages; the early purple orchis, *Orchis mascula*, which will show you the gynandrous growth peculiar to orchids; or the tuberous earth nut, *Bunium flexuosum*, type of the *Umbelliferæ*, and the clovers, grasses, and sedges in abundance. Or if you prefer the highways, you may find Jack by the hedge, *Alliaria officinalis*, smelling strong of some allyl derivative; the herb Robert, *Geranium Robertianum*; while in places the sunny hedgebanks are blue with ground ivy, ale-hoof, *Nepeta Glechoma*, or the still prettier germander speedwell, with its two stamens; or trailing by the side of the dusty road, the silver weed (goose grass), *Potentilla anserina*, or its relation the cinquefoil, *P. reptans*; while masses of the avens, *Geum urbanum*, which has been recently pointed out as an adulterant of arnica, and whose root you should make acquaintance with; then the great favourite of the "Yarl" women, yarrow, *Achillea millefolium*, and agrimony, *Agrimonia Eupatoria*, the odorous violet, the red and white campions; or on the hedges, the dog rose and the *Lonicera Periclymenum*, the woodbine "which loves to crawl up the low crag or ruined wall;" while straggling over the hedges "white with May," the black bryony is showing its glossy heart-shaped acuminate leaves. Should you choose the cultivated fields, you see the *Veronica arvensis*, *hederifolia*, etc., the dead nettles, the "rank fumiter," *Fumaria officinalis*, the lovely scarlet pimpernel, *Anagallis arvensis*, the "burning spurge," *Euphorbia helioscopia*, oozing milky juice at every wound; or where the glaring red of the poppies, *Papaver Rhœas* and *dubium*, please, with their picturesque contrast, all but a farmer's eye. Should you take a forest walk, you need not be idle, nor your vasculum remain unfilled; for, if not too late in the season, you will see "thickly strewn in woodland bowers anemones their stars unfold;" the lovely crab blossom, blushing like the sky at morn, or in some dark nook, the delicately streaked corolla of the wood sorrel, *Oxalis acetosella*, with its trifoliate leaves, emblem of the blessed Trinity, or "the primrose stars in

the shadowy grass," the bugle, *Ajuga reptans*, with its creeping scion, and the barren strawberry ; while in some shady place great patches of the herb mercury cover the delicate little moschatel, or the blackthorn borders are brightened and whitened by the brittle *Stellaria Holostea*. Then sitting down near some lime tree, with its sweets attracting the bees and bright hairstreaks and fritillaries which sport about in the bright sunlight, you count your treasures while you not altogether neglect the inner man, and rise up with renewed vigour to look after the vulnerary's wood sanicle, and find not only that but the graceful ladies' mantle, *Alchemilla vulgaris*, with its crenated leaves (and the white bryony, growing its little cucumbers, type of the purgative elaterium and colocynth) ; or, again, the pink ragged robin and yellow archangel vie with the blue bells and dog violets, in beauty as in number ; or, taking to the ridings, you may find the eye-bright, *Euphrasia officinalis*—"the little euphrasy that gives dull eyes to wander leagues around," " the eye-purging euphrasy ;" or should you go for a canoe voyage down the river, you will see quite a different flora, "the blue forget-me-nots that grow for happy lovers," the chaste water lilies, with their peculiar structure, their large cells and spicular raphides, and their flowers so often showing a general transformation ; the arrow-head, *Sagittaria sagittifolia*, with its delicate flowers and sagittate leaves ; the tall *Butomus* ; the bur reed, *Sparganium ramosum*, with its stramonium-like fruit. Now sweeping by patches of creeping jenny or money wort, *Lysimachia nummularia* ; or tufts of the hairy willow herb, *Epilobium hirsutum*, with its peculiar pollen and apple-like smell. Now the banks are reddened by tufts of loosestrife, till in shallow water it takes extra pulls to get through the long waving masses of the water crowfoot. Then on again, crushing through thickets of the reed mace, *Typha*, or snatching at the yellow iris ; now quietly floating by some dark corner you find the horseradish, now again nearly hidden by the rushes and great water dock, *Rumex hydrolapathum*, which looks almost tropical from its profusion of growth. Or if, in your holidays, you should want to get "far removed from smoke of town," you go among the mountains, you will find occupation even there.

Never shall I forget the pleasures of an ascent of Cairngorme some time since, when in the Scotch Highlands. Our way first led through a part of the pine forest of Rothiemurchus, where the *Coniferæ* grow in almost Canadian profusion. Coming here and there on some little clearing where the " hewers of wood " had built their shanties in almost Canadian simplicity ; then keeping by the banks of the Spey, down which were floating rafts of timber. But as we continued our journey the river narrowed, and its appearance began to raise our piscatorial ardour, till, passing through acres of sweet gale, *Myrica Gale*, and *Vaccinium*, botanical love regained supremacy, and was rewarded by finding the *Trientalis europæa* ; then came a novel sight to us of black burnt ground and charred tree trunk—only about a yard remaining—not a bit of living green around, some forest fire having cleared a way across the forest. But soon getting to green vegetation again, passing by Lake Mydoch—where the golden eagle once had a nest—after a stiff walk we commenced ascending the mountain quickly, finding the *Saxifraga aizoides* and *hypnoides ;* now passing over a steep slope, heather-covered, soon we added the alpine ladies' mantle and *Sibbaldia* to our store ; then going over squashy bog we found the cranberry and the lovely cotton grass, *Eriophorum*, and, in ground where to stay was to sink, grew the *Lycopodium inundatum* and *Pinguicula*, butterwort. As we gained higher elevations, we found the creeping azalea, or near some little stream that looked like a silver thread falling from the snow fields above, the rare little *Arabis petræa*, or higher still some *Cetraria* or *Lycopodium* was growing, more typical of Lapland than Great Britain. And when at length we reached the summit, were we not repaid for the exertion by the grand expanse of country laying around ? Looking on one side over Loch A'An towards Ben McDhu, with the snow laying in the dark fissures of the mountain, or on the other side down into the forests of Glen More, with the deer jumping and bounding over some fern-covered knoll ; or in another direction, what a prospect of sterile beauty and magnificent wildness could be obtained. Such an array of mountain tops growing indistinct in the distance, till mountain or blue mist could scarcely be distinguished from each other !

Or should you prefer the lovely lake district, what numbers of plants you may gather in walking by the placid lakes, through the rugged passes, or in ascending the wild fells and mountains.

Walk for instance by Lake Ennerdale, through the valley of the Liza, and before you have long passed the "Angler's Lake," in some of the narrow lanes you will find the fugacious yellow poppy, *Mecanopsis cambrica :* and as you reach the boggy ground at the end of the lake, in some pool you may find the pale water lobelia, *L. Dortmanna*, and the bitter, tonic, bog bean, *Menyanthes trifoliata* ; while, growing on the rocks, the sea plantain shows its insignificant-looking spikes ; or where some little rill comes brawling down the fell side, the *Chrysosplenium* and the *Drosera*, with its glandular leaf-appendages. But the lovely views of the rocky precipices of the Pillow Mountain, with the ugly-looking rock that gives it the name, of Ennerdale Lake lessening in the distance, and the river Liza winding through the valley, compel us to leave botany for a time and we commence climbing up the stiff side that begins the Scarf Gap Pass, the rocks being covered here and there with the sweet scented mountain fern. On reaching the top we find, growing out of the rock, the bright green parsley fern ; passing on we soon lose the valley of the Liza behind Buttermere Lake, and Crummock Water comes in sight ; near the former, bordered by the bird cherry, green meadows lay with bells and flowerets of a thousand hues. Passing these and ascending gradually again till opposite the steep sides of Homster Crag, we must botanize, and, climbing recklessly up the steep sides, find *Thalictrum alpinum*, and by the side of a waterfall, *Oxyria reniformis*, the mountain sorrel with its kidney-shaped leaves, or by the side of the road in moist ground the pretty Lancashire asphodel with its spikes of bright yellow flowers, or the acrid *Ranunculus Flammula*. Then gradually descending into Borrodale, where we found the pale blue flower of the giant campanula beside the purple foxglove, and, climbing among the grass, the sweet little *Anagallis tenella*, bog pimpernel, with its tiny streaked corolla, truly a crown of glory, the large blue "pansy freaked with jet" ; and growing on old walls, on rustic bridges, out of jutting rocks, the ferns seemed everywhere, the wall rue, the spleenworts, polypody, oak and beech ferns, as beautiful as abundant.

We cannot help noticing how, on clayey ground, one series of plants grow ; on chalk, or limestone, these give place to new ; while on sandy soil, still fresh ones are found. So we find that geology has not a little to do with plant life, but that their growth has geological as well as geographical limits.

How peculiarly suited this science is to us needs scarcely an argument, for it adds still greater pleasure to the short respite from long and close confinement, not to say imprisonment, which we endure. How in the short hours devoted to this study we get knowledge, refining, enlightening, improving, teaching us

> "To look on Nature with a humble heart,
> Self-questioned where it does not understand,
> And with a superstitious eye of love ;"

leading us to art and science for help—since Botany requires a microscope to demonstrate and an artist to portray—explaining and making easy to us organic Materia Medica in the best manner, sending us to poetry for pet names for the pretty ones, opening glimpses into the distant past by the quaint, curious, suggestive, country names. These are only a few among the many advantages to be derived from a knowledge of botany.

The Pharmaceutical Journal.

SATURDAY, MAY 30, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SELECT COMMITTEE ON THE ADULTERATION ACT.

THERE are many points in the evidence of which we published a report last week, which are eminently satisfactory to those engaged in the practice of pharmacy, so far, at least, as the general repute of their calling is concerned. In the first place, there seems to have been an unanimous denial of the existence of adulteration as regards drugs to anything like the extent that is commonly—we had almost said vulgarly—assumed to obtain. No doubt many of the drugs imported into this country are impure, either by accident in collection, or by reason of intentional admixture, but in many cases this circumstance operates only as a reduction in their value, and does not make them, otherwise than relatively, less valuable for many of the purposes to which drugs are applied in the present day. Opium and cinchona bark are striking instances of this, for though much of the opium imported is below the standard quality, it is quite as well available for the manufacture of morphia. Cinchona bark of that kind which contains the largest amount of quinine is now so scarce that a serious injury would be done if any restriction were imposed upon the importation of various kinds of this bark that are inferior only in containing smaller amounts of quinine.

Some of the questions put to the witnesses by members of the Committee indicated very forcibly an exaggerated estimate of the extent to which adulteration affects the quality of drugs used for the preparation of medicine, or supplied by druggists throughout the country. Whether these questions represented the belief of the inquirers, or were merely put in order to test the soundness of popular impressions, we cannot say; but it is satisfactory to observe that they were in every way received with unqualified contradiction. As an illustration of what is now referred to, we may instance the question whether it was not notorious that chloroform is sold containing little or no chloroform at all. Again the question concerning James' Powder betrayed a total want of acquaintance with all the facts of the case; so, likewise the question whether a prescription ordering opium would not have a very different strength when prepared in Edinburgh from that it would have when prepared in London. Then, to judge from the questions asked, it seemed to be thought almost impossible to get a prescription properly dispensed in a provincial town, even such a one as York, which was by accident mentioned. On this point, obviously one of great importance, not only for the public, but equally for the general interests of pharmacy, the answers left no kind of doubt that a country druggist could supply drugs of quality quite equal to those sold in London, and that prescriptions were dispensed in the country as well as in London.

It would indeed be in itself a monstrous anomaly if this were not the case, and the mere suspicion shows that there is much room for making more widely known what is the nature of the work the Pharmaceutical Society of Great Britain has been engaged in for the last thirty-three years.

Another point referred to in the examination was the injury suffered by a druggist in consequence of a prosecution of an unfounded or frivolous nature. It was very properly contended that a pharmacist's reputation is worth more than that of an ordinary dealer, from the nature of his business. If then it be desirable to protect retail traders in general from the inconvenience and damage likely to arise from improper prosecution, this is especially the case as regards druggists. From this point of view a very strong case was, we consider, made out in favour of the appointment of some Central Board competent to consider proposed cases of prosecution, judge of the facts on their merits, and decide impartially whether sufficient ground existed for carrying out the provisions of the Act.

Our readers will be sufficiently familiar with the miscarriages that have taken place in adulteration cases to appreciate the value of some such organization for protecting the honest tradesman from becoming the victim of misguided zeal on the part of local officials who possess no special knowledge to qualify them for deciding, in many instances, whether a prosecution should be instituted or not.

In reference to this point, however, we cannot at all agree with the suggestion that the chemical department of the Inland Revenue Board should be, or could be made, the authority for reference in questions affecting pharmacy or drugs. Not that we at all disparage or undervalue the work that department has long been doing, both in its own proper sphere of action and on many occasions outside it. Our reason for this objection is the opinion that no good is done by concentrating in one department the conduct of various kinds of work. Moreover, we believe that the growing demand for the aid of chemical skill in many matters relating to the public health and local government calls for the establishment of a department of public chemistry, with officers specially capable of dealing with questions of that kind.

The tendency of much of the evidence given last week before the Committee on the Adulteration Act does not furnish any great support to that claim for exemption of chemists and druggists from liability under the Act for selling adulterated drugs, which has been urged on the ground that such drugs were

sold as obtained, and without sophistication on the part of the seller. Both Mr. Horner and Mr. Hodgkinson, while admitting that the Act presses harshly on the vendors of drugs, decidedly represented the influence of the wholesale houses as being exercised in protection of the retail dealers. They put forward, and we believe they did so justly, the view that druggists can easily obtain, even in the country, drugs of the best quality if they are disposed to pay the price. Speaking as representing the wholesale drug trade, they, in fact, disclaimed any responsibility for sales of adulterated or spurious drugs; and by implication, they threw upon the retailers the whole onus accruing in such cases as, for instance, that at Glasgow, reported in this Journal at page 824.

There is also some good reason for the fact that the Adulteration Act does not, any more than the Pharmacy Act, touch the wholesale trader. He may fairly take the position that, as a purveyor of goods to customers belonging to a specially educated class of semi-professional men, his business is to supply what is required of him, without inquiring what use is to be made of it. On the other hand, since the qualifications of the retailer to carry on the business of a pharmacist may reasonably be expected to comprize the ability to judge as to the quality of the drugs thus supplied to him, there seems to be but slender room for any repudiation of responsibility on his part if the drugs he sells or uses in dispensing are not what they should be. The grocer who pleads that the adulterated tea he has sold was supplied to him exactly in that state by the merchant, at the best cuts only a sorry figure, for who should be so well able to judge whether tea is good or bad as himself? In a business, however, where the materials dealt in are often the agents of life or death, the application of this principle is imperative.

RHEUM OFFICINALE.

Those of our readers who may wish to become acquainted with the appearance of the species of *Rheum* which Professor Baillon lately named *Rheum officinale*, upon the presumption that it is the true source of the officinal rhubarb, will find an excellent engraving of it in *The Garden* for May 23rd. The plant has a noble appearance, and it is said that although, perhaps, it may not be sufficiently hardy to withstand severe spring frosts, it will doubtless form an attractive decorative plant, either on lawns singly, or in other prominent positions, during the hottest months of the year.

THE JACOB BELL MEMORIAL SCHOLARSHIPS.

It may be useful to gentlemen intending to compete for the Jacob Bell Memorial Scholarships, to remind them that, under the new regulations, the last day on which applications can be received by the Secretary is Monday next, June 1st.

Mr. William Morgan, Ph.D., F.C.S., has been appointed Public Analyst for Swansea, at a salary of £100 per annum.

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

A meeting of the above Society was held at 150, North Street, Brighton, on Friday, May 22nd., Mr. W. D. Savage, President, in the Chair, for the purpose of exhibiting microscopic objects.

A number of interesting preparations having been shown, the President brought the evening to a close by presenting Mr. Mathews, one of the honorary Secretaries, who is about to leave Brighton, with a handsome gold pencil-case, accompanied by a testimonial signed by all who had contributed to its purchase, expressive of their high appreciation of the services he had rendered to the Society during the time he had been Secretary, and their regret at losing him from their midst. He then made a short speech, in which he expressed the most kindly feelings towards Mr. Mathews and best wishes for his future success.

This having been followed by similar remarks from Mr. Cornish, and Mr. W. H. Smith, Mr. Mathews briefly responded, and the meeting terminated by passing the usual votes of thanks to the exhibitors and the Chairman.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, May 21st, 1874.—Dr. Odling, F.R.S., president, in the Chair. After the ordinary business of the meeting, the President called on Dr. W. H. Corfield to deliver his lecture "On the Sewage Question from a Chemical Point of View." The lecturer, after remarking that he was about to consider the value of chemical evidence on the sanitary view of the subject, compared the various systems for treating sewage, all of which might be reduced to two classes: the first, that of conservancy, where more or less of the solid matter was retained in the neighbourhood of habitations; and the other, where the whole of the excretal matter was removed along with the foul water by means of sewers. He emphatically condemned the former as poisoning the wells in the neighbourhood, and tending to produce disease; the death rate being in an inverse proportion to the efficiency of the means employed for the removal of the sewage. He subsequently discussed the methods of rendering sewage innocuous, showing that the only one of any value for this purpose was that of intermittent surface irrigation. An interesting discussion ensued, and the meeting finally adjourned until Thursday, June 4th, when the following papers will be read: 1. "On Dendritic Spots," by H. Adrien; 2. "On the Acidity of Normal Urine," by J. Reoch; 3. "Note on Kauri Gum," by M. M. P. Muir; 4. "On Certain Compounds of Albumen with Acids," by G. S. Johnson; 5. "On a Simple Form of Apparatus for Estimating Urea in Urine," by Dr. W. J. Russell and Mr. S. H. West; 6. "On Ipomæic Acid," by E. Neison and J. Bayne; 7. "On the Action of Chlorine and Bromine on Isodinaphthyl," by W. Smith; 8 and 9. "On Acetyl Sulphite" and "On a New Formation of Toluol," by Dr. D. Tommasi.

MEDICAL SOCIETY OF LONDON.

At the meeting of the Medical Society of London on the 27th of April, under the presidency of Mr. Victor De Meric, two papers were read bearing upon the administration of phosphorus. The first was by Dr. Routh, and was entitled,—

Some New Preparations of Phosphorus, with General Remarks as to their Therapeutical Value.

He stated that the paper was a corollary to his former communication on "Overwork and Premature Mental Decay." He then had mainly spoken of two preparations of phosphorus—viz., the solutio phosphori medicati, a solution of phosphorus in almond oil, with a little mucilage

and essential oil of the strength of 1-6th of a grain of phosphorus to the drachm; and the phosphide of zinc, both used by Mr. Hammond, of New York. In speaking of the effects of phosphorus as a drug, it was best to take this solution as a standard, and this pointed out the differences in the action of the other preparations. Dr. Routh then spoke of the effects of phosphorus, which were those of a stimulant in small doses, sedative, and producing a pleasant sensation of warmth, relieving neuralgia, and effective against certain obstinate skin diseases, such as eczema and acne, and he thought it retarded the progress of cancer. It was also an aphrodisiac, and appeared to improve the mental qualities if deteriorating. In larger doses it acted as an acrid poison, the peculiar feature being a burning sensation in the mucous tract, and whenever this symptom appeared it was a proof that the medicine had been carried far enough. With some persons it acted suddenly, producing, even after the first dose, sickness, faintness, and great stomach pain. Idiosyncrasy alone could account for this, and possibly decomposition. For these reasons Dr. Routh recommends the use of sperm oil, or purified neat's foot, in lieu of sweet almond oil; five drops of this solution added to a tea-spoonful of cod-liver oil improves the action of the latter in proper cases. The phosphide of zinc has been said to be inert, because insoluble, but it is easily assimilated. Rubbed up in a mortar it emits the characteristic garlic odour, and burns spontaneously when thrown over a flame. It is a weak preparation, and has been safely given in doses of one grain three times a day. Like other preparations of phosphorus, it is apt to clog up the liver, and must then be suspended for a few days. Chloro-phosphide of arsenic is prepared by bringing pure hydrochloric acid into contact with phosphorus and arsenic in a fine state of division. While the phosphide is insoluble, the chloro-phosphide is very soluble. The solution is of a clear yellow green, and pleasant taste. It is decidedly antiperiodic and effective in cases of neuralgia. This solution contains ten grains of arsenic, and 16½ of phosphorus to the ounce; the dose is, therefore, 3 to 5 minims, *ter die*. It can be largely diluted, and the author prefers one that is regulated at 15 drops. The syrup of phosphorus contains gr. 1-10th in the ℥i. The phosphorus should be added in a pure state, and finely divided with caution. It is very nice to the taste; dose 20 to 30 min. In cases of poisoning by phosphorus, Dr. Routh recommends emetics and an antidote in the form of turpentine; and in conclusion remarked that the exhilarating effects of the drug gained upon patients, and care must be taken lest in this way we introduce a new form of dram-drinking.

Mr. Ashburton Thompson then read a paper entitled

Suggestions for the safer Administration of Free Phosphorus.

He began by remarking that the internal use of phosphorus was almost as old as the discovery of the element itself, and that the medical literature of the century, dating from 1720, offered more essays on this than on any other single subject. Yet the employment of this element as a remedy was never firmly established, its history presenting fluctuations in popular favour that are unknown in the history of any other remedy. These fluctuations suggest that an element of danger attended the very great remedial properties it was found to possess. That this was the case was evidenced by the records of its use, where more than one case of fatal poisoning can be found. The author then alluded to the recorded experience of Drs. Hughes, Bennett, Eames, Cotton, and Broadbent, who gave phosphorized oil in doses equivalent to from 1-40th to 1-8th of a grain of free phosphorus in an aggregate number of fifty-two cases, with the frequent occurrence of abdominal derangement; then to his own experience of nine cases, in every one of which symptoms of poisoning had been observed—slight in all but one, in which death was hourly expected for three days. He then recited two cases of great interest, one already reported in the *Lancet* by Mr. Reedale. A child ten years old took for twenty-three days 3-5ths to 9-10ths of a grain of solid phosphorus, and the etherial solution daily, without evincing any serious symptoms, but did so after the fifth dose of 5-6ths of a grain dissolved in oil. The other case was reported by Solin. A male adult took half a grain of phosphorus in ether every twenty-four hours for nine days, and yet died of less than one grain dissolved in oil, and taken during thirty-five hours. He stated that others beside himself had found that a dose of phosphorus, poisonous when dissolved in oil, might be far exceeded if dissolved in ether and alcohol; while the excellent results obtained with the latter preparations testified to their activity. No case with the last-named solutions had been recorded. Mr. Thompson then considered what chemical change might account for the exhibition of unexpected toxic power on the part of phosphorized oil, and he asserted that phosphorized cod-liver oil might be given with the same safety as phosphorized ether or alcohol, and in the same doses. The main difference between this fish-oil and the vegetable (almond or olive) oils generally employed was, that the latter absorb very large proportions of air. As phosphorus oxidized very easily, this absorption exposed the element to change. Freely exposed to air, phosphorus passes rapidly into phosphoric acid—a harmless medicine; but it seemed plausible to the author to imagine that the density of vegetable acids, together with the peculiar manner in which they present oxygen to phosphorus, might serve to delay the element in its lowest and first stage of oxidation—viz., as hypophosphorous acid. The author then reviewed the important characteristics of this body—viz., causticity, its extreme avidity for oxygen, the ease with which it is absorbed; and alluded to a remark of Devergies, which showed that he had regarded their transformation as the cause of poisoning in Solin's case; also to Personne's recent experiments, which show that phosphorus, dissolved in hypophosphorous acid, is most readily absorbed, and becomes imbued with toxic powers quite out of proportion to the actual quantity of free phosphorus present. The author alluded to the possible influence of idiosyncrasy, and stated that, having watched more than 400 cases treated with this drug, and having carefully considered most of the hitherto recorded observations, he did not feel satisfied that any peculiar idiosyncrasy with regard to it existed, but he awaited the result of further experience. The solutions of phosphorus in vegetable oils do not, for the reasons stated, afford a safe means of exhibiting free phosphorus. The manner of preparing the oil in France consisted in heating it to about 560° F., and in England to 300°, which certainly drove off the air and water suspended in the oil, but did not avoid the dangers which must arise in the manner described from absorption of fresh portions of air and aqueous vapour, and therefore the author declined to use phosphorized vegetable oil any longer. He referred to the absorption of solid phosphorus by the stomach, and deduced the rule that it should be taken with food. Of zinc phosphide, he said that since it acted only after decomposition by the acids of the stomach it followed that many doses might accumulate and remain unchanged if the secretions of that organ were alkaline. If the accumulations were then suddenly brought in contact with acid, symptoms of poisoning would occur. This had happened in a case noted by Professor Gubler. The obvious and very necessary precaution consisted in the use of an acidulated tonic with each dose of the drug, or the dietetic employment of lemonade during the medication. Mr. Thompson concluded by stating that these rules, though simple, had never been formulated before, and he believes that ignorance of the facts on which they are founded had conferred on free phosphorus a reputation for treacherously poisonous qualities, even in remedial doses, in reality, appertaining (in the case of phosphorized vegetable oil at least) to an unsuspected admixture of combined (oxidized) phosphorus.

PARIS SOCIÉTÉ DE PHARMACIE.

A meeting of this Society was held on Wednesday, May 6th, under the presidency of M. Planchon. A paper of which the following is an abstract, was read by M. Guichard, on—

The Action of Carbon Bisulphide upon Benzoin, Tolu, the Resins, and the Gum Resins.

In a former note, the author described some large crystals which had formed in a flask where benzoin had been allowed to macerate for a considerable time in carbon bisulphide. From their origin, and a single examination made upon a small quantity of the crystals, he had been led to suppose that they consisted of benzoic acid. Further investigation, however, has shown that they contain a considerable quantity of cinnamic acid. Benzoic acid melts at 120°C., and cinnamic acid at 134°C. These crystals melted at from 130° to 131° C. Further, when treated with chromic acid they yielded hydride of benzoyl, a reaction which is characteristic of cinnamic acid. That acid, therefore, exists free in considerable quantities in amygdaloid benzoin, and its existence in Sumatra benzoin has been previously noticed by H. Kolbe, and Lautemann.

From the balsams of tolu and peru carbon bisulphide separates a resinous substance, and crystallizable acids. In order to obtain them in large crystals, the author extracted the acids from tolu with boiling water. These treated with carbon bisulphide, formed around the flask a hollow cylinder, in the interior of which were deposited large crystals that presented exactly the same form as those from benzoin. They melted at 134°C., and, treated with chromic acid, yielded hydride of benzoyl freely. They therefore consisted of cinnamic acid, which confirms previous observations.*

The ordinary resins are nearly entirely soluble in carbon bisulphide. The residue is formed of foreign organic matters, and other impurities ; and it is sufficient to filter and distil with a water-bath to obtain the resins pure. Balsam of copaiba dissolves completely, and elemi resin, mastic, turpentine resin, burgundy pitch, and colophony may be purified in the same manner. From 300 to 400 c.c. of carbon bisulphide are required for 500 grams of elimi resin.

Gum resins are not entirely dissolved by carbon bisulphide. If the liquid be evaporated a not very abundant residue is obtained, which has the appearance of a transparent yellow-brown resinous matter.

The insoluble residue presents points of much interest. That from gum ammoniacum is quite white, and if the gum was whole retains the form of the tears. If these be agitated with water, they are broken up and reduced to a milky emulsion with the greatest facility. The emulsion passes through a filter and deposits slowly a white matter, which is dried with difficulty into a grey soft mass. It is soluble in solution of potash, from which it is not precipitated by hydrochloric acid. At the same time, it gives off a sulphurous vapour that blackens nitrate of lead paper, and doubtless arises from some carbon bisulphide which is obstinately retained by the white powder, and requires the heat of a water-bath to drive off completely. It does not reduce Fehling's solution, even after boiling with dilute sulphuric acid. Ether does not dissolve the white matter, but renders it transparent and thick, like collodion, the ether floating above. It is attacked by nitric acid, which gives a yellow derivative, soluble in solution of potash. This potassic combination dissolves in strong alcohol and in water ; it is precipitated by hydrochloric acid in yellow flocks. The water from which the white matter is deposited retains, in solution, a substance that energetically reduces Fehling's liquor after the carbon bisulphide has been driven off by prolonged boiling. This liquor, evaporated in a water-bath, deposits a slightly sweet, very hygrometric, non-crystalline matter. The liquor is acid, and when left exposed to the air becomes covered with green mould. The sweet substance itself, evaporated to dryness, is also slightly acid, at any rate after some time.

Galbanum and sagapenum behave in a manner similar to ammoniacum. The carbon bisulphide dissolves a resin, and leaves a yellowish-white insoluble matter ; but this matter emulsifies more difficultly than that from ammoniacum, and it is necessary to employ boiling water. Assafœtida resembles ammoniacum in its behaviour.

The author suggests a process for purifying gum resins, based upon these properties, with the object of obtaining pure products for the preparation of plasters. The resins and gum resins are mixed in a flask with a sufficient quantity of carbon bisulphide, allowed to macerate for an hour, decanted, then macerated with a fresh quantity, and the whole filtered through lint. This product is distilled in a water-bath, and yields the resins. The insoluble residue is agitated in boiling water, when it disengages much carbon bisulphide, which may be collected by distillation. The whitish milk thus obtained is thrown upon a hair sieve, and the residue washed with a fresh quantity of water. It is then evaporated to dryness, and the product added to the resins previously obtained. For 1 kilogram of elemi and the quantities of gum resins corresponding to the formula of diachylon plaster of the Codex, in all, 1750 grams, the author employed two litres of carbon bisulphide and two litres of water. He obtained about 1205 grams of resins, 500 grams of gummy matters, whilst there were 200 grams of stones, vegetable debris, etc.

* Sce before, p. 927.

After the reading of this paper, M. Lebaigue said he thought it would be interesting to determine clearly whether the acid which exists in balsam of tolu be benzoic acid, or, as has been asserted, cinnamic acid. The size and purity of the crystals obtained by M. Guichard's method would allow of the elucidation of this controverted point.

M. Lefort described the results of the investigation by a commission upon the toxicology of phosphorus, and pointed out the insufficiency of the evidence presented by phosphoric acid or the ammonio-magnesian phosphate found in analysis. An abstract of this paper will be given in a future number.

SOCIETY OF ARTS.

The following lecture was delivered before the Chemical Section of the Society of Arts on Friday, April 24th :—

Pyrites as a Source of Sulphur, Iron, and Copper.

BY DR. C. R. A. WRIGHT, F.C.S.

In introducing the subject of the present paper, I fear that many of the remarks I have to make may be somewhat wanting in novelty, especially to those more peculiarly interested in the practical applications of the material in question. I have, indeed, no new discovery of scientific or commercial interest to bring forward but only a brief description of some of the more important industrial processes in which the mineral plays part, and of some of the more recent improvements made in these processes.

In the first place, what is meant by pyrites? This question can only be answered by a reference to some points more closely allied to pure science than to technical industry, although not absolutely without bearing on the latter. The term "pyrites" is applied by mineralogists to various substances more or less closely allied together in their chemical constitutions and properties generally, all of them agreeing in this point, that sulphur and iron are two principal constituents. To a particular variety, also containing copper, the term "copper pyrites" is applied, of which more anon ; of those varieties of which this metal is not an essential constituent, several distinct species may be enumerated, of which the more important are :—

1. Pyrites, *par excellence*, or yellow iron pyrites, the chief member of the group, consisting of iron and sulphur united in the proportions indicated by the following percentages :—

Iron	46·67
Sulphur	53·33
	100 00

Or more briefly by the chemical symbols FeS_2, whence the chemical name "Iron disulphide."

2. Marcasite, or white iron pyrites, a substance possessing the same chemical composition as yellow pyrites, but differing therefrom in various particulars, *e. g.*, its colour, its crystalline form (yellow pyrites crystallising in forms belonging to the monometric system, marcasite in shapes pertaining to the trimetric system), its specific gravity (yellow pyrites having the density 5·0 to 5·2, marcasite being somewhat lighter, having the density 4·85 to 4·9—Rammelsburg). Marcasite also oxidizes by exposure to air more rapidly than its isomeride, although yellow pyrites when in a finely divided state takes up oxygen with avidity, evolving a large amount of heat, so as occasionally to bring about spontaneous inflammation of mixtures of which this substance is a constituent.

3. Magnetic iron pyrites, or pyrrhotin, distinguished from the two preceding iron sulphides by containing less sulphur in relation to the iron, the composition approximating to the following percentages:—

Iron	60·49
Sulphur	39·57
	100·00

indicated by the formula Fe_7S_8, or as it may be written, FeS_2, 6 FeS, or Fe_2S_3, 5 FeS.

In addition to these sulphides of iron two others are known analogous in many respects to yellow pyrites, and capable of being used for the same industrial purposes as that substance; these are iron sesquisulphide, containing—

Iron	53·85
Sulphur	46·15
	100·00

indicated by the formula Fe_2S_3; and ferrous sulphide, or iron monosulphide, containing—

Iron	63·63
Sulphur	36·37
	100·00

and indicated by the formula FeS. These two bodies are rarely found in the free state as minerals, but when associated with the sulphides of various other metals, they form a numerous class of minerals known as double (or more complex) sulphides. Of these, the body designated as

4. Copper pyrites (towanite, chalcopyrite, kupferkies, &c.), is an example, it being a mineral possessing the percentage composition—

Iron	30·6
Sulphur	34·9
Copper	34·5
	100·0

indicated by the formula $FeCuS_2$, or otherwise Cu_2S, Fe_2S_3, or possibly CuS,FeS.

Closely allied to these different kinds of pyrites are several other minerals consisting essentially of sulphur united to other metals, exhibiting more or less similarity to iron; of these bodies, the sulphides of copper, lead, and zinc are the most important. Thus we have cuprous sulphide, Cu_2S, existing in copper pyrites associated with iron sesquisulphide, and also known separately as redruthite, (copper glance, vitreous copper, etc.); cupric sulphide, CuS, known as breithauptite, (covelline, indigo copper, blue copper, etc.); lead sulphide or galena, PbS; zinc sulphide or zinc blende, ZnS, etc.

(*To be continued.*)

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Alkali Act (1863) Amendment Bill.

The following is the text of a Bill to Amend the Alkali Act, 1863, introduced into the House of Commons by Mr. Sclater-Booth on the 11th May, and ordered to be printed:—

"Whereas it is expedient to amend the Alkali Act, 1863, in this Act referred to as 'the principal Act,' as made permanent by the Act of the session of the thirty-first and thirty-second years of the reign of her present Majesty, chapter thirty-six, and amended by the Public Health Act, 1872.

"Be it therefore enacted by the Queen's most excellent Majesty, by and with the advice and consent of the lords spiritual and temporal, and commons, in this present Parliament assembled, and by the authority of the same, as follows:—

"1. This Act, so far as is consistent with the tenor thereof, shall be construed as one with the principal Act, and this Act and the principal Act may be cited together as 'The Alkali Acts, 1863, 1874,' and this Act may be cited separately as The Alkali Act, 1874.

"2. This Act shall not come into operation until the *first day of March, one thousand eight hundred and seventy-five.*

"3. Whereas by section three of the principal Act, the term 'alkali work' is defined to mean 'every work for the manufacture of alkali, sulphate of soda, or sulphate of potash in which muriatic acid gas is evolved,' and doubts have arisen whether the formation of sulphate of soda in the treatment of copper ores by common salt or other chlorides is or is not a manufacture of sulphate of soda within the meaning of the said section; and it is expedient to remove such doubts: Be it therefore enacted that, The formation of sulphate of soda in the treatment of copper ores by common salt or other chlorides shall be deemed to be a manufacture of sulphate of soda within the meaning of the said section.

"4. Whereas it is provided by section four of the principal Act, that every alkali work shall be carried on in such manner as to secure the condensation of such percentage of muriatic acid gas as therein mentioned, and it is expedient to make further provision in relation thereto: Be it therefore enacted that,

"In addition to the condensation of such per-centage of muriatic acid gas as aforesaid, every alkali work shall be carried on in such manner as to secure the condensation to the satisfaction of the inspector, derived from his own examination or from that of a sub-inspector, of the muriatic acid gas evolved in such work to such an extent that in each cubic foot of air escaping into the atmosphere there is not contained more than one-fifth part of a grain of muriatic acid.

"If any alkali work is carried on in contravention of this section, the owner of that work shall be deemed to be guilty of an offence against the principal Act, and be subject to the penalties in that Act mentioned; and the provisions of the principal Act shall apply to the carrying on of an alkali work in contravention of this section in the same manner as if, wherever reference is made in the said Act to the condensation of muriatic acid gas to the extent in that Act mentioned, there were added a reference, with the necessary alterations, to the provisions of this Act relating to the condensation of muriatic acid gas.

"5. In addition to the condensation of muriatic acid

gas as aforesaid, the owner of every alkali work shall use the best practicable means, within a reasonable cost, of preventing the discharge into the atmosphere of all other noxious gases arising from such work, or of rendering such gases harmless when discharged. If he fail to use such means, in the opinion of the court having jurisdiction in respect of the penalties imposed by this section, he shall be liable to a penalty not exceeding in the case of the first offence *twenty pounds*, and in the case of a second offence *fifty pounds*, with a further sum of *two pounds* for every day during which such offence has continued, and in the case of a third or any subsequent offence *twenty pounds* for every day during which such offence has continued.

"Penalties under this section shall be recovered at the suit of the inspector, by action in the county court, in manner in which penalties for offences other than offences against a special rule are recoverable in pursuance of the principal Act.

"6. Every inspector and sub inspector of alkali works shall have the same power of inspection, examination, or testing, for the purpose of ascertaining whether the provisions of this Act with respect to noxious gases other than muriatic acid are complied with; as he has for the purpose of ascertaining whether the provisions of the principal Act, as amended by this Act, in relation to the condensation of muriatic acid are complied with, and all the provisions of the principal Act relating to the inspection, examination, and testing, and to penalties for obstructing any inspector or sub-inspector in the execution of the principal Act, or neglecting to afford to the inspector or sub-inspector the necessary facilities in relation to inspection, examination, or testing, under the principal Act, shall apply accordingly.

"7. Special rules made by the owner for the guidance of his workmen in pursuance of the principal Act may extend to any matter or thing required to be observed by them in relation to the prevention of the discharge of the noxious gases mentioned in this Act.

"8. 'Noxious gas' shall, for the purposes of this Act, mean any of the gases following, that is to say:—Sulphuric acid; sulphurous acid, except that arising from the combustion of coals; nitric acid, or other offensive oxides of nitrogen; sulphuretted hydrogen; and chlorine.

"9. Nothing herein contained shall legalize any act or default that would, but for this Act, be deemed to be a nuisance, or otherwise be contrary to law, or deprive any person of any remedy by action, suit, indictment, or otherwise to which he would have been entitled if this Act had not passed."

Notice of Motion respecting the Pharmacy Act.

The following notice of motion for Monday, June 1st., has been given by Mr. Errington:—

"Apothecaries and Pharmaceutical Chemists.—Address for Returns stating the nature aud duration of the course of study, and other qualifications, if any, required by the Society of Apothecaries in Ireland from applicants for a license to sell drugs and compound prescriptions in Ireland:

"The number of licenses so granted since the present scheme of study and examination was adopted, stating in what year it was adopted:

"The number of prosecutions for selling drugs and compounding prescriptions without license during the five years previous to the adoption of the present scheme of study and examination, and from the date of the adoption of the present scheme to the present time respectively:

"The nature and duration of course of study, and other qualification, if any, required by the Pharmaceutical Society of Great Britain, from applicants for certificate to exercise the business of Pharmaceutical Chemist:

"The number of certificates so granted from the 1st day of January, 1864, to the first day of January, 1869; and from the 1st day of January, 1869, to the 1st day of January, 1874, respectively;

"And the number of prosecutions instituted by the Pharmaceutical Society for exercising the business of Pharmaceutical Chemist in Great Britain without a certificate, during the above periods."

Prosecution under the Adulteration Act.
Alleged Adulteration of a Pharmacopœia Preparation.

At the Council-house on Friday, May 22nd, 1874, Mr. H. Fardon, druggist, of Castle Street, was summoned before two of the sitting justices, Messrs. Herbert Thomas and W. Pethick, for having citrate of iron and quinine adulterated with cinchonine and quinidine. Mr. Inskip appeared for defendant.

Mr. Yeates, the inspector appointed under the Adulteration of Food and Drugs Act, stated that he went to the shop of defendant on the 5th instant and purchased two drachms of citrate of iron and quinine. Witness paid 1*s.* for it, and then told Mr. Fardon that he was going to take it to the analyst to have it analysed, and that he (defendant) might go with him if he liked. Mr. Fardon requested him to let him have the bottle again, and he wrote upon the label the word "Howard's" above the line "From Webb, Fardon, and Co." He took that bottle, which he numbered 34, to Mr. Stoddart, who had since given him a certificate of its contents. Mr. Stoddart did not know at whose shop it had been bought. The certificate of Mr. Stoddart was read, and it was to the effect that the citrate of iron and quinine contained in the bottle was adulterated with cinchonine and quinidine.

Mr. Stoddart, the city analyst, was examined, and deposed to the results of his analysis. These showed that the salt was not wholly soluble in water, nor was all the precipitated alkaloid soluble in ether. These, with other reactions, were the reasons upon which Mr. Stoddart arrived at the conclusion that the sample of citrate of iron and quinine was not what it ought to be. In reply to Mr. Inskip, he said that the Messrs. Howard were well known as manufacturers, and that he sold no other quinine than that manufactured by Messrs. Howard. The adulteration was about half per cent. of cinchonine, but he did not think that even so small a quantity as that could be produced from quinine itself in the manufacture of Messrs. Howard, as he knew them to bve ery particular. There was nothing injurious in cinchonine, and he could not suggest any motive for the admixture. He did not attribute any motive, but thought that it must have been an accident.

Mr. Inskip said he submitted to the bench with considerable confidence that, taking the case upon the evidence of Mr. Stoddart himself, the charge must fail. Adulteration had been defined as the addition of some foreign body, and, assuming that there had been adulteration at all, the article introduced bore so infinitesimal a proportion to the bulk that it was difficult to make an estimate of that proportion. He reminded the magistrates, too, that the article introduced would not produce any injurious effect, nor would it result in any pecuniary gain, or other advantage to the vendor. Mr. Fardon purchased all his citrate of iron and quinine from Messrs. Howard, to whose reputation Mr. Stoddart had borne testimony, and he sold it in full confidence that it was pure and good, and Mr. Howard was there that day to deny the introduction of any foreign substance, and Dr. Tilden, of Clifton College, was also prepared to give evidence negativing the existence of any foreign matter, if their worships should deem it necessary that witnesses should be called. Mr. Howard, however, was prepared to admit that, owing to the absence of one of his foremen, the quinine might have been a little overheated, and that would account for the presence of the very small quantity of cinchonine.

The magistrates having consulted, Mr. Thomas said they found that the two articles alleged to have been introduced into the citrate of iron and quinine purchased by Mr. Yeates might both be derived or produced from the substance from which quinine was produced; and seeing that

they were present in such infinitesimal proportions—something less than half per cent.—they did not find it an adulteration, and dismissed the case.

Mr. Howard said, with permission of the magistrates, he desired to state that his firm were aware last summer that a large quantity of quinine had been overheated, owing to the illness of one of their foremen, and in order that it might not go out to their customers they destroyed over 2000 ounces. It appeared that Mr. Fardon was supplied with his quinine about that time, and some few ounces must have got out before they detected it.

*** The foregoing report, taken from a local paper, is not very clear throughout, and there appears to be some grave error in the account given of the way in which the presence of cinchonine was accounted for.—Ed. Pharm. Journ.

Adulterated Burnt Almonds.

On Friday, May 15th, Mr. Richard Parkin, confectioner, of No. 5, Charlotte Place, Goodge Street, Tottenham-court Road, was summoned before Mr. Knox, at the Marlborough Street Police-court, London, by John Hartley, Inspector of Nuisances for St. Pancras, for selling burnt almonds adulterated with bitter almonds, a poisonous fruit.

Mr. Hartley proved purchasing some burnt almonds at the defendant's shop, and dividing them into three parcels, and handing one of the parcels over to Dr. Stevenson, the analyst for the parish. The following certificate was handed in by Mr. Hartley, signed by Dr. Stevenson, who was in attendance to confirm the truth of it: "I am of opinion that the said article of food, namely, burnt almonds, is adulterated, the said article being made, not from the sweet almond, but almost exclusively from the bitter almond, a poisonous fruit, and I am further of opinion that the said article is injurious to the health of persons eating the same. I find that thirty per cent. of the sweetmeats consists of almonds of the bitter kind, and that each five or six ounces of the sweetmeats yields by maceration in water one grain of anhydrous prussic acid, a quantity which might prove fatal to one adult person."

Dr. Stevenson gave evidence in corroboration of his certificate.

Mr. Beard said he considered the whole matter an absurdity, and there could be no adulteration, as the articles were sold as they were got from the tree, and it was impossible for him to tell whether the almonds were bitter or sweet, there being no means of detecting the difference. Further, the defendant had no object in selling bitter almonds instead of sweet ones, there being little difference in the price, and, if anything, bitter almonds were dearer than sweet ones.

Dr. Stevenson produced specimens of sweet and bitter almonds which had been macerated.

Mr. Lumley, an almond dealer of about twenty years' standing, said he could never get Barbary almonds without a portion of bitter ones being amongst them. He could not by the appearance detect bitter from sweet almonds. He considered there was 10 per cent. of bitter almonds amongst sweet ones, and bitter almonds were dearer than sweet ones.

Mr. Samuel Cole, wholesale confectioner for forty years, stated that during his experience he had never bought almonds without there being a small portion of bitter ones amongst them, and he had never heard that they were deleterious to health. He had brought with him some fine samples of almonds, and there were bitter almonds in all of them. Bitter almonds were generally used by the higher classes for flavouring purposes.

Dr. Stevenson said that out of the sample given to him 30 per cent. only were sweet almonds.

Mr. Cooper said the object of the prosecution was to show that bitter almonds, which were injurious to health, must not be sold as sweet ones.

Dr. Whitmore, while not objecting to Dr. Stevenson's evidence, said, as the analyst for St. Marylebone, he had several samples of sweetmeats before him at the present time, and he found in them very few bitter almonds, and nothing warranting him in bringing the sellers before a magistrate.

Dr. Stevenson said it was the only case where he had found on analysis such an amount of prussic acid.

Mr. Knox, after stating that he could not see what object the defendant could have in selling bitter almonds in lieu of sweet ones, the evidence showing that no advantage was to be gained by him in doing so, said that he thought the object of the prosecution would be served by the defendant paying the costs, and promising to take every care for the future, the matter being thus made public as a warning to the trade to be careful.

The defendant was ordered to pay the costs.—*Daily Telegraph.*

Review.

A Manual of the Chemistry of the Carbon Compounds, or Organic Chemistry. By C. Schorlemmer, F.R.S., Lecturer on Organic Chemistry in the Owens College, Manchester. London: Macmillan.

A really good book on organic chemistry, sufficiently popular to meet the wants of the student and yet at the same time sufficiently complete to enable the professional man, without working his way through a mountain of periodic literature, to fill up the gaps in his knowledge,—such a book has for a long time been felt to be a great desideratum; and it is now, in this work, supplied to us by a man who is known, not only as an efficient teacher but also as one of the highest authorities on the subject. That a book written by Schorlemmer, on his own branch of Organic Chemistry, is simply excellent, is a matter of course. There is no room here for critical remarks; all we have to do is to confine ourselves to reviewing, pure and simple.

The title chosen by the author at once shows that what he means to give us is not a book on that which sometimes, in a very special sense, is called "organic chemistry," namely, the chemical history of the proximate constituents of organized matter, but nothing more nor less than an exposition of the science of the chemistry of carbon. Strictly speaking, it is true, carbon chemistry includes organic chemistry proper, but practically and conventionally, as we all know, it does not.

The barrier between mineral and organic chemistry, which half a century ago seemed impassable, was first broken through by Wöhler's discovery of the synthesis of urea; but it was not thereby by any means demolished. For a long time after this great scientific event, it was thought that, although such penultimate products of the breaking down of organic compounds as urea might be producible, synthetically, from their elements, organic substances proper—alcohol, sugars, real organic acids, and the like—could originate only through the agency of that mysterious thing called vital force. The great discoveries of Liebig, Wöhler, Dumas, Laurent even, wonderful as was the light they threw on the realm of organic chemistry, did not *directly* serve to bridge over the gulf that still separated it from the inorganic kingdom. Wöhler's brilliant discovery was, and remained, an isolated fact, the very significance of which, as the first step in synthetic organic chemistry, was only half comprehended until Kolbe taught us to prepare acetic acid from bisulphide of carbon, *i.e.*, a truly organic substance by what virtually amounted to a synthesis from the elements. Since that time the most brilliant discoveries in organic synthesis rapidly followed after one another; and now-a-days, since by the labours of Kolbe, Würtz, Berthelot, Piria, Mendius, and others, we have come into possession of systematic methods for producing any fatty alcohol, acid, amine, etc., that could be

named—including even those fatty ethers which were formerly known only as organic fats—nobody doubts that the discovery of the synthetic formation of *any* organic body is merely a question of time, and that nature, in building up even the most complex substances, employs no other forces than those, which, in the laboratory, we have at our free disposal.

But how is it, then, that up to the present day, carbon-chemistry is set apart from the rest, and looked upon as almost an independent science? Liebig, many years ago, defined organic (*i.e.*, carbon) chemistry as being the chemistry of *compound*, in opposition to inorganic chemistry as that of *elementary*, radicles. But this definition, satisfactory as it was at the time, can no longer be accepted. We now know fully well that radicles, as such, are mere fictions, the conception of which is as unavoidable in the theory of inorganic as in that of organic compounds. And yet, at the present day as much as ever, we find it quite natural that the chemistry of such a *peculiar* element as carbon should be considered for itself, independently of the rest. But what is it that gives to carbon its *peculiar* character? Here Schorlemmer has made a very happy hit; carbon *is sui generis*; but *not* on account of its high atomicity, or of its power of combining with itself—other elements show the same peculiarity, and in some cases the complexes formed possess a high degree of stability. What does constitute the specific nature of carbon is this, that, *given a complex of carbon atoms, and every disposable affinity in it can be saturated by means of hydrogen with formation of stable compounds.* We all know that; but—

"Selbst da wo's am Begriff nicht fehlt,
Stellt oft das rechte Wort nicht leicht sich ein;"

and Schorlemmer has found it. It almost amounts to a new idea.

After developing this definition out of a consideration of quantivalent elements in general and carbon in particular, the author, in the succeeding chapters, gives a general view of the constitution of carbon compounds, on the basis of Kekulé's theory of the concatenation of atoms; which he tacitly adopts as the best mode of summing up what is known of the facts, while Crum Brown's graphical notation serves him as an instrument for expressing its ideas. The author naturally starts with the simplest carbon compounds—viz., the paraffins (marsh gas and its homologues), and very lucidly shows how, by the substitution for 1 H in a given paraffin of a Cl, OH, NH_2, COH, COOH, we produce the chloride, alcohol, monamine, aldehyde, acid; and how the same replacements, when effected twice, lead to the formation of the corresponding diatomic compounds. He next considers the case of one or more couples of hydrogen atoms being simply eliminated *without* subsequent replacement, which leads him on to the allyl and other dehydrogenated "*wasserstoff-ärmere*" compounds, and, in the case of the C_6 series, to that important class of bodies called "*aromatic compounds.*"

After this theoretical introduction follows a short and concise, but perfectly sufficient, description of the methods of elementary analysis and of vapour-density determination; to which is appended a very clear exposition of the rules for deducing, from the data obtained in the elementary analysis (when given conjointly with the vapour-density, or, in the case of an acid, with the basicity and the percentage of metal in a well defined salt) the *true* empirical formula of a carbon compound.

But such a formula, although it not merely gives us the correct percentages of the several elements but represents the true *atomic composition* of the molecule, and consequently sums up in itself *all* the ways in which the molecule can possibly split up in its reactions—just for this reason, does a little too much of a good thing. What, if the study of organic chemistry is to be at all possible, we absolutely want, are formulæ which, of the vast number of potential transformations, single out those which under known circumstances can actually be realized, and give the greater prominence to those which are the more probable.

The extent to which this important problem has been solved, in an elementary book, can only be shown by examples; and this, consequently, is the course which our author adopts. He first shows, by the examples of ordinary alcohol and of acetic acid, how, in bodies like these, all *reversible* reactions, without exception, can be summed up in *one* typical formula, *e.g.*, in the formula $\left.\begin{matrix}C_2H_3O\\H\end{matrix}\right\}O$ for acetic acid. He then (with this same example) illustrates the fact that such a formula will never disagree with those transformations in which the molecule splits up into two carbon-groups. In the case chosen, for instance, these deeper-going changes (formation of carbonate and marsh gas, or acetone, etc.) can be at once depicted, in the original formula, by splitting up the "acetyl" into CO and CH_3. And if, in more complex compounds, the secondary radicles, even, will not account for all known metamorphoses, we always find that the consistent successive application to these radicles and their constituents, of the same principle which leads to the setting apart of the C_2H_3O in the $C_2H_4O_2$, will suffice to complete the image *without* disturbing the structure of the formula as it was at the previous stage. So, at least, it has been found to be the case with all well-studied compounds; and with regard to these, at any rate, we can assume that what ultimately results from the successive splitting-up of radicles, viz., those formulæ in which the atoms themselves figure as radicles of definite atomicities, to some extent represents, not, of course, the arrangement of the atoms in space but at least something like "the manner in which the attractive forces of the atoms forming the molecule are distributed."

After having thus given, so to say, an apology for the previous introduction, as an indisputable dogma, of the concatenation theory, the author now applies it to the explanation of some representative examples of isomerism proper, *i e.*, that kind of isomerism which prevails, for instance, between the two propyl alcohols. The cases of metamerism and polymerism which are taken up next, after all that preceded, are easily disposed of, and thus the purely chemical part of the general division is brought to a close.

The next chapter is devoted to the consideration of the dependence, in carbon compounds, of physical properties on chemical constitution. Here, on the small space of nine pages, we have before us a more complete *résumé* of all that can be clearly formulated of the results of the well-known researches of Kopp, Landoldt, and others, than we have ever met with in any other chemical text-book.

The author now—after the interpolation of a short chapter on fractional distillation, explains to us his way of classifying carbon compounds, and then in the rest (which, of course, is the body) of the book, gives a systematic exposition of the chemical history of the most important of known carbon compounds. The matter is arranged as follows:—First come the *cyanogen* and the *carbonyl* compounds, *i.e.*, those compounds in which these radicles form the central nucleus of the whole, and are not merely tacked on to something more complex, as, for instance, in cyano-substitution products. After the chapter on the carbonyl family, the author first gives a general view of fatty compounds, hydrocarbons, alcohols, acids, etc., and then proceeds to a detailed description of the individual substances, which are grouped according to the quantivalence (atomicity) of their characteristic radicles, and within each group, arranged according to the number of carbon atoms contained in these radicles. The non-saturated compounds are appended to those saturated ones to which they are most nearly related, genetically or otherwise. Thus, for instance, the allyl compounds are appended to the glycerine family; pyromucic acid, furfurol, pyrrol, to mucic acid, etc. That the aromatic compounds are *not* disposed of in this way, but treated for

themselves, needs scarcely be said. In fact, very nearly one half of the descriptive part of the book is entirely devoted to them. They are divided into two classes—1st. Those containing one; and 2nd. Those containing two or more benzol-nuclei. In this division Kekulé's hexagon theory everywhere serves as a basis for the explanation of genetic relations and isomerisms.

Of this part of the book more especially we should very much like to give a few extracts, as examples of the admirable treatment of the subject, but we have already more than filled up the space which this journal can allow for the review of even such an important book as this, and so we will confine ourselves to saying—with regard to this part no more than the rest of the descriptive division—that the amount of information it contains in its pages is simply miraculous, and that yet it never degenerates into a mere register. In a short compendium like this the author, of course, cannot afford to lecture to the reader; in many places the *facts* are simply put down as isolated molecules, but these are so clearly and transparently shaped, that, with the true student, the intermolecular medium of interpretation comes quite by itself. In short, a *better* book than this on organic chemistry has never been written—in any language.

BOOKS RECEIVED.

THE STUDENT'S GUIDE TO MATERIA MEDICA; in accordance with the latest Issue of the British Pharmacopœia. By JOHN C. THOROWGOOD, M.D. LOND. London: J. and A. Churchill. 1874. From the Publishers.

A SIMPLE AND EXPEDITIOUS WAY OF ESTIMATING THE VALUE OF MILK AS AN ARTICLE OF FOOD. By JOHN HORSLEY, F.C.S., etc. Cheltenham: S. H. Brookes. 1874. From the Author.

Obituary.

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

On the 12th May, 1874, Mr. James Jones, Pharmaceutical Chemist, of Newcastle-on-Tyne. Mr. Jones had been a Member of the Pharmaceutical Society since 1847.

On the 11th April, 1874, Mr. William Anderson, Chemist and Druggist, of Edinburgh.

On the 14th April, 1874, Mr. George Stannard Tooke, Chemist and Druggist, of Lakenham.

Notes and Queries.

[395]. SHEEP DIPPING COMPOSITION.—A good formula for a Sheep Dipping Composition to cure the scab in sheep, is asked for by C.

[396]. PLATE POWDER.—Can any correspondent supply a good formula for plate powder, white or red?—BETA.

[397]. TOOTH PASTE.—"*Alpha*" asks for a recipe for tooth paste, which will not effervesce or ferment out of the pots.

[398]. PREPARED SILICA.—Can any reader inform me who is the maker of the "Prepared Silica" recommended for plate powder?—ARTHUR DECK.

[399]. CORTEX RHAMNI FRANGULÆ.—Mr. E. A. Turner wishes to be informed where the Cortex Rhamni Frangulæ is to be obtained, also the dose, and the best means of preparing it (PHARM. JOURN., May 9th, 1874, p. 889).

Correspondence.

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

POISON REGULATIONS.

Sir,—Allow me to call the attention of those interested in the trade to the suggestion made by Mr. Carter, Coroner for East Surrey, in your impression of May 9th.

"That in future enactments it should be ordered that *all* poisonous substances, of whatsoever nature, have a label with the word 'Poison' affixed to them whenever sold to the public."

This suggestion appears very reasonable. If it be for the good of the public that certain poisons be required by law to be labelled, why not all? It is to be hoped those in authority will not allow this suggestion to pass by unheeded. Where is the consistency in the Act that requires tr. camph. co. to be labelled "Poison," while such articles as carbolic acid, chloral hydras, plumb. acet., and a host of proprietary medicines containing strong poisonous matter, are exempt. Should it occur that additions be made to Parts 1 and 2 of the regulations for selling poisons, it appears that the sale of such should be confined strictly to qualified persons. At present the regulations are so loosely observed that it is almost useless to the public or the trade. Many instances can be produced by almost every country chemist of daily infringements by grocers and general shopkeepers, and those who style themselves herbalists.

I trust Mr. Carter's suggestion will not be lost sight of.

P. R. B.

THE RECENT DISCUSSION ON THE ADDITIONS TO THE PHARMACOPŒIA.

Sir,—Any remarks by Mr. Sandford, on questions relating to what may be considered the political and ethical sides of pharmacy, are always well worthy of serious consideration. In this view his letter in the last JOURNAL cannot be allowed to pass quite unnoticed by me. There are, however, but one or two points on which I wish to say a word. With the particular opinions and feelings of regret expressed, I have nothing to do; men will differ in these matters as long as men exist, and Mr. Sandford has as much right to his views as I conceive I have to mine; but Mr. Sandford, like Dr. Redwood, endeavours to attach to my remarks a personal signification they certainly do not possess, for he says that I have been betrayed to write down remarks which were fairly taken by Dr. Redwood as an attempt to bring both the Addendum "and its authors" into ridicule; and that they may be so regarded by the Medical Council. Now, I at once dispute this. I see nothing whatever in the paper which can be fairly considered as ridiculing "the authors;" and I think it would sorely puzzle Mr. Sandford to point out any remarks bearing in that direction, or sustaining such an assumption. I certainly should be very much astonished to find the Medical Council entertaining such a notion.

Dr. Redwood, in his speech, alluded to some imaginary animus, to which I gave a most emphatic denial in the succeeding JOURNAL; Mr. Sandford cannot fail to have seen this. I am, therefore, the more surprised that this fancied charge of personal feeling or animus should have been reiterated. For the second time I distinctly deny having been influenced by any personal feeling whatever; I should have made precisely the same remarks if the book had arisen by spontaneous evolution, without any paternity at all. Shall I be required thrice to speak plainly on this point?

As to bringing the book itself into ridicule, that is a very different matter. If such be possible it is the fault of the book alone, and should not be set down to the critic.

Mr. Sandford seems to think the criticism was in some way an unfair one; but he fails to intimate in what the unfairness consists. In point of fact, it is as clear as noonday that the sting of my remarks lay, not in the diction or language, but in the *truth* these served to clothe. To this moment, although a cloud of indignation has been raised at the phraseology, no answer has been vouchsafed to my query why certain well-known and constantly employed preparations were not introduced. This may be the fault of those occult four-and-twenty pharmacists who were consulted by

the Medical Council. Whether these gentlemen were really representative men or not, we have no certain knowledge; so far as pharmacists generally are concerned, they are about as mythical as the "four-and-twenty blackbirds" of nursery fame; but, unlike these, now the Addendum "pie" is opened, they "don't begin to sing." Dr. Redwood incidentally mentioned Mr. Squire, but am I to understand this as explaining why Parrish's Syrup, for instance, is not found in the Addendum? There's a strange coincidence here. Either the compilers knew, or they did not know, of the popularity of this syrup. If they did not know, then clearly they were incompetent for the duty they had undertaken, that is, if the preface to the Addendum rightly sets forth their business. If they did know, as no doubt they did, then for what reasons have they not "thought it desirable to supply the requisite information" concerning that preparation?

Just one word more. Mr. Sandford in his last sentence inquires "whether, if Mr. Smith's paper be taken as indicating the tone and temper of the Pharmaceutical Society," etc., etc. IF! Well, *if* your uncle were your aunt, matters would be serious, no doubt; but as my paper does not indicate the tone and temper of anything or anybody besides myself, the Society need not fear, but may go on its way rejoicing in the sunbeams of medical "good will and confidence."

EDWARD SMITH.

May 26, 1874.

THE SALE OF BENZINE.

Sir,—Allow me, through the medium of your Journal, to inform "Chemicus" and others who may be interested in the sale of benzine, that a policy of fire insurance extends only to the shop and dwelling house connected therewith, and that benzine, etc., may be kept in an outhouse or cupboard safe in the yard at rear of premises without infringement of fire policy.

ROBERT OWEN FITCH.

200, *Well St., South Hackney, E.*

ANALYSIS OF TEA.

Sir,—The paper by Mr. Wigner, published in your last issue, affords valuable confirmatory evidence of the remarkable constancy which genuine teas exhibit in their percentages of soluble ash. In nearly a hundred samples which I have examined during the last few months, I have not met with a genuine black tea yielding less than 2·8 per cent. of ash soluble in water. It is rather remarkable that Assam teas furnish less than the average; green teas, on the other hand, a higher amount. In one of the latter I recently found 3·8 per cent. Mr. Wigner determines the soluble salts by difference; I prefer to make a direct estimation by evaporating the aqueous solution, as, if the result is normal, further treatment with hydrochloric acid is unnecessary. In estimating the silica, the hydrochloric solution should always be taken to dryness, and the residue treated with a little more acid, or soluble silica will be lost. I do not attach much importance to the estimation of alkali, as it could afford no criterion as to the presence of adulteration, except, perhaps, in the case of exhausted leaves which had been re-dried with potassium or sodium carbonates. The flame test, however, detects the latter, and in either case the soluble ash would be suspiciously high.

I think Mr. Wigner goes to unnecessary trouble in determining the aqueous extract, and its ash. The proportion of insoluble matter gives precisely the same information, whilst the tediousness of two exhaustions is obviated. I never employ less than two grammes of tea, which I boil with successive portions of water (about 70 c.c. at a time) till the liquid comes off colourless. In this decoction, I estimate astringent matter by acetate of lead*; and the insoluble residue, dried at 110° C., at once indicates the amount of extractive matter by difference.

FRED. W. FLETCHER, F.C.S.

Tatton, Southampton, May 19th.

* *Chemical News*, vol. xxix., p. 189.

"*Erin.*"—(1) We do not know of any fixed time for the meeting, but information could be obtained at the office, 32, Soho Square. (2) Messrs. Trübner and Co., Ludgate Hill, Messrs. Williams and Norgate, Henrietta Street, Covent Garden, or any respectable foreign bookseller.

"*Spes.*"—(1) The regulation as to age does not come into force until after the 31st of December next. (2) The candidates are expected to know the proportions of the active ingredients of Pharmacopœia preparations.

J. Barton.—Southall's "Organic Materia Medica of the British Pharmacopœia" is published by J. and A. Churchill, price 2*s.* 6*d.*

W. H. C.—We have handed your specimens to the Curator, Mr. Holmes, who will communicate with you respecting them.

W. Y. O.—(1) Lichens grow on rocks and trees, seaweeds in salt water. There are also differences in their reproductive organs, for an account of which you are referred to 'Bentley's Manual of Botany.' (2) A thick mixture of hydrate of lime and water.

"*Remus.*"—Commercial Leptandrin is prepared by precipitating with water a tincture of the root of *Leptandra virginica*, a plant indigenous in the United States. See *Amer. Journ. Pharm.*, vol. xxviii., p. 510.

C. Gerring.—(1) *Lamium Galeobdolon*, Crantz. (2) Guarana is prepared from the seeds of *Paullinia sorbilis*, a Brazilian Sapindaceous plant. See vol. iii. of the present series, p. 773.

T. P. B.—It is impossible to determine plants with certainty without the flowers. No. 2 is probably *Calamintha acinos.*

"*Botanist.*"—We are not acquainted with any such work.

"*An Apprentice*" is referred to the rule respecting anonymous contributions.

H. Chapman.—Care should be taken that the acetate of potash be not alkaline. If it is, it should be made neutral by the addition of a little acetic acid. The mixture would then probably keep fairly, although it would not be a stable mixture under any circumstances.

"*Inquirer*" (Taunton).—Melt about ʒss of white wax and pour into a warm mortar; add the carbolic acid and the extract of opium, the latter being first made softer, if necessary, by two or three drops of water. Mix all together, and when sufficiently cooled the mass may be rolled out.

"*Theta.*"—(1) This question should have been addressed to the Registrar. (2) In July next. (3) Yes; and all candidates for the Minor examination "must have passed the first or Preliminary examination."

Messrs. Young and Postans.—We have no knowledge of the preparation mentioned, and have not been able to learn anything of it.

"*A Dispenser.*"—We have asked a friend to examine the nature of the change, and will acquaint you with the result.

"*Inquirer*" (Exeter).—See Dr. Squibb's paper in the present number of the Journal, p. 956.

J. B.—(1) We are unable to decipher the prescription sent. (2) Probably the pills referred to are prepared from a private formula. (3) It would depend upon the manner of selling and labelling, and the purpose for which it was sold.

"*A Pharmacist from* 1842."—The answer given to "*Fair Play*" on p. 868, will convey to you our opinion on the subject of your letter. We believe that the course you hope for would only tend to promote the evil you complain of. If there really be any general desire on the part of registered Chemists and Druggists to incur the trouble and expense involved in the course you suggest, the proper plan would be to communicate officially to the Council of the Society to that effect, in the shape of a memorial.

M. P. S.—See the paper on Croton Chloral, by Dr. Liebreich, before, p. 510.

"*A Yorkshire Tyke.*"—Although we do not attach much value to the use of pharmaceutical titles on labels, etc., your communication is too uncomplimentary to those entitled to use the letters A.P.S. to admit of its publication.

G. T. D., *A Titan*, and *Palmam qui meruit ferat.*—We are obliged for your communications, but we think that enough has been written upon the subject of "legs" as a pharmaceutical qualification.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. R. H. Parker, Mr. B. Condy, Mr. Brevitt.

THE DECOMPOSITION OF MILK BY KEEPING.

BY EDWARD LAWRENCE CLEAVER,

Assistant-Demonstrator in the Laboratories of the Pharmaceutical Society.

At a recent prosecution under the Adulteration of Food Act, it was stated in the evidence for the defence that unless milk be analysed before it is six hours old the results are not reliable, implying that decomposition proceeds at a rate sufficiently rapid to destroy a large portion of the solid matter after that period of time. This is really a most important point, because it is rarely possible to analyse samples within the time above stated; with the object therefore of gaining some definite information on this subject, I made a series of experiments, the results of which are stated below.

There are several points which exercise some influence on the decomposition of milk, namely:—

1st. *Temperature.*

2nd. *Exposure to the atmosphere.*

3rd. *The relative poverty or richness of the milk.*

The present note only gives the results of experiments on an average sample of milk at the ordinary temperature; but I hope at some future time to publish a series showing the behaviour of different samples under varying conditions. A quantity of milk, purchased early in the morning, was divided into several small portions and placed in bottles, which were tightly corked. One portion was analysed immediately after purchase, and the rest from time to time. The results, taken at a temperature of 70° F., were as under:—

No.	Date of Analysis.	Total Solids.	Fat.	Ash.
1	April 30th, 1874	12·48	3·6	·7
2	May 1st, „	12·37	3·6	·7
3	„ 2nd, „	12·18	3·6	·7
4	„ 4th, „	12·12	3·6	·7
5	„ 6th, „	12·09	3·6	·7
6	„ 8th, „	12·07	3·6	·7
7	„ 12th, „	11·97	3·52	·7
8	„ 18th, „	11·97	3·4	·7

It will be seen from these experiments, extending over a period of three weeks, that decomposition does not, in an average sample, proceed at a very rapid rate; and that in an analysis made even after two or three days the error would be inappreciable.

It was suggested to me that if milk which had become sour were neutralized with soda, the volatile acids formed would be retained instead of being volatilized by the heat, and that the solid residue would therefore not suffer loss. On trying this plan, however, no difference was obtained from previous results.

But there is one source of loss to be guarded against when milk has become very old, and that is the deposition of mineral matter of some kind on the sides of the containing vessel, to which it adheres very firmly; under the microscope it has a distinct crystalline structure, but at present I have not been able to determine the exact nature of the compound.

THE ADDITIONS TO THE PHARMACOPŒIA.

BY H. BARTON.

Practically interested in the Pharmacopœia Addenda as we all are, it is evident that we have not all come to the same conclusion about its contents: some looking upon it as an uncalled-for and very defective compilation, others, with myself, seeing in it the stamp of careful consideration throughout; and as, so far, the discussion appears to have run pretty much *contra*, perhaps indications from the personal experience of one of the *pros* may not be altogether out of place.

First, I am very glad to see an old friend, *Tinctura Quinæ Ammoniata*, brought to honour and authority, prepared according to the formula published by Mr. Ince some years since with *simple* spirit of ammonia and proof-spirit. It is a very favourite preparation with several physicians and surgeons here, and much liked and repeated by patients who say they could never take the usual preparations of quinine. At the same time, we have often heard disappointment expressed when the preparation has been procured in establishments where stronger solutions of ammonia or *aromatic* spirits have been used, the observation usually being, "It did not suit me; I could not go on with it." So frequently have I heard such a remark, that I do not hesitate to say that the now authorized formula, with its dilute ammonia and absence of aromatic, will be preferred by the majority of patients, and its introduction will conduce to a pleasant uniformity so far as this article is concerned.

Liquor Magnesiæ Citratis I look upon as a valuable and agreeable addition to the Pharmacopœia. The "Limonade purgative" of the French Codex is immensely popular in France. During the siege of Paris we were called upon almost daily to supply it to one or more of our expatriated visitors, they paying 1*s.* 6*d.* per dose in preference to taking Seidlitz powders or magnesian citrates, etc., and that, be it remembered, at a time when economy was at least a temporary necessity with them.

Extractum Glycyrrhizæ Liquidum.—The compilers of the Addenda may be congratulated upon the introduction of another uniform preparation. For many years we have made a fluid extract from the Solazzi liquorice cut up and suspended (on a perforated rest) in distilled water, and then evaporated at about 120° to produce fl℥xvi. from each avoirdupois pound; once, at the request of a physician, we prepared about a gallon of "succus" from recent root, and a most agreeable preparation it turned out to be, thus much indicating a demand for some liquid preparation.

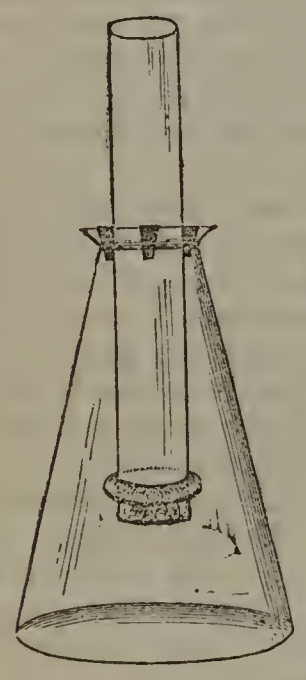
Amyl Nitris.—We have met with a colourless variety, of abominable odour, and intensely disagreeable to the patients; it is therefore satisfactory to note, in the "characters and tests" indicated, "an ethereal liquid of a yellowish colour, and peculiar, not disagreeable odour."

Chloroform Water is not the useless thing some would lead us to suppose. How often is the dispenser annoyed at the separation of chloroform upon the addition of chloric ether to mixtures containing bromide of potassium or nitro-hydrochloric acid, both of which may be added to chloroform water without such separation; so take the good, and despise not little bounties.

Syrupus Chloral differs from the syrup hitherto usually sent out under that name; nevertheless, when full doses have been given, the amount of sugar

has been found an objection, and consequently chloral in substance is generally ordered in prescriptions. I must confess to a prejudice against crystals, from once receiving a bottle of them bearing Dr. O. Liebreich's label, which, when made into syrup and solution, after a short time developed an odour of benzine. Since that time we have used dry cake, and, to ensure uniformity, made each bottle into a 50 per cent. solution as soon as opened, before dilution could take place from the absorption of moisture, which would be the case if a bottle of the chloral in substance remained for some time in current use.

Injectio Morphiæ Hypodermica.—Again, the profession will surely approve a uniform preparation. I apprehend the most likely source of variation might be through waste in washing the precipitated morphia, and suggest the following modification of a filter which may be used with advantage for that purpose.



Take a piece of large glass tube, or one of the smallest glass lamp chimneys, cut a disc of filtering-paper large enough to tie over the bottom, and secure it with a piece of muslin over it; also tie on to the glass three or four cork wedges, so as to enable the operator to suspend the cylinder in a precipitating jar or wide-mouthed bottle. Wash the precipitated morphia, and after it has been sufficiently drained, carefully remove the muslin and paper together, blow the moist mass from the tube into a capsule, and with a few drops of water remove any morphia adhering to the glass; then re-secure the muslin and paper, reversed (paper outside), and pass through it some of the prescribed water, which will carry every particle of morphia into the receiving capsule, and obviate the one chance of loss.

Some of our members seem afraid that soap for suppositories will be too irritating; that is a question for the medical profession. I can only say an old prescription for piles used to go the round here—half Castile soap, the remaining half extract of hemlock, to be made into suppositories, and I never heard any charge brought against them on that score.

Phosphorated Oil, after Mr. Méhu's formula, I find at the end of eighteen months perfectly limpid, so scarcely anticipate much likelihood of change in the more dilute preparation.

Pepsina.—If the authorized formula furnishes an article similar to "Pepsina Porci, Dr. Beale," as prepared by Messrs. Bullock and Reynolds, we may fairly anticipate that it will have a medicinal value far above that of the average commercial specimens hitherto supplied.

Brighton.

SYRUPUS FERRI PHOSPHATIS.

BY A. WILLSON,

Dispenser to the West London Hospital.

The difficulty of preparing a syrup of phosphate of iron which could be preserved from alteration for a reasonable period, led me, some time ago, to make some experiments upon the subject, which have resulted in my adopting the following formula, which I have found eminently successful.

Prepare the ferrous phosphate in the usual manner, being very careful to wash it perfectly free from the acetic acid formed during the process. Dissolve the moist phosphate in 7 drachms of syrupy phosphoric acid (sp. gr. 1.500), instead of the 5½ ounces of diluted phosphoric acid, as directed in the Pharmacopœia; when dissolved, add sufficient distilled water to make the solution measure 1½ ounce, and keep in a well-stoppered bottle. One drachm of this solution added to 7 drachms of simple syrup, forms a syrup in every respect identical with that of the B.P.

The use of syrupy phosphoric acid will be found far more convenient than the old mode (Groves' process) of evaporating the diluted acid.

Glycerine has been strongly recommended as a substitute for sugar in this syrup, but, so made, it is frequently objected to by the patient, as not being so thick as usual; and as a Liq. Ferri Phosph., prepared as above keeps well, its use is rendered quite unnecessary.

Hammersmith, May, 1874.

SUGGESTIONS TO BEGINNERS IN PHARMACY.*

BY THE LATE PROFESSOR WILLIAM PROCTER, JUN.

The following paper, written for the benefit of young pharmacists in the United States, is almost equally valuable to those in this country:—

When a boy enters an apothecary's shop with the view to becoming a pharmaceutist, he is at first employed in a great variety of services: as in opening and closing the shop, sweeping and dusting, cleansing mortars and other utensils, washing bottles, grinding, bruising, and garbling drugs, cutting herbs, stirring evaporating liquids, cutting, pasting, and attaching labels, bottling liquids, etc.—engagements requiring but moderate skill; after a time, however, the boy becomes aware that he is only on the surface of the knowledge he came to acquire, and that it is necessary for him to read and study. If he is thoughtful and earnest, and is fortunate in finding himself associated with a kindly disposed clerk, who will give a proper direction to his inquiries, and encourage his desire for knowledge, he soon gets sufficiently within the subject to find the great extent of its range and the variety of its detail.

The first effects of this impression are sometimes strongly discouraging and depressing, but if he perseveres, and has mastered the idea that all knowledge is of gradual growth, that like the stalactite it grows by accretion from without, as well as, plant-like, by development from within by thought-action, he will soon become reconciled to the process, and employ his spare time in its pursuit. But what shall the boys do who have no guide in a well-disposed associate, or who may be so unfortunate as to be the victim of a churlish or tyrannical clerk, or of an oppressive illiberal employer, or what is nearly as bad, to be placed at service with an ignorant, ill-qualified preceptor?

In considering the query, it has appeared feasible to undertake a short suggestive essay, which, without entering deeply or systematically into the subject of pharmaceutical tuition, may succeed in aiding this extensive class of learners, and at the same time afford a help to well-disposed apothecaries, who really desire to aid their boys, but who are at a loss how to advise them.

The *special* knowledge requisite to the apothecary is of four kinds, viz.:

* Read before the American Pharmaceutical Association, at Richmond, September, 1873.

1st. A practical acquaintance with the implements and apparatus of pharmacy, and with the methods of using them in all kinds of manipulation.

2nd. The intelligent use of this apparatus in making preparations of the Pharmacopœia, so as to adapt it to the nature of the material treated, which involves not only some acquaintance with the physical laws but also with the nature and composition of drugs.

3rd. The study of the scientific relations of pharmacy as explained in works on Chemistry, Materia Medica, Botany, and Physics, and a thorough acquaintance with the physical appearance and properties of drugs.

4th. That important part of the business involved in getting medicines ready for the sick, as well on the prescription of physicians as on ordinary demand by consumers, where a maturity of judgment has to be exercised in regard to the correctness of substances required. The construction of the Latin language, and some knowledge of its vocabulary, is absolutely necessary in this department in many countries, though less indispensable in the United States.

In view of all this knowledge to be gained, it must be apparent that the native ability, and the preliminary education of the boy, have much to do with his success in mastering its details. So important is it that the beginner in pharmacy should be well grounded in the ordinary branches of school education, that in several countries abroad, none but such are admitted to apprenticeship, with some knowledge of the classics superadded. When, therefore, he brings with him some rudimentary knowledge of the sciences as taught in the best common schools, our novice is well equipped to make progress in the avocation he has chosen, and needs only perseverance to succeed.

The text-books upon which the beginner has mainly to depend are, the United States Pharmacopœia, the United States Dispensatory, and some one or more works on chemistry and pharmacy, with a Latin dictionary and, when possible, Webster's dictionary. One of the first lessons is to get a practical acquaintance with the labels in the store, in connection with the substances labelled; this is the groundwork of his study of the business, and is essential to progress in other directions. The habit of abbreviating labels on shop furniture and in prescriptions adds much to the trouble of the novice in learning them, and it has sometimes happened that he has never thoroughly acquired the terminations of the words so as to use them with facility. A good plan is to commence with a shelf of bottles or a row of drawers at a time, and, by the aid of the officinal list of the Pharmacopœia and the Index of the Dispensatory, to copy the names in full into a rough note-book in *columns*, placing the English name in line. He should be assured that the labels are correct for the substances contained, and then by close observation get as clear an impression of the appearance, taste, and odour of each substance as possible. Another shelf or row should then be taken and proceeded with, observing from time to time to exercise the memory and the senses on each preceding lesson till it becomes familiar. This brings us to consider for a moment the manner of consulting the Pharmacopœia and Dispensatory for this purpose. The Pharmacopœia officinal list is arranged alphabetically, and the same arrangement applies to the groups or kinds of preparations, as well as to the individuals of each group. The *officinal names* (or authorized names) in full, with the regular English name, and a brief definition of the nature and natural source of the substance is given. Most Materia Medica names will be found in this list, whilst preparations will be found in the second part of the book, and most easily by consulting the index. Special attention should be given to the spelling of the Latin names and their terminations. For example, suppose our young friend in his first lesson has a drawer labelled "Colocyn.;" referring to the list he finds "*Colocynthis*," translated "Colocynth," and described as the fruit of Citrullus colocynthis "deprived of its rind." He naturally desires to know what sort of fruit, what are its qualities, what sort of a plant yields it, where it grows, what it is used for, etc. To get these answers he must go to the Dispensatory, article "Colocynthis," where he will find all he desires to know about it; but *this* inquiry may well be left until he has considerably extended his superficial knowledge of drugs and their correct names.

The immense size of the United States Dispensatory, and its comprehensiveness of detail, render it a formidable object as a text-book for the beginner, until he gets the key to its construction, and finds it almost as easily consulted as a dictionary, having an alphabetical arrangement. The greatest difficulty it presents is its fulness, and the longer time necessary to consult it. But it is by no means necessary for the beginner to read each entire article: for instance, in the example above stated, he can easily find that colocynth is a fruit like the mock-orange, growing on a vine with leaves like those of the watermelon; that its pulp is exceedingly bitter and purgative, that it comes from Northern Africa, and enters into several valuable medicines.

In an establishment where the preparations of the Pharmacopœia are made for its own dispensary, the beginner has a great advantage, as from the first he can witness processes more or less interesting, and which arrest his attention. Though at first only as an aid, or perhaps coming in at the close to cleanse the apparatus, he soon learns enough to be useful, and then if he is willing and obliging, he has the *open sesame* of rapid advancement. In this way a three months' apprentice has taken charge of the weekly supply of citrate of magnesia in a careful and reliable manner, and has felt encouraged and sustained by his conciousness of being useful, and of advancing in knowledge. When he becomes conscious of a desire to enter the field of book knowledge, and make it assist his observing faculties, and explain his difficulties, a great point has been gained in his onward progress. Let us suppose his first trouble in washing mortars to arise from Prussian blue, which resisting his best efforts, he applies for help, and is told to use solution of potassa, the magical effect of which makes a deep impression on his mind. When evening comes he sets to work with the Dispensatory, at the article Prussian blue, and soon gets at sea in chemistry which he cannot understand; but he succeeds in learning that potash forms a soluble salt with Prussian blue, and thus detaches it from the porcelain surface, setting oxide of iron free. At the same time he glances at "*Potash*," learns its origin from wood-ashes lye, that it is a *base*, neutralizes *acids*, forms *salts*, dissolves *fats* and forms *soap*, and many other facts.

Now it is not to be expected that our young friend has gotten a very clear insight into the chemistry of these subjects; but if intelligent he has seized the leading points, and will not rest until all is understood by subsequent study. The habit of close observation of colour, taste, odour, shape of outline, and configuration of parts, should be cultivated as one of the most valuable aids in gaining knowledge, as he progresses from day to day; and by cultivating a habit of using the pencil to imitate the form and construction of objects, whether drugs or apparatus, it will be found to aid the memory decidedly.

We will suppose our lad is set at grinding senna in a Swift's mill, for fluid extract. It is light work but tedious, and in the frequent resting-spells his curiosity is attracted to the drug. He finds several distinctly shaped leaves, notices that at the base they are mostly *uneven*, but some are not, that when chewed the drug colours the saliva quickly, and that it has a peculiar odour. If he is critical he may find leaf-stalks, seed-vessels, etc., and by the time he has ground ten pounds he is pretty well acquainted with the sensible characteristics of senna. When evening arrives he resorts to his Dispensatory and finds that there are several kinds of senna, and it takes him some time to decide that the mixed character of what he had been grinding fixed it as the Alexandrian, or

Upper Nile senna. He notes the kind of plant, gets a hint of its commercial history, what it contains, what liquids are best to extract its virtues, what medical properties it has, and what preparations are made from it. He then re-examines the leaves in view of his reading, looks at his school atlas for Nubia and Abyssinia as the country of its growth, and the next time he is sent to a large drug store asks to see a *bale* of senna, and he is pretty well booked up on senna, and will not forget it. All this will take several evenings. Senna is but one of a long list of vegetable drugs that in his first year's experience will practically come to his acquaintance, and, by following the same course, an outline of whose history will be grasped, and gathered into his storehouse of memory for future use.

At the very beginning of the Pharmacopœia is a notice of the weights and measures used in pharmacy, and at the end of the Dispensatory a much longer notice describing the French and other weights and measures. Now as pharmacy is a business constantly requiring exact quantities by weight and measure, the beginner should from the first familiarize his mind with the officinal weights and measures, and the manner of using the scales or balance, and the measures of capacity, as well as the relations of troy weight to avoirdupois or English weight, and metrical or French weight. He should also try his hand at dividing a given quantity, say a drachm, into ten parts with a spatula, by the eye, and then weigh each one, and see how it varies from six grains, the proper weight of a tenth. For the same reason that he exercises his memory to grasp knowledge, he should exercise his senses and muscles to acquire skill, constantly keeping in mind the old adage "that whatever is worth doing should be done well." In the simple matter of wrapping packages in paper there is a wide field for skill. Some never learn how to do it neatly, especially doses of powders. Others give so neat and regular a finish to their work as to make it attract attention. The wrapping of bottles and boxes in paper, and especially the tying of bundles, all are worthy of close attention until habitual skill is attained.

In the matter of cutting, and attaching labels to bottles and boxes, the same range of skill exists, and to be always neat requires care in gaining the habit at first.

In the manner of handling the pestle in trituration, in contusion, pill-making, or in emulsionizing, or of managing the spatula in mixing ointments or powders, there is a wide margin for grades of skill and neatness.

Cleanliness in pharmacy is a virtue that ranks with *order*, and without these the shop practice becomes more or less demoralized. Clean glassware, bottles, graduated measures, white mortars, bright spatulas, and a clean, orderly counter, add wonderfully to the pleasure of dispensing, as they do to favourably impress the patrons of a store. The habit of restoring bottles to their proper places after using them, that of keeping all receptacles suitably filled ready for use, and that of labelling every vessel or package that is set aside, are among the most useful that contribute to shop order and comfort. The amount of trouble and annoyance saved by habitual attention to these shop morals, by *all* the employés, can only be appreciated by those who have seen the working of both plans, and drawn their conclusions.

It is to ingraft and fix these and other important habits, that our colleges require four years' apprenticeship or training at the dispensing counter and in the laboratory, before granting their diploma; a requirement which should be most strictly carried out.

But a new experience awaits our novice; he is to take part in a chemical operation attended with some care and labour,—the making of Vallet's pill-mass of carbonate of iron. After weighing certain quantities of sulphate of iron and carbonate of soda, he separately dissolves them in boiling water containing a portion of syrup, strains the solutions to remove undissolved particles, and mixes them, when cold, in a vessel just capable of holding them, when, to his surprise, a thick, pulpy, bluish-white mixture results, which separates into a solid precipitate and a clear liquid above. The liquid is drawn off, and its place filled with pure boiled water containing syrup, and the whole intimately mixed, allowed to settle, and the process repeated, and the sediment finally drained on a cloth filter, tied, expressed, mixed with sugar and honey, and on a water-bath evaporated with constant stirring, until when cool it has a solid pillular consistence. The points in this process to attract his attention are: the reason that mixing the clear solutions produces a sediment, why boiled water is used, why the washing water is sweetened, why honey is used, and, finally, why a water-bath is employed. After the tedious process of stirring is concluded, and the pill-mass stowed away yet warm in jars, the Dispensatory will answer all these queries clearly and satisfactorily, if appealed to, and he will have added a chemical chapter to his experience, involving the law of double decomposition, and the power of sugar to prevent or retard atmospheric oxidation, and the process of decantation and filtration.

This is only one of many chemical processes that he will be called on to take part in, long before he will be able to attend lectures at college; or, if this is beyond his reach, before he can make progress in the study of chemistry sufficiently to understand chemical reactions. It is this excited curiosity, this desire to understand phenomena daily occurring, that is to stimulate his efforts at self-improvement in knowledge, and finally give him the victory over adverse circumstances. Some of the greatest minds devoted to chemistry in the past have thus begun their career. Scheele, the discoverer of so many important organic bodies; Davy and Liebig, so justly celebrated as chemists and investigators, were all at one time apothecary boys, groping in the dark bravely until they found light for themselves and all others. But our beginner is getting sufficiently advanced to be called a student, he is in his second year, and looking forward to attending lectures next winter, when he will enter systematically on the study of the science of his business, and clear up hundreds of little theoretical difficulties that have bothered him in his progress. He begins to see that botany is necessary to understand materia medica, and that the laws of physics or natural philosophy have much to do with explaining the phenomena of steam apparatus, of solutions, of crystallizations, and of taking specific gravities; and he rightly desires the aid of handbooks. For the former, Dr. Gray's little work, 'How Plants Grow,' will serve his purpose; or 'Lindley's Outlines of Structural Botany;' and for physics some work like 'Ganot's Popular Physics,' will do for awhile; but Mueller's will be more satisfactory for advanced students. Special works on manipulation, chemical and pharmaceutical, are of great value. The great book of Faraday on Chemical Manipulation, so simple in its language, but so full in its meaning, has long been out of print; but 'Campbell-Morfit's Chemical and Pharmaceutical Manipulations,' is a good substitute, and well illustrated. Bowman's Chemistry for the beginner in analysis, is good; but for the more advanced student, Dr. Attfield's Chemistry, written with a view to the needs of the student of pharmacy, is excellent. In fact, the literary aids to the student are so numerous that he is often confused in choosing a guide, and it is of the utmost importance that he should keep his mind clear to his main object, the building up layer on layer, regularly and solidly, the superstructure of his own professional knowledge, on the solid foundations he has laid by his first and second year's devotion to the rudimentary services in the laboratory and at the counter. If successful, his reasoning powers will have been exercised freely, his judgment matured, his memory well stored with facts derived from study or from observation and experience, and he will be well fitted to receive the honours of graduation, and to go out into the world as a disciple of Æsculapius in the service of his fellow-men.

THE REACTIONS OF ACIDS WITH OIL OF PEPPERMINT, AND THEIR BEARING ON THE FORMATION OF CHLOROPHYLL.*

BY M. A. FREBAULT.

With the object of combining the hydrocarbon of oil of peppermint with picric acid, the author heated gently together an alcoholic solution of that acid with some of the essential oil; water was added to dissolve the excess of acid, and the mixture left to stand. Twenty-four hours afterwards the oil, which had collected at the surface of the liquid, presented a magnificent green colour. This formed the starting point for the author's investigation.

Action of Picric Acid upon Oil of Peppermint.—If oil of peppermint be agitated with picric acid, nothing is observed at first further than that the picric acid partially dissolves, and communicates its yellow colour to the oil; but in half an hour the mixture is coloured manifestly green, and in twenty-four hours this colouration acquires a great intensity. If a slight heat be applied to the mixture the green colour appears more rapidly.

This green product, exposed to the air upon water during four or five days, acquires the reddish-yellow colour of dead leaves. Introduced floating on water into a test-tube containing nitrogen, the colour is retained for some time; but in oxygen it disappears more quickly. Treated several times with cold water, the washings remove each time some of the picric acid together with a red colouring matter, and finally the essential oil remains of a reddish-yellow colour.

The green product has a strong red fluorescence, and in an alcoholic or ethereal solution, this phenomenon is still more marked. Treated with solution of caustic potash or ammonia, a picrate of the base employed is formed, and the essential oil remains of a reddish-yellow colour. When the green product is distilled from caustic potash, a colourless liquid passes over into the receiver, and there remains in the retort a black mass analogous to that obtained by treating oil of peppermint with chromate of potash. The distillate no longer yields the green reaction with picric acid. Nascent hydrogen reduces the green product, and transforms it into a brown substance. If, instead of operating in the cold or with a gentle heat, the solution of picric acid in oil of peppermint is boiled for a few moments, it passes from the green state to yellow-brown, and then reddish-brown. Upon the addition of ammonia it quickly forms red crystals, which are probably picramate of ammonia, and some crystals of picrate, whilst in the midst of them is disseminated an amorphous powder of a beautiful red colour. This red powder is soluble in water, insoluble in benzine and oil of turpentine, and very slightly soluble in ether and alcohol.

That oil of peppermint is a reducing agent is shown by its producing the characteristic colour of Prussian blue in paper saturated with a solution of ferric sulphate and ferricyanide of potassium. At the boiling temperature it partially transforms the perchloride of iron to the state of protochloride, and the perchloride of mercury is also partially reduced to calomel. Submitted to dialysis in alcoholic solution, the picric acid diffuses through from the green product, together, no doubt, with a little menthene, the solid and crystallizable portion of the essential oil. This solution has a bitter, sweetish, and slightly cool taste. Distilled in a water-bath it leaves a yellow residue, which, treated with sulphuretted hydrogen and ammonia, gives the intensely red colouration of picramate of ammonia. The alcoholic distillate has the cool taste of oil of peppermint due to the menthene.

It was thought interesting to investigate whether the reaction took place between the crystallizable portion or the hydrocarbide of the essential oil and the picric acid; whether the green reaction was also produced with oil of pennyroyal, which contains no stearoptene. The phenomenon of colouration was found to be limited to the oil of peppermint, except that it occurred also with oil of chamomile; but in that case there is no combination, the green being produced by the mixture of blue and yellow, and there is no red fluorescence.

The reaction between oil of peppermint and picric acid is so clear, that the author thought picric acid might be used in testing for the presence of that essence in a mixture of essential oils, and, *vice versâ*, that oil of peppermint would be a suitable test for the presence of picric acid. For this purpose he made a mixture of several essences, about two grams, to which he added two drops of oil of peppermint. This was shaken with a solution of ten centigrams of picric acid in about fifty grams of water. At the end of twenty-four hours the essential oils collected on the surface, and presented a very perceptible green tint. In a second experiment, a decoction of barley and hops was made, to which an extremely small quantity of picric acid was added. The liquor was filtered, and a portion of it agitated with fifty centigrams of oil of peppermint in a test-tube. The green colour was very evident after twenty-four hours.

The author has made no experiments with beer, but he suggests that it might be tested by evaporating the suspected beer to the consistence of honey, treating the extract with alcohol to which a few drops of nitric acid have been added, filtering the liquid, concentrating and agitating with a little oil of peppermint. Nitric acid is used for the purpose of oxidizing any acid that may have been reduced to picramic acid by the action of sugar in the beer, and to saturate the lime salts present.

Action of other Acids on Oil of Peppermint.—The question as to what this colouration is due may receive some elucidation from observation of the action of other acids upon oil of peppermint, which has not yet been carefully studied. The following are the principle effects noted by the author:—

Sulphuric Acid produced at first a rose colour, then reddish-yellow, passing rapidly to reddish-brown. When ether was added it acquired a beautiful yellow colour, whilst the lower portion of the mixture was coloured red. When water was added and the mixture shaken the liquid separated into two layers, of which the lower acid aqueous layer was rose-coloured, and the uppermost ethereal layer took a greenish blue tint and had a strong red fluorescence.

Hydrochloric acid induced a rose colour rather slowly. Upon the addition of ether this became faintly green. When water was added the underneath layer was rose-coloured, but the ether retained its green colour. In some experiments a blue colour was produced.

Nitric acid caused first a rose colouration, then red, soon becoming greenish. Upon adding ether and water and shaking, the underneath layer was rose, and the ether rising to the top took a violet-blue grey colour.

The blue and green tints were rapidly altered by the action of air and light.

These observations were made upon pure and quite colourless oil of peppermint. When the yellow or greenish-yellow tinted oils frequently met with in commerce were employed, the phenomena of colouration were much more intense with sulphuric and hydrochloric acids; whilst with nitric acid the ethereal layer acquired a magnificent green colour and a strong red fluorescence. The rose colouration first produced by the acids had a violet reflection. Moreover, when chloroform was employed in the place of ether, sometimes a violet or a grey colour was obtained, the latter being the result of a mixture of yellow and violet, or perhaps red and green, or even blue and orange.

From the foregoing, the author concludes that the colouration produced by picric acid when reacting upon the oil of peppermint is not a property peculiar to itself, but common to the strong acids; that the picrate of the hydrocarbide which he sought was not produced; that it

* Abstract of a paper in the *Répertoire de Pharmacie*, vol. ii. p. 199.

was not a case of oxidation *pur et simple* as might have been supposed with picric acid. He looks upon the colouration as a phenomenon dependent upon the separation and combination of the colouring matters contained in the oil of peppermint. He thinks that the acids split up the oil into five colouring principles, red, blue, green, yellow, and violet; and that, according to the quantity and nature of the acid employed, one or other of these principles is obtained, or perhaps a grey resulting from a mixture of two complimentary colours.

Relation of the Green Colouring Matter to Chlorophyll.—The author remarks upon the striking analogy which appears to exist between the green substance obtained by the action of acids upon oil of peppermint and chlorophyll, which is set forth in the following table :—

Chlorophyll.	Green Matter obtained by the Action of Acids on Oil of Peppermint.
Strong red fluorescence.	Strong red fluorescence.
Becomes reddish-yellow in the air (dead leaves).	Exposed to air, it is changed into a reddish-yellow substance.
Treated with alkalies it becomes yellow.	Treated by alkalies, it becomes yellow.
Reduced and decolorized by nascent hydrogen.	Reduced and transformed into a brown matter by nascent hydrogen.
Yellow leaves become green by the action of acids.	After being made yellow by alkalies, again becomes green when treated with acids.
The green and blue colours obtained by the action of acids on chlorophyll are decomposed by light.	The green and blue colours obtained by the action of acids upon oil of peppermint are decomposed by light.

This comparative table presents points of great resemblance, of which the most important doubtless is the fluorescence, the red fluorescence being characteristic and confined to these two substances. Supposing it probable that in both cases the appearance is due to chlorophyll, the author endeavours to explain its formation in the oil of peppermint. He considers that as his experiments were made with colourless oil of peppermint it is necessary to assume that the constituent elements of chlorophyll exist in that essence; but that probably they exist there in a state of reduction, and that it is only under the influence of acids that a kind of synthesis of the chromule takes place. The blue principle (Frémy's phyllocyanine) and the yellow principle (phylloxanthine) are, so to speak, in a latent and colourless state, either in consequence of reduction or their combination with the other colouring principles present in the oil. Under the influence of acids the phyllocyanine is regenerated, and at the same time the phylloxanthine, separated from the red and violet principles, unites with the blue especially to form the green colour. With picric acid and nitric acid the green colouration is more intense than with the other acids, because an oxidizing action is combined with a separative action.

According to this hypothesis, which the author proposes to test by further experiment, chlorophyll, or at least its constituents, are volatilizable in the state in which it actually exists in oil of peppermint. The greenish colour which is seen in the oil when imperfectly rectified would then be due probably to chlorophyll, of which the elements have not been completely altered in a first distillation.

Action of Chloral upon Oil of Peppermint.—The rose colouration which takes place when hydrate of chloral is shaken with oil of peppermint, which was pointed out by M. Carl Jehn,* has also been the subject of experiment by the author. He has come to the conclusion that the colour is produced in the oil of peppermint and not in the chloral hydrate, and that it only occurs when the chloral hydrate used is acid, it being more intense in proportion as the chloral hydrate is more acid. But he has not yet been able to experiment with perfectly neutral specimens. In this case the reaction would be due to the formic acid contained in the chloral hydrate, or possibly to hydrochloric acid resulting from partial decomposition.

* See Pharmaceutical Journal, before, p. 556.

THE CONSTITUTION OF BLEACHING POWDER.*

BY C. SCHORLEMMER.

The author was much surprised by reading lately a paper by Goepner, "On the Nature of Chloride of Lime," in which he revives Berthollet's view, that the bleaching compound contained in it is simply a combination of lime and chlorine, and decomposed by acids into its constituents. He says that, although we find in all handbooks the statement that a solution of hypochlorous acid is obtained when a solution of bleaching powder is distilled with a dilute acid, as if the experiment had been made hundreds of times, this is a mistake; and the reason why the error has maintained itself so long is, that hitherto no reaction was known by which free chlorine and hypochlorous acid could be readily distinguished. Such a reaction has, however, now been discovered by Wolters, who has found that when chlorine-water is shaken with mercury, only mercurous chloride is formed; while with aqueous hypochlorous acid it yields a brown, crystalline oxychloride, which is readily soluble in hydrochloric acid. In employing this method for detecting hypochlorous acid in the liquid obtained by distilling bleaching powder with a small quantity of hydrochloric or sulphuric acid, Goepner could not find a trace of hypochlorous acid.

To this the author remarks that Gay-Lussac, in his classical research "On the Compounds of Chlorine with Bases," recommends, as a ready means for preparing a dilute solution of hypochlorous acid, to distil a solution of bleaching powder with dilute nitric acid. This experiment has since been repeated hundreds of times. Roscoe shows it every year in his lectures, and the laboratory students perform it in the course of their practical work. A perfectly colourless distillate is thus obtained, which is a much more powerful bleaching agent than freshly prepared chlorine-water. This is quite sufficient to show that the distillate contains hypochlorous acid. But why did Goepner fail in detecting it? Is it the fault of the analytical method? To decide this, hypochlorous acid was prepared by distilling a solution of bleaching powder with dilute nitric acid or sulphuric acid. On shaking the distillate with mercury, the brown oxychloride was formed in each case. Another argument against the existence of a hypochlorite in bleaching powder Goepner finds in the fact that the chlorine used in the manufacture always contains hydrochloric acid, and thus more calcium chloride is formed than would correspond with the formula $CaO\,Cl_2$. When bleaching powder is exhausted successively with small quantities of water, this excess of calcium chloride is found in the first solutions, while the following contain calcium and chlorine in the proportion corresponding with the above formula. This, however, only proves that bleaching powder is not a mixture of calcium chloride and hypochlorite, but that it contains the compound $Ca\begin{cases}Cl\\OCl\end{cases}$, or has the constitution which Odling has assigned to it. Williamson has shown that a solution of hypochlorous acid is also readily obtained by passing chlorine into a mixture of water and finely divided calcium carbonate, and distilling as soon as the carbonate is dissolved. In this reaction the above compound is probably also first formed and then decomposed in the following way :—

$$CaCl(OCl) + Cl_2 = CaCl_2 + Cl_2O.$$

* Abstract of a paper in *Deut. Chem. Ges. Ber.*, vi. 1509, from the *Journal of the Chemical Society* for April.

The Pharmaceutical Journal.

SATURDAY, JUNE 6, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE NEW COUNCIL AND THE NEXT ELECTION OF ANNUITANTS.

AT the meeting of the Council on Wednesday last, the general satisfaction of the Members of the Pharmaceutical Society with the conduct of its business, shown by the recent re-election of all the available members of the previous Council, was endorsed by that body in the re-election of its former officers, Mr. THOMAS HYDE HILLS as President, Mr. ALEXANDER BOTTLE as Vice-President, and Mr. JOHN WILLIAMS as Treasurer. But these offices, though honourable, are far from being honorary in respect to service; and no one was astonished to hear the report that Mr. HILLS had come to the determination to decline to resume the office of President if it were offered to him. The news, therefore, that the unanimity of his colleagues has overcome his reluctance and secured to the Society his services during another year will, we believe, be cordially welcomed by the members.

Besides the natural curiosity as to the choice of leaders, a considerable amount of interest has been excited in the question which the Council had to decide at its first meeting, respecting the election of annuitants on the Benevolent Fund in October next. A few words will suffice to make plain what they have done. The principle hitherto adopted in deciding the number of annuitants to be elected, has been not to exceed the income derived from the interest on the invested money. This now amounts to £14,000, the interest on which is just sufficient for fourteen annuities of £30 each. At the present time thirteen persons are in receipt of such annuities, so that, had the ordinary course been adopted, only one annuitant could have been elected next October. The Council, however, have resolved that four shall be elected, or three more than are provided for by interest of invested capital; and thus they have initiated the experiment of entering into permanent engagements based upon faith in the continued and extended generosity of the subscribers.

The course has been taken by the Council, doubtless, in deference to the opinion repeatedly expressed in the correspondence columns of this Journal and advocated by Mr. ROBBINS, that a more free distribution of the funds would induce a greater influx of subscriptions. That it is an experiment must not be forgotten, and one that did not awaken any great enthusiasm at the annual meeting. As Mr. BETTY aptly remarked on Wednesday last, the past prosperity of the Fund is proof that the principles upon which it has been administered have been sound; and he vouches that for two years no deserving applicant has been sent away unrelieved. It is urged, however, by some, professing to be representative of many more, that these casual grants lack the element of certainty which makes an annuity so grateful to those already weary of life's anxieties. Challenged again and again to test and prove the generosity of their brother pharmacists, the Council have, after mature consideration, picked up the glove. It is now for the challengers to show that they are not of those who turn their backs in the day of battle.

AN EVENING WITH DR. DOBELL.

A PLEASANT *réunion* took place at 84, Harley street, on Thursday evening last, at which were assembled a number of the disciples of Æsculapius and Galen. A variety of novelties were exhibited, chiefly medical appliances and preparations of new remedies, amongst which was shown in action a process of poulticing by steam. A mode of applying steam for this purpose has been practically worked out by Dr. DOBELL, in which a current of steam is made to pass through waterproof bags, and is passed off as condensed water, by means of an india-rubber tube, below the patient's bed. The bags, of different sizes and shapes to suit the parts to which they are to be applied, have an exterior coating of flannel or other non-conducting material, and can be kept *in situ* with an absorbent layer, if necessary, either wet, dry, or medicated, as the case may require, placed between them and the body. Messrs. MAW, SON and THOMPSON supply the apparatus, and bags of all sizes. Messrs. MAW, likewise, sent several other medical appliances. Messrs. MAYER and MELTZER exhibited a very compact portable electric battery; Mr. T. HAWKSLEY a Hunter's portable apparatus for producing vapour and hot air baths; Messrs. KROHNE and SESEMAN, Dr. Siegle's steam spray inhaler. Sphygmographs and aspirators of various kinds were also shown. Dr. SPENCER THOMPSON's ice preserver and butter cooler were unfortunately empty, or their utility might have been tested on that evening particularly. Of articles possessing more pharmaceutical interest, Messrs. HEARON, SQUIRE, and FRANCIS exhibited a large specimen of guaranine; Messrs. P. and P. W. SQUIRE exhibited Lin. Potassii Iodidi cum Sapone, made with hard soap and also with curd soap, Coca leaves and tincture, Liq. Fuci Vesiculosi, Liq. Vincæ Majoris, Liq. Ferri Chloroxidi, Tinct. Gummi Rubri, a bundle of Cannabis Indica and its extract, and Pulv. Glycyrrhiza Comp., B.P. and P. Boruss.; Messrs. SAVORY and MOORE exhibited Coca and its tincture, Guarana and its tincture, Cort. Eucalypti Globuli and tincture, Pancreatine and Pepsine, and coated pills of these; Messrs. CORBYN and Co., an improved double valve Inhaler, Perles of Sulphide of Calcium and of Sulphide of Sodium;

Mr. HAMPSON, specimens of his Sugar-coated Pills; Mr. MARTINDALE, a collection of preparations contained in the new "Additions to the Pharmacopœia" and some Fumigating Pastilles of Nitre, a substitute for nitre paper. Mr. J. B. BARNES represented elegant pharmacy with medicated effervescing draughts; Mr. COOPER, with his effervescing lozenges. Messrs. REW and Co. also exhibited Carbolized Ether, Hydrate of Chloral combined with Camphor, and other preparations.

"SCIENTIFIC EVIDENCE" AND THE ADULTERATION ACT.

SPEAKING of the uneasiness and dissatisfaction caused by the conflicting nature of the evidence which has been given by public analysts and others in several prosecutions under the Adulteration Act, the *Times*, in a recent leading article, says:—

"The present complaint arises really from the way in which the professional witnesses are ticketed off beforehand as the property of the one side or the other, and are expected to give evidence accordingly. There ought to be no such ticketing off. Questions which arise on which skilled evidence is requisite—and there will of course be many of them—should be referred to a qualified and impartial tribunal, and the answer obtained should be final for the matter under dispute. In this way only can those scandalous scenes be avoided which now perpetually recur in our Courts of Law, and make our administration of justice too frequently a by-word for its manifest absurdities. Something of this kind ought, no doubt, to have been done long ago. Foreign jurists are simply amazed at our present system, and regard it only as one among many instances of our strange and incomprehensible customs. Nor is it only that a change is requisite. Practically, too, there could be no great difficulty in making it. The manner of the appointment of the proposed tribunal in each case; who, if any, should form permanently a part of it, and in what way they should be required to examine and report—all these would be matters of detail, which could be arranged easily as soon as the attempt was *bonâ fide* made to settle them. Any system would be better than one which not only offers a direct premium on false evidence, but seems contrived for the express purpose of obscuring the very points which most need to be brought into the clear light of day. If our correspondent's suggestions are followed in reference to evidence under the Adulteration Acts, it will be, at all events, a step in the right direction. It will need, however, if the whole evil is to be met, to be supplemented by a much larger measure, dealing generally with the manner in which the evidence of all Experts is to be taken in our Courts of Law; and such a measure cannot, without grave mischief, be delayed much longer. The present system by which scientific witnesses are selected by the parties to a suit, poisons evidence at its very source."

MILK DRINKING IN NEW YORK CITY.

MILK, which through the operation of the Adulteration Act has lately received a certain rehabilitation of character in this country, is reported to be furnishing the latest sensation in "drinks" in New York city. According to the *Scientific American*, milk drinking has received an unusual impetus through the establishment of restaurants where the diet is confined to a few simple articles of farinaceous food and to bowls of milk and cream supplied at moderate prices. The idea appears to have originated some five years since with the proprietor of a small baker's shop in a back street, who had a monopoly of the business for some time, making large returns. Others, attracted by the gains, embarked in the business, and by a natural process of selection, from the little baker's shop have evolved the more pretentious restaurants. The most popular of these are said to be thronged by all classes, from bankers and merchants, clergymen and lawyers, to errand boys; showing that if this sudden increase in milk drinking be a popular mania, it is one that is widely diffused. As much as twelve hundred quarts on a cool day, and half as much more on a hot day, is the quantity of milk said to be consumed in a single establishment, by an average of twenty-five hundred persons.

PORTRAIT OF THE LATE HENRY DEANE.

THE following gentlemen have already sent in their names as subscribers to the fund which was proposed at the Annual Meeting for placing a memorial portrait of Mr. DEANE in the Council Room of the Pharmaceutical Society, and Mr. SANDFORD, of 47, Piccadilly, will be glad to receive early intimation from others who may wish to join in this tribute of respect to so worthy a member of the Society, and so eminent a pharmacist. It was understood that the subscriptions should not exceed one guinea.

	£	s.	d.		£	s.	d.
Mr. Hills	1	1	0	Mr. Reynolds	1	1	0
„ Bottle	1	1	0	„ Harvey	1	1	0
„ Stoddart	1	1	0	„ Bremridge	1	1	0
„ Williams	1	1	0	„ Giles	1	1	0
„ Atkins	1	1	0	„ Vizer	1	1	0
„ Robbins	1	1	0	„ Palmer	1	1	0
„ Yarde	1	1	0	„ W. B. Lacy	1	1	0
„ Fowler	1	1	0	„ Faulconer	1	1	0
„ Atherton	1	1	0	„ Evans	1	1	0
„ Constance	1	1	0	„ Edwd. Webb	1	1	0
„ Andrews	1	1	0	„ Humpage	1	1	0
„ Sandford	1	1	0	„ Brady	1	1	0
„ Mackay	1	1	0	Prof. Redwood	1	1	0
„ Frazer	1	1	0	Mr. Hampson	1	1	0
„ Greenish	1	1	0	„ Butt	1	1	0
„ Radley	1	1	0	„ Schacht	1	1	0
„ Betty	1	1	0	„ Darby	1	1	0

THE FRENCH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

IT is announced that the meeting of the Association Française pour l'Avancement des Sciences for this year will be held at Lille, August 20 to 27, under the presidency of M. WURTZ.

APPOINTMENT OF ANALYSTS.

DR. ALBERT JAMES BERNAYS, of St. Thomas's Hospital, has been appointed Public Analyst for the district of St. Saviour's, Southwark, *vice* Dr. BIANCHI, resigned. According to the *Standard* the terms of the appointment are that the salary shall be £105 per annum, and that during the year the analyses *shall not greatly exceed one hundred!* If this be correct, the local authorities may be congratulated upon even so limited an amount of zeal for the public morality as a step in advance, and preferable to accepting gratuitous services.

Mr. ALFRED WILLIAM SMITH, chemist and druggist, has been appointed Public Analyst for Rye; the remuneration to be 5s. to 10s. per analysis.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL,

Wednesday, June 3rd, 1874.

Present—Messrs. Atherton, Baynes, Betty, Bottle, Brown, Frazer, Greenish, Hampson, Hills, Mackay, Owen, Radley, Rimmington, Robbins, Sandford, Savage, Schacht, Stoddart, and Williams.

Mr. Hills was called to the Chair until a President should be chosen.

The minutes of the previous meeting having been read and confirmed, the first business was the election of officers and committees for the ensuing year.

Election of President.

On a ballot being taken, Mr. Thomas Hyde Hills was unanimously re-elected President. He thereupon thanked his fellow members for the honour they had again conferred upon him.

Election of Vice-President.

Mr. Alexander Bottle was also re-elected Vice-President, and acknowledged the compliment.

Election of Treasurer.

Mr. Williams was again elected to discharge the duties of Treasurer during the coming year, and also returned his acknowledgments.

Election of Secretary and Assistant Secretary.

Mr. Elias Bremridge was re-appointed Secretary and Registrar, and Mr. Richard Bremridge Assistant Secretary and Deputy Registrar.

The Conversazione.

Votes of thanks were unanimously passed to the Lords of the Committee of Council on Education for their kindness in allowing the use of the South Kensington Museum for the annual Conversazione; also to the official staff of the Museum for their services on the same occasion.

Appointment of Committees.

General Purposes:—the whole of the Council; to meet as occasion may require.

Finance:—Messrs. Greenish, Hampson, Owen, and Robbins. The Committee to meet at three o'clock on the day preceding the meeting of the Council.

Library, Museum, and Laboratory:—Messrs. Betty, Greenish, Hampson, Robbins, Sandford, and Williams.

Mr. Schacht suggested that this Committee should meet on the Tuesday prior to the Council meetings, in order to enable country members to attend it.

Mr. Sandford said it had been found necessary that one of the Committees should meet in the middle of the month, as various matters occurred which it was very desirable to have the advice of a Committee upon.

Mr. Hampson thought it very undesirable that the most important work of the Society should be all done by the London members. He should be very glad, therefore, if this Committee could hold its sittings on the day previous to the Council meeting.

Mr. Robbins said the General Purposes Committee was not utilized as it might be.

Mr. Atherton suggested that the House Committee should meet in the middle of the month, and the Library Committee meet on the Tuesday preceding the Council meeting.

Mr. Betty said that the House Committee did not require to meet every month.

The above mentioned gentlemen were then elected, with power to add to their number, and thus enable any country members to attend when business was to be transacted in which they took a special interest.

House:—Messrs. Betty, Greenish, Hampson, Robbins, Sandford, and Williams.

Benevolent Fund:—Messrs. Atherton, Brown, Frazer, Greenish, Hampson, Mackay, Owen, Rimmington, Robbins, and Sandford.

Law and Parliamentary:—It was proposed that this Committee should consist of the whole of the members of the Council; but, after some conversation, it was considered undesirable to have so large a number, and the following names were selected:—Messrs. Atherton, Baynes, Betty, Brown, Greenish, Mackay, Owen, Rimmington, Sandford, Savage, Schacht, and Williams.

Pharmaceutical Education:—Messrs. Atherton, Baynes, Betty, Brown, Frazer, Greenish, Mackay, Radley, Rimmington, Schacht, Shaw, Stoddart, and Sutton, were appointed a Committee on this subject, to take the place of the former *Provincial Education Committee*.

Evening Meetings:—The President, Vice-President, the Professors, and the Editor, were appointed a Committee to superintend the arrangements for the Evening Meetings.

The President and Vice-President are *ex officio* members of all Committees.

Appointment of Editor and Sub-Editor.

Dr. Paul was re-appointed Editor, and Mr. F. Passmore Sub-Editor, of the Journal for the ensuing year.

Local Secretaries.

The appointment of Local Secretaries was deferred until next month, the returns not yet being complete.

The British Pharmaceutical Conference.

The President read a letter he had received from Mr. Michael Carteighe, Local Secretary to the Conference, stating that the meetings were arranged to take place on the 6th and 7th of August next. Also stating that the Local Committee were anxious to make the necessary arrangements for holding a Conversazione on the evening of the 6th, and desiring to know the views of the Council with regard to holding the same in the premises of the Society. The President suggested that it would be very desirable for the Society to invite the Conference to a Soirée in the Society's House.

After some conversation, it was unanimously resolved, on the motion of Mr. Sandford, seconded by Mr. Atherton—

> "That the Society, through its Council, do invite the members of the British Pharmaceutical Conference to a Conversazione to be held in this House, on one evening of the first week of August.

The President read a letter he had received from Dr. Williams, President of the Medical and Chirurgical Society, stating that that Society would hold a Soirée on June 9th, and asking if the Pharmaceutical Society would send any specimens of drugs or chemicals for exhibition. It was decided that the Library, Museum, and Laboratory Committee take the matter into their consideration.

Library, Museum, and Laboratory.

The report of this Committee was read. It recommended the purchase for the Library of 'Pavy on Dietetics,' and Thorpe and Muir's 'Qualitative Analysis.' The Librarian reported that the average attendance had been, in the day, 19·36; in the evening, 6·36; being an increase of two on the previous number. The average daily attendance in the Museum had been nine. Books had been sent out under the new regulations to thirteen persons in the country. The average attendance at Professors Redwood's and Bentley's lectures had been from 28 to 30. Professor Attfield had reported that there had been 80 entries in the Laboratory since the commencement of the session; and that there were about 38 students now at work there.

The report and recommendations were received and adopted.

Parliamentary Committee.

This Committee met on the 21st May, when, having considered the evidence which it would be advisable to tender before the Select Committee of the House of Commons, they adjourned to the Committee-room. An abstract of the proceedings before the Committee on that day has been published in the Journal.

Mr. Sandford said the Committee would meet again on the morrow, and he could not help thinking, that the Act would be considerably amended. He then proceeded to give further details of the proceedings before the Committee, and read a clause which the solicitor had drawn, and which he had handed in to the Chairman of the Committee in response to a question whether he had any addition to suggest to the Act. The purport of the clause was to take away from any ordinary informer the power of proceeding against a chemist, and to leave all such proceedings in the hands of the Society. He had since received a letter from the solicitor, suggesting that he should be authorized to send another copy of this proposed clause to the Chairman of the Committee, with notes and explanations; but he (Mr. Sandford) had thought it better to take no further step in the matter until after the meeting of the Council. He was not himself quite convinced that it would be wise on the part of the Society to undertake the duty of prosecuting members of the trade for adulterations, but he would, *pro formâ*, move that the clause be taken into consideration.

Mr. Betty said he had read the report of the evidence given before the Committee with great interest, and, as far as he could understand, the Committee purposed recommending to the House of Commons the utilization of the public laboratory at Somerset House. The question therefore was, whether they should adopt, and endeavour to obtain the insertion of a clause such as had been referred to, which would, in effect, impose on that Society the duty of public prosecutor in cases of adulteration of drugs; or, whether they had not better leave it, as at present, in the hands of the Government. He thought it would be a most undesirable position for the Society to take, believing that when they went beyond their original scope as an examining and registering body they would be lowering themselves, and taking up a position which they ought not to fill.

Mr. Schacht asked if the responsibility of prosecuting persons for selling adulterated drugs did not already lie upon the Society, under the Pharmacy Act.

Mr. Betty said no doubt it did, according to the terms of the Act; but virtually under the Adulteration Act the power rested with other people, and had not hitherto been exercised by the Society. He thought it would be better to leave it in the hands of an independent body.

Mr. Rimmington thought it would not be desirable to insert any clause in the Act removing entirely the responsibility from the seller of drugs; or else it would be found that no seller would ever have a guilty knowledge, and all sorts of things would be sold with impunity.

Mr. Savage thought they ought to pause before they decided on doing what they could to hand over to any other body the powers they possessed, and which if once parted with would never be recovered. It appeared that as yet they had not thoroughly understood what their duties were; but if the Act were amended and were carried out in a different manner, he did not think the Council would shrink from performing their duty.

Mr. Schacht said the Society had obtained certain statutory privileges, and in return certain duties were imposed upon them. He was rather inclined to think that it would be better to get the present difficulties removed than to give up their authority altogether.

Mr. Radley also thought it would be more satisfactory to the trade at large if prosecutions for adulteration in the case of drugs were left in the hands of the Society, because there were many peculiar questions arising which only some one practically acquainted with the trade could fairly decide upon.

Mr. Williams said the principal point urged by the witnesses before the Committee, as he understood, was that the Society had no wish in any way to do away with the Adulteration Act, but only that it should not be oppressively exercised. A suggestion had been thrown out that all questions concerning drugs should be considered in the first place by certain experts, namely, a member of the College of Physicians, a pharmaceutical chemist, and an analytical chemist, who should act as a kind of grand jury before any prosecution could be instituted. One member of the Committee of the House of Commons also appeared strongly in favour of making use of the laboratory at Somerset House as a kind of Court of Appeal in case of varying analyses; and he was so far in favour of that view, that he thought if ten or twelve centres were established in England, with thoroughly well qualified and well paid analysts, it would be much better than having local analysts in every district.

The report and recommendations of the Committee were then unanimously received and adopted.

Infringement of the Pharmacy Act.

The Secretary drew attention to the case of poisoning at Colchester, reported in the Journal for 20th April (p. 865). Some aconite had been sold by a Mr. Webster, of East Hill, Colchester, medical herbalist, and the purchaser died; attention had been called to the case, and the solicitor had been instructed to communicate with Mr. Webster upon the subject. The solicitor now stated that, having written the usual letter preliminary to taking proceedings for illegally carrying on the business of chemist and druggist, Mr. Webster had called upon him and paid the amount of penalty and costs.

Finance.

Various accounts which had been examined by four members of the Council, acting as a Finance Committee, were ordered to be paid, and £100 was granted to the North British Branch to meet current expenses.

Congress at St. Petersburg.

Mr. Hampson moved:—

> "That two members of this Council be deputed to represent the Pharmaceutical Society of Great Britain at the fourth meeting of the International Pharmaceutical Congress to be held at St. Petersburg in August next, and that a sum not exceeding £80 be set apart to defray the expenses incident to their journey."

He hoped the Council would be unanimous in supporting this resolution, because he thought they ought to keep up their dignity amongst European pharmacists, and send a deputation to the approaching Congress.

Mr. Schacht had great pleasure in seconding the motion, more especially because when the subject was mooted before he might have appeared to have opposed the idea. That, however, was not his intention, his only desire being to postpone consideration of the question until they were better prepared to dispose of it.

Mr. Betty said he was rather surprised at this motion being brought forward, no notice of it having being put upon the Agenda paper.

The Vice-President said it was ordered to stand over for discussion at the present meeting; therefore all members of the Council had had notice of it, although by accident it was omitted from the Agenda. He thought the amount proposed to be expended was very moderate, and it was not really a question whether they would get an immediate return for it.

Mr. Baynes said he should support the proposition.

Mr. Williams said he had taken the opportunity of speaking to many leading members at the recent Conversazione, and they all expressed the opinion that it would be a disgrace to the Society if they were not represented at this Congress.

Mr. SANDFORD thought it would be better to delay passing this resolution till the next meeting, as an answer need not be sent until the 15th of July; they might in the meantime see what the questions for discussion at the Congress were, and be in a better position to say whether or not there was any necessity for the Society to be represented; for his own part he saw no necessity for it.

Mr. BROWN said the matter had already been postponed once and ought now to be decided.

After a few words from Mr. Hampson in reply, the motion was put and carried by a large majority.

It was then resolved unanimously that Messrs. Greenish and Sutton be appointed a deputation to go to St. Petersburg, and the President, Vice-President, Messrs. Betty, Schacht, and Hampson were appointed a Committee to confer with them as to the views on the various points of discussion which they should advocate at the Congress.

BENEVOLENT FUND.

Messrs. Bottle, Greenish, Hampson, and Owen had sat as a Committee to consider applications for assistance, and upon their recommendation the following grants were made :—

To the widow of a chemist and druggist at Gosport, £20.

To the widow of a recently deceased annuitant, £10.

To the widow of a chemist and druggist at Batley Carr, £10.

The name of Sophia Wick, of 44, Cambridge Street, Pimlico, and that of Dorothy Phillipps, of Batley Carr, were ordered to be placed on the list of "approved candidates for annuities."

A letter was read from Mr. Large, of New North Road, suggesting that, as in some other societies, there should be two classes of annuitants—one class consisting of those who had been members and subscribers to the fund, who should receive annuities of £30 per annum; and a second class, including those who had not been members or subscribers, and who should receive annuities of a less amount. The letter was referred to the next meeting of the Council for consideration. A letter was also read from Mr. Reynolds, of Leeds, reporting the manner in which he had disposed of the £20 recently granted to a widow in his neighbourhood.

The VICE-PRESIDENT said, according to the regulations, it was now the duty of the Council to determine as to the expediency of electing annuitants in October next. The question had been a good deal discussed as to whether they should go beyond the principle they had hitherto followed of only granting annuities to the extent of the interest upon their invested capital, without expending one farthing of the annual contributions in this manner. He was quite convinced that the time was now come when they might safely depart from that conservative idea, and might trench to some extent on the annual income of the Society. Since the last election, one annuitant had died; and he would propose now that four annuitants be elected in October next. This had been fully gone into by the gentlemen who acted with him as the Benevolent Fund Committee, on the previous day, and they had arrived at the conclusion that they might safely go to this extent, treating it as an experiment and leaving it to another year to determine whether the principle should be further extended. He begged to move therefore—

> "That it is expedient (financially) to elect pensioners on the Benevolent Fund in October next, and that four pensioners be elected accordingly."

Mr. BROWN had much pleasure in seconding the resolution. For a long time he had been a strenuous upholder of the old policy of only granting annuities out of the invested capital, but a Committee having been appointed to take into consideration the means of increasing the fund and inducing the members at large to take a more active interest in it, they were led in the course of their investigations, principally through the exertions of Mr. Robbins, to believe that they might safely depart from that policy. The broad fact was, that for many years past they had not expended one-fourth of their annual income in casual grants, and they thought therefore the time was now arrived, when, having a large invested capital, they might safely expend a part of the current subscriptions, still leaving a large surplus to be invested. It was not necessary to go on investing money as they had done, and he believed the proposed arrangement would tend to increase the popularity, as it certainly would the usefulness, of the fund. He thought they might safely go to the extent of electing four annuitants in October next, and probably on some future occasion they might go further.

Mr. OWEN supported the resolution.

Mr. BETTY moved as an amendment:—

> "That annuities on the Benevolent Fund be granted solely from the proceeds of invested capital."

If he had had any doubt that that was the right principle it would have been removed by the remarks of the two gentlemen who proposed and seconded the resolution, for it seemed to him they were diametrically opposed to each other in the reasons they gave: the proposer saying it was a matter of experiment, whereas the seconder put it on the broad principle that they should grant annuities out of annual subscriptions to the Society. He was content to take it on the main ground of the proved wisdom of the course they had already adopted as laid down by the founders of the fund. They had at present a very prosperous fund, which was certainly the best evidence of the wisdom of their principles, and they ought to be very cautious before departing from them. It would be impossible to lay down the principle that they ought to provide annuities for as many persons as applied for them; but, having sat on the Benevolent Fund Committee for two years, he was in a position to say that no deserving case had been sent away unrelieved. The question at present was, what form that relief should take, whether it should be in the form of annuities or of casual grants. He had a strong conviction that, in all matters of finance, safety was the main element for consideration, and though certain societies to which Mr. Robbins had referred on previous occasions had been able to grant annuities out of annual subscriptions, he considered that they were in very exceptional circumstances, and that their experience was no guide for the Pharmaceutical Society. He contended that the financial position of certain great London hospitals was a monitor to show the wisdom and necessity of having a large invested capital, for how frequently were those dependent on annual subscriptions obliged to make piteous appeals to the public in order to defray their current expenses.

Mr. BROWN said he had not the slightest idea that any amendment would have been proposed, or he should have made a different kind of speech in seconding the resolution.

Mr. SANDFORD, in seconding the amendment, said he believed the correct principle was that on which they had hitherto acted. If they looked to the recent annual meeting for support, there could be no doubt that the expression of opinion there was decidedly in favour of adhering to the old plan, and paying annuities out of invested capital only.

Mr. BROWN said he did not think it was a fair assumption to make.

Mr. SANDFORD said that opinion was repeatedly expressed, and he thought it was the general feeling of the meeting. He believed if a vote had been taken upon it, it would have been almost unanimous. It would be a great misfortune if annuitants ever had the slightest doubt about the permanence of their annuities.

Mr. SAVAGE said he had at one time been of the same opinion as that expressed by Mr. Betty, but better information had led him to a different conclusion; and he believed if the annual meeting had clearly understood the whole circumstances of the case, their decision or expres-

sion of opinion would have been of a very different kind. He hoped the resolution, which he considered a very moderate one, would be passed, seeing that it would absorb but a very small amount of the annual subscriptions.

Mr. FRAZER said he was quite satisfied that what was given out with one hand would be more than recovered with the other, and it would be very easy at any time to retrench if they went beyond their means.

Mr. ROBBINS said he would not detain the meeting by going into the several reasons which he had laid before the meeting, or otherwise he might easily have replied to the observations which had been made.

Mr. RIMMINGTON said he was in the same position as Mr. Robbins. He could mention several societies which gave very large amounts in annuities, though entirely supported by voluntary contributions.

A division then took place on the amendment, with the following result:—

For.—Messrs. Betty, Hills, Radley, Sandford, and Williams.

Against.—Messrs. Baynes, Bottle, Brown, Frazer, Greenish, Hampson, Owen, Rimmington, Robbins, Savage, and Schacht.

The amendment was therefore lost.

Mr. BAYNES said it might, perhaps, dispose of the objection of some gentlemen if the annuities were divided into two classes, one paid from the interest, and the other from the subscriptions.

Mr. BROWN said that could be discussed in Committee.

Mr. BAYNES said he would not move the resolution if it tended to stop the decision of the question.

Mr. WILLIAMS then moved as an amendment to the original motion, and Mr. Sandford seconded:

"That two annuitants on the Benevolent Fund be elected in October next."

Mr. BETTY asked if the invested capital would provide for two.

Mr. WILLIAMS said not quite. It was certainly leaving the principle to a certain extent.

The VICE-PRESIDENT drew attention to the regulation which called upon them to decide at that meeting the question how many annuitants should be elected.

The amendment was then put, and lost by a large majority.

Mr. BAYNES said if the proposition were voted upon without further discussion, he would move

"That annuities be of two classes, one granted from interest on invested capital, and another from annual subscriptions."

Mr. BETTY seconded the proposition.

Mr. SAVAGE said he could see no possible good in dividing them.

The VICE-PRESIDENT said this was not really an amendment to the motion.

The amendment was therefore withdrawn, and the original resolution was then put and carried.

Mr. ROBBINS said if an annuitant were elected he was elected for life, but the annuity was not granted to him and his successors for ever. Therefore, from year to year they could very easily determine how many annuitants should be elected, according as their subscriptions came in.

Mr. SANDFORD said he did not quite understand the suggestion of Mr. Baynes. How were the voting papers to be filled up?

Mr. BAYNES said he did not wish to press it in any way. He had only proposed it out of consideration for the feeling of gentlemen present who objected to the new principle.

Mr. BETTY then, according to notice given, drew attention to an advertisement which had appeared in the PHARMACEUTICAL JOURNAL of May 9th, in which, as he said, an unjustifiable use had been made of the name of the Society in connection with a trade article. After giving a brief history of the transaction, he moved:

"That Messrs. Churchill be instructed that the advertisement referred to was incorrect in certain particulars; and that, therefore, the Society, exercising their rights as proprietors, could not sanction the insertion of any statement, which, on the face of it, contained a misrepresentation of facts."

Mr. SCHACHT suggested that it would be better if instructions were given to the publisher not to insert any advertisement containing the name of the Society, without previously submitting it to the Secretary.

Mr. HAMPSON thought such a resolution would be very difficult to carry out in practice.

The VICE-PRESIDENT said that advertisements for assistants often contained the name of the Society, and under such a resolution the publisher would not be able to insert them without reference to the Secretary, which would be very inconvenient.

After some further discussion, it was decided to refer the whole matter to the Parliamentary Committee.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemist.

Cleave, Samuel Whiteway .....Shanghai.

Chemist and Druggist.

Lewis, Nathaniel James .....Neston.

ASSOCIATES.

The following, having passed their respective examinations, and being in business on their own account, were elected "Associates in Business" of the Society.

Minor.

Connor, Thomas Haigh .....Alresford.

Modified.

Thomas, William .....Southampton.

The following, having passed the Minor Examination, were elected "Associates" of the Society:—

Baldwin, Arthur Henry .. ..Clifton.
Guy, William Adolphus .....Kimberton.
Harrison, James .....Sunderland.
Munday, John .....Bridgnorth.
Overton, John .....Bristol.
Shum, Arthur George .....Edinburgh.
Knight, William .....Hinckley.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary Examination, were elected "Apprentices or Students" of the Society:—

Creer, George .....Castletown.
Madeley, Edward Stanbury.....Barnes.

Several members who had neglected to pay their subscriptions in proper time, were ordered to be restored to their former status on payment of the subscription for the current year, and a fine equal to half the amount.

REPORT OF EXAMINATIONS.

May, 1874.

ENGLAND AND WALES.

Examinations.		Candidates. Examined.	Passed.	Failed.
Major		4	2	2
Minor	May 13th	23	5	18
,,	,, 14th	29	5	24
,,	,, 15th	26	9	17
		— 78	— 19	— 59

Certificates received in lieu of the Preliminary Examinations:—

College of Preceptors 1
University of Cambridge 1
2

SCOTLAND.

Examinations.	Candidates. Examined.	Passed.	Failed.
Minor	9	6	3
Modified	4	2	2
	13	8	5

THE LATE HENRY DEANE.

A letter was read from Mrs. Deane, acknowledging the letter of condolence from the Society respecting the death of her late husband.

Mr. SANDFORD announced that he had already received the names of thirty-four subscribers to the fund for painting the portrait of the late Mr. Deane, and as the subscription was limited to £1 1*s.* each, he should be glad to receive sufficient names in order to make up the amount required—£100.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING MAY, 1874.

LONDON.

	£	*s.*	*d.*
Baker, Alfred P., 33, Norfolk Terrace, Bayswater, W. ...	0	10	6
Cull, Joseph, 105, London Wall, E.C.	0	10	0
Cruse, James C., 27, Canonbury Place, N.	0	10	6
Fox, Charles E., Bethnal Green Road	1	1	0
Goosey, William, 53, Ben Jonson's Road, Stepney	0	10	6
Humphreys, R., 9, Upper Belsize Terrace, Hampstead, N.W.	0	19	0
James, James Thomas, 15, Princes Street, Hanover Square, W.	0	10	6
Morrell, F. K., 306, Kennington Park Road...	0	10	0
Stocken, James, 33, Euston Square, N.W.	0	10	6
Taylor, John, 13, Baker Street, W....	0	10	6
Upjohn, F. W., 55, King Henry's Walk, Mildmay Park, N.	0	5	0
Wells, F. T. Percy, 2, Frederick Place, East Brixton, S.W.	1	1	0
White, George G., 130, Camden Road, N.W...	1	1	0
Yarde, Giles, 60, Lamb's Conduit Street, W.C.	1	1	0

COUNTRY.

Chatham, French, John	0	10	6
Chipping-near-Preston, Watson, J. B.	0	5	0
Derby, Ashley, W.	0	10	0
,, Barnes, B.	0	10	6
,, Clifton, F.	0	10	6
,, Evans, B.	0	10	6
,, Hart, C. D...	0	10	6
,, Hollis, T.	0	10	0
,, Medley, W...	0	10	6
,, Wheatcroft, A. E.	0	10	6
Eastbourne, Hall, Samuel	0	10	6
Edinburgh, Brown, David R.	1	1	0
,, Kerr, R. McC.	0	5	0
,, Morrison, D.	0	2	6
Helston, Wakeham, C....	0	5	0
Hulme, Arton and Leech	0	10	6
Liverpool, Agnew, James	0	5	0
Llanelly, Hughes, Edward	0	10	6
Longton, Litchfield, John	0	10	6
Newcastle-upon-Tyne, Watson, Thomas E.	0	10	6
Norwich, Fitch, Robert	0	5	0
Sandwich, Baker, Frank	0	10	6
Stevenage, Fresson, Lewis F.	0	5	0
Torquay, Bridgman, W. L.	0	5	0
Truro, Percy, Thomas B.	0	10	6
Wath-on-Dearne, Hick, Allan	0	10	6
Watford, Oldfield, Henry	0	10	6
Woolwich, Parkes, J. C...	0	10	6

DONATION.

Mee, George, 79, Grosvenor Road, Highbury New Park ...	2	2	0

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The annual meeting of members of the above Association was held on Friday, May 29th, at the Great Western Hotel; Mr. Wm. Southall occupying the chair, in the room of Mr. Grieves (President), who was unavoidably absent.

The Secretary read the annual report, in which it was stated that the Council had decided to give up the rooms in the Quadrant, one reason being that the books and specimens could be more useful if allowed to be taken to the homes of the students, instead of the latter being compelled to go to the rooms for the purpose of study. The other reason was that the change would effect such a saving in funds as would allow the Council to reduce the annual subscriptions of members and associates to 2*s.* 6*d.* and 1*s.* 6*d.* respectively. By this reduction it was hoped that the number of members would be considerably increased. Two important pieces of legislation were going on at the present time which affected the interests of chemists and druggists, and concerning which the Council would invite an expression of opinion. The first of these measures was the Adulteration Act. Though it was desirable that adulteration should be detected, yet the Act was working very unfairly in some instances, and should, therefore, be carefully watched. The other measure was the Juries Bill, which was in committee, and should it pass, chemists and druggists, as well as pharmaceutical chemists, would be exempt from serving on juries. It had been thought that, as chemists were closely confined in shops, an effort should be made to take advantage of one of the bank holidays for an annual excursion. Such an excursion would offer a good opportunity to the botanical students to examine fresh specimens, and so render interesting what was now a very dry study. The report concluded by an expression of regret at the death of Mr. George Dymond.

The statement of accounts showed receipts for the year amounting to £65 2*s.* 5½*d.*, which the expenditure exceeded by £4 9*s.* 10*d.*

Mr. Barclay was elected president of the Association, and Mr. W. Jones, hon. sec. Other officers were appointed.

The usual votes of thanks having been passed, Mr. Barclay opened a discussion on the Adulteration Act. While showing the advantages of the working of the Act, and complimenting Professor Postgate, the author of it, who had honoured the Association by his presence that night, he complained of the unjust nature of some prosecutions which had taken place under it, and instanced the citrate of magnesia case, popularly, though wrongly so-called; spirit of nitre, which is liable to decomposition, and at the best is very uncertain in its composition, and if tested when freshly prepared, three months afterwards would show very different results; quinine, in which the sulphate was the article invariably wanted by the public; and milk of sulphur, for although he would always recommend pure precipitated sulphur to be sold, yet when it was contended by some who were constituted authorities under the Act that milk of sulphur was lime and sulphur, and not pure sulphur, it showed the unfair working of the Act. In the scammony prosecution, had the resin of scammony been supplied, which cost less than half the price of the other, the prosecution would have fallen to the ground; in the arrowroot case there was no adulteration; the conviction was on technical grounds; in a more recent arrowroot prosecution the chemists had a complete answer to the charge, and were prepared to prove the absence of either adulteration or injury through over-drying; but when the case came on for hearing the analyst sent a medical certificate to say he was unwell, and asked for a remand for five or six weeks; the charge in the meantime, which has publicly made, hangs over the parties, and they have no redress. Chemists were subject to penalties for selling drugs which do not answer the B.P. test, but it is impossible to get such in some cases, excepting as rare specimens, which would be fit for a museum. He instanced gum benzoin, which is extensively sold in Birmingham for French polishing: the test is that it must be *soluble* in alcohol and solution of potash; thus no chemist would be safe if this is acted upon. Essence of lemon decomposes and renders the seller liable, although he may be ever so careful in buying and storing. The remedy for these cases would be in having referees, one of whom should be

a pharmaceutical chemist, for magistrates and medical and ordinary analytical chemists do not understand these technical questions. He moved that the chairman should be requested to sign the following memorial, on the part of the meeting, to the Chairman of the Committee on the Adulteration Act; and that Mr. P. H. Muntz, M.P., should be requested to present it:—

"Inasmuch as the Adulteration Act has been found to be in some cases oppressive in its operation, your memorialists, the members of the Midland Counties Chemists' Association, beg to lay the following suggestions before the Committee now inquiring into the Adulteration Act:—(1) That in all cases the person buying goods for analysis should divide the article into two portions, and hand over one portion under seal to the vendor for independent analysis. (2) That referees should be appointed by the Government, and that one of them should be a pharmaceutical chemist. (3) That in case of an analyst reporting that an article is adulterated which shall be proved to be genuine, the prosecutors shall be compelled to advertise the verdict in the newspapers of the district, so that the reputation of honest dealers may be protected. (4) That guilty knowledge should be necessary to constitute an offence under the Act. (5) As it appears from the report of the examiners in committee that the members have an erroneous idea of the capability and respectability of the chemists in the country as compared with those in London, your memorialists suggest that one or more country druggists should be examined before the Committee of the House of Commons."

He showed the necessity of by quoting the last clause from the evident misconception the members of the Committee of the House of Commons have of country druggists. Mr. Hodgkinson is reported in the PHARMACEUTICAL JOURNAL to have replied to a question put by Mr. Muntz, "a country chemist, if he were a respectable man, would not sell another article for James's Powder." The same witness said, in reply to Mr. Welby, "I do not think country druggists are considered so much inferior to those of London." He did not impute anything to Mr. Hodgkinson, but this showed, by the questions put, what was in the mind of the members.

On the resolution being put, it was amended on the motion of Mr. Arblaster, "That three sealed samples be made at the time; one for the chemist, one for the analyst, and the other for an independent analysis;" and by Mr. Southall, "That particulars of the charge should be given when the summons was issued."

The resolution having been seconded, Mr. Postgate explained in detail the various clauses of the Adulteration Act, supporting the resolution, and stating that he had already made some of the suggestions contained in the memorial.

The resolution was passed, and the proceedings terminated.

SOCIETY OF CHEMISTS AND DRUGGISTS OF IRELAND.

The monthly meeting of the above Society was held in the Society's rooms, Molesworth Street, on Monday evening, June 1st, Mr. E. M. Hodgson, President, in the chair.

There was a large attendance of members and associates. After the usual routine business, a long conversation took place in reference to the proposed alteration in the Pharmacy Laws in Ireland. A letter from the Apothecaries' Company was read, inviting a deputation from the Society to wait on the Hall to discuss several amendments to their Bill, suggested by the Society. A deputation was then formed, to consist of the president, secretary, treasurer, and committee of the Society, and the following gentlemen: Messrs. W. Allen, J. T. Holmes, J. O'Brien, and Stanley Oldham.

The deputation was authorized to take whatever action they thought desirable in the interests of the Society.

Parliamentary and Law Proceedings.

THE SALE OF VERMIN KILLERS.

On Tuesday, May 26, Mr. F. W. Johnson, Coroner, held an inquest, at Staleybridge, on the body of Job Lee, aged 44, a machinist. After a heavy drinking bout of ten weeks, deceased worked a day or two and then had another relapse. On Saturday night he purchased two threepenny packets of "Gibson's Manchester Vermin Killer" at the shop of Mr. J. Rigby, botanist and herbalist, representing that he wished to destroy some "black-jacks" and mice. Mr. Rigby sold him the powders, and warned him of their poisonous quality. On Sunday morning, he began to vomit very severely, but that his wife attributed to his debauch. In the forenoon he paid another visit to Mr. Rigby's shop, and bought some more "Vermin Killer," Mrs. Rigby serving him. He told her he had killed some mice with the powders he purchased on the Saturday, and that he intended to kill more. He went to bed in the afternoon, and his wife went out to tea at a neighbour's. On returning home at eight o'clock in the evening she found him lying dead in his shirt on the bed-room floor. She had never heard him threaten his life, but he appeared to have been in a low-spirited way for some time. Not the least trace could be found in the house of the powders or papers in which they were wrapped, and, according to the evidence of his wife, the mice, etc., of which the deceased had spoken, existed purely in his own imagination. The Coroner said the case was a very suspicious one, but as there was no actual proof that the deceased had taken the poison, or had it administered to him, the only verdict the jury could return was that of "Found dead." Verdict accordingly.—*Stockport Advertiser.*

PROSECUTIONS UNDER THE ADULTERATION ACT.

THE SALE OF COLOURED TEAS.—IMPORTANT DECISION BY THE COURT OF QUEEN'S BENCH.

In the Court of Queen's Bench on Saturday, May 30, the case of a Birkenhead grocer, named Roberts, was heard on appeal which raised an important question on the Adulteration Act—whether the sale of any article, as tea, which is adulterated can be excused on the ground that it is known to be so in "the trade." The Act says "that every person who shall sell any article of food or drink with which to his knowledge any ingredient injurious to health has been mixed, and every person who shall sell as unadulterated any article of food or drink which is adulterated shall for such offence be convicted." The appellant keeps a shop at Birkenhead for the sale of tea, coffee, etc., and a person went to his shop and asked for "some green tea," which was served to him by a shopman, and he bought two ounces of it for which he was charged 5½d. The purchaser then informed him that he bought it for the purpose of analysis, and the shopman told him that he was authorized by his employers to guarantee all their green tea of the value of of 3s. per lb. and upwards as genuine green tea. The tea was afterwards analysed by a public analyst, who stated that it was adulterated by a thick facing of mineral matter and Prussian blue—that is, it was painted or "faced" with gypsum and Prussian blue for the purpose of colouring it, and this was the adulteration charged. The tea was sold in the same state in which it came from abroad, and the seller did not in any way cause the tea to be "painted" or "faced" in this country. A sample of tea was produced by the public analyst before the magistrates, which resembled in colour and appearance what is popularly known as green tea, and it was proved to be neither "painted" nor "faced." He also proved that he had analysed other samples of teas resembling in colour and appearance green tea, and that they contained no colouring matter. It was also proved that tea which is imported from China as green tea and

generally known as such in the tea trade is painted and faced in the manner and for the purposes stated, and that the sample proved not to be painted or faced was imported from Japan, and not known generally in the trade as green tea. It was contended on the part of the tradesman that the merchantable article imported into this country, known by the name of green tea in the tea trade, is a painted or faced tea, and that it is not a natural simple production of nature, and that therefore a vendor of green tea cannot be taken to represent that he sells only the leaves of the tea plant unaffected by any process; that green tea was sold in the state in which it was imported from China, and that the painting or facing was done there, and not in this country; and that painting or facing tea for the purpose of colouring it is not an adulteration within the meaning af the Act. But the magistrates were of opinion that as the practice of painting and facing tea sold as green tea (though known to those engaged in the tea trade) is not known to the public. The sale of this tea to a purchaser who asked for green tea was a sale of an adulterated article as unadulterated, and they accordingly committed the tradesman, following the decision of this Court in a case of sale of bad butter. The question was whether the tradesman was properly convicted.

Mr. C. Russell, Q. C., and Mr. Segar were for the tradesman who appealed; and Mr. Poland appeared in support of the conviction.

On the case being opened,

The Lord Chief Justice observed that the question seemed to be, whether an article could be adulterated with impunity if the adulteration was notorious in the trade.

Mr. Justice Blackburn observed that it appeared the adulteration of tea was not so known to the public. It was not suggested that everyone knows the tea they buy is adulterated.

Mr. Russell said he denied that this tea was "adulterated," because it was not found to be injurious to health, and the article was merely altered in appearance.

Mr. Justice Quain asked: Is tea "food" or "drink," or a "drug?"

Mr. Justice Blackburn: It is all these—it is "food," "drink," and "drug," at all events, it is clearly one or the other, and so within the Act.

The Lord Chief Justice: The question seems to be whether it is adulterated if mixed with gypsum and Prussian blue.

Mr Justice Blackburn: It being clear that it is sold as genuine, and that the public have no general knowledge that it is not so.

The Lord Chief Justice: It was sold as genuine, was it not? Does not genuine green tea mean tea as grown and dried in the ordinary course of things?

Mr. Russell: This was sold "in the ordinary course of things;" it was not adulterated by the tradesman; it was the article usually known and sold in the trade as green tea.

Mr. Justice Quain: You say it is the article known and sold in the trade as "green tea?"

Mr. Russell: Just as sherry is sold, though few of us probably ever drank a glass of genuine sherry.

Mr. Justice Quain: I believe it is usually dressed with gypsum.

Mr. Justice Blackburn: However, let us take one thing at a time. This is tea. Is not gypsum or Prussian blue an adulteration of it? Alum is an adulteration of bread. If a wine merchant sold me sherry mixed with gypsum I would not, if I knew it, employ him again.

Mr. Justice Quain referred to the case of butter.

Mr. Justice Blackburn observed that the public at large do not know the green tea is thus adulterated, although it is known in the trade.

Mr. Russell cited Johnson's definition of "adulteration" —"an admixture of some foreign matter which corrupts."

Mr. Justice Blackburn: Well, are not gypsum and Prussian blue "foreign matters," and do they not corrupt the tea?

The Lord Chief Justice: I should not like to drink tea so corrupted. Is it excused because it is a practice in the trade?

Mr. Justice Archibald: The public don't suppose they are buying tea mixed with gypsum and Prussian blue.

Mr. Justice Blackburn: The public think they are buying green tea. The learned in the trade know better. But it is not known to the customer. Tell a man you are selling him tea mixed with gypsum and Prussian blue, and then he can buy it if he likes; but you don't tell it to him and you sell it to him as green tea. How is that excused because it is "commercial" green tea? Why might there not be a "commercial" butter if there may be a "commercial" tea? When a man buys claret, does he suppose he is buying sloe-juice? I should be sorry to hold that was not an adulteration.

Mr. Russell urged the mixture of wine with alcohol was.

The Lord Chief Justice pointed out that wine could not be kept without alcohol, and that alcohol was very different from gypsum.

Mr. Russell still urged that there was no adulteration, and that it was the commercial article known in the trade as "green tea." It was thus coloured when first known and dealt with and imported as green tea.

Mr. Poland, in support of the conviction, argued that it appeared genuine green tea was known in the trade, and that this tea was sold as genuine, but was not so, as it was mixed with noxious mineral substances. That being so, it ought to be declared to be so to the customer.

Mr. Justice Blackburn: The effect of that would be that it would check the importation of Chinese tea unless they ceased to colour their teas. But I don't know if that would be a result to be regretted.

Mr. Poland urged that it was the very result aimed at by the Act—the suppression of the traffic in adulterated articles. The public bought tea, not tea and paint. It was distinctly stated that the public did not know it.

The Lord Chief Justice observed that it must be taken that the tradesman knew of the adulteration, for it appeared that it was known in the trade.

Mr. Justice Blackburn: In this instance, as the purchase was for analysis probably the purchaser did not expect it to be genuine.

Mr. Poland urged that it was stated that the public did not know of the adulteration, whereas the trade knew of it.

The Lord Chief Justice pointed out that knowledge of the adulteration was not essential to the offence if the article was sold as genuine when it was, in fact, adulterated. It is the duty of those who sell articles as adulterated to find out whether they are so or not.

Mr. Poland urged that the tradesman was bound to give notice to his customers of the existence of adulteration.

Mr. Russell, in reply, urged that there was no adulteration of green tea, but that the green tea sold was, in fact, thus adulterated when imported; the adulteration assumed the pre-existence of a genuine article, but here no such article existed in the trade.

Mr. Justice Blackburn.—It is common, no doubt; though I incline to think that it is not so common as is stated, but it is not a necessary characteristic of green tea.

Mr. Justice Quain.—It is expressly stated that it is done for the purpose of colouring the tea.

Mr. Justice Archibald.—It is stated that the tradesman represented the tea as genuine green tea.

Mr. Justice Blackburn: Does that mean tea which is genuine, or tea which is sold and imported as such?

The Lord Chief Justice: Does not that depend upon the impression conveyed to the mind of the customer?

At the close of the argument, the learned Judges consulted together, and then,

Mr. Justice Quain asked: Is it to be taken that the tradesman knew of the adulteration?

Mr. Russell thought not.

The Lord Chief Justice said it was stated that it was known "in the trade," and the tradesman was in the trade.

Mr. Justice Blackburn: Surely he must be taken to have known it, though, in the view I take of the Act, that is wholly immaterial as regards this part of it.

The Judges consulted again, and then

The Lord Chief Justice proceeded to give his judgment that the conviction was right. I cannot help thinking, he said, though my Brother Quain doubts, that this is a case of the sale of an article as unadulterated, which is, in fact, adulterated. Is it adulterated? I think it is, for this process of painting is surely an adulteration. It is known in the trade that it is so, but it is not known to the customer. Further, it is sold to him as "genuine," for the tradesman here expressly warrants it as genuine green tea. It is not material upon this section of the statute whether the tradesman knew of the adulteration; but if it were material, I think it appears that the tradesman must have known of it, for it is known in the trade. It is stated that the tea which comes from China is very generally thus dealt with, but that will not excuse the seller under this enactment if he sells as genuine that which is, in fact, adulterated. This is an adulterated article; it is not the article the public think they are buying; on the contrary, if they knew what it was they would not buy it. Therefore, it is selling the adulterated article as genuine, and that is an offence within the statute.

Mr. Justice Blackburn concurred. The first part of the enactment, he said, was directed against the selling mixtures containing deleterious ingredients, the second was directed against the selling any adulterated article as genuine. This did not require knowledge of the adulteration if there was adulteration in fact and the article was sold as genuine. And here it was so; for "green tea" meant the natural leaf of the plant simply dried, and certainly mixture with gypsum and Prussian blue did not properly nor necessarily form any part of the process of making it. It was, indeed, stated that it was known by "all" the trade that green tea was thus adulterated; but he suspected that this was not so generally the case as was supposed, and at all events, it was not necessarily or properly so. Where the article was a compound and not a natural article, and required in the process of making it some foreign ingredient—as alcohol in the making of sherry or *liqueur*—it might not be an adulteration; but gypsum was not such an ingredient, nor was it necessarily used in the drying of green tea, and, therefore, the use of it was an adulteration. Then, it appeared, the article so adulterated was sold as genuine, and the offence was complete.

Mr. Justice Quain said he was sorry to differ from his brethren, but he could not think this an offence within the Act. Here was a small shopkeeper at Birkenhead convicted for selling tea just as it was imported by great merchants from China. He could not think that this was intended to be an offence under the Act. Practically, the shopkeeper sold the only article known as green tea, and he did not alter it at all, but sold it as he bought it—as the "green tea" of commerce.

Mr. Justice Archibald, however, agreed with the Lord Chief Justice and Mr. Justice Blackburn in thinking this a case within the Act. Knowledge, he said, under this section, was immaterial; but if it was, the shopkeeper was in the "trade," and the adulteration was known in the trade. On the other hand, it was not known to the customer who bought this as "genuine green tea," whereas, in point of fact, it was adulterated.

Conviction affirmed.—*Times.*

Declaration of Admixture at Time of Sale.

In the Court of Common Pleas, on Thursday, May 28, an appeal (Pope *v.* Tearle) was heard by Lord Chief Justice Coleridge, and Justices Brett and Grove sitting *in banco*, against a magisterial decision under the Adulteration Act. The information was for selling Colman's mustard as unadulterated, against the provisions of the recent Act. The magistrates had dismissed the summons, stating a case for the Court.

The appellant was an inspector of weights and measures; the defendant was a grocer. The defendant on selling the mustard had stated that it was not sold as pure mustard, and a label upon the box bore the inscription "Warranted free from injurious admixture, but not sold as pure mustard." The analyst stated that it was mixed with a quantity of wheaten flour and turmeric, not injurious to health.

Mr. Merewether appeared for the appellant; Mr. Wills, Q.C., and F. M. White for the respondent.

The question of law was whether it was necessary for the respondent to do more than declare that the mustard was not pure, and whether he ought also to have declared the quantity and nature of the admixture.

The Court held that the respondent had complied with the provisions of the Act, and was entitled to judgment. —*Times.*

The Adulteration of Butter.

At the Bow Street Police-court on Saturday, a shopkeeper, of New Street, Covent Garden, was summoned for selling adulterated butter, and the case presented features of great interest. Mr. Douglas Straight was retained for the defence, and, in the first place, objected to the summons on the ground that it did not disclose any offence within the meaning of the statute. It was necessary under the Act that it should appear on the summons that an adulterated article was sold as unadulterated, whereas this summons did not state anything of the kind. He contended that it was bad on the face of it.—Mr. Dangerfield, for the prosecution, said that it was not likely that any shopkeeper would say he sold adulterated goods, nor that people would buy such goods if the statement were made. He said this was merely a technical objection, and the case must be heard on its merits.—The magistrate ultimately overruled the objection, and the case was proceeded with.—The local inspector proved the purchase of the butter, which he had sealed up in two different packets in the shop, and one of these packets he left at the laboratory of St. Martin's Vestry for analysis. The other packet he retained in his own possession, and now produced it.—The official analyst, Mr. G. A. Anderson, next gave evidence. He said he recollected finding this sample of butter on the table of the laboratory. It was sealed up with the Vestry seal, and marked No. 1. He analysed the butter and found it contained water, 1·07 per cent.; and an admixture of butcher's fat, the precise quantity of which he was not able to determine, but the presence of which he detected by qualitative analysis. This adulterated butter, when melted, had a congealing point of about 67° F., while pure butter was about ten degrees less, congealing at about 57° or 59° F. Again, he had what he termed a saponification test, which, when applied to pure butter, produced certain appearances which were not developed in the case of this adulterated article. The saponification test was this:—When he saponified pure butter he uniformly found that it darkened in colour, that it saponified easily, and the olein, which was subsequently separated, was dark in colour, and on cooling formed a sort of jelly. In manipulating fatty matter, not butter, the reverse was the case, the fatty matter not being improved in colour, as they got what he described as a light sherry-colour fluid ley. He might also mention that the smell of pure butter in melting, and exposed to a temperature of 212° was sweet and characteristic. When adulterated butter was thus dealt with, however, the odour was entirely different from that which he had described.—Cross-examined by Mr. Straight, the witness said he was aware of the fact that in the celebrated butter case of Liverpool—Fitzpatrick *v.* Kelly—

the results obtained by the first analyst were shown to be not correct by the results obtained by subsequent analysis. In this butter which he had analysed there was more than eight degrees of adulteration. He could not precisely estimate the quantity of butcher's fat. He had taken great care that the butter should not be depreciated before he analysed it.—This being the case for the prosecution, Mr. Straight contended that the certificate of the analyst did not comply with the terms of the Act, especially as to the tenth section. This section directed that the sample taken by the inspector should be sealed in the presence of the analyst, by the inspector, and could thus be produced if required; whereas in this case, as was shown by the evidence, this had not been done, in fact, quite the contrary course of proceeding had been adopted.—Mr. Flowers considered the point raised by Mr. Straight to be fatal to the case, and he should accordingly dismiss the summons.—Mr. Straight further mentioned that the certificate was defective, inasmuch as it did not say whether the adulteration was injurious to health.—Another summons of a similar character was withdrawn.

American Diplomas.

At the Wolverhampton Police Court, on Wednesday, May 27, before the Stipendiary, Mr. Wm. Follows appeared, upon remand, charged with improperly using the title of "Dr." Mr. Stratton supported the complaint, which was lodged by Dr. Freeman, of St James's Square; and Dr. S. Evans (instructed by Mr. Dallow defended. The defendant is in business as a chemist and druggist in North Street, Wolverhampton; and the evidence of Dr. Freeman was that upon his shop-door there was a brass plate, with the words "Dr. W. Follows, member of the medical College of Philadelphia," and that in his shop there were labels announcing the hours of attendance of "Dr. Follows." The offence charged was the use of the word "Dr.," for the defendant's name was not upon the British Medical Register.

For the defence, it was urged that Mr. Follows was exempt from penalty because he had set forth the source of his diploma. He had never claimed to possess an English degree; but he was now preparing to take one, and with that view he had entered himself as a student at the Queen's Hospital Birmingham. In October, he gave notice to the Clinical Board of that Hospital that he had ceased to practise as a physician; and during the interval he had not practised.

Dr. Freeman: He has; he has attended on two of my patients! Of this the explanation offered was that the defendant had been called in, but had received no remuneration for his services.

Dr. Freeman: Why, he came to my surgery and said he could not get the man to pay him. This the defendant himself denied. The American diploma was produced, in compliance with the request of the Stipendiary.

His Worship, in deciding the case, said he thought the defendant had really "falsely and wilfully" attempted to obtain credit from the public by the diploma. It was, he thought, the grossest fraud that could be made upon the public. He saw, however, no reason why, if the defendant undertook not to practise as a physician, and paid the full costs, the case should not be dismissed. To enable the defendant to carry out this decision, the case would be adjourned for a month.

The defendant: That being the case, I shall apply for a summons against Dr. Freeman for using the title of "Dr." on his brass-plate; which he, no more than I, has a right to do.

The Stipendiary: You must apply for that in the right place; but let me tell you that you will not have the slightest chance, for his name is on the Medical Register. —*Birmingham Daily Press.*

Review.

The Naturalist in Nicaragua: a Narrative of a residence at the Gold Mines of Chontales; journeys in the Savannahs and Forests; with observations on Animals and Plants in reference to the theory of evolution of living forms. By T. Belt, F.G.S. London: Murray.

Since Bates's "Naturalist on the River Amazons," few books of travel have been published containing so much of interest and novelty to the naturalist as the one before us. The author is a mining engineer who combines with his professional work the habits and the keen powers of observation of the naturalist. Few countries are so rich in objects of interest of every kind as the Central American republic with a considerable portion of which the author had the opportunity of becoming acquainted. Landing at Greytown, the capital, he first proceeded up the river San Juan to the lake of Nicaragua. The country through which this river runs is one of the centres of the India-rubber trade; the export of this article from Greytown having increased from 401,475 lbs., valued at 112,413 dols., in 1867, to 754,886 lbs., valued at 226,465 dols., in 1871. Parties of men are fitted out with canoes and provisions, and proceed up the rivers far into the uninhabitable forests of the Atlantic slope, where they remain for several months. The tree from which the rubber is obtained is quite different from that which produces it in the Amazon country, the latter being *Siphonia elastica* belonging to the order Euphorbiaceæ, the former a species of wild fig *Castilloa elastica*, easily known by its large leaves. The milk is run out in a liquid state into large tin bottles, and is coagulated by adding to it a decoction made from a liana, *Calonyction speciosum*, in the proportion of a pint to a gallon of the rubber, which is then made into flat round cakes. In the warmer plains of Nicaragua the wine-palm, *Cocos butyracea*, is grown, and the process of manufacture of the fermented liquid is very simple. The tree is felled, and an oblong hole cut in it just below the crown of leaves, eight inches deep, and passing nearly through the trunk. The juice of the tree immediately begins to collect in this hollow, scarcely any running out at the butt where it has been cut off. In three days the hollow will be filled by a clear yellowish wine, and this will continue to secrete daily for twenty days, during which the tree will have yielded some gallons of wine.

The great interest of the volume is in its stories of the wonderful forms of animal and vegetable life of the western tropics; and we have seldom met with anything more interesting than some of the author's narratives of the habits of humming-birds, monkeys, and other tropical animals, and his descriptions of some of the extraordinary mimetic animals; of the *Marcgravia nepenthoides*, with the pitchers attached to the flowers from which the humming-birds sip the nectar, and in so doing act as carriers of pollen; and of the *Melastomas* with leaves which furnish a direct provision of houses for the ants. His account of the habits of some of these ants deserves more space than we can afford. With regard to the instinct, or, as he prefers to call it, the intelligence of these creatures, he narrates how one of their number which he had purposely imprisoned by placing a stone upon it, and another which he buried in clay all except its antennæ, were rescued by their comrades, which were fetched for the purpose by the individuals who first discovered the misfortune of their companions. On another occasion he watched a wide column of ants crossing a water-course along a small branch not thicker than a goose-quill. They widened this natural bridge to three times its width by a number of ants clinging to it and to each other on each side, over which the column passed three or four deep; when, but for this expedient, they would have had to pass over in single file and treble the time would have been consumed.

Mr. Belt is an ardent disciple of Darwin, Wallace, and Bates in their doctrines of evolution and natural selection; but his enthusiasm is always tempered with the sound judgment of a careful and experienced observer.

Notes and Queries.

[399]. CORTEX RHAMNI FRANGULÆ.—Please inform Mr. E. Turner, and any other parties anxious to know, that I have lately imported a bale of true Cortex Rhamni Frangulæ, and that I can supply him with any quantity. The formula for the decoction is given in the PHARMACEUTICAL JOURNAL, 3rd series, vol. ii., page 152. I am daily receiving letters with a request to supply this bark, and most gratifying and favourable accounts of its action.—H. C. BAILDON, 73, *Princes Street, Edinburgh.*

[400]. LIQUID ANNATTO.—Can any readers favour me with a good formula for the preparation of liquid annatto, for cheese colouring, etc.?—ENQUIRER.

[401]. AERATED LEMONADE.—W. J. N. will feel obliged to any reader who can give a formula to make Aerated Lemonade (from the lemon juice) clear and bright.

[402]. COCKROACH DESTROYER.—Could you inform me, through the medium of the PHARM. JOURNAL, the best destroyer for cockroaches and beetles, one not injurious to domestic animals?—A.X.H.

Correspondence.

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

THE ADDITIONS TO THE PHARMACOPŒIA.

Sir,—I don't know whether Mr. Smith includes me among the blackbirds he wishes to hear sing, or whether he thinks I have already sung enough; but, as he seems anxious to elicit information on points with reference to which I may be supposed to have some knowledge, it will perhaps be expected that I should answer his questions, and add a few remarks to those I was enabled to make on the Additions to the Pharmacopœia in the short time allowed me for the purpose at the conclusion of our last evening meeting.

Mr. Smith appears to consider the subject one in the discussion of which a "bantering," facetious style is most appropriate, and strict observance of the principles of logic unnecessary. I do not propose to attempt to follow him in the spirit of the communications with which he has favoured the readers of our JOURNAL, and which, although evidently congenial to his taste, is not so to mine.

The addition to our national Pharmacopœia of thirty-four medicines which had no previous official recognition could not fail to attract the attention, and call forth an expression of the opinions, of those whose duty it is to dispense, as well as of those who prescribe, these and other medicines. The subject is necessarily an interesting and very important one to the pharmacist as well as the physician, and it might be expected to be, as it usually has been, discussed in a spirit of seriousness and just appreciation of the responsibilities of those who are called upon to use, as well as of those who have produced, the work.

The preparation of the British Pharmacopœia has been entrusted by the Legislature to the Medical Council, who are solely and entirely responsible for its production and maintenance as a fair and sufficient exponent of the medicines recognized and used by prescribers, and sanctioned by the highest medical authorities. The work being intended as a medium of communication between prescribers and dispensers of medicine, conveying to the latter an authorized description not only of crude drugs but of processes involving pharmaceutical skill and experience, by which these are prepared for use, a practical acquaintance with the details of such processes is an essential qualification in those who undertake its production. But as all the medicines are designed for the use of physicians, it is right that, while they are enabled to avail themselves of the assistance of practical pharmacists in devising and describing processes and products, they should retain a controlling power over the whole of the matter. The extent to which members of the pharmaceutical body may expect to be consulted and allowed to take part in the construction, improvement, or alteration of this important work, will depend not only upon the character they have acquired as educated, skilled, and experienced pharmacists, possessing a practical knowledge of the art of preparing and compounding medicines, but also upon the judgment of which they have given evidence in the use of their knowledge, and the disposition they manifest to render such assistance as they are capable of giving in their special department, without pretending to or assuming a position and influence to which they are not entitled. Practical pharmacy is not the only knowledge required in the construction of a Pharmacopœia, and although many members of the pharmaceutical body are distinguished proficients in this and other knowledge which the authors of such a work should possess, they do not monopolize the whole of such knowledge, and are not the only persons who may desire to be consulted in this application of it.

As intimated by Mr. Sandford, the Medical Council have fully recognized the importance of associating pharmaceutical with medical knowledge in the compilation of a pharmacopœia, and ample opportunities have been afforded to the Pharmaceutical Society collectively, and its members individually, for exercising the "privilege" of contributing by their advice and assistance to the introduction of improvements in the British Pharmacopœia. The first edition of this work, in 1864, bore unmistakable evidence of the use then made of matter which had been prepared by a Committee of the Pharmaceutical Society, and the Society itself might be said to have been represented among those engaged in the compilation of the work by a former active member of that Committee. From that time to the present the Society has not only been represented, as stated by Mr. Sandford, but repeated messages have been conveyed through me from the Pharmacopœia Committee of the Medical Council to the Pharmaceutical Society and its members, to the effect that any information or suggestions the latter might be enabled to offer, with the view of assisting in the preparation of a future edition of the Pharmacopœia, would be thankfully accepted and duly considered. There appear to be those, however, who think, and Mr. Smith and Mr. Carteighe are among the number, that practical pharmacy ought to be more largely and directly represented than it is in the Pharmacopœia Committee. It has been stated by Mr. Carteighe that the editor employed by the Medical Council to act in conjunction with the Pharmacopœia Committee and assist in the preparation of new editions of, and additions to, the British Pharmacopœia, was overweighted by members of the Committee, and probably had "to deal with elements very difficult to manage." With reference to this statement, I must be allowed to say that there is not the slightest foundation for it. Since I have been associated with the Committee I have always found the greatest unanimity to prevail, and a tendency to place, I fear, too much reliance on my judgment where questions of a purely pharmaceutical character have arisen. When it became a question whether in reprinting the Pharmacopœia any new matter should be added, it was seen and at once admitted by the Committee that there were some important medicines, not included in the work, that ought to be officially recognized and described; and some new forms of medicine for which authorized formulæ were required, and I was requested to prepare, in the form of an appendix, a description of such articles as appeared to be most suitable for introduction into the Pharmacopœia. This was laid before the Committee as the basis of the proposed Additions, and one of the earliest uses I was allowed to make of it was to submit it to a meeting of the Pharmaceutical Society on the 5th of February, 1873, when, after explaining its general purport, I stated that "the Pharmacopœia Committee were anxious to obtain as extensively as possible the opinions of pharmacists with reference to these and other additions which it might be thought desirable to make to the Pharmacopœia." I also stated that the subject would probably be under consideration during the remainder of that year (1873), as the reprint of the Pharmacopœia was not expected to be required before the commencement of the next year. The subject was again discussed at subsequent meetings in March and April, when several suggestions were made, some of which have been adopted.

But, besides this direct appeal to the Pharmaceutical

Society, the Committee were brought into communication with several practical pharmacists, including members of some of the leading retail, wholesale, and manufacturing houses, who might be fairly described as "*representative*" men. If it is any satisfaction to Mr. Smith to know, I may state that among the articles suggested to be included in the Addendum, was Parrish's Chemical Food; but, although the Committee were cognizant of the fact that this is a largely advertised and much used proprietary medicine, they did not consider it desirable to introduce any suggested formula for it into the Pharmacopœia, but thought it might be left with chlorodyne, nepenthe, and other secret remedies to enjoy the kind of reputation these nostrums have acquired, until some more definite, reliable, and satisfactory information has been obtained with reference to them. It will not, I presume, be contended that even extensive use among medical men is always a sufficient justification for giving to a medicine the highest sanction it can receive by introducing it into the Pharmacopœia. Extensive use is sometimes due to other causes than intrinsic merit.

I may remark here that after direct appeal to the Pharmaceutical Society, repeated discussion of the subject at public meetings, and communication during several months with practical pharmacists in various parts of town and country, no material alteration was made or even suggested in the list of articles originally proposed; and, excepting that two new preparations of ipecacuanha, which it had been intended to include, having failed to realize all that was expected of them, were struck out at my instigation, and two other preparations added, the proposed Additions remained very much as they were originally, and copies, corrected up to the end of 1873, were sent to all the members of the Medical Council for their revision and remarks. That these copies passed into the hands of many practical pharmacists in England, Scotland, and Ireland was proved by the numerous communications returned with them to the Committee. It is unnecessary for me to enumerate the individuals from whom these communications emanated, but I may confidently state that they were all carefully considered by the Committee, with my assistance, and although many differences of opinion were expressed in them, these were generally found to balance each other. The result was that all the articles inserted in the proof-sheet remained, and that five additional medicines were introduced, namely, areca nut, larch bark and its tincture, compound powder of liquorice, and ammoniated tincture of quinine. I cannot say that I think the list has been proportionally increased in value by the additions resulting from the more extended appeal to practical pharmacists which was finally made, but this no doubt arose from the fact that the most important medicines had already been introduced into the list. Under the circumstances of their recommendation, however, I fully and cordially concurred with the Committee in approving of all the additions and alterations made, from first to last.

And now I would ask any dispassionate man, acquainted with the medical and pharmaceutical practice of this country, to set the medicines included in the Addendum against an equal number taken from any part of the Pharmacopœia, and say whether the former suffer in importance by the comparison. Can it be said of nitrate of ammonia, nitrite of amyl, hydrate of chloral, hypodermic injection of morphia, the preserved juices of belladonna and hyoscyamus, compound scammony pill, compound elaterium powder, pepsin, the hypophosphites of lime and soda, phosphorated oil, and phosphorus pill, that these are out of place, or that their omission would not have been justly and generally condemned? Are not acetic ether (recommended years ago by the Pharmacopœia Committee of the Pharmaceutical Society), chloroform water, mustard paper, liquid extract of liquorice, solution of citrate of magnesia, and tincture of fresh orange peel, typical medicines required by the tendency to pharmaceutical refinement? Has there not been a desire expressed by many members of the medical profession for the introduction into the Pharmacopœia of a form for suppositories not of a greasy character; and should this be disregarded? Are oxide of bismuth, which, like acetic ether, was suggested by the Pharmaceutical Committee, precipitated oxide of mercury, required for recently introduced medicines, areca-nut and larch-bark, which are recommended on high medical authority—are these medicines worthy of a place beside many others of no greater pretensions which already occupy a place in the Pharmacopœia? Surely those who object to their introduction might have expressed their opinions and supported them with reasons, at a time—for ample opportunity has been afforded—when the doing so could have influenced the result.

Exception has been taken to the form for phosphorus pill on the ground of its not being readily disintegrated when introduced into the stomach; but this merely involves a question of prescribing, for if it be mixed with a little soap, one grain of soap to three of the pill-mass, it forms a pill that breaks up readily in water, and is in every way unobjectionable. Of course the soap can only be properly added in dispensing, and should therefore be ordered in the prescription, for after the addition the mass cannot be kept under water.

It might be said of phosphorated oil, even more justly than of phosphorus pill, that it cannot be administered without further preparation, and this also involves a question for the prescriber, who will find the following a suitable prescription for an emulsion:—

℞.

Olei Phosphorati	fl. ℥j.
Vitelli Ovi	fl. ℥ij.
Liquoris Potassæ	fl. ℥j.
Syrupi Tolutani	fl. ℥vj.
Aquæ Chloroformi, ad	fl. ℥vj.

Misce secundum artem.

Here again, judgment, that now of the dispenser, must be exercised; and it will be found that if the ingredients be put together and mixed in the order in which they are written a less satisfactory result will be obtained than by mixing the first two ingredients and adding the syrup and water before the addition of the alkali.

Differences of opinion have been expressed with reference to some of the other preparations, but although there has been no evidence of a reluctance to raise objections, sometimes on the slightest possible grounds, I am not aware of any case in which a general disapproval has been manifested; and as opinions thus expressed appear to be pretty nearly balanced, it is obvious that the result must have been the same whether the articles or processes referred to had been retained, altered, or rejected.

The contents of a Pharmacopœia may be divided into two classes. There are some articles which, in everybody's estimation, are there by right and of necessity, but there are also many with reference to which there will always be differences of opinion; and two Committees would never be likely to agree upon such a question as which articles shall be turned out of the Pharmacopœia, and which admitted into it?

T. Redwood.

June 2nd, 1874.

Carbolic Acid Suppositories, B.P. Addendum.

Sir,—Mr. T. H. Williams cannot, I think, have followed the simple directions of the B.P. Addendum for the preparation of these.

I expected, from the remarks he made, to have had great trouble in their manufacture.

The form given was carefully followed, and the suppositories made in a short time, with no trouble.

Edward Pratt, M.P.S.

P.S.—The morphia and tannic acid suppositories were just as easily prepared.

High Cross, Barnstaple,
June 2nd, 1874.

Higher Remuneration for Chemists.

Sir,—It cannot be denied that in these days of high rents, high wages, and of high prices of materials, and when a higher scale of payment is demanded in all mechanical trades, that a higher remuneration for chemists and druggists' work is very desirable; and it strikes me that, were the chemists *in a body* to demand at the present time higher prices, the public would believe that they were only following the example of other trades.

Need I give examples of the small remuneration of chemists? Take the common Seidlitz powder. In the large town in which I live, the general price is one shilling for the box of twelve powders. The price of this old household medicine has remained the same, perhaps, for forty years,—ever since they were put into the box form. Consider the

low remuneration for this. A nice box, twelve powders in blue paper, and twelve in white, carefully prepared, all for one shilling! Think of the time required to put up one box only, at the same time the neatness and accuracy in so common a matter, plus the learning which the chemist is supposed to have acquired, all required and displayed for one shilling!

Could we not have two or even three shillings for this work? And, if we had, it would not be a high price compared to the rate of remuneration given to others in other trades or professions.

A short time since I had a tooth extracted under the influence of nitrous oxide gas. The charge was 3*s.* 6*d.* A high price, compared to the prices we get for equally responsible work.

It is questionable whether the drawing of a tooth involves more responsibility, manipulation, learning, or capital invested in education, than is involved in putting up a box of Seidlitz powders, "cleanly, neatly, etc.," and why should we not receive as high a price?

But, sir, I have failed to raise the prices in my own pharmacy. I tried to get 1*s.* 3*d.* per box of Seidlitz powders. My fraternity around did not follow me, and my customers patronizing them, told me of my high charge, and I was compelled to keep to the old price.

Having a sore throat the last time I went to town, I called at a London chemist's for a few sal prunella balls. Three were given me, and I was charged 3*d.* The same quantity is sold in our town for ½*d.* I made no remark, considering he was *welcome* to six times the price for his goods if *he could get it.*

There are means within our own hands of obtaining a higher scale of payment. It is said that the country chemist is looked upon as a "Cheap Jack," and, if it be true, it is really what he deserves. Thieves have a union as well as chimney sweeps. We know this to our cost, and are we to stand still, and not advance too? One determined and unanimous move throughout our body regarding a higher rate of remuneration would be very acceptable to us, and would not be received by the public, now, with surprise, since similar demands in other trades have been granted.

A Country Major Associate.

Poison Regulations.

Sir,—Having read the letter on "Poison Regulations" signed by "P. R. B.," I consider that it opens a question worthy of consideration—"If it be for the good of the public that certain poisons be required by law to be labelled, why not all?" It also refers to the selling of poisons by unqualified persons. I would ask—are there no means of preventing oilmen from selling poisons? I have now before me a price list of an oil and Italian warehouseman, and amongst the "sundries" I see the public can obtain "spirits of salts, oil of vitriol, beetle poison, and poisoned wheat." Ought these poisons to be sold by such men? And I have no doubt that in nine cases out of ten they are sold to young children. Are they allowed to sell the above preparations because they do not come under the "Sale of Poisons Act?" If such be the case I think the sooner *all* poisons are brought within the meaning of that Act the better it will be for the profession (or trade) and the public.

H. Bartlett.

June 1st, 1874.

Sir,—Your correspondent, "P.R.B." is quite correct respecting country chemists being able to produce instances where the Sale of Poisons' Act is daily infringed by grocers and general shopkeepers and those who style themselves herbalists. I would simply refer your readers to a case of "suspected death from poison at Stalybridge," which will probably be reported in the Journal this week. How comes it that Mr. J. Rigby, Botanist and Herbalist, is allowed to *sell* two threepenny packets of Gibson's Manchester vermin killer? These vermin killers (if the poison regulations were not so loosely observed as they are) ought to have been registered and witnessed as in Part 1. schedule A, because it is known that they contain strychnine. Where is the evidence produced on this point at the inquest? Mr. Rigby certainly warned the man, but has Mr. Rigby any right to sell at all, or, are botanists and herbalists included in the Pharmacy Amendment Act as persons duly qualified to dispense and sell poisons under the Act? Not long ago a person called upon me, wishing to appoint me agent for his vermin killers. I refused, and he thereupon appointed a greengrocer, who only ceased to sell it upon my showing him a letter from the Registrar, Mr. Bremridge. After this came another person, who transferred the agency to a plumber and painter. Now, should not such persons as these be held amenable to punishment?

I could give other instances.

A Country Chemist and M.P.S.

[*** It should not be forgotten by our correspondents that they or any other persons sufficiently interested can institute a prosecution for a breach of the section of the Pharmacy Act which relates to the sale of poisons. Or if they were to send adequate evidence of such a breach of the law to the Registrar, it would at once receive attention.—Ed. Ph. J.]

Sir,—Some time since you kindly permitted me to appeal to your readers on behalf of the aged widow of the late Mr. J. T. Newby, a chemist who died last October, in Brunswick Street, Hackney Road. That appeal was anonymous, and this may perhaps be the reason why, so far as I can learn, less than ten shillings has been received for Mrs. Newby. Her husband had served his apprenticeship to the trade; he had also attended lectures on various subjects, and had been in business, chiefly in London, for nearly forty years. As, however, he was neither a member of the Pharmaceutical Society, nor registered, his widow is not eligible for a pension or grant from your Benevolent Fund. She has no means of support, and her daughters are quite unable to render her aid, being barely able to maintain themselves. Surely some of your readers will give something to cheer her declining years—she is nearly 70—and prevent her from either starving or entering a workhouse. The Rev. Mr. Kelly, of 19, Hoxton Square, N., has kindly consented to receive subscriptions for Mrs. Newby.

W. Bathurst Woodman, M.D., etc.

6, *Christopher Street, Finsbury Square, E.C.*
June 2nd, 1874.

"*Army.*"—See the regulations printed at p. 79 of the present volume of this Journal.

"*Enitar.*"—If the gum was received in powder, possibly it contained an admixture of tragacanth. If not, please to send a specimen for examination.

J. M. J. (Conway).—Persons who are on the Register by virtue of having been in business before August 1st, 1868, are eligible for election as Chemist and Druggist Members of the Society, but not as Pharmaceutical Chemists.

J. W. Yeats.—Bentley and Redwood's Abridgment of Pereira's Materia Medica; Royle's Materia Medica, Oliver's Lessons in Elementary Botany.

G. H. G.—See two papers in the current volume of this Journal, pp. 754 and 954.

T. P. B.—The plant sent is *Potentilla argentea.*

"*Chymist.*"—It has been stated by an American pharmacist that Unguentum Hydrargyri Oxidi Rubri may be preserved for an indefinite length of time by keeping it beneath a layer of glycerine half an inch thick. See before, vol. iii., p. 878.

W. R. F.—Wanklyn's Water Analysis, published by Trübner, Ludgate Hill.

H. M. Leigh.—First weigh the proper quantity of extract, then dry it and use it in powder.

W. Ballard.—Apply to the Secretary for particulars.

S. P. L.—See the Pharmaceutical Journal for last week, p. 953.

"*A Dispenser*" (*Leamington*).—The precipitate turns out to be a mixture of basic tartrate of iron with cream of tartar. Other salts, *e.g.*, iodide of potassium, act in a similar way. Solution of potash does not *prevent* the decomposition, as you seem to imagine; it only retards it.

Communications, Letters, etc., have been received from Mr. Cotterrell, Mr. Biddiscombe, Mr. Leigh, Mr. Finch, Mr. Ballard, Mr. Neale, Mr. Jackson, Mr. Pratt, E. S. M., A. X. H., Inquirer, and Devonshire.

TINCTURA QUINIÆ AMMONIATA.

BY JOSEPH INCE.

Some time back there was a preparation bearing this name, made by dissolving one grain of quinine disulphate in one drachm of spiritus ammoniæ aromaticus. The idea was ingenious, but as a medical formula it was bad. It laboured under the disadvantage of being prepared with the Pharmacopœial sal volatile of that date, which was unfortunate in its composition. A compound is not necessarily aromatic because strongly flavoured with essential oils, and smelling violently of cloves. The tincture I had to manufacture was free from this element of failure, for I had to work with an aromatic spirit of ammonia of unexceptionable quality. Yet this quinine solution met with little acceptance, and was finally regarded more as a chemical illustration than as a pharmaceutical remedy. It was essentially too strong, and caused unpleasant symptoms in many cases where it was prescribed.

In 1853 an amended form was published, under the name of Ammoniated Solution of Quinine, by Mr. Bastick; and to that gentlemen is its introduction due. This was quoted in the PHARMACEUTICAL JOURNAL, vol. xiii., p. 344, old series; and by myself in the same, vol. xv., p. 509. The subject should teach us humility, for neither Mr. Bastick, nor Professor Redwood, nor I, were able to spell correctly the Latin for proof spirit. The original formula was this:—

"℞

Quinæ Disulphatis	. . .	gr. xxxij
Spiritus Tenuioris	. . .	℥iiiss
Liquoris Ammoniæ	. . .	℥ss.

Mix the quinine with the spirit, and add the ammonia, which will at first precipitate the quinine, but afterwards re-dissolve it. Each drachm of this solution contains one grain of quinine. It will mix readily with water, and moreover it is necessary that it should be taken in some such fluid, as the ammonia is too pungent in the solution to be administered undiluted."

Three thoughts were then suggested:—

First, the ammonia was the one thing needful, and not any flavouring ingredients.

Second, the quinine disulphate was more soluble in spirit than in an aqueous menstruum.

Third, it seemed an unscientific thing to add water to a spirituous compound unless necessity required, and an obvious advantage was obtained.

I therefore ventured to propose another improvement, which will be found in a paper called "Trade Pharmacy."

℞

Quinæ Disulphatis	. .	gr. xxxij
Spirit Tenuioris	. . .	℥iiiss
Spirit Ammoniæ	. . .	℥ss.

M.

Not even a gentle heat is required to effect solution, nor, so far as I have any evidence, does it undergo the slightest change on keeping.

This is the preparation mentioned by Mr. Barton, but not adopted in the Addendum. I was not aware until I read the contribution of Mr. Edward Smith, that any pharmacists continued to use the old rudely constructed formula made with sal volatile, which, twenty-one years ago, was rejected by the public and discountenanced by the profession. No sooner did I prepare the tincture according to the last receipt, than I had to manufacture it by the gallon instead of four ounces at a time. The sale was considerable, and it was patronized extensively by West-end medical men, in spite of Mr. Umney's observation, "*Tinct. Quiniæ Ammoniata* has been seldom heard of previously." That is a question of locality.

I cannot altogether leave the discussion on the Addendum without a few remarks. A Pharmacopœia, British or otherwise, has for its first main intention to meet the requirements of the prescriber, who treats the matter from a therapeutical and not from a trade point of view.

It is not for us pharmacists to dictate terms for the formulæ the physician may think proper to employ.

Yet, seeing that men versed in laboratory processes and in manipulation may afford sound sensible advice, their aid is willingly accepted. Happy is it when both work together on terms of mutual respect, a result not likely to be promoted by a recent communication from Torquay. The compilers of the Addendum, keeping in sight the medical bearing of their investigations, have presented us with simple standard recipes, capable of universal adoption, and also of universal adaptation and alteration.

Had they given a concentrated saccharine solution of chloral hydrate, or a concentrated ammoniacal solution of quinine; we should have had forced upon us two preparations, useful in certain cases, but inadmissible in many others. Not the slightest veto is placed on individual pharmacists manufacturing whatever their ingenuity or their cultivated experience may suggest.

But the word *nostrum* means "ours," and is not to be translated by the sign B.P.; and, therefore, without let or hindrance, for business purposes, the house of Godfrey may still make its sal volatile; Mr. Davenport his chlorodyne; and Parrish his compound syrup of the phosphates; with equal profit to themselves, and satisfaction to their customers.

June 8th, 1874.

VEGETABLE POISONS AND THEIR ANTIDOTES.

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

(*Continued from page 770.*)

Absorption of Poisons.—Poisons are generally introduced into the system by coming in contact with the lining membrane of the stomach, or more rarely by application to a wound. In either case the effects are not manifested until the poison is absorbed into the blood, and circulated in the capillary vessels. The rapidity with which absorption takes place depends upon the nature of the surface to which the poison is applied. It takes place slowly through unbroken skin, but with greater rapidity when introduced into the cellular tissue beneath the surface. When taken into the stomach it is absorbed more readily if that organ be in an empty state. The mucous surface of the small intestines absorbs poison with greater rapidity and uniformity than the stomach; this is especially the case with the rectum, so much so, indeed, that a quantity which will not be sufficient to cause death when swallowed will destroy life when administered in the form of an enema. The result of experiments shows that a

poison may be absorbed into the blood in a space of time varying from nine seconds to two minutes. In some cases, of course, it takes a much longer time. The mucous membrane of the lungs also affords to volatile poisons like prussic acid an easy entrance into the circulation. It is, however, when introduced directly into the blood that the effects of poisons are most rapidly produced. The rate of absorption will also depend in some measure upon the solubility of the poison and the rapidity of the circulation.

Absorption into the blood is in every case indispensable to the action of poisons, and until the poison has reached the arterial capillary vessels no symptom of poisoning is produced. It also appears that *only the small portion which is absorbed into the circulation produces poisonous effects*, the portion which remains unabsorbed in the stomach, having no share in causing death. The quantity required to destroy life is in some cases exceedingly small.

Action of poisons when absorbed.—The action of poisons when circulated in the system seems to be to set up a state of disease, so closely resembling those diseases which result from natural causes that it is not always an easy matter to distinguish between them. Thus, the symptoms produced by the neurotic poisons are those of apoplexy, epilepsy, tetanus, disease of the heart, and of perforation of the stomach; and the symptoms produced by the irritant poisons may be mistaken for cholera, gastritis, peritonitis, etc. The sudden and violent accession of the symptoms in spite of treatment is therefore the only reliable guide in distinguishing them. In most instances of poisoning the symptoms are manifested within an hour after the substance has been taken, the only exceptions being when the person is in a state of intoxication or when sleep follows soon after its administration. Most poisons, in whatever way they may be introduced into the system, affect one particular part of the frame. Thus, morphia, whether applied to a wound or taken internally, affects the brain; digitalis, the heart; strychnia, the upper part of the spinal marrow; aconite, the nerves of sensation; and conia the nerves of motion. It is probable, however, that these local or specific actions are caused by an influence proceeding from, or transmitted by, the brain and spinal marrow. Why they act in this way is not easily accounted for.

Cause of death.—On whatever organ poisons may act, the *immediate cause of death is, in all cases, a stoppage of the action of either the lungs or the heart.* The former may be produced by paralysis of the muscles of respiration, as by opium, or by spasm of the glottis, as by strychnia; the latter by paralysis of the muscular tissue of the heart, as by digitalis.

It seems probable, however, that poisons ultimately cause death by exhausting the nervous power of the system. It is certain that they cause a change in the physical and chemical properties of the blood, which is sometimes manifested by an alteration in its consistency or colour, the poisonous substance in some cases simultaneously undergoing a change; thus, essential oil of almonds is deoxidized into hippuric acid in passing through the system. Some poisons, however, as strychnia, nicotine, morphia, and prussic acid, undergo no change in the body. The alteration caused in the blood by poisons may be produced by their retarding the circulation, or otherwise preventing its proper oxidation, and thus destroying the power of the blood to give energy to the brain and stimulus to the heart; for it is a well-known fact that the heart's action is no more stimulated by dark unoxidized blood than it would be by hot water, and that coma and convulsions are produced as well by loss of blood as by the cerebral poisons. It is not unlikely that the chemical changes produced in the blood may be accompanied by electrical disturbance, and thus cut off the supply of nervous force. This would perhaps account for many facts that would otherwise appear inexplicable. Recent researches show that in poisoning by digitalis the muscular juice becomes acid instead of alkaline, and that the external surface is electrically negative to the cut surface instead of (as normally) positive.

The action of poisons upon the body may be modified by various circumstances, as habit, idiosyncrasy, tolerance, or intolerance of medicine.

Habit.—It is a well-known fact that this diminishes the effect of certain poisons. Thus, habit will enable persons to take poison sufficient to destroy from two to ten of their own species. This effect is manifested in the use of opium, tobacco, and alcohol.

Idiosyncrasy is that peculiar condition of body in which small medicinal doses of poisons, as opium, strychnia, arnica, or ipecacuanha, so seriously affect a person as to endanger life. Even mutton, rice, strawberries, and other harmless substances, have been known to cause all the symptoms of irritant poisoning in those who are thus peculiarly constituted.

Intolerance.—To persons who have a tendency to apoplexy a small dose of opium may prove fatal, and whenever the body is debilitated by disease (provided the nervous system be not in an excited state) poisons acquire greater virulence of action.

Tolerance.—There are certain conditions of the body in which a large dose of poison may be taken at once by one who has not taken it previously, and yet the symptoms of poisoning will not be manifested. A case is mentioned by Dr. Christison, in which a gentleman took nearly an ounce of good laudanum without any effect. I have myself seen four grains of good opium taken without the slightest effect. In some diseases, as tetanus, hydrophobia, dysentery, mania, and delirium tremens, large doses of poison are borne without effect; thus, as much as four drachms of laudanum has been given daily in tetanus without producing symptoms of narcotism. It was at one time the universal belief that the action of poisons could be delayed, and that a poison might be made to kill after the lapse of several days, weeks, or months, as desired, and in modern times the negroes of Martinique have been said to possess similar powers, but careful research has shown the absurdity of this statement.

Elimination.—That poisons begin to be eliminated as soon as they are absorbed into the blood and that the process goes on until death, or in cases of recovery until the whole of the poison has been removed from the system, is a fact well-known to physiologists. The rate of elimination is not, however, uniform, nor is it the same with different poisons. This may depend upon the decreasing power of the system or the paralysing effect of the drug upon the organs by which it is eliminated. Thus with prussic acid the muscles of respiration are paralysed before the lungs have had time to eliminate the poison; volatile poisons, such as prussic acid and nicotine, being chiefly removed from the system through the respiratory organs.

Thus it will be seen that *the chief use of antidotes*

is to support the system until nature has eliminated that small portion of poison which is taken into the circulation. In the case of volatile poisons, which act with the greatest rapidity, the respiration should be continued artificially until the poison is eliminated; and in the case of the neurotic poisons, those substances must be used which will counteract the influences that lead to asphyxia or syncope. Thus in poisoning by strychnia, a substance should be used which will relax the muscular spasms and so prevent the glottis from being spasmodically closed.

The symptoms generally produced by the different poisons will therefore be first noticed; then instances in which recovery has followed the use of antidotes; and, lastly, drugs which by their physiological action would seem likely to prove antidotal. Several methods of classification of poisons have been adopted by different writers; but as all of the symptoms seem to be caused either by direct or reflex action of the brain and medulla oblongata, those which cause insensibility will be noticed first; secondly, those in which consciousness is wholly or partly retained; and, thirdly, those which act chiefly on the intestines without particularly affecting the brain, and which are generally called irritant poisons.

The first class will include opium, belladonna, stramonium, hyoscyamus, *Cicuta virosa*, *Œnanthe crocata*, and *Æthusa cynapium*, prussic acid, tobacco, lobelia and yew.

In the second class, digitalis, conium, Calabar bean, aconite, and strychnia will be noticed.

In the third, *Helleborus niger*, *Savin*, *Colchicum*, and *Veratrum album*.

THE APPENDICES OF THE BRITISH PHARMACOPŒIA.

BY WALTER G. SMITH, M.D., DUBLIN,

Fellow and Censor K. and Q. C. P. I.; Examiner in Materia Medica, Q. U. I.; Assistant Physician to the Adelaide Hospital.

The subjoined explanation of the uses of the officinal tests will, it is hoped, prove useful to the student by way of summary, and supplies a deficiency which exists in most of the text-books on Materia Medica with which the writer is acquainted.

The Appendices of the Pharmacopœia contain a number of articles intended for the purposes of analysis, *i.e.*, of inquiring into the nature and composition of bodies, or of ascertaining the presence of adulterating agents. Appendices I. and II. are concerned with qualitative analysis, which merely seeks to determine the presence and *nature* of certain bodies, irrespective of their actual quantity; while Appendix III. is concerned with quantitative analysis, which aims at estimating the precise *amount* of the component parts of any compound, and by which we may accurately determine the strength of many chemical compounds.

Appendix I.

Alcohol. C_2H_5, HO.—For an account of its preparation and characters, see Spiritus Rectif. Test for Oleum Ricini, and for Aconitia, Atropia, Acidum Carbolicum, Zinci Valerianas.

Benzol (or benzine). C_6H_6.—Not to be confounded with benzoyl (C_7H_5O), the radicle of essential oil of almonds, mentioned under Styrax Præparatus. Test for Gurjun balsam as an adulterant of copaiba.

Boracic Acid. H_3BO_3.—To prepare solution of boracic acid, App. II.

Chloride of Barium. $BaCl_2.2H_2O$.—To prepare solution of chloride of barium, App. II.

Copper Foil. Cu.—Test for Acidum Nitricum; and for arsenic in Acidum Hydrochloricum, and Ferri Phosphas.

Gold, Fine. Au.—To prepare solution of chloride of gold, App. II.

Hyposulphite of Soda. $Na_2S_2H_2O_4.4H_2O$.—To prepare the volumetric solution of hyposulphite of soda, App. III.

Indigo. C_8H_5NO.—The blue colouring matter (indigotin) is not soluble in water or alkaline solutions, but forms several compounds with sulphuric acid. To prepare solution of sulphate of indigo, App. II.

Isinglass.—A pure form of gelatin obtained from the inner membrane of the swimming bladder of sturgeons (*Acipenser*), and other fishes. To prepare solution of gelatin, App. II.

Litmus.—Obtained principally from *Roccella tinctoria*, N.O. Lichenes, and made up with chalk or plaster of Paris into small cakes for the market. To prepare litmus tincture, App. I.

Litmus Paper, Blue.—Test for acids.

Litmus Paper, Red.—Test for bases.

Note.—The action of acids and bases on litmus is thus explained: ordinary litmus contains a *blue* salt, viz., lithmate of calcium. But, since free lithmic acid is *red*, and possesses very feeble affinities, when any other acid, even the weakest, is added to litmus, lithmic acid is displaced, and so the red colour is produced. Again, all metallic lithmates are blue, therefore when we add any base to reddened litmus (*i.e.*, neutralize the free lithmic acid) the blue colour is restored.

Litmus Tincture.—Test for Carbo Animalis Purificatus.

Oxalic Acid of Commerce.—To prepare oxalic acid, purified, App. I.

Oxalic Acid, Purified. $H_2C_2O_4.2H_2O$.—To prepare oxalate of ammonia, App. I.; and the volumetric solution of oxalic acid, App. III.

Oxalate of Ammonia. $(NH_4)_2C_2O_4.H_2O$.—To prepare solution of oxalate of ammonia, App. II.

Plaster of Paris. $CaSO_4$—To prepare solution of sulphate of lime, App. II.

Platinum Black. Pt.—Test for Alcohol Amylicum.

Platinum Foil. Pt.—To prepare solution of perchloride of platinum, App. II. To ignite substances on.

Red Prussiate of Potash (Ferridcyanide of Potassium). $K_6Fe_2Cy_{12}$.—To prepare solution of red prussiate of potash, App. II.

Subacetate of Copper of Commerce (Verdigris). $Cu2C_2H_3O_2,CuO.6H_2O$. — To prepare solution of acetate of copper, App. II.

Sulphate of Copper, Anhydrous. $CuSO_4$.—Test for water in alcohol, App. I.

Sulphide of Iron. FeS.—To prepare sulphuretted hydrogen, App. I – $FeS+H_2SO_4=FeSO_4+H_2S$.

Sulphuretted Hydrogen. H_2S. — To prepare solution of sulphide of ammonium, App. II. Test for many metals.

Note.—Sulphuretted hydrogen is an invaluable agent in chemical analysis for the detection of metals, and for effecting their separation into distinct groups, and for these reasons: All metallic sulphides are insoluble in

water, except the sulphides of the alkalies (K, Na, NH_4, L) and alkaline earths (Ba, Ca, Mg, Sr); therefore all other metals are precipitable as sulphides (or oxides) either by sulphuretted hydrogen or sulphide of ammonium. But the conditions under which the various sulphides are thrown down differ materially, and hence, by modifying these conditions, we can divide the whole family of the precipitable metals into different sections.

I. Some sulphides are insoluble in either dilute acids or alkalies, and accordingly it is immaterial in which condition the solution be; *i.e.*, either sulphuretted hydrogen or sulphide of ammonium may be used as the precipitating agent; *e.g.*, Hg, Ag, Pb, Bi, Cu, Cd (see Cadmii Iodidum).

II. Some sulphides are soluble in alkalies, and therefore the solution must be acidified previous to precipitation, *i.e.*, sulphide of ammonium must *not* be used, as it would redissolve the metallic sulphide; *e.g.*, Sn, Sb, As. (See Liquor Arsenicalis, and the preparations of antimony *passim.*)

III. On the other hand, some sulphides are soluble in dilute mineral acids, and accordingly the solution must be rendered alkaline previous to precipitation, or, what comes to the same thing, we may use sulphide of ammonium as our precipitant. Sulphuretted hydrogen will not directly precipitate them (see Ferri Sulphas.); *e.g.*, Ni, Co, Fe, Mn, and Zn. (See the salts of zinc *passim.*) Of this group of sulphides, sulphide of zinc alone is insoluble in *acetic acid.*

As to colour, most of the sulphides are *black* (*e.g.*, Hg, Ag, Pb, Bi, Cu, Ni, Co, Fe, etc.; (*a*) one only is *white*, viz., sulphide of zinc, ZnS; (*b*) three are *yellow*, viz., the sulphides of arsenic, As_2S_3, cadmium, CdS, and tin, SnS_2; and (*c*) one is *orange*, viz., sulphide of antimony, Sb_2S_3.

Tin, Granulated. Sn.—To prepare solution of chloride of tin, App. II.

Turmeric.—Its colouring matter (curcumin) is nearly insoluble in water, but is freely taken up by alcohol and ether. Alkalies change the yellow colour of turmeric to brown, but most acids, with the exception of boracic acid, produce no change of tint. To prepare tincture of turmeric, App. I.

Turmeric Paper.—Test for alkalies.

Turmeric Tincture.—To prepare turmeric paper, App. I.

To be continued.

ARTIFICIAL FORMATION OF THE AROMATIC PRINCIPLE OF VANILLA.

BY F. TIEMANN AND W. HAARMANN.

In a lengthy and elaborate paper recently published,* an abstract of which has also been read before the French Academy,† the authors describe their researches upon coniferin, from which body they have succeeded in producing artificially a substance identical with vanillin, the aromatic principle of vanilla. The following abstract will present the chief points of interest to our readers.

Among the numerous glucosides of vegetable origin there is one, coniferin, which for a long time escaped the notice of chemists and physiologists; although it is found in considerable quantity in the members of one of the most widely distributed orders of plants. This body was first found in 1861 in the juice of the cambium of the *Larix europœa*, by Hartig,‡ who for that reason called it "laricin." Afterwards, its presence being recognized in the cambium of all the pines, the name of "abietin" was conferred upon it. Finally, as it appeared to exist in all the Coniferæ, W. Kubel,§ who was the first to study it chemically, with the consent of Hartig, again changed the name to coniferin.

Coniferin may be prepared in the following manner. At the time of the formation of the wood, in the spring or early summer, such conifers as *Abies excelsa* and *A. pectinata*, *Pinus strobus* and *P. Cembra*, *Larix europœa*, etc., are felled, and the trunks are sawn into several pieces and afterwards barked. The juice of the cambium is collected by scraping the wood with a sharp instrument such as a piece of glass. This juice is boiled and filtered to eliminate albuminous matters; then evaporated to about one-fifth its original volume. After a time it deposits brown coloured crystals, which are pressed, and purified and decolorized by repeated recrystallizations and treatment with animal charcoal. The greater part of the impurities may be removed by treating the brown solution of coniferin, whilst still warm, with small quantities of acetate of lead and ammonia; the resinous and colouring matters being precipitated, whilst the coniferin remains in solution. Excess of acetate of lead may be easily removed by means of a current of carbonic acid gas.

Coniferin is slightly soluble in cold water, more soluble in hot water and in alcohol, but is not soluble in ether. It crystallizes upon cooling in white, transparent, brilliant, sharp-pointed crystals, frequently grouped in a star or rosette. Its fusing point is 185° C. These crystals become opaque and dull in contact with air, losing part of their water of crystallization, which is driven off completely at 100° C. The aqueous solution of coniferin is bitter, lævogyrous, and does not reduce Fehling's solution even after prolonged boiling. It is not altered by dilute acid in the cold, but when heated with a few drops of hydrochloric or sulphuric acid, the solution deposits a white resinous matter, which in drying ordinarily becomes yellow or orange, whilst glucose is then found in the liquor. In contact with strong sulphuric acid, coniferin is at first coloured deep violet and afterwards dissolved, communicating to the liquid a red colour; upon the addition of water an indigo blue resinous matter is precipitated. If strong sulphuric acid be poured, a little at a time, into an aqueous solution of coniferin, as the temperature rises there is formed a deposit of the white resinous matter above mentioned; then the liquid becomes violet and turbid, and, after the addition of a considerable quantity of the acid, a clear dark red solution is obtained as in the preceding case.

Moistened with carbolic acid or concentrated hydrochloric acid, after some time coniferin acquires an intense blue colour; in the sunlight this colouration is almost instantaneous. It is upon this reaction that the use of pine wood as a test for carbolic acid is based.

Kubel ascertained that coniferin is a non-nitrogenous body, which is confirmed by the authors' researches; but not having isolated, with the exception of glucose, any of the products of decomposition he could not assign to it any definite formula, though his analyses led him to consider it as—

$$C_{24}H_{32}O_{12} + 3aq.$$

After a close investigation of the substance by Messrs. Tiemann and Haarmann they have represented the molecule of coniferin by—

$$C_{16}H_{22}O_8 + 2aq.$$

which agrees very closely with the figures required by Kubel's formula.

In order to determine the chemical constitution of coniferin, the authors sought first to determine the nature of the product or products resulting from its decomposition with elimination of glucose. As before stated, dilute hydrochloric or sulphuric acid, aided by heat, split it up into a resinous matter and glucose; but the properties of the resinons matter so obtained not appearing sufficiently definite, it was determined to effect the decomposition by fermentation by means of emulsion. For this purpose 50 grams of pure coniferin were placed in 500 grams of water, 0·2 to 0·3 grams of dry emulsion added, and the mixture

* *Berichte der deutschen chemischen Gesellschaft*, 1874, p. 608.

† *Comptes Rendus*, vol. lxxviii., p. 1365.

‡ *Jahrbuch für Forster*, 1861, vol. i., p. 263.

§ *Journal für praktische Chemie*, vol. xcvii., p. 243.

kept at a temperature between 25° and 26° C. The action commenced immediately, and in a few hours the presence of glucose in the liquor could be detected. The undissolved crystals of coniferin gradually disappeared, and in their place were deposited at the bottom of the vessel white flocks which were distinguishable from coniferin by their solubility in ether. After six or eight days the process of fermentation terminated, and by that time the bottom of the vessel was covered by a thick layer of this crystalline matter, the supernatant liquor being clear and slightly coloured. The liquor containing the precipitate was shaken with ether, which removed the flocks, and upon evaporation generally left a residue of well-formed white prismatic crystals. Sometimes, however, it left an oily residue, from which crystals were obtained upon cooling by a freezing mixture. The crystals were pressed between filtering paper, and purified by recrystallization from ether. The aqueous solution, having had any remaining emulsion removed by coagulation by heat and filtering, was found to contain in solution only glucose, and, it may be, slight traces of undecomposed coniferin.

The product of decomposition, chemically pure, melts at 73°—74° C. It is soluble in ether, less soluble in alcohol, difficultly soluble in hot water, and nearly insoluble in cold. It is represented by the formula, $C_{10}H_{12}O_3$, and is derived from coniferin according to the following equation :—

$$C_{16}H_{22}O_8 + H_2O = C_6H_{12}O_6 + C_{10}H_{12}O_3.$$

If this body be dissolved in dilute alcohol, and a few drops of sulphuric or hydrochloric acid added, a white flocculent amorphous precipitate is produced, which is ess soluble in ether and alcohol, but has the same composition, and is considered by the authors to be a polymer of the original decomposition product.

The crystalline product is soluble in caustic soda, from which it is precipitated by acids in the amorphous form, and this is again re-dissolved by the alkaline solution. Like coniferin it is coloured red by sulphuric acid, and, in dissolving, colours the liquid red; but it does not give the violet reaction characteristic of the glucoside.

The pure crystalline product, when recently prepared, is quite inodorous, but after a time acquires a feeble, though well-characterized, odour of vanilla. The same odour is produced when either of the decomposition products or coniferin is heated with dilute sulphuric acid, and still more clearly when an oxidizing mixture of sulphuric acid and solution of bichromate of potash is used. The crystalline decomposition product, reduced to fine powder, was therefore triturated with water, sulphuric acid and bichromate of potash in solution added, and the mixture distilled. At first a liquid, smelling strongly of ethylic aldehyde, was obtained, in which the presence of that aldehyde could be detected. The next portions did not present this character, but were strongly acid, and diffused a well-characterized odour of vanilla. From these portions of the distillate, ether removed a body which crystallized in stellate groups of crystals, possessing in a high degree the odour and taste of vanilla.

Operating in this way the yield was very small, in consequence of the rapid resinification of the decomposition product under the influence of the sulphuric acid, and in this state it was only slowly and partially attacked by the oxidizing mixture. It was found more easy and advantageous to operate directly upon coniferin. This was done by pouring an aqueous solution of coniferin into a hot mixture of bichromate and sulphuric acid; and heating the whole together for several hours in a flask furnished with a returning condenser. After cooling, the liquid was filtered to eliminate a little resinous matter which was deposited, and then agitated directly with ether. Upon distilling or evaporating this solvent a yellowish oil was obtained, which, after some days, formed a crystalline mass. By recrystallizing this from water and decolorizing with a little animal black, fine crystals were obtained having the odour and taste of vanilla. They melted at 80° to 81° C., were readily soluble in ether and in alcohol, difficultly soluble in cold water, and more soluble in hot water. Their composition was represented by the formula $C_8H_8O_3$. In fact, this body presented the same properties and was identical in composition with vanillin, or vanillic acid, the substance to which vanilla owes its aroma. Vanillic acid was a short time since studied by M. Carles,* who prepared from it a series of salts having the general formula $MC_8H_7O_3$, in which M represents one equivalent of a metal; he also prepared iodine and bromine substitution products. The facts observed by him are stated by the authors to accord exactly with those observed by them in operating upon vanillin prepared from coniferin. The transformation of the product of decomposition is represented by the following equation :—

$$C_{10}H_{12}O_3 + O = C_2H_4O + C_8H_8O_3.$$

In order to elucidate the nature of vanillin it was fused with caustic soda. The product of this reaction was protocatechic acid, $C_7H_6O_4$. This was further identified by its transformation into pyrocatechic acid, $C_6H_6O_2$, by the separation of a molecule of carbonic acid :—

$$C_7H_6O_4 = C_6H_6O_2 + CO_2.$$

The conversion into protocatechic acid fixes the constitution of vanillin; this compound is the methylic aldehyde of protocatechic acid, the molecule of which is expressed by the formula :—

$$C_6H_3\begin{cases}\diagup OCH_3\\ -OH\\ \diagdown COH.\end{cases}$$

In fact, submitted to the action of hydrochloric acid under pressure vanillin splits up into methylic chloride and protocatechic aldehyde :—

$$C_6H_3\begin{cases}\diagup OCH_3\\ -OH\\ \diagdown COH\end{cases} + HCl = CH_3Cl + C_6H_3\begin{cases}\diagup OH\\ -OH\\ \diagdown COH.\end{cases}$$

An analogous reaction takes place with hydriodic acid; but in that case the aldehyde undergoes a more profound alteration.

Another proof of the correctness of this theory was obtained in treating vanillin with acetic anhydride and chloride of benzoyl. The prolonged action of these agents only produced the bodies

$$C_6H_3\begin{cases}\diagup OCH_3\\ -OC_2H_3O\\ \diagdown COH\end{cases} \qquad C_6H_3\begin{cases}\diagup OCH_3\\ -OC_7H_5O\\ \diagdown COH\end{cases}$$

This the authors consider a clear demonstration that the molecule of vanillin contains only a single hydroxylic group.

The constitution of vanillin being cleared up, the structure of the fermentation product, the oxidation of which engendered vanillin, became evident. This product is the ethylic ether of vanillin :—

$$C_6H_3\begin{cases}\diagup OCH_3\\ -OC_2H_5\\ \diagdown OOH\end{cases}$$

This formula explains the disengagement of ethylic aldehyde during formation of the vanillin. Moreover, in operating upon the fermentation product under pressure with hydriodic acid, alcoholic iodides were obtained in considerable quantities, which could be separated by suitable means into methylic and ethylic iodides :—

$$C_6H_3\begin{cases}\diagup OCH_3\\ -OC_2H_5\\ \diagdown COH\end{cases} + 2HI = CH_3I + C_2H_5I + C_6H_3\begin{cases}\diagup OH\\ -OH\\ \diagdown COH.\end{cases}$$

Messrs. Tiemann and Haarmann carried on this investigation in the Laboratory of Dr. A. W. Hofmann at Berlin.

* Pharm. Journ. [3] vol. iii., p. 407.

LATENT PEPSIN.*

BY GEO. W. C. PHILLIPS.

It is the generally received opinion among pharmacists and scientific men that the principle, pepsin, cannot exist where there is any alcohol. This theory has been most strongly advanced by Prof. Scheffer of Louisville, whose experiments seem to point out the fact that all wines and elixirs of pepsin, necessarily composed of alcohol, contain no pepsin at all. He bases this idea on the fact that certain wines of pepsin, when digested with coagulated albumen, at a temperature approximating that of the human stomach, have no solvent effect upon it. This view being urged upon medical men, has caused all these otherwise elegant mediums for administering pepsin to be received with distrust or given up entirely. The results of experiments which I have recently made have caused me to believe that pepsin does exist, in a marked degree, in all well-prepared wines and elixirs, and only needs proper treatment to bring out its full chemical and medicinal effects. My belief is that it exists in these wines and elixirs, and that by sufficient dilution and warmth, such as they would receive in the human stomach from its juices and heat, it regains its activity. I base this opinion upon the following experiments: One ounce of Boudault's wine of pepsin was digested with one hundred and twenty grains of coagulated albumen at a temperature of 98° F. for three hours. At the end of that time the albumen was examined and weighed. The only apparent effect this treatment had upon it was to slightly colour it brown, and harden it; a slight decrease in weight was probably owing to loss of water.

This experiment was repeated, without alteration in the quantities; the only difference being in the addition of an equal volume of water to the wine of pepsin. At the expiration of three hours, the albumen was again examined. It had decreased in weight thirty grains, and presented the characteristic appearance of albumen which has been acted upon by pepsin; the sharp angles were gone, and in their place a granular surface was presented.

Another experiment with the same quantities, the water being increased to three ounces, showed a decrease in the albumen of fifty grains. A sample of the wine of pepsin used in these experiments was then examined, to determine the amount of alcohol it contained. Horsley's process, given in the *Chemical News* of October 19, 1861, was employed, and it was found to contain eight per cent. of free alcohol.

The conclusion that I draw from these and other experiments is this: That while a carefully made wine of pepsin, not containing over ten per cent. of alcohol, may, and does contain pepsin, that it exists in a latent state, and that when diluted with the juices of the stomach, at the normal temperature of that organ, it regains its activity, and will perform its digestive functions.

NOTES ON GELSEMIUM SEMPERVIRENS.†

BY JAMES SAWYER, M.D., LOND., ETC.,

Physician to the Queen's Hospital, and to the Children's Hospital, Birmingham.

Since reading Dr. Wickham Legg's interesting paper, published in the *Lancet* in May last, advocating the employment of *Gelsemium sempervirens* in the treatment of odontalgia, I have frequently used the drug among my out-patients at the Queen's Hospital, for the relief of toothache and some allied affections. As the remedy has proved a reliable one in my hands, I have thought it worth while to bring it before my professional brethren.

Gelsemium sempervirens, commonly called the yellow jasmin, or woodbine, belonging to the natural family Apocynaceæ, grows plentifully in the southern states of North America. The plant has a shrubby, twining stem; the leaves are ovate lanceolate, opposite, entire, smooth, and of a dark-green colour; the flowers are large and yellow; the corolla is gamopetalous and infundibuliform; it has five stamens, inserted on the corolla and alternate with its lobes; the pistil is composed of two distinct carpels. The flowers are so strongly scented that they perfume the neighbourhood in which the plant grows. The root, the part employed medicinally, comes to England cut up into small pieces, the larger pieces being from half an inch to two inches in length, and about a quarter of an inch in thickness. Wood zones and medullary rays are visible to the naked eye. The root is brown externally, and of a greyish colour internally. The active properties of the plant are said to depend upon the gelseminate of gelsemia.

Gelsemium is not generally known to English practitioners, although it has been largely used in medicine for some years in America. In England it has been principally employed by homœopathists and disciples of "botanic medicine." From various sources I have been enabled to gather the following account of its properties. The drug acts mainly upon the nervous system, impairing the sensibility of the sensory nerves. It has no direct action upon the heart. In large doses it gives rise to a general feeling of oppression and numbness, objects are seen double, and, if the dose be large enough, there may be complete paralysis of the voluntary muscles, and insensibility. The plant, like many of the natural family to which it belongs, is very poisonous, and should be used with caution. Several deaths from poisoning by gelsemium have been recorded. Death seems to arise from asphyxia, the result of paralysis of the muscles of respiration. The drug has been said to be a specific in the headache and sleeplessness of the drunkard; in sick-headache it seems to have proved useful; it has been recommended in some forms of dyspepsia, attended by considerable flatulence; it has been thought to aid the obstetrician in cases of rigidity of the os uteri; it has been praised as a remedy for dysmenorrhœa; and there appears to be good reason for believing that it is capable of decidedly relieving toothache and some neuralgic affections. Its virtues, like those of very many other drugs, have probably been grossly exaggerated; but I have seen enough of the employment of gelsemium to feel sure that more extended experience and careful investigation will establish it as a valuable addition to our materia medica.

American pharmacists prepare a liquid extract. The dose of the powdered root is from one to two grains. Mr. Dewson, of the Queen's Hospital, to whom I am indebted for much valuable information concerning the drug, has prepared a tincture for me. I give the formula in his own words:—"Take of gelsemium root, in coarse powder, two ounces; of rectified spirit, twenty fluid ounces. Moisten the powdered root with ten ounces of the spirit, and allow the mixture to stand for twenty-four hours. At the end of that time pack in a percolator and add the remaining ten ounces of spirit. When the fluid has ceased to flow, remove the contents of the percolator and press them. Add the pressed liquid to that obtained by percolation, filter, and make up with rectified spirit to a pint." Eleven minims are about equal to one grain of the root. The liquid extract would be best prepared from the fresh root. The tincture is only slightly darkened by perchloride of iron, and but a very small precipitate is produced; it contains, therefore, only a minute quantity of tannin, and may be prescribed with salts of iron.

Following the example of Dr. Wickham Legg, I have only given gelsemium in cases of odontalgia. In hospital out-patient practice we meet with a large number of cases of neuralgic pains in the face and jaws, associated with carious teeth. The patients are frequently ill-fed and badly-nourished women. I selected examples of the malady in which there were no very evident local inflammatory complications. In these I gave the tincture of

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* From the Annual Report of the Alumni Association of the New York College of Pharmacy.

† Communicated to the Pathological and Clinical Section of the Birmingham and Midland Counties Branch of the British Medical Association.

gelsemium in doses of fifteen minims every six hours, in an ounce of dill-water. I very rarely gave anything else or made any local application. Out of about twenty cases I do not think the use of the remedy failed to be followed by decided and lasting relief in more than three or four instances. The relief was not usually experienced till after the third or fourth dose.

THE USE OF PETROLEUM BENZIN FOR EXHAUSTING OLEORESINOUS DRUGS.*

BY JOSEPH P. REMINGTON.

Many uses have been discovered for petroleum benzin since it became an article of commerce, and though but recently brought to notice, its applications, from thinning white lead to purifying rare alkaloids, from dissolving india-rubber to removing grease from a silk dress, have secured for this product of mother earth a name and a place not to be despised.

The immense and overgrown development of the petroleum interest has tended to reduce the price of benzin to a very low figure; the common unpurified article is a drug in the market; and although efforts are constantly made to fit it for illuminating purposes, a means of rendering it free from liability to explode, and cause fearful accidents, is yet to be discovered.

The purified benzin commands a much better price, is put to finer uses, and should alone be used for solvent purposes in pharmacy; the common article is unfit for any purpose in a preparation, for it will be sure, from its offensive odour, to leave its tracks in it.

The first requirement in answering the query, What merit has petroleum benzin as a solvent for the extraction of oleoresinous drugs, like buchu, chenopodium, etc.? was believed to be, to secure a good benzin. This was readily done, and an article having the specific gravity of 0·642 was obtained, which on being tested proved to be free from objectionable impurities, and no odour was left on a clean sheet of paper when a small portion was poured on it, and suffered to evaporate.

Eight ounces of finely powdered buchu leaves were taken, and firmly packed in a Squibb's glass percolator, with the siphon arrangement. It was found to be best, however, to substitute the rubber lid for one made of wood, the wooden lid having a groove cut in the under surface to fit the rim of the percolator, and at the bottom of the groove a rubber-band made the joint air-tight.

After allowing the powder to macerate for four days, the siphon was started, and the percolate, very dense and highly charged with extractive matter, came over, at first slowly, and afterwards rapidly; after two pints had passed, the buchu seemed to be exhausted, and so great had been the solvent power of the menstruum, as far as the chlorophyll and other colouring matter was concerned, that the residue looked as if it had been bleached.

The percolate was allowed to evaporate spontaneously, and the amount of oleoresinous extract obtained weighed 305 grains. This, at first sight, was supposed to contain all of the active properties of the drug, and in order to test it, five grains were swallowed in a little water by the writer, producing, however, but little diuresis; the dose was increased to ten grains, which had but moderate effect.

Taking the dose of fluid extract of buchu at a fluid drachm, and granting that one fluid ounce of the extract represents one troy ounce of the drug, it can readily be seen by a simple calculation, that if the benzin had fully extracted the virtues of the buchu, five grains of the oleoresinous extract obtained would produce the same effect as a fluid drachm of the fluid extract, whilst ten grains would be a large dose.

This fact suggested, that although the buchu had every appearance of being thoroughly exhausted, it might yield some activity to alcohol, and it was then percolated with stronger alcohol, and a dense dark-coloured liquid obtained, possessing a bitter taste and considerable odour.

Ten grains of this liquid produced active diuresis, and the writer has no hesitation in asserting that he believes alcohol to be much the better solvent for buchu.

Various other experiments with other drugs are now progressing, but sufficient progress has been made to justify the assertion that the uses of benzin in this direction are circumscribed; the principal objections to its use being inflammability, great volatility, requiring the use of apparatus not always at the command of all pharmacists; the odour is objectionable generally, and in many cases could not be tolerated by a weak stomach. A continuance of this subject was requested, in order to obtain further information with other plants.

* Read before the American Pharmaceutical Association, September, 1873, and reprinted from the 'Transactions.'

INSECT-DEVOURING PLANTS.*

However opposite the parts which animals and vegetables play in the economy of the world, as the two opposed kingdoms of organic nature, it is becoming more and more obvious that they are not only two contiguous kingdoms, but are parts of one whole—antithetical and complementary to each other, indeed, but such "thin partitions do the bonds divide" that no definitions yet framed hold good without exception. This is a world of transition in more senses than is commonly thought; and one of the lessons which the philosophical naturalist learns, or has to learn, is, that differences, the most wide and real in the main, and the most essential, may nevertheless be here and there connected or bridged over by gradations. There is a limbo filled with organisms which never rise high enough in the scale to be manifestly either animal or plant, unless it may be said of some of them that they are each in turn and neither long. There are undoubted animals which produce the essential material of vegetable fabric, or build up a part of their structure of it, or elaborate the characteristic leaf-green which, under solar light, assimilates inorganic into organic matter, the most distinguishing function of vegetation. On the other hand there are plants—microscopic, indeed, but unquestionable—which move spontaneously and freely around and among animals that are fixed and rooted. And, to come without further parley to the matter in hand, while the majority of animals feed directly upon plants, "for 'tis their nature to," there are plants which turn the tables and feed upon them. Some, being parasitic upon living animals, feed insidiously and furtively; these, although really cases in point, are not so extraordinary, and, as they belong to the lower orders, they are not much regarded, except for the harm they do. There are others, and those of the highest orders, which lure or entrap animals in ways which may well excite our special wonder—all the more so since we are now led to conclude that they not only capture but consume their prey. As respects the two or three most notable instances, the conclusions which have been reached are among the very recent acquisitions of physiological science. Curiously enough, however, now that they are made out, it appears that they were in good part long ago attained, recorded, and mainly forgotten. The earlier observations and surmises shared the common fate of discoveries made before the time, or by those who were not sagacious enough to bring out their full meaning or importance. Vegetable morphology, dimly apprehended by Linnæus, initiated by Caspar Frederic Wolff, and, again, independently in successive generations by Goethe and by De Candolle, offers a parallel instance. The botanist of Goethe's day could not see any sense or practical application to be made of the proposition that the parts of a blossom answer to leaves; and so the study of homologics had long to wait.

Fly-catchers.—Until very lately it appeared to be of no consequence whatever (expect, perhaps, to the insects) whether *Drosera* and *Sarracenia* caught flies or not; and

* From the *Garden*, May 23, 1874.

even *Dionœa* excited only unreflecting wonder as a vegetable anomaly. As if there were real anomalies in Nature, and some one plant possessed extraordinary powers denied to all others and (as was supposed) of no importance to itself. That most expert of fly-catchers, *Dionœa*, of which so much has been written and so little known until lately, came very nearly revealing its secret to Solander and Ellis a hundred years ago, and, doubtless, to John Bartram, its probable discoverer, who sent it to Europe. Ellis, in his published letter to Linnæus, with which the history begins, described the structure and action of the living trap correctly; noticed that the irritability which called forth the quick movement closing the trap entirely resided in the few small bristles of its upper face; that this whole surface was studded with glands, which probably secreted a liquid; and that the trap did not open again when an insect was captured, even upon the death of the captive, although it opened very soon when nothing was caught, or when the irritation was caused by a bit of straw or any such substance. It was Linnæus who originated the contrary and erroneous statement, which has long prevailed in the books, that the trap reopened when the fatigued captive became quiet, and let it go; as if the plant caught flies in mere play and pastime! Linnæus also omitted all allusion to secreted liquid—which was justifiable, as Ellis does not state that he had actually seen any, and if he did see it, quite mistook its use, supposing it to be, like the nectar of flowers, a lure for insects, a bait for the trap. Whereas, in fact, the lure, if there be any, must be an odour (although nothing is perceptible to the human olfactories); for the liquid secreted by the glands never appears until the trap has closed upon some insect and held it at least for some hours a prisoner. Within twenty-four or forty-eight hours this glairy liquid is abundant, macerating the body of the perished insect. Its analogue is not nectar but the gastric juice. The observations which compel such an inference are recent, and the substance of them may be briefly stated. The late Rev. Dr. M. A. Curtis, forty years and more ago, resided at Wilmington, North Carolina, in the midst of the only district to which the *Dionœa* is native; and he published, in 1834, in the first volume of the 'Journal of the Boston Society of Natural History,' by far the best account of this singular plant which had then appeared. He remarks, that "the little prisoner is not crushed and suddenly destroyed, as is sometimes supposed," for he had often liberated "captive flies and spiders, which sped away as fast as fear or joy could hasten them." But he neglected to state, although he must have noticed the fact, that the two sides of the trap, at first concave to the contained insect, at length flatten and close down firmly upon the prey, exerting no inconsiderable pressure, and ensuring the death of any soft-bodied insect, if it had not already succumbed to the confinement and salivation. This last Dr. Curtis noticed, and first discerned its import, although he hesitated to pronounce upon its universality. That the captured insects were in some way "made subservient to the nourishment of the plant," had been conjectured from the first. Dr. Curtis "at times found them enveloped in a fluid of mucilaginous consistence, which seems to act as a solvent, the insects being more or less consumed in it." This was verified, and the digestive character of the liquid well-nigh demonstrated, six or seven years ago, by Mr. Canby of Wilmington, Delaware, who, upon a visit to the sister-town of North Carolina, and afterwards at his home, followed up Dr. Curtis's suggestions with some capital observations and experiments. These were published at Philadelphia, in the tenth volume of Mehan's *Gardeners' Monthly*, August, 1868, but they do not appear to have attracted the attention which they merited. The points which Mr. Canby made out are, that this fluid is always poured out around the captured insect in due time, "if the leaf is in good condition and the prey suitable;" that it comes from the leaf itself, and not from the decomposing insect (for when the trap caught a plum-curculio, the fluid was poured out while he was still alive, though very weak, and endeavouring, ineffectually, to eat his way out); that bits of raw beef, although sometimes rejected after awhile, were generally acted upon in the same manner—*i.e.*, closed down upon tightly, slavered with the liquid, dissolved mainly, and absorbed; so that, in fine, the fluid may well be said to be analogous to the gastric juice of animals, dissolving the prey and rendering it fit for absorption by the leaf. Many leaves remain inactive or slowly die away after one meal; others reopen for a second and perhaps even a third capture, and are at least capable of digesting a second meal. Before Mr. Canby's experiments had been made, a similar series had been made in England by Mr. Darwin, with the same results, and with a small but highly curious additional one—namely, that the fluid secreted in the trap of *Dionœa*, like the gastric juice, has an acid reaction. Having begun to mention unpublished results (too long allowed to remain so), it may be well, under the circumstances, to refer to a still more remarkable experiment by the same most sagacious investigator. By a prick with a sharp lancet at a certain point, he has been able to paralyse one-half of the leaf-trap, so that it remained motionless under the stimulus to which the other half responded. Such high and sensitive organization entails corresponding ailments. Mr. Canby tells us that he gave to one of his *Dionœa*-subjects a fatal dyspepsia by feeding it with cheese; and under Mr. Darwin's hands another suffers from paraplegia. Finally, Dr. Burton-Saunderson's experiments, detailed at the last meeting of the British Association for the advancement of Science, show that the same electrical currents are devolved upon the closing of the *Dionœa* trap, as in the contraction of a muscle. If the Venus's fly-trap stood alone it would be doubly marvellous—first, on account of its carnivorous propensities, and then as constituting a real anomaly in organic nature, to which nothing leads up. Before acquiescing in such a conclusion, the modern naturalist would scrutinize its relatives. Now the nearest relatives of our vegetable wonder are the

Sundews.—While *Dionœa* is local, the *Droseras*, or Sundews, are widely diffused. The two whose captivating habits have attracted attention, abound in bogs all round the northern hemisphere. That flies are caught by them is a matter of common observation; but this was thought to be purely accidental. They spread out from the root a circle of small leaves, the upper face of which especially is beset, and the margin fringed, with stout bristles (or what seem to be such, although the structure is more complex), tipped by a secreting gland, which produces, while in a vigorous state, a globule of clear liquid like a drop of dew—whence the name, both Greek and English. One expects these seeming dewdrops to be dissipated by the morning sun; but they remain unaffected. A touch shows that the glistening drops are glutinous and extremely tenacious, as flies learn to their cost on alighting, perhaps to sip the tempting liquid, which acts first as a decoy and then like bird-lime. A small fly is held so fast, and in its struggles comes into contact with so many of these glutinous globules, that it seldom escapes. The result is much the same to the insect, whether captured in the trap of *Dionœa* or stuck fast to the limed bristles of *Drosera*, As there are various plants upon whose glandular hairs or glutinous surfaces small insects are habitually caught and perish, it might be pure coincidence that the most effectual arrangement of the kind happens to occur in the nearest relatives of *Dionœa*. Roth, a keen German botanist of the eighteenth century, was first to detect, or at least to record, some evidence of intention in *Drosera*, and to compare its action with that of *Dionœa*, which, through Ellis's account, had shortly before been made known in Europe. He noticed the telling fact that not only the bristles which the unfortunate insect had come in contact with, but also the surrounding rows, before widely spreading, curved inwards one by one, although they had not been touched, so as within a few hours to press their glutinous tips likewise against the body of the captive insect—thus doubling or quadrupling the bonds of

the victim, and (as we may now suspect) the surfaces through which some part of the animal substance may be imbibed. For Roth surmised that both these plants were, in their way, predaceous. He even observed that the disk of the *Drosera* leaf itself often became concave and enveloped the prey. These facts, although mentioned now and then in some succeeding works, were generally forgotten, except that of the adhesion of small insects to the leaves of Sundews, which must have been observed in every generation. Up to and even within a few years past, if any reference was made to these asserted movements (as by such eminent physiologists as Meyen and Treviranus) it was to discredit them. Not because they are difficult to verify, but because, being naturally thought improbable, it was easier to deny or ignore them. So completely had the knowledge of almost a century ago died out in later years that, when the subject was taken up anew, in our days, by Mr. Darwin, he had, as we remember, to advertise for it, by sending a "note and query" to the magazines, asking where any account of the fly-catching of the leaves of Sundew was recorded. When Mr. Darwin takes a matter of this sort in hand, he is not likely to leave it where he found it. He not only confirmed all Roth's observations as to the incurving of the bristles towards and upon an insect entangled on any part of the disk of the leaf, but also found that they responded similarly to a bit of muscle or other animal substance, while to any particles of inorganic matter they were nearly indifferent. To minute fragments of carbonate of ammonia, however, they were more responsive. As these remarkable results, attained half a dozen years ago, remained unpublished (being portions of an investigation not yet completed), it would have been hardly proper to mention them, were it not that independent observers were beginning to bring out the same, or similar facts. Mrs. Treat, of New Jersey, noticed the habitual enfolding of the leaf in the longer-leaved species of Sundew (*American Journal of Science* for November, 1871), as was then thought for the first time—Roth's and Withering's observations not having been looked up. In recording this, the next year, in a very little book, entitled "How Plants Behave," the opportunity was taken to mention, in the briefest way, the capital discovery of Mr. Darwin, that the leaves of *Drosera* act differently when different objects are placed upon them, the bristles closing upon a particle of raw meat as upon a living insect, while to a particle of chalk or wood they are nearly inactive.

The same facts were independently brought out by Mr. A. W. Benentt at last year's meeting of the British Association for the Advancement of Science, and have been mentioned in the journals. If to these statements, which we may certify, were added some far more extraordinary ones, communicated to the French Academy of Science, in May last, by M. Zeigler, a stranger story of discrimination on the part of Sundew-bristles would be told. But it is safer to wait for the report of the Committee to which these marvels were referred, and conclude this sufficiently "strange, eventful history" with some details of experiments made last summer by Mrs. Treat, of New Jersey, and published in the December number of the *American Naturalist*. It is well to note that Mrs. Treat selects for publication the observations of one particular day in July, when the Sundew leaves were unusually active; for their modes vary with the weather, and also in other unaccountable ways, although, in general the sultrier days are the most appetizing:

"At fifteen minutes past ten of the same day I placed bits of raw beef on some of the most vigorous leaves of *Drosera longifolia*. Ten minutes past twelve, two of the leaves had folded around the beef, hiding it from sight. Half past eleven of the same day, I placed living flies on the leaves of *D. longifolia*. At 12° 48′ one of the leaves had folded entirely around its victim, the other leaves had partially folded, and the flies had ceased to struggle. By 2° 30′ four leaves had each folded around a fly. . . . . I tried mineral substances—bits of dry chalk, magnesia, and pebbles. In twenty-four hours, neither the leaves nor their bristles had made any move like clasping these articles. I wet a piece of chalk in water, and in less than an hour the bristles were curving about it, but soon unfolded again, leaving the chalk free on the blade of the leaf. Parallel experiments made on *D. rotundifolia* with bits of beef and of chalk gave the same results as to the action of the bristles; while with a piece of raw apple, after eleven hours, "part of the bristles were clasping it, but not as closely as the beef, and in twenty-four hours nearly all the bristles were curved towards it, but not many of the glands were touching it."

To make such observations is as easy as it is interesting. Throughout the summer one has only to transfer plants of *Drosera* from the bogs into pots or pans filled with wet moss; if need be, allowing them to become established in the somewhat changed conditions, or even to put out fresh leaves, and to watch their action or expedite it by placing small flies upon the disk of the leaves. The more common round-leaved Sundew acts as well as the other by its bristles, and the leaf itself is sometimes almost equally prehensile, although in a different way, enfolding the whole border instead of the summit only. Very curious, and even somewhat painful, is the sight when a fly, alighting upon the central dew-tipped bristles, is held as fast as by a spider's web; while the efforts to escape not only entangle the insect more hopelessly as they exhaust its strength, but call into action the surrounding bristles, which, one by one, add to the number of the bonds, each by itself apparently feeble, but in their combination so effectual that the fly may be likened to the sleeping Gulliver made fast in the tiny but multitudinous toils of the Lilliputians. Anybody who can believe that such an apparatus was not intended to capture flies might say the same of a spider's web. Is the intention here to be thought any the less real because there are other species of *Drosera* which are not so perfectly adapted for fly-catching, owing to the form of their leaves and the partial or total want of co-operation of their scattered bristles? One such species, *D. filiformis*, the thread-leaved Sundew, is not uncommon in America, both north and south of the district that *Dionæa* locally inhabits. Its leaves are long and thread-shaped, beset throughout with glutinous gland-tipped bristles, but wholly destitute of a blade. Flies, even large ones, and even moths and butterflies, as Mrs. Treat and Mr. Canby affirm (in the *American Naturalist*), get stuck fast to these bristles, whence they seldom escape. Accidental as such captures are, even these thread-shaped leaves respond more or less to the contact, somewhat in the manner of their brethren. In Mr. Canby's recent and simple experiments, made at Mr. Darwin's suggestion, when a small fly alights upon a leaf a little below its slender apex or when a bit of crushed fly is there affixed, within a few hours the tip of the leaf bends at the point of contact, and curls over or around the body in question; and Mrs. Treat even found that, when living flies were pinned at half an inch in distance from the leaves, these in forty minutes had bent their tips perceptibly towards the flies, and in less than two hours reached them! If this be confirmed—and such a statement needs ample confirmation—then it may be suspected that these slender leaves not only incurve after prolonged contact, just as do the leaf-stalks of many climbers, but also make free and independent circular sweeps, in the manner of twining stems and of many tendrils. Correlated movements like these indicate purpose. When performed by climbing plants, the object and the advantage are obvious. That the apparatus and the actions of *Dionæa* and *Drosera* are purposeless and without advantage to the plants themselves, may have been believed in former days, when it was likewise conceived that abortive and functionless organs were specially created "for the sake of symmetry" and to display a plant; but this is not according to the genius of modern science.

(*To be continued.*)

SELECT COMMITTEE ON THE ADULTERATION ACT.

At the sitting of the Committee on Friday, June 5th, Mr. Allen, public analyst for Sheffield, was examined shortly upon the subject of the adulteration of drugs. He stated that with regard to the case of drugs the Adulteration Act had not been enforced to any great extent, and there had been few prosecutions. Even these few prosecutions, however, had mostly resulted unsuccessfully, and had been very ill-advised on the part of the analysts, who had condemned drugs as adulterated which were not fairly open to censure on that account, although there were undoubtedly many instances where drugs were adulterated. It was, for instance, customary in Sheffield to sell laudanum which contained scarcely any goodness in it. He should certainly consider it to be adulterated. In some cases a person bought such laudanum as a genuine sample, and took it in proportions as though it were perfectly genuine, and it did not act properly. There was a deficiency of opium in it, and it was coloured with burnt sugar. The ingredients were harmless in themselves, but ought not to be there. With respect to laudanum, there was no fixed standard of purity, and he thought it was desirable that some such standard of strength should be determined upon. Tincture of opium and laudanum, he might point out, were considered identical, and if laudanum were asked for in a respectable shop tincture of opium would be supplied, but in a lower class of establishment probably this would not be the case. It would have been better, perhaps, if he had said that tincture of opium was adulterated, and not up to the strength of the Pharmacopœia. Being questioned with regard to scammony, the witness said that if a druggist sold an article in which there was 10 per cent. of something not scammony, he should not give a certificate of adulteration in such a case. There must be some discretion exercised in such a case by the analyst. The best scammony did not contain more than 80 or 90 per cent. of resin. They might as well say tea was adulterated because it had three per cent. not tea. It was true that scammony was adulterated, but because it contained only 90 per cent. he did not think it ought to be considered adulterated, and he should not certify it to be so. If a parcel of scammony were brought to him for analysis, he should use his discretion with regard to it, and any analyst should do the same. In regard to drugs generally there was no defined standard, but he thought that there should be some such standard defined by a sufficient authority. For drugs which it was possible to treat in this way there should be such a treatment. Generally speaking, he was of opinion that pharmaceutical preparations could be purchased all over the country of equal strength, and as good in provincial towns as in London. It was merely a question of paying for them. He had been speaking recently to a druggist and grocer in South Wales—a tradesman who combined the sale of groceries with drugs—and he said that he received articles in the drug line which were much adulterated. Certain drugs deteriorated in value by keeping. The dealers would usually know when these drugs had gone bad, and could act accordingly. He should not absolutely prohibit the sale of the cheap drugs. In the case of scammony a great deal of the inferior varieties were used, and when a dose was taken and did not have its effect this might be due to the presence of adulteration. In the case of a mustard plaster, if it had not the desired effect it might be because there was a large amount of flour used in the manufacture of the mustard, and this was, of course, undesirable for plasters. In selling articles in the Pharmacopœia, the druggist should be guided by that. Being questioned as to the sale of medicines in the country, the witness stated that medicines should be sold all over the country of the same strength, and prescriptions should of course have the same effect. Any one making up inferior preparations should be liable to punishment.

On Monday last, Mr. F. Sutton, F.C.S., member of the Council of the Pharmaceutical Society, and analyst for Norfolk, gave evidence. He said he was not aware that the Pharmaceutical Society had given any definition of what constituted adulteration. Some drugs greatly deteriorated in value by keeping, but these were rather chemical preparations, such as Prussic acid, etc. He agreed generally with the evidence given upon this subject at a former sitting. Relative to articles adulterated abroad, he thought it was advisable that some measures should be adopted to stop largely adulterated substances coming to this country and entering into the consumption of the people. With regard to tea, he was of opinion that the examination of tea in bond would stop the importation of an adulterated article. It was very desirable to have some central authority organized, to whom cases might be referred, and he thought the laboratory at Somerset House was quite adequate to form such a central authority. With regard to mixed articles, the mere statement of percentages would not, in his opinion, be wholly effectual, as it would not indicate what the quality of the article was. His analyses of tea showed him that, with the exception of caper teas, the general average of teas sold in this country were of fairly good quality. As to teas being naturally adulterated in this country, he did not believe it. In his opinion mixed cocoas were in no way injurious to health, nor were they indigestible. With regard to the adulteration of butter, his experience did not confirm the statements to the effect that butter was grossly adulterated. He had not found it so. Butter was a fat, and it was not easy to distinguish between fats. With regard to vinegar, of which no evidence had been given to the Committee, he stated that vinegar should be made of malt, but a great many cheap vinegars were adulterated. They were not made of malt at all. There had been a great improvement of late years in the quality of cayenne and pepper. He did not consider that arrow-root was adulterated, but there was a great variation in quality and price. He was of opinion that mixed mustard—mustard condiment—was preferred by the public to the perfectly pure article. It was desirable, however, that the mixture should be stated on the label. Since the Adulteration Act came into operation there was no doubt that a great number of retail dealers who did not adulterate in any way had been greatly harassed. In regard to a satisfactory definition of adulteration—the crucial point in the matter—he agreed that the abstraction of a valuable constituent from an article was an adulteration as well as the addition thereto of a foreign ingredient. As an analyst he was paid by fees, which were four times as much as the price fixed for the public to pay. Thus, if the public paid 2*s.* 6*d.* he would get 10*s.* There had been no prosecutions under the Act in Norfolk; in fact, it had been quite a dead letter there. In country districts, where people knew each other better than in large towns, there was a disinclination to inform against dealers so that prosecutions might be instituted against them. Examined by Sir Henry Peek, the witness admitted that if he had analysed the green tea in the case of Roberts *v.* Egerton (reported in the Pharmaceutical Journal last week) he should not have given the certificate of adulteration upon which those proceedings were founded. In his opinion adulteration did not prevail to anything like the extent which was generally represented. In fact, he gave it as his opinion that some analysts were so exceedingly sharp as to be much too sharp for a proper protection of public interests. There was no doubt that some of the analysts were insufficiently paid. For an analysis of milk they would get 2*s.* 6*d.*, and that analysis, properly performed, would occupy the best part of a day. With regard to the qualifications of an analyst, chemical experience was the main point, though he must possess a knowledge of microscopy, and sufficient medical knowledge to know what would be injurious to health. There had undoubtedly been unfortunate appointments of analysts under this Act, the cause being that really competent men did not care to accept such appointments, as the remuneration was inadequate.

The Pharmaceutical Journal.

SATURDAY, JUNE 13, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BRITISH PHARMACEUTICAL CONFERENCE.

ONCE more the time for the meeting of the British Pharmaceutical Conference is drawing near. The meeting this year will be exceptional, perhaps, in more ways than one, and it is pleasant to be able to state that so far as it is possible to read the "signs of the times" the visit to London in 1874 promises to be one of the most memorable gatherings of this body. The London Local Committee, with a lively recollection of the many hearty receptions the Conference has received from pharmaceutical brethren in all quarters of the country, and mindful that the present will be the first and probably the only opportunity that London members of the trade will have for several years of reciprocating this kindness, have already sketched out a programme extending over four days, and calculated to satisfy the most diverse pharmaceutical fancies.

The meetings will be inaugurated on the evening of Wednesday, August 5th, by a Conversazione, to which the members of the Conference have been invited by the Pharmaceutical Society, through its Council. This will be held on the Society's premises in Bloomsbury Square. Thursday and Friday, August 6th and 7th, from 10 a.m. to 12·30 p.m., and from 2 to 4·30 p.m., are to be devoted, after the reception of the Report and the PRESIDENT'S address, to the reading and discussion of papers. On Thursday evening, August 6th, the members will hold their Annual Dinner. And on Saturday, the members of the Conference residing within the London postal district invite the country members to an excursion down the picturesque valley of the Thames, between Marlow and Maidenhead.

Those who remember the exhibitions at Nottingham, Norwich, and Liverpool, will be glad to learn that an exhibition of drugs, chemicals, apparatus, fittings, and other objects of pharmaceutical interest, will be held during Thursday, Friday, and Saturday, the 6th, 7th, and 8th; and will form a leading feature of the Conversazione held by the Pharmaceutical Society, on Wednesday evening, the 5th August. Indeed, we would suggest since the subsequent days will be so fully occupied in other ways, that, if found possible, it would be convenient that the exhibition should be open during the whole of Wednesday, thus affording to visitors an opportunity of examining the exhibits in a more leisurely manner.

Considering how favourable an opportunity this will afford wholesale houses of bringing their novelties and specialities under the notice of the members, we suspect that considerable tact and discretion will have to be exercised to confine the exhibition within available space.

It needs no great amount of sagacity to predict that, in point of numbers, the attendance will probably exceed that in any previous year; the London chemists and druggists would hardly be satisfied if it were not so, and their interest in the event will not be confined to any particular section of the trade. In former years the members of the Conference have been the guests, not only of local Conference members, but of all interested in the chemists and druggists' calling in the districts where the meetings have been held. A similarly catholic welcome we doubt not will now be given, not only by metropolitan members of the Conference but by all connected with the trade, to their country brethren.

Of course the "sinews of war" will be required for all this; but we may mention, without breach of confidence, that a considerable sum has already been voluntarily guaranteed. This seems to imply that Mr. CARTEIGHE, as Local Secretary, has only to make his wants known to have them supplied.

APPRENTICESHIP AS A MEANS OF PHARMACEUTICAL EDUCATION.

So much has been said and written as to the necessity of providing lectures and classes and other extraneous help for the pharmaceutical novice, now that examinations are compulsory upon all persons wishing to carry on the business of a chemist and druggist, that there is a danger of overlooking the fact that the Minor examination, upon which the legal status depends, is eminently of a practical character. Although he who is fortunate enough to be able to supplement the education he receives while apprenticed by studies in the lecture and class room and laboratory, may find his road considerably smoothed, and be thus enabled to win a higher place in the list of passed men, it is in the shop, in the application of the acquired information to his every day duties, that he can best gain the familiarity with his business which in the examination room will give confidence to himself and gratification to the examiner. Indeed, it is not too much to say that the apprentice who follows his daily calling in the spirit indicated in the excellent article by the late Professor PROCTER which we transferred to our columns last week, and who receives the assistance and practical tuition which he has a right to expect from his employer, not only studies for the Minor examination under most favourable conditions, but lays the surest foundation for those qualifications which will carry him successfully through the Major.

It is therefore with satisfaction that we this week publish a letter from "A PROVINCIAL," in which the writer does good service by recalling attention to the duty of employers towards their pupils, in respect to

practical training in the business, a duty which they cannot depute to any lecturer or class teacher, but which must be performed in the pharmacy. It is to be hoped that the rumour alluded to by our correspondent—though probably true—had reference to an extreme case, which possibly might find an explanation in the absence of any practical training, and is representative of the class that will be excluded by the bye-law coming into operation after the 31st December, 1876. But it must be confessed that known facts are more than sufficient to account for the lamentable deficiencies which have thrown upon the Examiners the painful duty of rejecting so many candidates. Indeed, the trenchant accusations contained in the quotation from the German Pharmacy Laws read almost like a bit of contemporary English history, and raise a fear that on both sides of the German Ocean pharmacists "sometimes study their "own advantage more than they do that of the "apprentice or the public," recalling the shrewd remark of HORACE :—

"Cœlum non animum mutant qui trans mare currunt."

We presume that the form of indenture of apprenticeship quoted by our correspondent is that which still generally obtains, and no form could better represent the primary object of the Pharmaceutical Society of Great Britain. That object has always been, not so much to promote the study, desirable as it may be, of physics, chemistry, or botany *per se*, as to produce the skilled pharmacist by enabling the apprentice to study the art more intelligently with their aid. This can only be properly done when the "master his apprentice shall teach and instruct, or cause to be taught and instructed, in the art of a chemist and druggist." On the one hand it is not done when the apprentice is confined to the rough and mechanical work that might appertain to a huckster's shop, which leaves him at the end of his time but at the beginning of his studies, or at best but a mere weighing, measuring, and pill-rolling machine. Neither, on the other hand, is it done, though his head may be crammed with GANOT, ATTFIELD, and BENTLEY, if he so lacks the practical application of the knowledge that he is unable to make a good pill-mass or dispense a sightly and uniform mixture.

PROPOSED PHARMACEUTICAL LEGISLATION IN THE UNITED STATES.

THE *Pharmacist* for May contains a synopsis of a Bill to prevent incompetent persons from engaging in the practice of pharmacy in the district of Columbia. It resembles in its main features others which have become law in the United States during the last four or five years. It provides that no unregistered person shall "keep open a pharmacy," or "take charge of one," or "dispense physicians' prescriptions, except under immediate supervision of a registered pharmacist," under a penalty of fifty dollars for each offence. "Graduates" in pharmacy, who shall have had at least four years' practical experience in the retail drug business, and, under certain conditions, persons engaged in the business in the district at the time of the passing of the Act are to be entitled to registration without examination; all other persons are to be examined by a "Commission" consisting of five competent pharmacists, and examination is to be preceded by "an apprenticeship of at least four years in a pharmacy where physicians' prescriptions are daily prepared."

A Bill to regulate the practice of pharmacy and sale of poisons, and prevent adulterations of drugs and medicinal preparations in the State of Illinois also, has been introduced into the General Assembly of that State, which proposes to make it unlawful for any person, unless a registered pharmacist, or a registered assistant in pharmacy, to retail, compound, or dispense medicines or poisons. The provisions for registration resemble those described above. There is a further provision, that in rural districts, where there is no registered pharmacist within two miles, it shall be lawful for retail dealers (in what is not mentioned) to procure licences from the Board of Pharmacy, at a fee of one dollar, to sell the usual medicines and poisons.

In an article published in the *American Journal of Pharmacy* for May the legality of these local Acts has been challenged by Mr. C. C. FREDIGKE, who is of opinion that they interfere with the civil rights of the citizen under the Constitution, and that, were an appeal carried to the Supreme Court of the United States, a judgment would be obtained that would stagger any Board of Pharmacy!

RHEUM OFFICINALE.

IN our issue of the week before last, we referred our readers to a fine cut of the medicinal rhubarb which recently appeared in the *Garden*. By those who are able to visit Kew, a splendid plant is to be seen at the present time, in flower, in the herbaceous department of the Royal Gardens. The sumbul, *Euryangium sumbul*, though not in flower, is also a fine plant, and in excellent health.

THE YORKSHIRE COLLEGE OF SCIENCE.

THE Council of the Yorkshire College of Science have announced that, in view of the opening of the College at Leeds in temporary premises on October 1st, they are prepared to appoint a Professor o Chemistry, a Professor of Geology, and a Professor of Mathematics and Physics. The stipend of the Professor of Chemistry, who is also to have charge of the Chemical Laboratory, is to be £300 per annum and two-thirds of the fees of the Lecture Students (excepting registered Students of the Leeds School of Medicine), and one-third of the fees of all students entering the Laboratory course. Applications are to be forwarded, not later than July 1st, to the Honorary Secretaries, Messrs. HENRY H. SALES and RICHARD REYNOLDS, 16, St. Andrew's Chambers, Leeds.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The last two meetings of the twenty-fifth session of this Association were held at the Royal Institution, on the 17th and 21st of May.

Dr. Charles Symes occupied the chair on both occasions. The following donations were announced :—The current numbers of the PHARMACEUTICAL JOURNAL, from the Society ; 'Proceedings of the American Pharmaceutical Association,' from John M. Maisch, Esq., Philadelphia ; a paper on Eucalyptus Globulus, from Professor Bentley, F.L.S., etc., and a book of botanical specimens of British plants, from Messrs. Butler and Co.

At the first meeting, Mr. Thomas Williams, F.C.S., read a paper on Antimonial Preparations.

At the second meeting (May 21st) the President delivered the following

VALEDICTORY ADDRESS.

Gentlemen,—Arrived at the close of another session, I have this evening to offer you a parting farewell. On such occasions it is customary to review the work of the six months, and see how far it has been satisfactory. It is well that we should to some extent recapitulate. The student in this way fixes his lesson more deeply in his mind ; the man of business is often able to correct errors in judgment, etc., by the same process. We cannot flatter ourselves on what has been accomplished ; and yet, with all its imperfections, the session will, I think, bear favourable comparison with its predecessors. I cannot say that I am perfectly satisfied with this general statement, and must confess to having entertained greater expectations than have been realized.

Technical chemistry has been represented by Dr. Cook, Mr. Armstrong, and Dr. Milne, with two papers on Animal Charcoal, and one on Superphosphate of Alumina, their merits and demerits, relative value, etc., in sugar refining, and one on a new form of gas. If any of you amongst our pharmaceutical element have entertained doubts as to the propriety of occupying four of our evenings on such subjects, I have not. When practical men come forward and give us the result of their experience we are sure to gain some valuable information. The various branches of science are so dependent on each other for aid, so interwoven into a network, that it is impossible to point to any one as standing aloof from all others, purely on its own merits ; and I am sure you will agree with me that pharmacy has learnt somewhat, and has yet much to learn, from technical chemistry. For example, Easton's syrup is a preparation which becomes discoloured by age and unfit *in appearance* for medicinal use ; agitation with a little washed animal charcoal and subsequent filtration removes the discolouration without impairing its therapeutic value. Again, the favourite process of the present day for the preparation of tinctures, and the one almost exclusively adopted in the B.P., viz., percolation, or displacement, was known and practised by the brewer many years previous to its use in pharmacy under the name of sparging.

Pharmaceutical education has received a fair amount of attention. Two evenings and several council meetings have been devoted to the subject, and you will ask with what result ? Let me illustrate my answer. You are doing some business, but you wish to do more. You get your premises painted anew ; you give more attention to the arrangements of the details of your counters, cases, etc. ; or you spend time and money in some other way, with the same object in view ; and when all is done, what is the result ? You do not find customers come rushing in more rapidly, or that the public have, through your exertions, acquired a taste for physic. No ; you do not see any immediate or marked results, and yet you do the same thing again and again during your career, and do not feel, after all, that it is time and money thrown away. The fact is, you get some general progressive effect, and this is exactly what we can hope for with regard to our educational movement. We do not find young men rushing to embrace our offers ; we do not find that they evince any stronger liking for study ; but we can still hope that the time will come when our efforts will develop in the establishment of an efficient and well-attended school of pharmacy in Liverpool. Judging from the results of recent examinations, we should conclude that the means of education which exist are not equal to the requirements of the present day, or that young men do not take sufficient pains to prepare for the ordeal. To my mind the mistake is just this. The revolutionary tendency of the age prompts to an increased amount of pleasure and diminished amount of labour. Pharmaceutical young men, in common with others, find this a very pleasant path to tread and put off preparation for examinations as long as possible ; they see it in the distance as something uncomfortable to contemplate and therefore most desirable to banish from the mind, presuming it will be got over in some way. Instead of this, from the day a youth enters on his apprenticeship he should devote himself to the acquirement of a knowledge of the business, not only with a view to passing the examinations but to becoming proficient in his calling. This is perfectly consistent with healthy recreation ; and I feel confident in repeating what I have on previous occasions asserted, that no pharmaceutical school, however well conducted, no amount of grinding at the eleventh hour, will supply the place of home study.

Practical pharmacy has not been lost sight of. Specimens of useful heating apparatus, exhibited by Mr. Davies ; bergamotte fruits, crystallized glycerine, etc., by Mr. Mason ; specimens illustrative of the additions to the B.P. as a donation to our museum, by Messrs. Evans, Sons, and Co. ; remarks on commercial and B.P. pepsine, by Mr. Abraham ; and some original researches on preparations of antimony, by Mr. Williams, have all contributed to give considerable interest to our meetings, and have been specially worthy the notice of those engaged daily in the manipulation of those substances and their products.

At the very interesting and instructive lecture on a new form of gas for illuminating purposes, we were honoured by the presence of ladies. If all our meetings could be rendered sufficiently interesting to attract the fair sex I am sure we should less frequently have to complain of a small attendance.

Ill-health deprived us of a paper by Mr. Sharp on the life of William Allen, which we should all have listened to with much pleasure. With his usual good nature, he was unwilling to disappoint us altogether, and at the cost of some physical suffering, gave a very interesting paper on "A Half Century of Patented Inventions Relating to the Preservation of Food."

A similar unfortunate circumstance deprived us of a paper from Mr. Alfred Tanner, and of his active co-operation.

Excessive zeal and misguided judgment on the part of some of those appointed to carry out the provisions of the Adulteration Act caused most persons engaged in business to feel some little anxiety for their reputation ; indeed, I fail to see on what grounds any one could guarantee to himself perfect immunity from these attacks. It is true, we as a body have no cause in this town to complain ; for, as far as I am aware, no single case of prosecution under this Act, which could in any way be considered unfair, has occurred. But if the authorities here have the good judgment to administer the spirit rather than the letter of the Act, there is no reason why we should not seek to gain for our less fortunate brethren the privileges which we ourselves enjoy ; and, indeed, an effort has been made, not to encourage adulteration, nor to provide a means for breaking the law, but rather to render the law such as to be within the power of every honest man to comply with its requirements. All of us did not think alike in this matter, and those who thought

differently had a perfect right to do so, but want of unity weakened our action and tended to nullify the benefit which would probably have accrued, nevertheless I have still faith that some good will result. Mr. Murphy gave us a paper on adulteration, criticising some of the provisions of the Act, which was preceded and followed by a somewhat animated discussion.

During the session, two works relating to pharmacy have been published, viz., 'Proctor's Practical Pharmacy' and the 'Additions to the British Pharmacopœia.' The former fills a place long vacant in our literature. First editions of most works admit of improvement, and Mr. Proctor's book is no exception to the rule, but it contains much valuable information and should be in the hands of every student.

The Additions to the British Pharmacopœia have come under our notice so recently that little requires to be said on it on the present occasion. At the Pharmaceutical Meeting in Bloomsbury Square, held for the purpose of discussing its details, a letter was read from Mr. E. Smith, which dealt with the matter so frivolously as not to merit serious consideration; but several of the speakers pointed out grave defects in the work, and reiterated views similar to those I had previously expressed at a meeting of this Association. I think there can be no doubt that the work is a *failure*. So was the Pharmacopœia of 1864, and no one denounced it more unsparingly then Dr. Redwood. Under these circumstances he certainly ought to have borne the criticisms of this (which should have been the child of the 1864 rather then the 1867 edition) a little more calmly than he appears to have done. His reply can scarcely be considered satisfactory, and if Mr. Smith's remarks were out of place, certainly some of the Professor's were equally so.

During the last two months pharmacy has suffered a great loss in the death of two worthy members of our calling—two who stood foremost in our ranks, and whom we could ill afford to lose. Taking, as they did, an active interest in all that tended to promote our welfare, they won our high esteem, and their memories will long live amongst us, whilst the fruits of their labours will remain to prompt others to follow in their footsteps and assist in the great work of progress. Think not that the field of investigation is narrowing. A perusal of the circular issued by the British Pharmaceutical Conference will alone satisfy you that much remains to be done, and that you should undertake your share. Every new fact elicited takes us a round higher in the ladder—enables us to see a little further in the vast area of inquiry—causes us to contemplate what more glorious truths still lie beyond our ken—gives us a noble ambition to rise higher and higher, and to enjoy, through His works, communion with the Great First Cause and Creator of All.

In conclusion, allow me to thank you for the consideration you have shown me, and the help you have afforded in rendering the session as successful as it has been.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, June 4th, 1874. Professor Odling, F.R.S., president, in the chair. After the transaction of the ordinary business of the Society, the following papers were read:—1. "Dendritic Spots in Paper," by H. Adrian. These he finds to consist of sulphide of copper formed from particles of gun-metal derived from the machinery employed in manufacturing the paper, and are far more usually found in common papers than in the better classes. 2. "The Acidity of Normal Urine," by J. Resch, M.A. 3. "On a Simple Method of Estimating Urea in Urine," by Dr. Russell and Mr. West. The apparatus employed for this purpose was exhibited, and a practical illustration given by Mr. West. 4. "On Ipomœic Acid," by E. Neison and J. Baynes. This acid, prepared by the action of nitric acid on jalapin, the authors find to be identical with sebacic acid. 5. "On Certain Compounds of Albumen with the Acids," by G. S. Johnson. 6. "On Sulphite of Acetyl," and 7. "On a New Method of Preparing Toluene," both by Dr. D. Tommasi. 8. "Note on New Zealand Kauri Gum," by M. M. P. Muir.

The meeting was finally adjourned, at a late hour, until Thursday, June 18th.

SOCIETY OF ARTS.

Pyrites as a Source of Sulphur, Iron, and Copper.

BY DR. C. R. A. WRIGHT, F.C.S.

(*Continued from p.* 967.)

Owing to the similar character of these minerals and the sulphides of iron, it frequently happens that the deposits of these substances found in nature are more or less intermixed together, *e.g.*, a deposit consisting principally of iron disulphide is found also to contain more or less copper pyrites, or other copper sulphide, or some lead or zinc sulphide; or a deposit may contain copper sulphide, in conjunction with some iron sulphide, or with the sulphide of some other metal. An immense variety of substances of this character are known, some of which are mineralogically ranged as different species, *e.g.*, copper pyrites, or the compound of cuprous sulphide with iron sesquisulphide. The more important substances of this kind from a commercial point of view are, however, minerals, not exhibiting any great definiteness of composition, but consisting essentially of yellow iron pyrites, intermixed with larger or smaller quantities of copper pyrites or some copper sulphide, together with more or less considerable amounts of other metallic sulphides, notably arsenic, zinc, and lead. All these bodies are commercially designated as pyrites, and it is with substances of this class that the present paper has more especially to do. Copper pyrites and minerals approximating thereto, *i.e.*, containing more than a very few per cent. of copper, are usually treated by the metallurgical processes for smelting copper ores, and the iron and sulphur therein contained are usually not utilized in this process.

Using the term "pyrites" in this wide and somewhat loose sense, the substances met with in commerce may be divided into two classes, viz., those not containing copper in quantity greater than traces only, and those containing small quanties of the metal up to a few per cent.; the latter ores are usually termed cupreous pyrites, or, preferably, cupriferous pyrites or cupriferous sulphur ores.

Usually the deposits found naturally in any quantity are more or less intermixed with earthy and siliceous matters, and when the amount of such admixture becomes large, the ores are frequently rendered of little or no value Carbonaceous substances are also present in the pyrites of the coalmeasures (coalbrasses), greatly interfering with some of its applications. In addition to these substances the pyrites of commerce ordinarily contains small quantities of arsenic, lead, and zinc, and not unfrequently other metals and metalloids, such as silver, gold, thallium, manganese, antimony, selenium, etc.

The following tables give a general idea of the composition of some of the various kinds of pyrites in practical use, derived from various localities. Of these, the first mentioned (Huelva and Tharsis ores) possess the greatest amount of practical importance, on account of the extent of the natural deposits, the scale on which they are worked, the amount of copper contained, and the large and increasing quantities of metallic copper now actually extracted from them. The comparative freedom of these ores (viewed on the large scale) from ingredients other than iron, sulphur, and copper, and more particularly from admixed earthy and siliceous matters, also gives considerable importance to them as a source of these three substances.

Analyst.	Huelva and Tharsis.			Belgium.	Cornwall.
	Clapham.	Wedding and Ulrich.	Wright (average).	Clapham.	Clapham.
Sulphur	47·50	48·90	49·07	42·80	34·34
Iron	41·92	43·55	44·28	35·70	32·20
Copper	4·21	3·10	2·75	...	0·80
Arsenic	0·33	0·47	0·38	0·20	0·91
Zinc	0·22	0·35	...	0·40	1·32
Lead	1·52	0·93	...	0·92	0·40
Silica (quartz, sand, etc.)	3·40	2·70	2·34	8·86	29·00
Oxygen, alumina, lime, and matters not determined	0·90		1·18	10·12	1·03
	100·00	100·00	100·00	100·00	100·00

Analyst.	Wicklow.		Westphalia.	Pomerania.	Sweden.
	Thompson.	Wright (average).	Pattinson.	Browell and Marrecco.	Browell and Marrecco.
Sulphur	47·41	30·84	45·60	48·75	38·05
Iron	41·78	...	38·52	42·93	42·80
Copper	1·93	1·29	...	2·87	1·50
Arsenic	2·11	...	trace	trace	...
Zinc	2·00	...	6·00	...	...
Lead	...	...	0·64	...	...
Silica (quartz, sand, etc.)	3·93	...	8·70	3·20	12·16
Oxygen, alumina, lime, and matters not determined	0·84	...	0·54	2·25	5·49
	100·00	...	100·00	100·00	100·00

The limits of space necessarily imposed on the present paper forbid anything like an exhaustive and comprehensive view of all the various processes and improvements that have been from time to time proposed in reference to the extraction from pyrites and its allied minerals of the three constituents—sulphur, iron, and copper. A general view of the subject, with a brief sketch of some of the more important of these special processes, is all that can be attempted.

The use of pyrites, copper pyrites, and analogous minerals, such as zinc blende, in the manufacture of the different "vitriols" (green vitriol or ferrous sulphate, blue vitriol or cupric sulphate, and white vitriol or zinc sulphate), is of considerable antiquity, these salts having been known from an early period as being produced by the natural or artificial oxidation of these sulphur-containing minerals; and the use of copper pyrites, galena, and zinc blende, as sources respectively of metallic copper, lead, and zinc, and their alloys, also dates from a comparatively early epoch. Moreover, it has long been known that when pyrites is heated in open vessels so as to allow free access of air, sulphur dioxide is formed, whilst more recently it has been found that when the heating is effected in close vessels, sulphur is expelled as such, and may be collected by means of suitable condensing arrangements. It is, indeed, not improbable that some at least of the sulphur found in the free state in volcanic districts is actually derived from this source in this way, although a considerable portion of such natural sulphur is probably formed by the mutual reaction of gaseous sulphuretted hydrogen and sulphur dioxide, water and free sulphur being produced thus :—

$$2\,SO_2 + 4\,H_2S = 4\,H_2O + 3\,S_2.$$

As mentioned below, advantage has also been taken of this change to obtain sulphur from pyrites commercially, one portion of the mineral being heated in contact with air so as to form sulphur dioxide by the combustion of the sulphur present, another being so treated as to give rise to sulphuretted hydrogen.

As far back as the first part of the last century, processes for the extraction of free sulphur from pyrites and analogous minerals appear to have been worked in this country. Thus, in 1730, Samuel Hutchins took out a patent for "a method of extracting and preserving the sulphur contained in mundic, etc., by which this sulphur may be prepared so as to answer the end of that imported from abroad;" and in 1738, William Champion patented "a method or invention for the reducing of sulphurous British mineral and minerals into a body of metallic sulphur;" whilst in 1778, Matthew Sanderson took out a patent for "a new process for extracting a mineral sulphur from pyrites, copper, and lead ores, separating its acid, and rendering it useful for every medicinal purpose," this process being virtually a rough method of distillation of the sulphurized substances, whereby a portion of the sulphur was volatilized and again condensed separately.

The extraction of free sulphur from pyrites in this way is still practised to some extent, the apparatus employed being very simple. The ore is broken into small fragments the size of nuts, and is then piled up inside a cylindrical roasting vessel capable of holding 50 to 60 tons of material; this vessel is simply a circular wall of masonry enclosing a level floor, along which pass four flues meeting in the centre in the form of a cross. Through these the requisite supply of air enters, the floor communicating with the flues by openings here and there; the heap of ore is covered over with earth and turf, an opening being left for an exit pipe along which the vapours pass to a long condensing flue. The mass is lighted at the openings of the four flues arranged as a cross, and these openings are then partially closed; the heat generated by the combustion of a portion of the sulphur present serves to expel the rest, most of which is condensed in the main condensing flue. The operation usually lasts about six weeks, and the amount of sulphur collected is but small as compared with the quantity that is burnt and escapes as sulphur dioxide.

When heated in a closed vessel, iron disulphide parts with about $\frac{3}{7}$ of its sulphur in the free state, the main reaction being—

$$7\,FeS_2 = 3\,S_2 + FeS_2\,6\,FeS.$$

the product being a kind of "magnetic pyrites." Tubular clay retorts, arranged in rows and heated simultaneously by a furnace, are sometimes employed for this purpose: but only about a quarter of the sulphur present can be thus obtained with safety, as the residue is readily fusible, and cannot easily be removed from the retort if once fluxed.

(To be continued.)

Parliamentary and Law Proceedings.

Prosecutions under the Adulteration Act.

Adulterated Mustard.

At the Highgate Police Court, on Monday, June 8, three grocers, William Watkins, of North Road, Highgate; Edward Coldrey, of Hornsey; and Thomas Robertson, of North Road, Highgate, appeared before Messrs. Bodkin, Nicholson, and Lermitte, on summons, charged by Mr. Faulkner, food inspector, with selling adulterated mustard.

Mr. Faulkner said that he caused some sugar, coffee, and mustard to be purchased at Mr. Watkins's shop. Witness was in the shop at the time, looking after the weights and scales. No question arose about the sugar and coffee, but Professor Redwood, the county analyst,

certified that the mustard—a 2 oz. packet of Colman's—was, in his opinion, adulterated with flour and turmeric, but that the adulteration was not injurious to health.

Cross-examined, witness said that he did not hear the label—which stated that the article was an "admixture of pure mustard, with farina and choice condiments"—read. The gentleman who actually purchased the mustard by witness's direction was not now present.

By the Bench: The label was on the packet when I bought it. My attention was not called to it.

Mr. Bodkin: How can you say it was sold as unadulterated?

Mr. Faulkner: I asked for mustard, and that was given to me.

Mr. Bodkin said the whole question turned on the meaning of the word "declared," in the Act. Did that refer to words, or was the label sufficient?

Mr. White, for the defence, said the offence was to sell it "as unadulterated." This packet was sold as "mustard," and the definition was on the label, which amounted to a declaration. Everyone knew that in preparing mustard for the table it was necessary to mix it with flour.

Mr. Bodkin: The only question is whether the printed label does not meet the meaning of the word "declared." It seems to me to be clear.

Frank William Watkins, son of defendant, deposed that he supplied the packet to the purchaser. It was the article known commercially as "mustard for the table." Witness's father pointed out that it was not sold as genuine mustard, but witness could not state what was said.

The Bench held that the label was a sufficient declaration, and dismissed the summons.

In the two remaining cases the mustard was not sold in packets, but from bulk, and the purchaser had not been told that it was not genuine.

Professor Redwood certified that it was adulterated with flour and turmeric, but not injurious to health.

A fine of 5*s*. and 8*s*. costs was inflicted in each of these two cases.

Milk Adulterated with Salt.

At Greenwich Police Court, on Tuesday, June 9 Edward Pursaill, dairyman, of High Street, Deptford, appeared to an adjourned summons, at the instance of the Greenwich district Board of Works, charging him with selling milk adulterated with salt. Mr. Spencer attended to prosecute, and Mr. H. Pook for the defence. The milk in question was purchased at the defendant's premises on the 9th ult., and was at once forwarded to Mr. Wigner, the public analyst for the district, who, on the first hearing of the case, sent the following certificate, which is made evidence by the Act of Parliament :—"In my opinion the sample (named) is adulterated with about half an ounce of salt per gallon, and with a small quantity of some colouring matter, probably annatto, and that I consider such adulteration injurious to the health of children drinking such milk." Mr. Balguy explained that the case had been adjourned by him, on the application of Mr. Pook, in order that the analyst should attend personally to be cross-examined. He thought this was necessary, from the wording of the certificate then read. For instance, the certificate in reference to the amount of salt contained the word "about," and in reference to the nature of the colouring matter the word "probably" was used. These words left a doubt as to what the certificate meant. Mr. Wigner explained that in writing "about half an ounce" there were 217 grains of salt found to the gallon, and 230 grains being half an ounce, he thought his description would be more intelligible than by giving the number of grains. With regard to the world "probably," this had been used because it was utterly impossible to separate annatto from other colouring matter in the sample sent. In answer to Mr. Pook, the witness said he had not brought his books containing the entries of the analysis made, but was ready to state the steps in the process of analysing, which he did. The analysis was commenced on the 9th of May, and, from the date on the certificate, was concluded on the 23rd ult. The delay was caused in endeavouring to find other colouring matter. If cows drank from water in which rock salt was placed, the salt would not assimilate with the cow's milk. Mr. Pook complained of the delay in finishing the analysis, precluding defendant from having a counter-analysis, and asked that the summons should be dismissed against the defendant, whom he tendered as a witness to state he had neither put nor sanctioned salt to be put in the milk. Mr. Balguy ruled that defendant could not give evidence. The analyst had very satisfactorily explained the matter, and he concurred with him that the adding of salt to milk would be injurious to the health of infants. The defendant had grievously offended under the Act of Parliament, for which he would be fined £5 and costs.

Adulterated Coffee.

At Southwark, on Monday, June 8, William Stratford, grocer, White-Street, Borough, was summoned by Mr. Edwards, the sanitary officer of St. George's Vestry, for selling adulterated articles of food. Mr. Birt, the vestry clerk, attended to prosecute. Mr. Edwards said that on the 14th ult. he sent his assistant to the defendant's shop to purchase half a pound of sugar and two ounces of coffee, for which he paid 3d. Witness told the defendant he had bought them to have them analysed, and asked him to accompany him to Dr. Muter's. He declined doing so. Accordingly, witness delivered the articles to Dr. Muter, who found the coffee to be adulterated with 25 per cent. of chicory, and the sugar to contain a large quantity of acarus (sugar mite). This was very injurious, but the Act of Parliament did not meet it. The defendant said he sold the sugar as he received it, and as for the coffee, he told the man it was mixed with chicory, as pure raw coffee could not be bought at the price. The magistrate told him that he should have marked in plain figures on the wrapper containing the coffee that it was a mixture of chicory. He must pay 5s. and 7s. costs. Abraham Berry, oil and colourman, Red-Cross-street, was also charged with selling as pure mustard a mixture of turmeric, flour, and mustard. The sale having been proved the defendant said he did not sell it as pure mustard, but as "mustard condiment," which was superior to mustard. The magistrate doubted that, and ordered him to pay 10s.

Poisoning by Carbolic Acid.

A case of poisoning by carbolic acid which had a fatal termination, is reported to have occurred in Marsham-street, Westminster, on Saturday week. It seems that a Mrs. Bartrop had for some time been in ill-health, and was taking medicine. For the purposes of cleansing, her husband had purchased some carbolic acid, which was placed in the same cupboard as his wife's physic. The latter, wishing to take a dose of her medicine, went to the cupboard for the purpose, and by mistake poured out the carbolic acid and swallowed it. No sooner had she done so than she discovered her mistake, and Dr. Fenton and the house-surgeon from Westminster hospital were called in. The stomach pump was applied, but without effect, and Mrs. Bartrop was dead in less than an hour.

Imitation of Trade-Marks.

At the Mansion House, Messrs. William Prendergast and John Irish, carrying on business as the Universal Sauce and Condiment Company, appeared before Alderman Sir Robert Carden, on an adjourned summons, to answer a charge, under a provision in the Merchandize Marks Act, of exposing for sale, and for the purposes of trade, a sauce purporting to be "Yorkshire Relish," with a counterfeit trade-mark, which they knew to be forged and counterfeited.

Mr. William Powell, a partner in the firm of Goodall, Backhouse, and Co., of Leeds, wholesale druggists, deposed that they had been established eighteen or twenty years, and were the manufacturers of the sauce called "The Celebrated Yorkshire Relish." The label was their design, and as such they claimed the whole of it. They registered it at Stationers' Hall many years ago, and they had used the same label ten or twelve years exclusively.

The genuine and the alleged counterfeited labels were produced in court, and were so nearly alike in colour, lettering, and design, with certain alterations not immediately perceptible, as to be readily mistaken one for the other, at a casual glance. Evidence was given to prove the purchase at the defendants' premises of some of the counterfeited article, and that in one case the counterfeited label had been placed on a bottle of the complainants. Mr. Prendergast, one of the defendants, said there was a doubt about the matter, and when they found it out they stopped the sale.

Sir Robert Carden pointed out the general resemblance in design and colour between the labels on the genuine and imitated articles, and how easily a person buying might be deceived. He believed the defendants' label to be a false, forged, and counterfeit trade-mark, and the case, in his opinion, ought to go before a jury.

The case, however, on the first hearing, was adjourned by the mutual consent of the parties on both sides, with the view to an arrangement; and on Saturday, when they reappeared before the Court, the complainants' solicitor stated to the Bench that since the adjournment the defendants' solicitor had attended at his office, and had furnished a list of the quantities supplied to their various customers, from which it appeared that a little over 10 gross of the counterfeited sauce had been sold by them; that they had given up the remainder of the counterfeited labels, and would get back the bottles from their customers as soon as they could, for destruction. The defendants, moreover, had paid £22, part of the costs of the prosecution, and had consented to the terms of the arrangement being advertised at their expense in the *Times* and the *Grocer*, a trade newspaper.

Sir Robert Carden was not satisfied at first with that, and said the defendants ought to be punished as well. It was explained to them, however, that the case could be dealt with summarily, without going before a jury. Upon that the defendants pleaded guilty, and the Alderman fined them £10 each, which he afterwards reduced to £5 each, in consideration of their having paid upwards of £20 in costs.

The defendants paid the money.—*Daily News.*

Reviews.

PHARMACEUTICAL LEXICON: A DICTIONARY OF PHARMACEUTICAL SCIENCE; containing a Concise Explanation of the Various Subjects and Terms of Pharmacy, with Appropriate Selections from the Collateral Sciences, etc. By H. V. SWERINGEN. Philadelphia: Lindsay and Blakiston.

This is a book that is designed as a "guide for the pharmaceutist, druggist, physician, etc." It really does supply to some extent a real want. We have more than one dictionary of medical terms, but we know of no other book than that under notice which has for its special object the arrangement and definition of terms met with in pharmacy and the allied sciences. It is, therefore, worthy of a welcome in these pages, and sure of a ready recognition of such merits as it possesses.

But what would the great lexicographer, Dr. Johnson, have said of a lexicon from which etymology is shut out? According to his definition, a writer of dictionaries is "a harmless drudge, that busies himself in tracing the original, and detailing the signification of names." But Mr. Sweringen tells us in his preface that he regards the derivation of words as a matter of secondary, and comparatively little, importance, "because there is scarcely an instance in which a knowledge of the original word can give us any precise idea of the meaning of its derivative." But, of course, as he lives in a free country, he is not bound to defer to Dr. Johnson's opinion, and is at liberty to call his book by the name which pleases him best. In one "tracing of the original," however, which he does give he follows Webster and other lexicographers in saying that "Castor oil" is a corruption of "castus oil," the plant producing it having formerly been called *Agnus castus*." We should like to learn whether this is fact or fancy.

However, if Mr. Sweringen has shunned the etymology, evidently he has not feared the drudgery; for he has collected together a variety of information that is at least creditable to his industry. The book is certainly convenient for ready reference, and although the definitions are not always happy, and the arrangement is certainly not systematic, there is a clue furnished to the meaning or value of most of the terms that a pharmacist is likely to meet with in the pursuit of his calling. But that there is much need for improvement is what the author himself acknowledges. For instance, the definitions of many of the principal chemical bodies are unaccompanied by any formula representing their composition, and the verbal descriptions are in many cases exceedingly vague. To mention some of the acids. Acetic acid is said to be "an acid composed of carbon, hydrogen, and oxygen, always in the same uniform and definite proportions." Atropic acid "is an uncrystallizable salt." Benzoic acid "consists of benzyl and oxygen." If the seeker tries to run down the secret of its formula by turning to the word benzyl, he will find—

"BENZYL (*Hydruret of Benzyl*). A compound radical contained in the purified oil of bitter almond. It is composed of carbon, hydrogen, and oxygen."

Under "benzoyl" it is stated that that substance is the "radical of benzoic acid," and that it "can be isolated while treating chloride of benzoyl with sodium," but neither its formula nor that of the chloride appear to throw light upon the proportionate composition of benzoic acid. For such information it is necessary to turn to a Table of Pharmaceutical Equivalents in the Appendix, in which there is the further inconvenience that the formulæ are set forth according to the old notation only, and the name attributed to the formulæ is frequently neither that of the United States nor of the British Pharmacopœia.

To mention two other important acids, all that is said about sulphuric acid, beyond giving the synonyms, is that it is "an acid obtained by burning sulphur, mixed with one-eighth of its weight of nitre, over a stratum of water, contained in a chamber lined with sheet-lead," whilst sulphurous acid is described as "a sulphuric acid containing only two-thirds as much oxygen as the officinal sulphuric acid." Another feature, characteristic also of other parts of the book, is that some of the acids are arranged in the alphabetical order of the word "acid," and others in that of their particular names.

It must be remembered by British readers that the formulæ given of the tinctures, powders, &c., are those of the United States Pharmacopœia only. It would have been well had this been indicated by the initials, U.S.P. In many cases, such as hive syrup, a preparation which is occasionally asked for in this country, the ingredients are given, but not the quantities, thus rendering the information useless. This neglect of uniformity is apparent in many ways. Just as chemical formulæ are in some cases stated and in others are not, so the natural order of a plant is mentioned in a few cases and not in others.

The British pharmaceutist will, however, find a good deal of useful information with regard to the uses of American drugs, and to preparations of the United States Pharmacopœia.

The articles on materia medica are in some instances not up to the present date. Thus, gamboge is said to be the product of an undetermined plant; rhubarb is attributed

to *Rheum palmatum*, and other species ; and pareira brava is said to be obtained from *Cissampelos Pareira*. In some instances. too, the meaning is not very clear. Thus, an achene is defined as being a small bony fruit, consisting of a single seed, which neither adheres to the pericarp, nor opens when ripe. A strobile is stated to be "an ament, the carpels of which are scale-like and spread open and bear seeds ; sometimes the scales are thin with little cohesion, but they are often woody and cohere together into an irregular tuberculated mass." On turning over the pages to look for ament, there is no such word to be found, nor does the word cone occur, to which the above description more correctly applies ; and many botanical terms often met with, such as berry, drupe, legume, etc., are not to be found. Pepo is defined as the seed of *Cucurbita pepo*, or common pumpkin. *Adiantum capillus veneris*, is stated to be "an European species of maidenhair, or *Adiantum pedatum*." These instances show that, as a botanical dictionary, the book had better not be used, although, as a dictionary containing a large number of technical terms, and as a ready book of reference for anything relating to American pharmacy, it will doubtless be very useful. It is printed on good paper and in clear type ; and is strongly and neatly bound.

We hope to see the above defects remedied in a future edition. In a dictionary which necessarily includes so many branches of science, it is almost impossible to attain perfection in a first edition.

Besides the Lexicon proper, which extends to 427 octavo pages, there is a "Part Second," which includes a list of abbreviations used in prescriptions ; a number of "selected prescriptions ;" formulæ and doses of medicines for hypodermic medication, and also for inhalation ; a posological table ; definitions of diseases ; antidotes and tests for poisons ; table of boiling points, and several other sections that are all of more or less use to the pharmacist. We believe the London agents for the publisher are Messrs. Trübner.

QUALITATIVE CHEMICAL ANALYSIS AND LABORATORY PRACTICE. By T. E. THORPE, Ph.D., F.R.S.E., Professor of Chemistry, Andersonian Institution, Glasgow ; and M. M. PATTISON MUIR, F.R.S.E. London : Longmans, Green, and Co. 1874. Small 8vo, pp. 238.

The sixteenth volume of Messrs. Longmans' cheap series of science manuals lies before us. Having made a careful survey of its contents, we can safely recommend it to our readers as an intelligible, and, at the same time, trustworthy, guide in the department of practical chemistry to which it is devoted. But we should not be inclined to go further, and say that it presents any very obvious advantages over several other existing text-books that we could name ; and, except as a contribution to the series of science manuals to which it belongs, or because, as the production of a Glasgow professor it may possibly bear a special recommendation to students of chemistry in the north, it is difficult to see why it was written. We have every desire to give the authors of this little volume credit for their success in producing a useful book, but we cannot pretend to disguise the fact that the almost weekly appearance of new text-books, for the most part differing in no essential particulars from one another, is becoming nothing short of an intolerable nuisance. In chemistry especially is this the case, and we believe most teachers who have to deal with large classes would be glad if the array of manuals offered to the choice of the student could be reduced.

Professor Thorpe's text-book is divided into two parts. In the first is given a description of a series of preliminary experiments designed to familiarize the beginner with the properties of a few typical elements and compounds, and to afford him practice in the management of ordinary apparatus. Here he may learn how to prepare and examine the properties of oxygen, hydrogen, nitrogen, ammonia, carbon dioxide, and a dozen other equally important bodies, the manipulation of tubing and corks, the use of the pneumatic trough, and the process of filtration ; but if the student expects to find here anything that has not already been described and depicted in fifty other books since chemistry began, he will be disappointed. Perhaps, after all, such expectation would be unreasonable.

Throughout this first part sufficiently good woodcuts are supplied profusely, and the author adopts the very useful plan of summarizing at the end of each chapter the objects and results of the experiments described.

The second part of the book is devoted to qualitative analysis. Bunsen's flame tests and the use of the spectroscope are first described, and then the author proceeds to a detailed account of the wet and dry reactions by which the several groups of metallic and non-metallic radicles are characterized, and the members of each group separated and identified. In this part we do not think the book so suitable for young students as some others that have come before us ; and this partly because the explanations given of the reasons for adopting the particular methods which are recommended are very scanty, partly because the examination of the metallic groups begins at the most difficult end, with silver, lead, and mercury, and partly because we should be disposed in a few cases to doubt whether the selection of methods of separation were entirely judicious. A section further on gives an account of the detection and analytical classification of the rarer elements, and in the last two sections the student will find pretty full directions for the detection of poisons and the examination of urine and urinary calculi. Amongst the tests which are given for the identification of alkaloids, one or two reactions are mentioned which are not described in the British Pharmacopœia, nor in the ordinary text-books. Any additions to our knowledge in this direction must be welcome to students of pharmacy, we therefore quote some of these reactions, though how far they are to be depended upon as characteristic we are not prepared to say.

"Veratrine ($C_{32}H_{52}N_2O_8$).

"Strong sulphuric acid at first causes this alkaloid to form into small lumps ; these, however, speedily dissolve to a light-yellow fluid, changing to reddish-yellow, and eventually to blood-red.

"Strong hydrochloric acid forms a colourless solution, which becomes intensely red by long-continued boiling.

"This reaction is very delicate."

"Narcotine ($C_{22}H_{23}NO_7$).

"Pure strong sulphuric acid gives a bluish-violet, or in less pure specimens a yellowish colour, changing to cherry red on heating."

"Morphine.

"The formation of a violet colour upon addition of sulphuric acid, followed by a mixture of the same acid with nitric acid, is characteristic.

"If a few small pieces of manganese dioxide are added to the liquid obtained as above, it changes to mahogany colour.

"If solid morphine, or a morphine salt, is moistened with a solution of 1 part of iodic acid in 15 parts of water, and a solution of 1 part of starch in 400 of water is added, a blue colour is produced. If now a layer of very dilute ammonia is poured on this blue liquid, two coloured rings are formed at the point of contact—the upper blue, the lower brown. This reaction serves to detect $\frac{1}{200000}$th part of morphine (A. Dupré)."

In the appendix are some hints on the preparation of pure reagents which will be useful to many students. In the purification of hydrochloric acid, protochloride of tin is recommended for the purpose of removing arsenic ; and in connection with this we may remind those of our readers who may have forgotten it that protochloride of tin is a very useful and delicate reagent for the detection of arsenic, not only in hydrochloric and sulphuric acids but in salts of bismuth, antimony, and zinc, and in many other substances liable to such contamination. The test is a very simple one. A strong and acid solution of stan-

nous chloride is added to the solution of the substance, which, of course, should be free from oxidizing agents. If any appreciable quantity of arsenic is present it is deposited in the elemental form as a brown precipitate, which makes its appearance only after some time, when not more than minute traces are present.

The purification of sulphuric acid from lead, arsenic, iron, and oxides of nitrogen may be effected by heating it successively with ammonium sulphate and manganese dioxide, and subsequently distilling it, but the last part of the operation is so troublesome, and sometimes dangerous, that it is generally best to leave this to the manufacturer.

In conclusion, we may add, and this is high praise, that we have not been able to detect in the book any errors or inaccuracies worth noticing.

BOOK RECEIVED.

THE NEW CHEMISTRY. By JOSIAH P. COOKE. With Thirty-one Illustrations. Second Edition. (International Scientific Series.) London: H. S. King and Co. From the Publishers. 1874.

Obituary.

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

On the 28th May, 1874, at Henley-on-Thames, after a lingering illness, James Henry Byles, Pharmaceutical Chemist, of Hackney Road, London. Mr. Byles was a member of the Pharmaceutical Society.

Notes and Queries.

[398.] PREPARED SILICA FOR PLATE POWDER, ETC., can be obtained of T. Crotch and Co., St. George's Terrace, Liverpool Road, Islington. I may add that it is very valuable for cleaning photographic glasses. It is also used in tooth powders, etc., etc.—W. B. FITCH.

Mr. C. Biddiscombe writes that Messrs. Read and Co., of London, are the makers of Prepared Silica.

Correspondence.

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

ALLEGED ADULTERATION OF A PHARMACOPŒIA PREPARATION.

Sir,—I quite agree with your foot-note to the report of the hearing of Mr. Fardon's case at Bristol, "that the report is not very clear throughout;" and, as I am made to say quite the reverse of what I did say, perhaps you will allow me to explain.

After the case was dismissed the justices gave me permission to say a few words, as our name had been mentioned; and I stated that last summer, during the illness of one of our foremen, a large quantity of citrate of iron and quinine, had been overheated in the course of manufacture; that we thought that we had stopped it all, and that none had been sent out, and regretted to find that a small quantity, of which Mr. Fardon's sample must have been part, had gone before the accident was discovered; and I also stated that the overheating had decomposed a portion of the quinine, forming the dark resinous matter of which Mr. Stoddart complained.

What Mr. Stoddart considered to be cinchonine is unquestionably a trace of cinchonidine, which, as is well known, is found in considerable quantities in most of the barks used for quinine making.

It was given in evidence that only a trace was discovered; and, though we have no doubt that our quinine would be found almost invariably free from it, where a trace does exist, such a slight defect in manufacture cannot in any sense be called an adulteration. It is annoying enough that such a mistake should have occurred and caused so much trouble, without the matter being further complicated by the misapprehension of newspaper reporters.

SAMUEL HOWARD.

Stratford, near London, E.,
June 3rd, 1874.

APPRENTICESHIP.

Sir,—It is now a good many years since I served my apprenticeship in a country town, but I well recollect that, in addition to a respectable premium being paid, a stamped document was executed, requiring on the one hand that "the said apprentice his master shall faithfully serve, his secrets keep," etc.; on the other that "the said master his apprentice shall *teach* and *instruct*, or *cause* to be *taught* and *instructed* in the art of a chemist and druggist." I have just been looking at this indenture, and wonder if similar documents, and possessing legal force, are now in fashion.

The result of the Minor examination last recorded in the Journal, when, out of 78 who presented themselves, 59 failed, is eminently unsatisfactory, and the subject is worthy of more attention than apparently it has yet received. This state of things certainly does not indicate progress, and an effort to trace the evil to its source may not be without some practical benefit.

I was scarcely prepared to hear it rumoured, on the day of the General Meeting, that a candidate for the Minor who had served his apprenticeship to a chemist and druggist, had finished that apprenticeship without being taught the composition of a Seidlitz powder. He may have been ignorant of high-class pharmacy, or a stranger to elegant pharmacy; many drugs he may never have seen, and some ugly compounds he may never have dispensed; but surely there could be no excuse for his being ignorant of the ingredients of a Seidlitz powder.

On my return home the question forced itself upon me—Is it fairly honest to take an apprentice, pocket the premium, and turn him out so lamentably deficient as must have been the larger number of those who presented themselves at this examination?

In a paper on Pharmacy in North Germany, by Mr. Greenish, the following quotations from the Prussian Pharmacy Laws occur, and they are so pertinent to the subject of this letter, that I cannot help referring to them.

"All apothecaries may take apprentices, but as they sometimes study their own advantage more than they do that of the apprentice or the public, the following has been made binding:—they must only take such apprentices as have by nature good parts, and as are sufficiently prepared by education and good moral training. In order that apprentices may not be taken from school too soon, it is enjoined they do not leave before the age of 14; and as the knowledge of the Latin language is indispensable for properly understanding prescriptions, no apprentice shall be taken until he can translate easy passages from a Latin author. *The master has further to see that the intended apprentice writes fluently and distinctly; this is particularly necessary, to prevent mistakes occurring, and the patient being mis'ed by illegible writing.*

"It is the duty of the master to provide proper books for the apprentice. It has occurred that apothecaries in many places have had other business than that of an apothecary to attend to, and that sometimes they have no *assistant*, but only three or four apprentices instead, and they prefer to take the roughest and most ignorant of boys, and also those that are too young, because they could make use of them for the rough work in their other businesses; and as the practice has led to an increase in the number of mere mechanical chemists' assistants, it is hereby ordered that an apothecary be allowed to take only as many apprentices as he has qualified assistants. If the business be so inconsiderable that one person only be employed, then no apprentice can be taken unless it be impossible to procure an assistant, or that the master be sufficiently skilful to take the place of assistant.

"To prevent the increase of badly trained assistants, it is ordered that for the future no master shall give his apprentice a certificate until the said apprentice has been examined by the Government medical officer in the presence of his master. The examination shall refer to such subjects as he has a right to expect from so young a man. He shall be particularly examined as to his practical knowledge of phar-

macy and handiness in doing ordinary work, as practical knowledge is of more importance than mere theory in an apothecary. Should it be found that he is not yet a capable assistant, it is the duty of the Government medical officer to inform him that he cannot yet leave his apprenticeship, but must remain until he has fully qualified himself. *Should it, however, appear that the master is more in fault than the apprentice and that he has neglected him or shown his own incapacity to instruct him in the business of an apothecary, that master shall be forbidden to take another apprentice.*"

I commend these pharmacy laws, which have done much to make the German pharmacist the model pharmacist of Europe, to the careful consideration of those who profess to train up apprentices; and I hope that the result of future Minor examinations may be less humiliating than the one now referred to.

A PROVINCIAL.

THE PRESIDENCY OF THE PHARMACEUTICAL SOCIETY.

Sir,—Would you kindly allow me to express an opinion, as a means of ascertaining if it be held by any number of my fellow members of the Pharmaceutical Society? I have always felt that the honourable position of President should be open to country as well as London members of the Council; and, so far as the charter is concerned, it appears to be so, but it seems to have drifted into an unwritten law, that no country member shall be elevated to the presidency. This I feel has arisen from a natural modesty of the country members, and also from a conservative tendency to observe an apparent rule. Having country members on our Council who are in every way a credit to our Society, I cannot help thinking that if the Council elected a country member to the office of President they would do honour even to themselves.

I do not for a moment find fault with the appointment of any past President, for they have all been good men, and I shall always feel proud of having been on the Council under two such men as Messrs. Haselden and Hills, as Presidents, and Messrs. Brown and Bottle, as Vice-Presidents. Knowing how well and at great inconvenience the Vice-Presidents did their duties, I do hope the time is not far distant when I shall see the higher office of President occupied by a country member.

W. W. URWICK.

60, *St. George's Road, Pimlico,*
June 9th, 1874.

"HIGHER REMUNERATION FOR CHEMISTS."

Sir,—The question of prices is one worthy at all times the serious attention of pharmacists, and especially so at this time, when rents are being doubled, and everything else in general consumption is being advanced in price. Your correspondent, "A Country Major Associate," deserves the thanks of the trade for opening up the subject once more, and I have to express the hope that something practical will result ere long: to have, first, a uniform trade-mark for pricing prescriptions; and, second, a general price-list, which will act as a guide to all the retail chemists throughout the country. This latter, however, is a thing which cannot be accomplished in a day; and it seems to me there is but one way of hastening it on, and that is, if all the large centres would adopt the plan which has been carried out with such wonderful success by the chemists of this city. I may mention that, up till two years ago Glasgow and the surrounding towns were amongst the worst remunerated places in the whole country, and now I think the price-list of the Glasgow Chemists' Association will compare favourably with that of any price-list in the country. The plan which I would advise in all large towns which have not yet united on any particular course, is to convene a meeting of employers connected with the trade (if the question of prices is mentioned in the circular, they are certain to turn out in large numbers), and appoint a committee, with power to draw up a price-list suited to the requirements of the particular locality; or, if they do not care to go to the expense of printing a list for themselves, there are, I believe, now, a goodly number of lists published throughout the country, all of different grades of charges, from which they could select the one most suited to their circumstances. There should be no puffing of the meetings in the daily prints, and no advertising publicly, but it should be done in as quiet a manner as possible. In this way the Glasgow Chemists have advanced their prices 25 per cent., and because we were united there has been few, if any, complaints on the part of the public. All the surrounding towns have followed suit by adopting the Glasgow scale. In Edinburgh, however, where a price-list has been published for a good many years, they have hitherto kept ahead of the Glasgow prices, but not a few have the idea that an amalgamation may yet take place between the Edinburgh and Glasgow committees; and then let us hope there will be a near prospect of having a committee of the Council, or a special committee sitting in London to regulate the whole scale of charges for the United Kingdom. For there can be no doubt that the fact that there is a difference in the prices in many cases between London and the country is one reason why the idea has got abroad that there is also a difference in the quality of the drugs. One thing I would urge in particular, viz., that all chemists throughout the country should use the one trade-mark in pricing prescriptions, and that every prescription should be marked distinctly. "Mel Boracis" is the mark used by Edinburgh, Glasgow, Manchester, and other places, and there is no reason why other towns should not do the same. I have often been annoyed by getting prescriptions which had been made up in English towns, without any mark at all. In conclusion, I would say that, instead of writing anonymous letters to the Journal on the question, if brethren would take action at home to unite and fraternize with their other brethren in the trade, they would do much more to advance prices, not only in their own locality, but throughout the country.

J. M. FAIRLIE.

Glasgow, June 9th, 1874.

Sir,—The letter of "A Country Major Associate" in last week's issue of the PHARMACEUTICAL JOURNAL will, doubtless, find an echo in many a domicile where pharmacy is practised; although I doubt whether the object sought by your correspondent will be attained in the present century; and I justify my opinion by the last paragraph but two in C. M. A.'s letter.

When C. M. A. and the rest of us have the courage to back our opinions, *at the risk of loss to ourselves*, then the object sought will have been attained: then, and not before.

NISI PRIUS.

J. E. G.—(1) *Glaux maritima.* (2) *Spergularia marina.* (3) *Lotus corniculatus.*

A. Young.—*Cassia lanceolata.*

C. Davies.—(1) The Preliminary examination must be passed at some time previous to going up for the Minor examination, and it is advisable that it should be passed before the apprenticeship takes place. (2) The examination is intended as a test that the candidate has received a moderately fair education in English, Latin, and Arithmetic, subjects that are well taught in too many books to allow of any being particularly specified. (3) This is a matter for arrangement between the contracting parties.

J. A. C. B.—No; since the bye-law says that "after the 31st day of December, 1874, no person shall be admitted to the Major or Minor examination who shall not have attained the full age of twenty-one years."

C. F. Passmore.—A paper on the preservation of plants for herbaria was given in the PHARMACEUTICAL JOURNAL for March 21st, p. 754.

F. W. Yeats.—After the 31st of December, 1874.

"Devonshire" Permanganate of potash is not a trustworthy test for the presence of organic impurity in water. See Wanklyn's "Water Analysis," published by Trübner.

C. Gerring.—The florets of the ray are tubular but irregular; they are also barren, but those of the disc have both pistil and stamens. The black-looking upper portion of the florets of the disc, consists of the syngenesious anthers, which form a tube through which the style protrudes. If you examine a fully expanded flower you will find all these parts.

E. S. M.—Yes; the action of the hydrochloric acid has, we think, been overlooked by the prescriber.

"Ratæ."—(1) Pages 377 and 435 of the present volume. (2) Much would depend upon what the name is.

M. Jones.—*Hypericum hircinum.* The plant is not indigenous to Britain.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Rimmington, Mr. R. H. Parker, Mr. Brown, Mr. Guyer, "Inquirer," "Crinis," "June," L. S.

VEGETABLE POISONS AND THEIR ANTIDOTES.

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

(*Continued from page* 995.)

Opium.—The symptoms of poisoning by opium commence with giddiness and stupor, which rapidly increase until the person becomes motionless and insensible, the breathing becomes slow, and the pupil of the eye contracted ; as the poisoning proceeds the features become ghastly, the pulse imperceptible, and the muscles exceedingly relaxed, death generally ensuing from six to twelve hours after taking the poison.*

Cases of Recovery.—In a case of opium poisoning, recorded in this journal,† in which coma had set in and a fatal prognosis was almost certain,—the child being two years old,—fifteen minims of tincture of belladonna were given every twenty minutes. In an hour after the fourth dose, the child was to all appearance well.

In another instance, mentioned in the *Lancet*,‡ in which a quarter of a grain of atropine was injected into the arm hypodermically, consciousness was regained in eight hours, and perfect recovery took place.

In the *Medical Times and Gazette*, vol. ii., 1872, p. 268, eleven cases of recovery from opium poisoning and one failure, by the use of atropine, are recorded by Dr. Johnston. It is only right to state however, that on p. 342 of the same volume, Mr. Burness criticizes Dr. Johnston's cases of cure, and quotes Dr. Harley's opinion that the evidence of the antagonism of opium and belladonna is inconclusive. On p. 175 of vol. i., 1873, of the same journal, Dr. Johnston gives five cases of failure by the use of atropine as an antidote. In some of these cases death appears to have resulted rather from exhaustion than from the action of opium. Mr. Burness also remarks that he thinks the dose of atropine used was too large. Dr. Johnston further states that upwards of three hundred cases of opium poisoning have come under his observation, and that he knows of no other remedy which produces such marked effects as atropine used hypodermically, when the coma resulting from opium poisoning has set in ; while he has found that emetics, followed by the use of strong coffee and stimulants, are generally effectual in milder cases.

Other antidotes have also been used. A negro boy who had taken an overdose of morphia, and had fallen into the comatose state, was cured within an hour by the use of eighteen minims of Norwood's tincture of *Veratrum viride*.§

Mr. Burness‖ states that Mr. F. J. Mavor has found by repeated experiments on horses and dogs that opium is a certain antidote to strychnia, and recommends the trial of strychnine as an antidote to opium.

Antidotes.—From the evidence above given, it would appear that belladonna in the form of atropine has been successful in the greatest number of cases, and that its use as an antidote to opium deserves further experiment. In all ordinary cases, emetics, followed by the use of strong coffee and stimulants, are the best antidotes; but in dangerous cases, in which coma has set in, doses of belladonna, repeated at intervals until the pupils begin to dilate, must at present be regarded as the best and safest antidote to opium.

More deaths have been caused by opium and its preparations than by any other vegetable poison. Notwithstanding the fact that the above supposed antidotes are known, we have no record of their trial in the thirty-three cases of poisoning by this drug, which have been recorded in the pages of this Journal during the years 1870-1872.*

Belladonna.—The symptoms of poisoning by belladonna are dryness of the fauces, with a sense of constriction of the throat, flushed face, nausea, full, hard, and frequent pulse, mirthful delirium, hallucinations, dilatation of the pupils, convulsions, coma, and death in about fifteen hours.

Cases of Recovery.—A child aged six years recovered in three hours from poisoning by a drachm of *Succus Belladonnæ*, by the use of twenty drops of laudanum given every half hour until six doses had been given.†

A person, aged thirty, had been poisoned by the hypodermic injection of atropine ; in this case, laudanum, given in one drachm doses, caused complete recovery.‡ In a third case, in which six grains of extract of belladonna had been taken by mistake, two doses of thirty drops of laudanum were followed by complete reaction and convalescence.§

In a fourth case, symptoms of poisoning, induced by the hypodermic injection of nine milligrammes of atropine, were treated and cured by the injection of thirty-seven milligrammes of hydrochlorate of morphia, without any other means being resorted to.

In the *British Medical Journal* a curious instance is related by Dr. Finney, in which an hypodermic injection of atropia and morphia was used. In this case symptoms of atropine poisoning were manifested, which were removed on the administration of a further quantity of morphia, showing that when the two drugs are administered together the one which is given in the largest dose will alone produce a poisonous effect. Three cases of recovery from atropine poisoning are recorded on the same page of this journal, by three independent observers, the recovery in each case being due to the use of opium preparations.‖

Another case is on record in which 1½ oz. of liniment, containing about 25 grains of extract of belladonna, and nearly half an ounce of laudanum, did not prove fatal, and the recovery was attributed by Dr. Cotter to the mutual counteraction of the drugs.¶

Probably many other cases have never been recorded which would tend to confirm this antidotal power, or throw further light upon the action of these two drugs when used together, as is often the case in liniments.

These cases seem to indicate that opium and belladonna act reciprocally as antidotes. It has been suggested that opium should be used in all cases of poisoning in which the pupils are dilated, and belladonna in those in which the pupils are contracted,

* Hempel's 'Materia Medica,' p. 674.
† Pharmaceutical Journal (2), vol. iv., p. 80.
‡ April 3rd, 1869, p. 473.
§ Pharmaceutical Journal (3), vol i., p. 610.
‖ *Medical Times*, vol. ii., 1872, p. 342.

* *Vide* Pharmaceutical Journal, vols. i., ii., iii., 3rd series.
† Pharmaceutical Journal (2), vol. iv., p. 80.
‡ Pharmaceutical Journal (2), vol. iii., p. 583.
§ *Lancet*, May 8th, 1869, p. 657.
‖ *British Medical Journal*, vol. ii., 1872, p. 82.
¶ Pharmaceutical Journal, vol. xi., p. 869.

these symptoms being thought to be characteristic of a particular state of the brain.*

Stramonium.—The symptoms of poisoning by stramonium very much resemble those produced by belladonna and hyoscyamus, but the delirium is more furious than in either, while the determination of blood to the head is less than that caused by belladonna, although more than that produced by hyoscyamus. The pulse is not much altered, or, if at all, it is full and slow, rather than frequent and hard. Owing to the incessant motion, violent perspiration and intense thirst are often present. In fatal cases death generally occurs within twenty-four hours, from paralysis of the muscles of respiration.

Cases of Recovery.—On account of the comparatively rare occurrence of stramonium in this country, there are but few cases of poisoning by it on record. One case of recovery from stramonium poisoning by the use of opium was recorded in the *Druggists' Circular* for May, 1869, but as the paper is mislaid I am not able to give the particulars.

Antidotes.—Opium is said to be used as an antidote in India, where various species of stramonium are common. From the similarity between the physiological action of belladonna and stramonium, it appears probable that opium would prove the best antidote in severe cases, and emetics in milder ones.

Henbane.—Hyoscyamus affects the brain similarly to belladonna, exciting and perverting its functions, but there is little determination of blood to the head. The pulse is small, frequent, and irregular. Occasionally the delirium takes a ludicrous form. A story is related of some monks who ate the roots of henbane by mistake for supper. Those who partook of it were seized in the night with the most extraordinary hallucinations, so that the monastery seemed turned into a lunatic asylum. One monk rang the bell for matins at midnight, and of those who attended the summons some could not read, some read what was not in the book, and others saw the letters running over the pages like so many ants.

Antidotes.—Henbane does not often prove fatal, and an emetic is generally sufficient; but from the similarity of the symptoms produced to those of belladonna, it is probable that opium would prove useful in severe cases.

(*To be continued.*)

IODIDE OF BISMUTH AND POTASSIUM AS A TEST FOR ALKALOIDS.†

BY M. YVON.

The employment of the double iodide of bismuth and potassium has been indicated for the detection of alkaloids, but the value of this new reagent has not yet been sufficiently established. The author, in a note read recently before the Sociéte d'Emulation pour les Sciences Pharmaceutiques, describes a method for its ready preparation.

The preparation of the reagent by means of iodide of bismuth, obtained according to either of the processes given in Wurtz's Dictionary, and iodide of potassium, appears to present some difficulties, the iodide of bismuth not being entirely soluble in the alkaline iodide. But it is not at all necessary to use the iodide of bismuth, and the author gives the details of several alternative processes, but for various reasons adopts the following as the most convenient :—

Take of—

Subnitrate of Bismuth . . .	1·50 grams.
Iodide of Potassium . . .	7·00 ,,
Hydrochloric Acid	20 drops.
Water	20 grams.

The subnitrate is suspended in water and boiled, and the alkaline iodide and the acid are then added. A limpid solution is thus obtained of very fine orange-yellow colour, which may be readily used as a test for alkaloids.

If one drop of this solution be poured into water, a white precipitate is produced, resulting from the decomposition of the salt by the water. This decomposition may be avoided by the addition of a few drops of an acid, the author preferring hydrochloric acid for the purpose. It is not indifferent whether the acid be added to the reagent or to the solution to be tested for an alkaloid; 4 drops of hydrochloric added to 40 or 50 c. c. of the latter being sufficient to prevent the decomposition, but a much larger quantity is required if added to the iodide reagent.

If the solution be not sufficiently acid, the decomposition takes place after some minutes, instead of occurring immediately. But the more or less deep orange-yellow precipitate resulting from the presence of an alkaloid may be confounded with the pale yellow product of the decomposition of the iodide by water.

Prepared in the above manner, this reagent deposits after some time a blackish powder which is easily recognized as iodide of bismuth, and may be removed by filtration.

The alkaloidal precipitate does not appear to present a constant composition, it seeming to vary according to the proportion of acid present in the solution. Thus, for example, in precipitating quinine from a solution of its sulphate, if only sufficient acid be added to prevent the decomposition, a beautiful orange-red precipitate is obtained; but if there be an excess of acid, the precipitate is paler and diminished in volume.

Since, therefore, the nature of the precipitate varies, and the composition of the reagent itself also changes, M. Yvon considers it would be impossible to use the double iodide of bismuth and potassium as a volumetric test; but it would be useful for the detection of alkaloids where the precautions indicated are taken.

ACTION OF CAMPHOR ON PLANT LIFE.*

In the year 1798, Benjamin Smith Barton described two experiments as to the stimulant action of camphor on plants. One was made on a tulip, which, placed in a solution of camphor, showed vigorous growth, and was longer in withering than other tulip slips of the same kind, placed in ordinary water. The other experiment was made on a withering yellow iris; through treatment with camphor it seemed, for some hours, endowed with new life. Barton came to the conclusion that camphor has a greater action on plants than any other known substance; and he compared its action to that of spirituous liquors, or of opium, on the human body, when taken in certain quantity.

These almost forgotten experiments of Barton's have been repeated, in new forms, by M. Vogel, of Munich; and they have a considerable theoretic interest. This author, who has recently communicated his results to the Munich Academy, obtained a homogeneous solution by rubbing camphor with water, and shaking camphor powder in a flask with distilled water. Two branches (alike in size and similarly conditioned) of a flowering syringa were then introduced, one into ordinary water, the other into the camphor-water. Considerable differences soon appeared: in twelve hours the branch standing in pure water drooped and was near withering; the other branch in camphor-water stood upright, and without any sign of withering—some of its buds were even developed; it was not till three days after that this branch began to wither.

* Pharmaceutical Journal, vol. iv., p. 80.

† *Répertoire de Pharmacie*, vol. ii., p. 335.

* From the *Gardeners' Chronicle*.

In another experiment, a flowering branch of syringa, which was nearly dead, was placed in the camphor-water, and a marked renewal and recovery was ere long observed, which lasted some time. Frequent repetition of the experiment with branches of syringa showed the same result in varying degree. The camphor-water seemed to have less effect on vine-shoots, and almost none on *Sambucus nigra*.

The action of camphor on cut branches of living and fully developed plants having thus been established, at least for some species, the idea naturally occurred that camphor must also have an influence on the process of germination of seeds. With this view, several seeds of *Lepidium sativum* and various other plants were taken for treatment, and they were mostly old, as the germinative force in such appears to be weaker than in fresh seeds. The seeds were spread out on some moistened blotting-paper covering a porcelain plate, and a second moist paper was put over them. In all cases the seeds thus treated with ordinary water and with camphor-water were exactly in similar conditions as regards temperature and access of air.

For the first experiments, seeds of *Lepidium sativum* of the years 1869 and 1871 were taken. The entire duration of the germinative force of *Lepidium sativum* is known to be three years. The seeds of both the years mentioned, treated which ordinary water, showed a very imperfect, retarded germination, while the seeds moistened with camphor-water germinated very soon—those of the year 1869 in twenty-four hours, those of 1871 in seven hours. A similar acceleration of the germinative process has previously been observed in treatment of seeds with chlorine.

A further experiment was made with different kinds of *Raphanus sativus major*, the seeds being of the year 1866. As the duration of germinative force of this seed is three years, or four at the most, the sowing of the specimens in a garden would, of course, have been thought useless. Treated with camphor-water, however, the seeds germinated in four days, and thus some days earlier than fresh seeds under favourable circumstances.

Seeds of *Pisum sativum* of the season 1865 showed in forty hours, under treatment with camphor-water, all the phenomena of the germinative process. Apart from the fact that *Pisum sativum*, even under the most favourable conditions, first begins to germinate after four or five days, the duration of germination of the seed is two, or at the most three, years; so that seeds of the year 1865 could no longer be sown with advantage.

With like rapidity seeds of *Cucumis sativus* germinated under action of camphor-water. In ordinary cultivation of this species of seed in garden ground, not a single grain, out of a large number sown, showed the slightest germinative movement after a long time. The example is thus a striking evidence of the peculiar action of camphor in revival of germinative force of some species of seeds.

The following flower seeds were examined in their relation to camphor-water :—*Schizanthus pinnatu*, of the year 1869, *Maurandia Barclayana, Coreopsis, Ipomopsis, Senecio elegans* of the year 1860, *Silene pendula, Silene amœna* of 1867, *Basilicum, Myosotis alpestris* of 1866, aster species of 1868, *Celosia cristata* of 1867. In all of them a remarkable influence of camphor on the germinative force was perceived. The after development of some of the seeds that were treated with camphor was observed by Dr. Raob, the seeds having been put into the ground. It is interesting to know that the traces of the camphor treatment were here also visible, the young plants showing greater vigour and freshness.

From all these facts, M. Vogel draws the inference that we have in camphor a kind of stimulant for vegetation, capable both of strengthening the force and accelerating the time of vegetation.

There are cases, however, it appears, in which the favourable action of camphor is not observed. Thus M. Vogel found that clover seeds, which in garden soil germinated in twenty-fours hours, showed no signs of germination after a longer time, when the earth had previously been mixed with camphor powder.

As oil of turpentine acts like camphor on the animal organism, M. Vogel made some experiments as to the action of water containing oil of turpentine on plants. The general result was, that this solution also accelerated the germinative process. But there was here, as evidently, an injurious action on the after development of the plants. Even in a few days the progress of the quickly developed seed ceased, and the plant deteriorated.

M. Vogel remarks in conclusion, that the process of germination, receiving of oxygen, and giving up of carbonic acid, is identical with animal respiration. From the agreement of the vegetable process in the early period of germination with the animal processes, the thought arises that precisely in reference to this, stimulants are possible whose action resembles the known stimulants of animal life.

THE SPECIAL COMMITTEE ON THE ADULTERATION ACT.

At the sitting of this Committee, on Wednesday, June 10, Dr. Cameron, the analyst for Dublin and sixteen Irish counties, gave some interesting evidence, being examined the whole day. With regard to drugs he was not examined at any length, but mentioned incidentally that they were beginning to take up that subject in Dublin. He had made several examinations of drugs, and had found a good deal of adulteration. He believed some drugs were adulterated in England and sent over to Ireland by the wholesale firms. Scammony and drugs of that kind—indeed the subject generally—had not attracted very much attention in Ireland. No doubt some drugs deteriorated by being kept—extracts, tinctures, and so on. The use of methylated spirit of wine, instead of pure spirit, was practised in Ireland to some extent. There were certain drugs imported into this country which were not absolutely pure: they were mixed with certain articles in foreign countries. Opium was constantly adulterated in the East. Absolute purity was almost impossible, many drugs being almost always impure, without any intention to defraud on the part of the buyers. In some cases he thought there was no intention to defraud on the part of the dealers abroad, the adulteration being accidental in the collection or gathering. Scammony had been adulterated to the extent of 60 or 70 per cent.—that was very extensive. It was usually adulterated with woody fibre, plaster of Paris, etc. Twenty or thirty per cent. was about usual. It was possible to get pure scammony; it was merely a question of price.

Dr. Stevenson Macadam, was questioned briefly about drugs. He had not given special attention to drugs, but he had reason to believe that the drugs in Edinburgh were as pure and strong as those sold in London. There was no danger of a physician giving an overdose to any one, from the prescriptions being made up in different parts of the country. Previous to the British Pharmacopœia there were certainly great differences, and in the case of prussic acid there were two different strengths, so that prescriptions would vary. That danger, he believed, was obviated now. Some drugs very much deteriorated by keeping; and there were some drugs which, in their manufacture and collection, would naturally contain certain impurities. He thought that the analysts were in some cases incompetent, and sometimes not adequately paid. It was very difficult to analyse drugs properly: the process was complicated, requiring some time, and the analyst he thought was not very highly paid for it. In reply to Mr. Muntz, the witness stated that possibly there were inferior druggists both in London and Edinburgh. Prescriptions might vary, more especially in medicines containing opium, which would depend upon the kind of opium which was

selected in making the laudanum and the proportions. In the average of best opium the proportion of morphia was about ten per cent. He could quite understand that serious consequences might arise from variations in prescriptions; and it was very desirable that all these medicines should be of the same strength, and that there should be a standard of purity with regard to the active principle contained in them. In reply to Dr. Brady, the witness stated that all men engaged in the dispensing of medicine should undergo some examination. That would have reference to every one making up prescriptions. Since the British Pharmacopœia had been established, the prescriptions were all dispensed in the same way all over the kingdom, so far as he was aware.

Dr. Tidy being examined, said that the adulteration of drugs was a very serious matter, especially as regarded some drugs. As an illustration, he mentioned tincture of opium. He purchased eighteen samples of tincture of opium, and found that some samples were three times the strength of others. In medical practice they knew how much depended upon tincture of opium, and there should be a uniform strength for an article of that kind. In *delirium tremens* their whole trust was upon opium. By proper opium, they could get sleep; if not, the man died. It was most important that the article should have a definite strength. He did not mean to say tincture of opium was done wilfully. In some cases opium contained more water, the weighing made a difference, and in some cases it contained more active principle: this would account for the variation. In fact, the active ingredients varied largely. It was a difficult question to decide how there could be uniformity in opium secured to the public, but he would make a suggestion upon more consideration, and give it to the Committee.

Dr. Voelcker was examined before the Committee on Monday last. He expressed his opinion that it would not be desirable to fix standards of purity for all articles of food, his idea being that each particular case should be determined upon its own merits. Prior to the passing of the Adulteration Act, milk was largely adulterated with water; but since the Act came into operation, a great deal of such adulteration was discontinued. Occasionally milk might be found coloured in the same way as butter and cheese were coloured. The analysts, he thought, had been too hard upon the vendors of milk, and, in making their analyses, had not sufficiently allowed for the variations incident to milk. He had analysed some Australian butter—that was to say, butter called Australian, but manufactured in this country. It was very bad, and largely adulterated with bone fat. "Dutch" butter was made of American lard, with a certain proportion of genuine butter, and coloured by annatto. Pure butter varied more in quality than in composition. It was certainly difficult to distinguish between butter and other fats, and it had been to him a subject of some astonishment that analytical chemists could make such positive statements with regard to the adulteration of butter with other fats. The use of alum by the bakers had greatly decreased since the passing of the Act. Relative to the question of cocoa, he said pure cocoa was rarely sold. People preferred the mixed cocoas, and also mixed mustard; and, in his opinion, mixed cocoas were not indigestible—rather the reverse. As to corn-flour, he did not agree with the statements of one witness that it was an article which contained no nutrition. He did not consider the "facing" or colouring of tea an adulteration. The practice of colouring articles of consumption was so great that the dealer had to meet the requirements of the public in this direction. The whole question of colouring was one of considerable delicacy, because if it were allowed in one article it could not very well be condemned in another. If the colouring were harmless, and did not mislead the purchaser, he should not like to condemn it. The result of his analyses of tea had been to show that tea was not adulterated. Generally speaking, with regard to the analysts, he did not think they had efficiently performed their duties. Many of them were incompetent, inexperienced in their work, and lacking in chemical training. Therefore, they sometimes made assertions which were flippant and unwarrantable; and it was not desirable that the character of the trading community should be placed in such hands. If the Act were amended the analysts should be appointed, not by the local authorities, but by a central commission; and, in order that traders might not suffer from incorrect analyses, he suggested that the analysts should be better class, and more competent men than at present; that they should be fewer in number, and that they should be better paid. He did not think there would be any difficulty in procuring such men. They should devote their services entirely to the duties arising out of the administration of the Act. He might mention that his opinions upon this subject were wholly unbiassed. He held no appointment as public analyst, and was only anxious that the Act should not become a dead letter. With regard to certificates being given by chemists eulogizing certain articles as of surpassing quality, he considered the system objectionable, and had declined to give such certificates. It was desirable that there should be some central authority appointed, to which cases of disputed analysis might be referred. A great deal of injustice had doubtless been caused by the incompetence of the analysts. He could and would define the word adulteration for all the practical purposes of the Act, but there would be some difficulty in doing this if articles of food were to be treated in the strict sense as articles of pharmacy. Speaking generally, in the samples of human food which he had examined he had not found anything injurious to health. He thought that adulterated tea would be stopped from entering into consumption if it were examined in bond. He was of opinion that, if the thing could be done, it would be better to sell all articles of food in their pure state. He did not consider condensed milk an adulterated article, although sugar was added, and usually some of the cream taken off. In such an article as this and Liebig's extract, he did not consider them adulterated, because they were special preparations, and what might be considered adulteration would be the particular excellence of the food.

Mr. J. Barringer was next examined as to "facing" tea in this country. He said he had "faced" a good deal, but since the decision in the Court of Queen's Bench in the Birkenhead case to the effect that green tea was an adulteration, he had ceased to "face" or colour tea. The quality of the tea was not in any way injured. He did not care to say what the colouring matter he used was composed of. He did not believe the facing of tea was injurious.

Mr. Horniman, the well-known tea-merchant, also gave evidence as to tea, but there was little or nothing new in what he had to say. He said his firm imported pure uncoloured tea from Java, Japan, and India, and a large proportion of the tea they sold was imported strictly pure. The uncoloured green teas were not so pleasing to the eye as the ordinary green teas of commerce.

JALAP BISCUITS.

M. Tambureau, a pharmacien residing at Guelma, Algeria, publishes the following directions for the preparation of biscuits containing the resin of jalap, which he says are of good appearance, and have an agreeable taste:—

Pure Jalap Resin	56 grams.
Powdered Sugar and Flour . . .	1000 ,,
Tincture of Vanilla	10 ,,
White of Egg	No. 20
Yolk of Egg	No. 40

Emulsify the resin with the egg yolks, add successively the sugar, tincture, and flour, and make a homogeneous paste, into which thoroughly incorporate the egg-whites previously beaten up. Divide the mass into 144 biscuits.

The Pharmaceutical Journal.

SATURDAY, JUNE 20, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACY IN IRELAND.

THE papers relating to the contemplated amendment of the law on this subject have, during the last few days, received a further addition in the shape of a circular, bearing the signature of Dr. J. MAGEE FINNY, the Registrar of the King and Queen's College of Physicians, and addressed to Dr. LEET, the Secretary to the Apothecaries' Hall of Ireland. In this letter Dr. FINNY replies, by direction of the College, to the objections* raised by the Governor and Company of the Apothecaries to the Pharmacy Bill of the College, which we placed before our readers some weeks since.†

It will be remembered, the proposition of the College of Physicians is simply to extend the English Pharmacy Act to Ireland, and that the objection urged by the Apothecaries' Hall is to the effect that this cannot be done, inasmuch as the provisions of that Act are throughout intended for Great Britain; special reference being also made to the circumstance that when the English Pharmacy Bill was before Parliament, in 1868, the Irish ATTORNEY-GENERAL successfully opposed a similar proposition to make it extend to Ireland for the same reasons.

The Registrar of the College of Physicians replies to this argument by pointing out that the proposal to introduce into Ireland, as pharmacists, duly qualified persons registered under the English Act, was nevertheless even then so favourably regarded that it was only postponed until such time as there had been opportunity to observe the working of the Act in Great Britain. In fact, when Mr. EYKYN withdrew his intended motion for an amendment of the Bill by which its operation was to be extended to Ireland, he did so only on condition of the Irish ATTORNEY-GENERAL undertaking subsequently to bring in a Bill to make the Act applicable to Ireland. The pledge given to that effect was not kept, simply because the ATTORNEY-GENERAL soon after went out of office.

Again, in the House of Lords, the desirability of extending the Pharmacy Act to Ireland was very thoroughly recognized. Lord VAUX, of Harrowden, pointed out that there were no chemists and druggists in that country in the sense understood in England, because the examinations required of dispensers of medicine in Ireland were so severe that persons would not practise as chemists; and he showed that there was, in consequence, great difficulty in getting a prescription made up in the small towns and villages. From communication with medical practitioners in Dublin, he had been satisfied by them that persons who were not apothecaries ought to be allowed to sell drugs, provided they underwent an examination suitable for ensuring competent knowledge and skill for that business. Lord GRANVILLE agreed with these views, and had no objection to the Bill being extended to Ireland. The Marquis of CLANRICARDE hoped also that the provisions of the Pharmacy Act would, in the following session, be embodied in another Bill to be made applicable to Ireland. Both the Duke of MARLBOROUGH and the LORD CHANCELLOR, at whose instance the extension of the Act to Ireland was abandoned, were unreservedly in favour of an uniformity in the laws affecting the practice of pharmacy in the two countries, and the course they actually took was instigated only by a regard to certain technical difficulties of the case which they thought would better be dealt with by a separate Bill for Ireland.

Considering these circumstances, there is good reason for the reproach conveyed by the College of Physicians to the Apothecaries' Hall for having omitted all reference to facts that were so opposed to the views they desire to support as regards the desirability of extending the Pharmacy Act of Great Britain to Ireland. We may also add that there are even more cogent arguments against the opinion that the Pharmacy Act is inapplicable to Ireland; such, for instance, as the fact that certain portions of this Act have already been extended to Ireland in the Act to regulate the sale of poisons in Ireland.

As regards the objection that the general extension of the Pharmacy Act to Ireland in the manner contemplated by the College of Physicians would deprive the Apothecaries' Company of its rightful control over pharmacy, and prove very injurious to the public, the reply of the College is a denial that the control exercised under existing laws by the Apothecaries' Hall is either "rightful" or justifiable in itself, or that it has been beneficial to the public.

In support of this denial, reference is made to the College of Physicians' Circular containing observations on the proposed Bill to amend the laws affecting the practice of pharmacy in Ireland, a *résumé* of which we gave in the PHARMACEUTICAL JOURNAL of April 18th.

Another objection urged by the Apothecaries' Company was that the proposed Bill would entitle physicians and surgeons to keep shops for compounding and dispensing medicine, without the possession of the necessary skill and knowledge. To this it is replied that the proposed Bill does not confer any such power on physicians and surgeons, as such. Section 1 of the Act 32 and 33 Vict., cap. xvii.,

* See PHARMACEUTICAL JOURNAL, *ante*, p. 847.
† *Ibid*, p. 879.

merely protects from penalties such "legally qualified practitioners" as "shall have passed an examination in pharmacy."

A third objection is that the Bill would introduce into Ireland a number of English chemists and druggists who have found a place on the Register without having undergone the course of study or the examination required under the Pharmacy Act. In answer to this it is stated that the Bill would only introduce into Ireland such chemists and druggists as are on the *Register of the Pharmaceutical Society of Great Britain*, and entitled by law to practice pharmacy in Great Britain.

The words we have put in italics clearly indicate the existence of some misapprehension, for the Register of the Pharmaceutical Society would be merely the roll of its members, and since the operation of the Pharmacy Act, 1868, is not in any way restricted to that body, the extension of that Act to Ireland would enable anyone on the Register of Chemists and Druggists to carry on business in Ireland, irrespective of their being memberss of the Society or not.

As to the supposed difficulty there might be in distinguishing English chemists and druggists from the unlicensed Irish chemist and druggist, the College of Physicians holds that since the Apothecaries' Hall and the Pharmaceutical Society would have full power to prosecute and punish anyone compounding medicine without being duly licensed by either body, their respective registers would at once afford the information necessary for the public to make this distinction.

In answering the objection that the proposed Bill makes no provision for candidates for the pharmacy license devoting time to acquiring a knowledge of practical pharmacy by a fixed term of apprenticeship or pupilage, the College of Physicians again falls into error in assuming that the Pharmaceutical Society requires, under its Acts, courses of study, and carries out a very searching examination in practical pharmacy. This is not the case, as our readers, we presume, are aware; and, however desirable such a system may be considered by some, the absence of any provision of this kind may fairly be urged to some extent as an objection to the suggested extension of the Pharmacy Acts to Ireland, where the license to practice pharmacy has so long been subject to the passing through such courses of study.

As to the supposed necessity for Irish students of pharmacy to go to England for their examination and qualification, there would not really be any compulsion of the sort, for if requisite the Pharmaceutical Society could appoint a Board of Examiners in Ireland, just as it has already appointed such a Board in Scotland, to examine candidates in that part of the United Kingdom. However, this step would not even be necessary in regard to Ireland, since the power of the Apothecaries' Hall of Ireland to examine and grant licences in pharmacy, is not interfered with in the Bill now proposed by the College of Physicians.

We have thought it desirable to place before our readers the foregoing information, since a Bill has just been brought into Parliament under the title of the Apothecaries' Licences Bill, to amend the law with reference to the licensing and practice of apothecaries, chemists and druggists, and it is to be read a second time on Tuesday next. From the general terms of the notice given it is impossible to say what may be the contemplated scope of this Bill, but we hope to be able, in our next issue, to furnish some definite information on this point.

PROPOSED COLLEGE OF SCIENCE AND LITERATURE FOR THE WEST OF ENGLAND.

On Thursday of last week the Mayor of Bristol presided over an influential meeting, held to promote the formation of a college of science and literature for the South and West of England and South Wales. The project has been the subject of discussion for some time. It may, however, be said to have first assumed a practical aspect about the beginning of last year; when the faculty of the Bristol Medical School, being about to establish themselves in new buildings, were met by the suggestion that the opportunity should be used, if possible, for the foundation of a Technical College of Science, of which the medical school might form one department. The movement met with the co-operation of Balliol and New Colleges, Oxford, in an offer of a yearly contribution of £300 from each for a period of not less than five years, upon certain conditions. The result has been the meeting last week, at which the Bishop of Exeter, the President of the British Association, Dr. Carpenter, Professor Roscoe, the Rev. Professor Jowett, and many other eminent gentlemen, were present, and at which it was resolved that the College should be established.

It is hoped that sufficient funds may be raised promptly, to allow the College to begin its operations in October, 1875; and it may be that some of our readers who look to the multiplication of such institutions throughout the country, for the future of provincial pharmaceutical education, will feel disposed to contribute towards so desirable an object. The views of the Council of the Bristol Pharmaceutical Association in respect to the proposed College are represented in the following resolution, which was read at the meeting:—"That, in the opinion of this Council, the establishment of a College of Science and Literature in Bristol is calculated to advance the objects of this Association (namely, the promotion of scientific pharmacy), by affording facilities for the study of those sciences upon which pharmacy is founded; and that the proposition to establish such a college is therefore entitled to the cordial support of the Association."

The professorships with which it is proposed to

commence are :—Mathematics ; Chemistry ; Engineering, including descriptive geometry and its applications, mechanical philosophy, and mechanism ; Mining, including geology, mineralogy, and the art of mining and surveying ; Greek and Latin, language, literature, and history ; English, language, literature, and history ; and those connected with the medical faculty.

CULTIVATION OF THE TEA PLANT IN ANJOU.

An interesting experiment in the cultivation of the Tea plant is reported to have been carried out in Anjou. The district is celebrated for the culture of the camellia, one horticulturist, M. André Leroy, having in his ground upwards of a hundred thousand of these plants. The suitability of the soil for the growth of camellias induced M. Leroy to try whether the kindred tea plant could not be raised, and he now has four or five hundred fine plants of *Thea viridis*, from eight to ten years old. They are all grafted on camellia stocks, and are planted amongst the camellias, which they greatly resemble. Each year, if the temperature has not been too cold, the extreme branches bear flowers and capsules ; the flowering takes place in April, and the seeds are ready for collection in October.

Of course it is an interesting question whether the tea produced in Anjou is as aromatic as that grown in China. Unfortunately it is not, as its infusion has not really any of the taste of tea. M. Meniere, of Angers, writing in the *Répertoire de Pharmacie*, is inclined, however, to attribute this to ignorance as to the proper mode of drying the young leaves, or, perhaps, to the absence of the more aromatic flowers of some other member of the Camellia family, which may be mixed with tea for the purpose of giving it flavour.

In an investigation for the presence of theine, and also of the quercitannic acid of Mulder, in the leaves of the Anjou plants, M. Meniere found the former of these substances in small quantity ; he has also met with tannic, gallic, and oxalic acids. But at present his experiments are not complete.

AN IMPROVED LAMP WANTED.

Aladdin's cry of "New Lamps for Old" is adopted in a slightly varied sense by the Council of the Society of Arts. The Gold Medal of the Society is offered for an improved lamp that shall produce a good, clear, steady, durable, and safe light, and be suitable for railway passenger-carriages. It must be simple in construction, and capable of being readily cleaned and repaired ; and, in judging of its merits, cost will be taken into consideration. Specimens, in a condition suitable for trial, should be sent to the Society's House, John Street, Adelphi, before the 1st of November next.

Provincial Transactions.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

At a meeting of the Council of this Association held on Monday evening, June 8th, Mr. W. Wilkinson, Vice-President, in the chair, the prizes awarded by Mr. Siebold in the Association's classes were presented to the successful competitors.

The following particulars of different courses were supplied by Mr. Siebold :—

Chemistry.

No. of Lectures delivered.	No. of entries.	Average attendance.	No. of Competitors for Prizes.
33	21	17	10

Materia Medica.

27	19	16	8

Botany.

20	23	19	6

Total number of entries 63
Total number of students 30

That these numbers were considerably smaller than last session was perhaps due to the fact that the fees had been nearly doubled.

The prizes, consisting of standard works on pharmaceutical subjects selected by the prize men, were then handed to them by the Chairman, who addressed a few words of congratulation and encouragement to each.

Chemistry . . . { First Prize, Mr. Naylor ; Second Prize, Mr. Unsworth.
Materia Medica { First Prize, Mr. C. W. Jones ; Second Prize, Mr. James Maxwell.
Botany . . . { First Prize, Mr. Naylor ; Second Prize, Mr. C. H. Hurst.

In reply to an enquiry as to when he found time to work up his subjects, Mr. Naylor, the first prize man in two subjects, said chiefly from 5 to 7 a.m.

The examination consisted of the following written questions, and the answers were, on the whole, very correct. In some cases, 90 per cent. of the possible marks had been obtained.

Chemistry.

1. Calculate in what proportion by volume NO and O must be mixed in order to form pure N_2O_3.
2. State how the carbonates of zinc, lead, and bismuth may be distinguished by tests.
3. Find the vapour densities of iodine, mercury, arsenious anhydride, phosphorus, alcohol, ether, and chloroform.

Atomic weights :

I=127, Hg=200, As=75, P=31, C=12.

4. State how you would convert metallic mercury into white precipitate, and explain the change by equations.
5. How is glycerine obtained?
6. Explain how pure nitrate of silver may be made from impure silver, such as coin.
7. Write down the symbols for the following compounds :

Sodium phosphate, sodium pyrophosphate, calcium hypophosphite, ferrous arseniate, potassium bichromate, borax starch, ferric phosphate, amyl alcohol, chloral hydrate, pyroxylin, platinum perchloride, gallic acid.

8. How much oxide of bismuth is obtainable from 1000 grains of the subnitrate?

Atomic weight of Bi=210.

9. What effect does chlorine produce upon acidum sulphurosum?
10. How may bromide of ammonium be prepared from bromide of potassium?

MATERIA MEDICA.

1. A mixture of 20 vegetable drugs is handed to you for examination, name the substances it contains.

2. Name the botanical sources, natural orders and habitats of the following substances: elemi, hemidesmi radix, oleum cajuputi, quassia, cusso, ergota, and maticæ folia.

3. How would you distinguish creasote from carbolic acid?

4. State the distinguishing characters of eusparia bark and the bark of *Strychnos nux vomica*.

5. How would you detect potato starch and wheat starch or other common kinds of starch in arrowroot?

6. Give short descriptions of true Vera Cruz jalap and true ipecacuanha.

7. How is elaterium tested for adulterations?

BOTANY.

1. Define the terms runner, offset, stolon, and sucker.

2. Describe the transverse section of a tree-fern.

3. Give definitions of a panicle and a cyme.

4. Explain the modes in which anthers may be attached to the filaments.

5. What is a perianth.

6. Define a capsule, a legume, and a pome.

7. Give a short description of the stem, leaves, and flowers of *Conium maculatum*.

Parliamentary and Law Proceedings.

PROSECUTION OF A CHEMIST AND DRUGGIST UNDER THE ADULTERATION ACT.

ALLEGED ADULTERATION OF SCAMMONY.

On Wednesday last, June 17, Mr. Cocks, chemist and druggist, of Chancery Lane, appeared before Mr. Vaughan, at Bow Street, in answer to a summons, charging him with selling adulterated scammony powder. Mr. Jenkins appeared on behalf of the Strand Board of Works, in support of the summons, and Mr. St. John Wontner for the defence.

Mr. Jenkins: I appear for the Strand Board of Works, in support of the summons issued against the defendant, who is a chemist, at 88, Chancery Lane, and who is summoned for having sold to the Inspector appointed by the Strand Board of Works, under the Act, a small quantity of scammony powder. It is a purgative drug, I believe, and I have the report of the analyst, who is also here himself, that it is adulterated with a small quantity of flour and chalk. I will first call the Inspector.

(*Frederick Taylor, sworn. Examined by Mr. Jenkins.*)

Are you the Inspector appointed by the Strand Board of Works, under the Adulteration Act?—Yes.

On the 28th of last month, did you visit the defendant's shop?—I did.

Where is it?—88, Chancery Lane.

You made a purchase there?—I did.

What did you buy?—Two drachms of scammony powder.

Mr. Jenkins: What did you pay for it?—1*s*.

Who served you?—An assistant of Mr. Cocks.

When you requested to be served with the scammony powder, what observation did you make to the chemist?—After I purchased it, I told him it was to be analysed; not until after I had possession of it.

Did he make any observation?—I believe he did say he was sure it was pure.

Having made the purchase, what did you do with the article you had purchased?—The following morning I took it to Mr. Piesse, the analyst, and gave him a portion of it.

The analyst appointed by the Board for the Strand District?—Yes.

And you received from him this certificate?—Yes, some days afterwards.

Mr. Vaughan: How much did you hand to the analyst About half; one drachm, or as nearly as possible.

In the same state in which you purchased it?—Yes.

[The certificate of the analyst was put in and read, stating that the scammony powder examined was adulterated to the extent of about 8 per cent. by the addition of about 5 per cent. of flour and about 3 per cent. of chalk.]

Cross-Examined by Mr. Wontner.

I may take it that personally you know nothing at all about this drug?—No, nothing whatever.

Perhaps you know what it is used for? No, I do not even know that; in fact I never heard it named before.

By whose instructions did you go to the defendant's shop?—General instructions.

In what way; do you mean that you were directed to visit every chemist's shop?—Every one in turn.

In the whole district?—Yes; every chemist in turn, the same as any other tradesman.

Were you instructed at all what representation you were to make to obtain the drug?—Simply this, that after I had purchased the article I was to say what it was for.

That is not what I asked you. I asked you if you were instructed what to say in order to get it?—I was instructed to get a certain quantity of a certain drug called scammony.

And to get it as best you could?—To get it as pure as I could.

Was the way in which you got this by representing that you wanted it for a doctor who was out of it?—No.

Be a little careful; did you not say when you went into the shop that you wanted it for a doctor who was out of it?—I did not.

That you swear positively?—I can swear it positively.

Were you told by the assistant who served you that it was not at all an article that was usually sold over the counter, and that he did not know what to charge you for it?—He must have known what to charge me for it, because he showed me a list of prices.

You know that is not what I asked you. I asked you whether he did not tell you that it was an article not sold over the counter, and that he did not know what to charge for it?—Yes.

Did he or did he not say so?—He did say so.

Did he refer to the invoice to see what he ought to charge you for it?—No, he went to the invoice to see what his employer paid for it wholesale.

So that he did not know what to charge you?—No not exactly, I believe.

He charged you 1*s*.?—Yes.

Did you tell him at the time that it was very dear, and that you had not paid more than 6*d*. anywhere else?—No, I did not.

Did you tell him it was very dear?—I told him that it was very dear, and that I had not paid more than 9*d*. anywhere else.

Did you tell him that you had paid 6*d*. at some places?—No.

Did not he tell you that they sold nothing but the very best articles, and therefore charged the best prices?—Yes, he told me that.

You were evidently surprised at the price you had to pay for it?—No, I am surprised at nothing.

Then you are a happy man. You gave it to the analyst, did you?—I did.

How many other samples have you got?—Am I bound to answer that question?

Yes?—Two.

Only two?—No, three.

That made four altogether?—Four altogether.

Did you take out the summons?—I did.

By whose instructions?—By the instructions of the Board.

Did you communicate with the analyst after you had taken it out—did you tell the analyst you had taken it out?—Yes, certainly.

When you told the analyst you had taken out the

summons, did not he tell you you had made a great mistake ?—No.

Did not he tell you that this was as pure virgin scammony as could be got in the market, and that you had made a great mistake ?—No.

You mean positively to say that ?—I do.

Did he make no remark to the effect that it was as pure as it positively could be imported ?—He did not.

If he has not said it to you, are you aware that he has said it to others ?—I cannot say that.

Mr. Vaughan : You will have an opportunity of asking the analyst.

Re-examined by Mr. Jenkins.

Is there the smallest pretence for asking you whether you obtained this drug by any subterfuge ?—No.

It is a perfectly gratuitous suggestion ?—There was nothing of the sort at all. I went in my uniform.

Mr. Wontner : It will be for the magistrate to say whether it is gratuitous, because I shall call the assistant.

Mr. Jenkins : You went as you are now, in uniform ?—Yes, as I am now.

(*Charles Henry Piesse, sworn. Examined by Mr. Jenkins.*)

Where are your chambers ?—303, Strand.

You are the analyst appointed by the Strand Board of Works for the district ?—I am.

Do you recollect, on the 29th of last month, the last witness bringing you certain samples of scammony powder ?—Yes, I do, on the 28th or 29th, I forget which day it was.

Do you recollect the one numbered 237 ?—Yes, I do.

About what quantity did he give you ?—About one-eighth of an ounce, I think.

With the request that you would analyse it ?—Yes.

In your capacity as analyst to the Strand Board of Works ?—Yes.

And you did effect that analysis ?—I did.

That is your report ?—Yes, that is the report I handed in on the 8th inst.

That correctly states the ingredients you found in the scammony ?—It does not give the result of the complete analysis, it merely points out the ingredients which ought not to be there.

But did you find 5 per cent. of flour ?—Yes, about 5 per cent. of flour, and about 3 per cent., or rather more, of chalk.

Are those substances inherent in scammony ?—Not at all.

Mr. Vaughan : What is scammony ?—Scammony is a peculiar gum resin.

A gum, is it ?—A gum resin.

Mr. Jenkins : Can you tell us what percentage of resin you would expect to find in pure scammony ?—About 80 per cent. ; sometimes more than that.

The other 20 per cent. consists of foreign substances ?—Yes, foreign substances which are natural to the gum.

Fibrous matter and that kind of thing ?—Just so, vegetable tissue and so on.

Is it a fact that flour and chalk must have been imported into the gum as an adulteration ?—Yes, they must have been added to it.

Scammony powder is an active purgative, is it not ?—Yes.

Cross-examined by Mr. Wontner.

Are you a pharmaceutical chemist, or simply a pure chemist ?—A pure chemist.

It is no part of your business to know the results of the drug, medicinally, at all ?—Not absolutely ; I merely know the effect of certain drugs.

You say that flour would not be inherent in scammony. Do you know that starch is inherent in scammony, and very largely ?—I know that all plants contain, or yield, or can be made to yield, varieties of starch, but I do know that scammony powder does not contain wheaten flour —it ought not to, at any rate.

Before we get to scammony powder, let us see if we can make the magistrate understand what scammony itself is.

Mr. Vaughan : He said it was a gum resin.

Mr. Wontner : Your worship will hear directly what it is. Is scammony a convolvolus, growing in Asia Minor ?—The plant is from which it is obtained.

Is the trade principally carried on by the natives of Asia Minor, Greeks and Turks ?—To the best of my knowledge, it is.

Mr. Jenkins : How can he know.

Mr. Wontner : I presume that, before taking out this summons, the Board of Works——

Mr. Jenkins :——Did not send to Asia.

Mr. Wontner :——Took some trouble to see what scammony is, and all about it ! I am endeavouring to get at what it is.

Mr. Jenkins : My witness has not been to Asia, and he does not know.

Mr. Wontner : I presume he has studied works, which are plentiful enough, as well as other people. Do you know that when found by the natives, first of all the leaves and branches are cut off, then the trunk is sliced off, a hole is dug round, and into the plant is fastened a shell, with the view of catching the gum as it runs out ; do you know that ?—I know it in so far as books tell me that that is roughly the process which is adopted.

Mr. Jenkins : My friend may produce any books to show that, but this gentleman cannot know.

Mr. Wontner : I will produce books enough presently.

Mr. Vaughan : I do not know at all to what point the cross-examination is directed. It may be contended, and I suppose that is the object of it, that these ingredients which are mentioned as an adulteration in some way or other get into this bowl or shell, which is put there to catch the gum.

Mr. Wontner : I shall show conclusively, presently, that the prosecution have commenced these proceedings without taking the trouble to inquire what the scammony is.

Do you know that that is a scammony root (showing a specimen to the witness) ?—I cannot say that I know that particular piece.

I do not say that particular piece. Have you any doubt that is scammony root ?—I should have very little doubt.

Do not you know that when found, the native digs a hole round this root, leaving a small space uncovered exposed to the air ; that then it is sliced off at the top, and at some prominent part of the root a mussel shell is placed for the purpose of catching the scammony juice as it exudes. Do not you know that that is the way in which it is got ?—It believe it is done so, but sometimes they do not put the shell there.

Where does the juice go then ?—It simply goes out into the hole.

On to the bark ?—Yes.

And then is scraped off with a knife ?—No ; with a shell.

I presume you would expect to find a considerable quantity of bark mixed up with the juice ?—I should, decidedly ; I should expect to find about 20 per cent.

Of bark ?—No ; but of foreign substances, not actual scammony resin.

Do not you know, as a man of science, that the ordinary way is to stick a mussel shell into the stem or root, and to catch in that shell the juice as it exudes ?—I believe that is the method usually adopted.

Do not you know that the soil in which this root grows is a light chalky soil ?—No, I do not ; I never made any examination of it.

You have not taken the trouble to inquire ?—I have not analysed it.

Do not you know that this resin or gum is extremely sticky ?—I believe it is, when it is fresh.

When it is coming out it would be then extremely likely to catch the dust from the sandy soil of Asia Minor ?—I suppose it would.

Do not you know it is the fact that a great variety of foreign matter that is found in the virgin scammony is the light dust which is caught by the gum as it is exuding and falling into these shells?—I have no doubt some portion of it is, but I know as a matter of positive fact that the whole of it is not.

Mr. Wontner: When it is caught in the shell, do you know what is then done with it?—It is then scraped out.

Do you not know that when it is scraped out, in order to manipulate and hold it, it is necessary for the natives to use flour or something so that their fingers do not stick to it?—I have heard it so stated, but not on any reliable authority.

Do not you know also that even when placed in the blocks, in which form it is imported, they are still so sticky that they are obliged to put a coating of flour, or something of that sort, over them so as to prevent one sticking to the other?—I cannot say, they may do so, I am not prepared to swear.

Mr. Vaughan: Have you any knowledge about it?—I have a knowledge that, in general terms, what this gentleman says is perfectly correct; that is, that they do use or must use some pulverulent substance to prevent the blocks of resinous sticky gum from sticking together.

Might not that be wheaten flour?—It might be wheaten flour; but I say also that there is such a thing as scammony without wheaten flour which is pure scammony.

Mr. Wontner: There is such a thing as scammony which contains 90 per cent. of the pure resin; but do not you know that that is only obtained in about the proportion of one cwt. in the year in the whole district. Do you recognise that as a sample of scammony? (Handing witness a specimen.)—That is not scammony powder.

I do not say scammony powder. This is scammony, is it not?—I am talking about scammony powder.

But if I ground this to powder, it would be scammony powder. I ask you whether this is not scammony?—It has the appearance of scammony, but I would not swear to it.

Do you mean to say that you know so little of it that you cannot tell?—That I decline to pledge my opinion to; I believe it to be scammony, but I will not swear that it is scammony.

Do you believe that the white coating you see on either side of this is wheaten flour, put over it for the purpose of preventing one block sticking to the other?—I do not believe it.

Have you any doubt of it?—I have no doubt; I do not believe it at all.

What do you think it is?—I am not prepared to say; it may be simply—it might be one of fifty things.

Now let us come to the scammony as imported into this country. Do you know as a fact that any adulteration, if adulteration there be, takes place abroad?—I believe so, I believe, almost exclusively, it is adulterated abroad.

Do you know that the finest scammony collected is collected by the Greek peasants, who are more industrious than the Turks?—I have heard it.

Do you know that the Turks, to avoid trouble, do not protect the juice as it is exuding, and therefore allow the dust to come upon it more than the Greeks?—I am not prepared to swear that I know that as matter of positive fact, I cannot say that I am acquainted with the relative working powers of Greeks and Turks.

You say you know the best produce is that collected by the Greeks?—No, I have not said so.

I understand you to say so. You do not know that even?—I do not admit I do not know it.

Have you read any books on the subject?—I have.

Have you not seen it so stated?—I have seen it, and I take it on the book's authority, not on my own. I do not swear to the authority of the books.

I do not suppose you have ever tried the trade. I am simply asking, have you gone to all the sources of knowledge that you could to obtain information?—I could have gone there.

Why did not you before taking this out?—I did not choose.

The only source of knowledge that you are in possession of, without going there, you say you have applied yourself to?—Just so.

Yet you will not positively say whether that collected by the Greeks is better than that collected by the lazy Turks?—It is generally admitted to be so so, but I do not commit myself to it absolutely.

Tell me what you would call the amount of impurity you would expect to find in the very best virgin scammony, as imported into this country, and to be bought in the market.—Does that include flour and chalk?

If you like. All impurities foreign to the matter?—The foreign matter natural to the gum varies, but is proximately 20 per cent.

I believe, not only in this but in other drugs you take the British Pharmacopœia as your standard, do you not?—Yes.

Do not you know that the British Pharmacopœia gives as the highest standard of virgin scammony from 75 to 80 per cent. of resin?—I believe that it is so stated.

Have you not looked in your standard work?—No, I am not a Pharmaceutical chemist; I say by book knowledge the quantity is about 80 per cent.

Do you not know, as a matter of scientific knowledge, as a chemist coming here to instruct the Court, that at least 20 per cent. is almost inseparable from the article from the very mode of collecting it?—Twenty per cent.

Twenty per cent. of substances other than actual resin?

Mr. Vaughan: What the witness has said is that the 20 per cent. is fibrous vegetable tissues.

Mr. Wontner: I am perfectly willing to take that what the witness says is correct. I am endeavouring to show from the mouth of the witness, that, apart from any vegetable tissue, it is absolutely necessary, in gathering and collecting this article, that there should be a quantity of other foreign matters.

Do you not know that it is inseparable from the collection, or the obtaining, if you like, of this particular article that there should be chalk, and there should be flour, and there should be starch in it?—I do know that it is not.

You think that actually the dusty soil, the grit, could run down the side, and run into shells of this description, and that there should be none of the dust caught by the sticky substance as it is running down?—Far from it; but I said that does not amount to 20 per cent.

I ask you in addition to the 20 per cent?—You asked me whether it contained flour, and I said certainly not.

I asked you originally whether you did not know that starch was an inherent part of this very root itself?—I know flour is not.

We will take starch first. Do you know that there is a large quantity of starch in every sample?—I do.

Do you know that starch would exude with the gum?—I should say it would be scraped off, and probably some of it would exude with the gum.

Do you not know that throughout the whole body of this there is starch?—I admit it.

Do you mean to say that, as it comes out, the starch would not come out at the same time?—Probably it would.

It would come out with the gum?—A mechanical operation.

Consequently it would flow into the shells with the gum, and would become a part of the general hard substance?—That would be part of the 20 per cent.

In addition to that 20 per cent., do not you know that there necessarily must be a quantity of light chalky dust with it?—I do not admit that.

Have you the slightest doubt it must be so?—I do not say chalky dust. I say any dust is included in the 20 per cent.

Take the chalky dust?—I do not admit it is chalk.

Mr. Vaughan: If you want me to believe that this chalk is in the soil, you must produce evidence of somebody who has been there and knows this grows in chalk.

Mr. Wontner: I do not know that I can bring anyone who has been there.

Mr. Vaughan: Unless you can prove that, it is no use going into the soil.

Mr. Wontner: I will drop that part of it.

Do you not know that the British Pharmacopœia, the standard which is held up to all chemists and druggists, fixes from 75 to 80 per cent. as the highest standard of virgin scammony?—I believe it does.

You, yourself, in your report, say that there is 5 per cent of flour and 3 per cent. of chalk?—About. I have not the result of my analysis with me, but I think it is something about 12 per cent of impurity in addition to that. Rather more. I do not commit myself to that.

Perhaps I can refresh your memory:—3 per cent. of chalk, 5 per cent. of flour; so much per cent. of moisture, etc., etc.—No, that was not it. I never put my results down like that. Impurity, 5 per cent. and the starchy substances natural to the gum made about 13½ or thereabouts.

Bringing it to about 18½ per cent.?—Just so, roughly, and I should say that the starch and flour were about 5 per cent., and the chalk about 3 per cent.

Leaving upwards of 73 per cent. of pure resin?—One-tenth of one part upwards of 73 per cent.

We will take it for the purposes of this case that there was 73 per cent. of resinous scammony in this sample?—Just so.

Do you not know, of your own knowledge, that that is a percentage which is rarely found in this country?—Upon the supposition that I admit it contained 80 per cent., and I found 5 per cent. of flour and 3 per cent. of chalk, in addition to the 80 per cent., I should hold it to be adulterated; no matter the percentage of resin, if the substances are there.

I ask you whether 73 per cent. and a little over, resinous scammony is not a very large percentage of resin to find in any article of the description introduced into this country?—Not this particular variety.

Did you not tell Mr. Francis that you considered this was a very good specimen?—I told Mr. Francis I should consider it a very good specimen of the scammony of commerce.

Did you tell him you thought they had made a mistake in taking out a summons?—I told him it was a case in which I should not have recommended a summons; but a summons having been taken out, there was ground sufficient to support it.

Did you tell him you would get into very hot water with the Pharmaceutical Society?—Mr. Francis told me that.

In consequence of the summons?—No, I certainly did not do that, for I do not care about the Society.

Do you know the French Pharmacopœia?—No.

You have never seen that?—I may have seen it.

You do not know what percentage it gives of the resinous scammony?—I should think it would be about the same.

And the American the same?—I do not commit myself to that.

Do you not know, as a matter of common knowledge, that 75 per cent. is a very high percentage of scammony as introduced into this country?—75 to 80 per cent. is the quantity allowed by the Pharmacopœia.

When this sample was given to you it was moist, was it not?—No, it was about the same as flour.

Did you dry it?—Certainly. I dried it to estimate the moisture. I could not estimate the moisture without.

Then you allow 5 per cent. for the moisture, and drying is part of the process of analysis?—I do not allow it.

You charge it in your report. Without the water, would there haye been about 78 per cent? Suppose, before testing how much resin there was, you dried it first, and then tested it afterwards, would you have found 5 per cent. more?—Five per cent. more on the 73.

So that by that you would have got 78?—Yes.

So that you would have arrived at something over the standard?—I am dealing with the sample as it is sold.

Do you not know, as matter of fact, that this light powder would naturally attract a certain amount of moisture if kept in a chemist's shop?—All powders do.

Do you not know it is impossible to prevent that?—That is why I estimated it.

However careful a chemist may be, it is impossible to prevent a certain amount of moisture attaching itself?—To any powder.

So that if you take the moisture away, you get 70 per cent. of resin?—Upon the supposition that the powder was given to me perfectly dry, and contained 80 per cent. of resin, if it contained 5 per cent. of flour and 3½ per cent. of chalk, I should report it to be adulterated, not because of the presence of resin, or the absence of it, but on account of the presence of flour.

Tell me how you found the 5 per cent. of flour?—I first weighed a portion of the scammony powder. I then extracted the resin, and the residue I boiled with a little sulphuric acid, until I knew that the starch had been converted into sugar.

That is to say you formed your opinion?—I knew it as matter of fact.

That is how you knew it?—That is how I did it.

By so doing you knew it?—Yes. I estimated the amount of sugar present by a solution known as Fehling's solution.

Do you know that the gum would act on Fehling's solution?—I know I did not give it a chance, I do not say whether it would or would not.

How did you separate the gum from the starch?—As I observed I separated the resin before.

There would be gum in the residue, surely?—Certainly not, how would there be?

I ask you whether there would not be gum?—I say no.

How did you get the resin out?—By extracting it by alcohol and ether.

Is gum soluble in alcohol and ether?—Yes, gum is a general expression. Do you mean gum arabic?

You know?—There is a gum there that is soluble.

You say it is soluble in alcohol and ether?—Yes.

You pledge your reputation to it?—Yes.

The gum?—I do not say gum is soluble, for this reason, that gum is a general expression—the particular gum resin.

What is the gum?—Gum resin.

That is the gum and the resin mixed up together which you separated. What is the gum which you separated?—Gum is the substance to which I am alluding.

Is all this gum resin (referring to a specimen)?—I should say that has got about 20 per cent. of impurity.

Is not part of the impurity gum?—Do you mean gum arabic?

You say there is so much impurity?—I do not understand the question.

Mr. Vaughan: By gum you mean the gum resin?—Yes.

Gum resin and gum are the same thing?—Just so.

Mr. Wontner: When you say there is so much per cent. of resin, you mean gum resin?—I might say so.

Do you mean it?—In this particular instance I do mean it.

Do you mean it only for this particular instance. Is that the opinion formed for this particular instance, or is that what you would say on other occasions?

Mr. Vaughan: It is with reference to this scammony.

Mr. Wontner: You say you have not seen these other Pharmacopœias, the United States and the French?—I have not.

Medicinally, do you know the qualities of this?—I know it is a purgative.

You know it is a purgative, and you know nothing beyond that. Do you know that the roots themselves are actually imported and ground down, and that the resin is extracted from the dry roots?—I believe it is.

As an article of commerce in this country, and as an article of manufacture in this country?—I believe so.

Do you know that pure resin so obtained can be sold at just half the price as what you call the adulterated resin as imported from Asia Minor?—No, I know nothing about prices.

Do you know, at any rate, that it is much cheaper?—I know nothing about the prices whatever, I do not keep a shop, and am not a wholesale druggist.

I presume you made inquiries when you took out a summons of this description?—I have not taken out a summons of this description.

You know nothing about pure resin, as extracted from the dry root when imported, being much cheaper than that—than when it is imported in this way?—I know nothing of it.

Do you know, as matter of medical knowledge, whether, in the profession, scammony so obtained is regarded as not half so good as that which is condemned here?—I believe it is stated to be not so good.

As a matter of fact, have you the smallest doubt that this starch and flour that you are complaining of was introduced into this scammony in the process of extraction from the root abroad, or in the process of manipulating it abroad, and making it up for the purpose of sending home?—I have very great doubt about it.

Examined by Mr. Vaughan.

Have you ever analysed scammony before?—I have.

Have you found these foreign substances which are found here, existing in that scammony which you have analysed?—Very frequently. It is a very common adulteration.

At all events, you very commonly find these substances in the gum?—Yes.

That is, the flour and the starch?—Yes.

And in the same proportions?—No; sometimes a great deal more. Other varieties of scammony contain the third of their weight.

This in fact would be a very good sample of scammony?—I should take it to be very good.

There is nothing of course injurious in any way in these things?—Nothing injurious to health, except it is deemed so by the Act.

I observe that you say you get sugar?—It is a known chemical fact that by boiling starch with diluted sulphuric acid the starch is converted into a variety of sugar called glucose.

Could you not get it from anything else?—You can get it from many other things, but in this particular instance, there was nothing there but the starch and the flour to yield it.

You could not detect the presence of it until after you had analysed it?—The detection of the actual presence of the flour was very simple, by looking at it with the microscope.

You are quite sure it was wheaten flour?—Yes.

How do you discover the chalk?—By the examination of the residue, after extracting the gum resin. The residue is an extremely fine powder, the same as the original substance, and upon treatment of that with acids it effervesces, and there are one or two other phenomena which identify the component parts of chalk.

Not from any microscopic observation?—No, chemical experiment.

Were these experiments of such a nature as to determine positively the presence of chalk?—Yes.

You could not confound the presence of chalk with any other substance?—No, I could not have done so.

Mr. Jenkins: That sir, is my case.

Mr. Wontner: Sir, I appear in this case on behalf of Mr. Cocks, who is a chemist, having carried on business in Chancery Lane for upwards of twenty years, I believe. He is a gentleman of the highest possible respectability, and against whom, before, there has never been the slightest suggestion made that he would sell anything but what was perfectly pure. At the same time, I appear on behalf of the gentlemen who supplied him with this particular article, Messrs. Hearon, Squire, and Francis, of Coleman Street, London. I shall have to call Mr. Squire before you, and probably Mr. Francis. I may say that Mr. Squire has had, probably, the longest experience of any man in the trade of this particular article, having been upwards of forty years in the trade, and having had this article under his notice during the whole of that time. It is not of course for me to say anything with reference to the Adulteration of Food Act. No doubt is is an extremely salutary measure, and although in the case of many prepared articles, such as the mustard of commerce, and cocoa of commerce, and the tea of commerce, and other things of that description, which are manufactures long known and well understood, the legislature thinks this Act is to apply when persons perfectly *bonâ fide* dispose of articles which they believe to be genuine, which they buy as genuine, which they do not adulterate themselves, and which if they are adulterated are adulterated before they come to their hands, and without their knowledge, no doubt the legislature in so deciding is wise, and, although at a great loss to themselves, the vendors of such articles must put up with the consequences. But I say it seems to me that the Act has gone quite far enough, and before it is carried any further, at any rate, the public authorities should take the trouble to inquire respecting the articles they are about to proceed upon before they take any such proceedings; and more especially so when the persons they proceed against are persons whose characters stand as high as that of any one in the land. I think the least they could do, especially in a case of this description, when they are treading upon unknown land, is to make themselves acquainted with the subject before they attack the character and reputation of persons whose character has hitherto been above the breath of suspicion. In this case I shall conclusively show you that this summons must fail, and it ought never to have been taken out. I shall show you that Mr. Squire, one of the firm of wholesale druggists who supplied this article to the defendant, went in the ordinary way upon the market, and, having a thorough knowledge of the article, bought it from the catalogue of the broker. There were a number of consignments from Smyrna; and I shall show you that he went in the market prepared to give the best price, that he did give the best price for his article, and that the article was tested by him afterwards and found to contain 80 per cent of resin, that being the maximum amount expected to be found even by the Pharmacopœia standard, upon which the government go in regard to these matters—the standard upon which the Pharmaceutical Society of England take their stand. It was ground and dried, and in the dry state there was 80 per cent. of resin, and in that dry state we sold it to the defendant. Mr. Cocks placed it in a bottle, and, as a matter of fact, this article is not sold at all over the counter. Scammony powder is not retailed, it is not used by one person in a million; and the only adulteration that could have taken place, if adulteration it is, must have been that this article when in the hands of Mr. Cocks was put into a stoppered bottle, and the stopper perhaps did not fit quite so tight as it should, the necessary consequence of which was that it would attract a certain amount of moisture, which would reduce it probably to the 73 and a decimal which is stated by Mr. Piesse, the analyst, to be the result of his analysis, that is to say, to be the amount of resin which he found. I shall show you conclusively that, from the time it left Mr. Squire's to the time it was sold over the counter to the Inspector of the Strand Board of Works, nothing whatever was done to it, and you will have positively, on oath from Mr. Squire, that when he tested it,

he being a chemist himself, having 40 years experience, having given the best price for it, it was of the character which I have stated to you. Although the article was obtained, I may say, surreptitiously, because the article, generally speaking, would not be sold to a private individual—

Mr. Jenkins: If Mr. Wontner is not going to prove that fact, he ought not to asperse the Local Board by stating it.

Mr. Wontner: If my friend wants me to prove it, I am in a position to do so.

Mr. Jenkins: I shall call upon you to prove it.

Mr. Wontner: I have the assistant here, and I shall call him if it is necessary.

Mr. Vaughan: I do not know that that is necessary for my decision.

Mr. Wontner: So it seems to me. However, the fact remains the same, whether it was obtained by a subterfuge or whether it was obtained in a perfectly legitimate manner. The article was purchased by Mr. Squire at the highest price, it was bought as an article that had been imported from Smyrna, from which part most of this virgin scammony comes. It was sold to a chemist of high reputation and good standing, and it never left his hands until it was handed over by his assistant to the inspector. During the whole of that time not the smallest addition was made to it, either for the purpose of fraudulently increasing its bulk, which is one offence under the Act, or for putting into it anything injurious to health, which is not here suggested. The article which you have here is really and substantially the same article that was bought by Mr. Squire. As soon as it came to the knowledge of Mr. Cocks that this was to be analysed, and that an analysis had actually been made, which he really did not believe at first, he went to the gentlemen from whom he had bought it, and they went to his bottle, and took a sample from the very same bottle. I have the sample here, or a portion of it. That was taken to Dr. Attfield, Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain. He analysed it, and although the analysis varied slightly from the analysis made by the analyst who has been called here to-day, I think I may say that he made 75 per cent., whereas the analyst only made 73 and a fraction. He will be called before you, and will tell you that from the analysis he made of this sample which was given to him, and which is the same sample that was analysed by Mr. Piesse, it is a sample of thoroughly genuine virgin scammony, and as good a sample as could be obtained—that it is more than a fair average sample. You will see by a return that I will produce, if necessary, that there are a very few pounds of the best scammony collected by the Greeks, who, it appears, are much more diligent and careful in collecting it, and so manage to get it with less impurities than the lazy Turks get theirs. For instance, in scraping the bark to get what is called the cream, which, it appears, exudes, a certain portion adheres to the side—

Mr. Vaughan: You suggested in your examination that you were going to call the partners.

Mr. Wontner: I shall call them both, and shall prove by them the actual way in which it is collected, as far as knowledge can be acquired from reading books upon the subject. You will have full information from both Mr. Squire and Dr. Attfield. They will tell you, as they instruct me, that it is a necessity from the very method in which this virgin scammony is obtained, that there should be so much chalk, and so much dust in it. As to the starch, Dr. Attfield will tell you that starch is largely present in the root, that it is an ingredient in it. It is impossible to obtain the resin without obtaining a large quantity of the starch, and that he would expect to find quite as much, if not more, than is spoken to by the analyst.

Mr. Vaughan: You had better call Mr. Squire.

(*Mr. Wm. Squire, sworn. Examined by Mr. Wontner.*)

Are you a member of the firm of Hearon, Squire, and Francis, wholesale druggists, 5, Coleman Street?—Yes.

I believe Mr. Cocks, of 88, Chancery Lane, is a customer of yours, and has been for many years?—He is.

I believe you, personally, have an experience of 40 years in the trade?—Yes, I have.

During the whole of that time, with this drug called scammony?—Yes, I have.

Did you supply him with the scammony in question, which is the subject of this inquiry?

Mr. Jenkins: How can he tell that?

Mr. Wontner: You did supply him with scammony powder—my friend disputes this particular sample.

Mr. Jenkins: I do not dispute it. I said he knows nothing about it?—Yes.

Mr. Wontner: Where did you get that?—I bought it in the usual manner, I bought it on the market and had it ground and powdered, and supplied it to Mr. Cocks.

Before supplying it to him, or to any one else, did you yourself test it?—I did. After the grinding was finished, I tested that and one or two other samples.

Mr. Vaughan: Do you buy it in the root?—Not this identical powder I supplied to Mr. Cocks.

You bought the gum?—I bought the scammony in the gum.

Can you tell the way in which this is obtained?—Merely from books.

We have the books here, but, without taking time to refer to them, will you shortly tell the magistrate how it is obtained?—At a proper season of the year an incision is made transversely just at the crown of the root and then a small vessel, generally a mussel shell, at least we imagine so, because we frequently find these mussel shells imbedded in the scammony, is inserted.

Mr. Jenkins: He is not telling us this from his own knowledge. Does not it come to this, that he has heard Mr. Piesse's evidence and substantially agrees with it? The only point I raise is, whether this flour is properly or improperly in this scammony.

Mr. Wontner: We are going to show how the flour gets in.

Mr. Vaughan: The question is, whether it is introduced in this country or introduced before. People are not to be made responsible for substances which get in in the preparation or the collection of the gum in Asia Minor.

Mr. Jenkins: I think the decision in the Queen's Bench the other day, would rather lead to the inference that they were.

Mr. Vaughan: You mean with regard to the tea?

Mr. Jenkins: Yes.

Mr. Wontner: That is a different thing.

Mr. Vaughan: I do not think those cases at all go to this.

Mr. Jenkins: I submit it is really a much more simple matter than the question of tea.

Mr. Wontner: It is so simple, that if the decision should be against us, no more scammony could be sold, and you will have to bear your pains of the stomach, and have no purgatives to take. Will you go on and explain the process?—At certain intervals, say perhaps once in 24 hours, these shells are cleared and the gum is collected. It is then a soft and sticky substance, and is dried in the sun.

Mr. Vaughan: You are now giving the result of your reading?—Yes.

What authority do you quote from?—Dr. Pereira, I think, gives it.

Mr. Wontner: Here is the United States Dispensatory, which gives an account of the process?—I only go from my own reading.

Mr. Wontner then read a passage from the book referred to, which stated that it was adulterated by persons called scammony makers; the materials employed being chiefly chalk or some kind of flour, and that very little, comparatively, was exported perfectly pure.

The Witness: You will find the same thing in Pereira.

Mr. Wontner further read a passage from a paper contributed by Mr. S. H. Maltass to the Pharmaceutical Society, on November 9th, 1873.

Mr. Vaughan: Is that Dr. Pereira?

Mr. Wontner: No, this is by Mr. S. H. Maltass, who speaks from personal experience. He is dead; but Dr. Attfield is here, who heard the paper read. It gives a variety of other information, and the different per centage in different samples, from 88·2 down to as low as 10 per cent.

Mr. Wontner: You tested this scammony, and found it contained 80 per cent.?—I found it to be 80 per cent. Of course I did not go so closely into it perhaps as Mr. Piesse. I dissolved out all the matter soluble in ether, filtered it, and dried the residue, and found that it contained 80 per cent. of soluble matter.

Whilst it was in your hands, was there any adulteration?—No.

Was there anything added to it to increase its bulk?—No.

Then any adulteration, if adulteration there be, was before it came into your hands?—Certainly.

You bought it in the ordinary course upon the market?—Yes; and I think we have a fellow case here to the one I bought, from which the powder supplied to Mr. Cocks came.

Mr. Vaughan: I do not want to see that.

The Witness: I wish you would, for it is a very important matter to me.

Mr. Wontner: It is very important to the trade generally; we have a reputation of 40 years to sustain.

Mr. Vaughan: If you think it is necessary for yourself or your own reputation to produce this to me, let me see it.

The Witness: It will not take one moment. (The witness then produced a case of scammony to the magistrate, showing the state in which it is imported.)

Mr. Vaughan: Did you give the best price for it?—I did. I happen to have in my pocket the catalogue of the day's sale (producing the same). These are my remarks. The goods are on view the day before the sale, and I made my remarks as to their value and quality. Then when the sale comes you see the prices which they fetched. Here are the three lots which I bought, 30s. a pound, and they are now worth 34s. The next I valued at 22s., being second quality, and there are some others of a very common description. There are some lots of this common stuff which was here taken in at 5s., were sold without reserve from 1s. 7d. to 1s. 9d. per pound. They were bought by some German houses, and I wish the German houses luck of their bargain. That will show you the great variety in the prices of scammony.

You gave 30s. which was the highest price of the day?—Yes, and if any gentleman will bring me some, equal in quality to this, I will give him 32s. for it to day.

Mr. Wontner: Do you know, as a fact, what this white outside is?—I do not of course, I have not examined it. I should say it was farinaceous matter. I will not go so far as the analyst, and say it is wheaten flour, because I do not know that they have much wheaten flour in Syria.

Mr. Jenkins: He did not say so.

Mr. Wontner: I understood him to say so. At any rate, it is some matter put on to prevent one block sticking to the other, or to be able to press it into shape?—Yes, no doubt. Oddly enough, within the last few hours, a sample of scammony has been put into my hands to report upon. I have never in my experience seen anything like it, and I do not believe anything of the kind has ever been brought into London before. If you will examine it (handing same to the magistrate) you will see actually leaves upon it, which shows that it has been compressed within leaves in order to dry it. That is only part of a small parcel come by post within a few days. I believe it is very pure and fine scammony, but you see there is this curious fact, that the leaves are imbedded in it.

Mr. Wontner: Do you say that this sample we are upon here is a good sample of virgin scammony?—I dare say so.

As good a sample as usually can be obtained in the market?—It is, I believe, very pure.

Scammony collected by the Greeks is rarely imported into this country?—Occasionally we get a specimen. I can show you a specimen, but it is a sort of cabinet specimen.

Is it a fact that, by way of making pure scammony without any of these so-called adulterants, you import the root itself?—Yes.

Do you grind the root up, and then extract the pure scammony resin out of it?—We do.

And by doing it in that way, can you sell it at least for one half the price you sell the other?—We can sell it at one third of the price.

Do you know, as far as the medical profession is concerned, that pure scammony resin, as you call it, is not looked upon as possessing the medicinal virtues that Smyrna scammony, as imported, does?—Yes, I do. I know from my personal experience too.

So that in spite of the so-called adulterants, the scammony here complained of is considered very much better than the pure scammony which you could extract from the root?—It is very much better.

I may take it that if this were termed an adulteration within the Act it would put an end to the trade in scammony altogether, and the public would have to go without it?—Entirely, I think.

Cross-Examined by Mr. Jenkins.

How could you give that last reply, saying it would put an end to the trade altogether if this is declared to be an adulteration. Do not you know it might be sold and marked as adulterated?—Yes, but what respectable chemist would admit he sold adulterated articles.

He would not admit that he sold an adulterated drug?—He would not only not admit it, but he would say it is not an adulterated article. It comes to a question of the meaning of the word "adulteration."

Have you ever bought this drug at a higher price than you did on that day?—Yes.

At a very much higher price?—I think I have. I cannot tax my memory, but I think the highest price has been 38*s.* or 40*s.* per lb.

How much was it on that day?—30*s.*

With reference to the sample you have just produced with leaves upon it, before it is dealt with for trade purposes do you get rid of the impurities there are in it?—This is an exceptional sample I have to report upon.

Have you ever seen scammony in a similar condition to that?—Never; I think it is a unique specimen.

Have you ever seen it with leaves attached?—I have never seen scammony with leaves attached.

Have you seen any other substances attached to it?—I have seen natural scammony with small stones, and ashes and cinders.

Before that was used for trade purposes, were means used to get rid of the adulteration?—You could not do it.

It was not done?—You could not do it. I will find you in this very box of scammony, if you will permit me, a piece with cinders in it.

The adulteration alleged here with flour is only 5 per cent on the entire amount; but supposing the adulteration had been 35 per cent., would you consider that equally lawful and equally open to be sold without bringing yourself under this Act?—That is a question; I get scammony of various qualities; on the very same day that this was ground, I powdered other scammony of lower qualities—that is, of less value, and one tested 70 per cent. of resin, and another 50. We have to do with a great many different people, and if a man buys scammony of me, I say, what scammony do you want? if you want scammony, buy this, and I will be answerable for it; but if you buy anything at a lower price, you must take your chance.

Mr. Cocks buys nothing but the best, and therefore I am here to protect him and also myself.

I understand you to say there is better scammony than this sold?—No.

I thought you said at a higher price?—No, I say this scammony was formerly worth more money. Of course, the markets vary. This scammony I bought the other day is worth more money now.

Mr. Vaughan: It was the highest price of the day?—Yes, and it is now worth considerably more money.

Mr. Jenkins: You heard from the American Pharmacopœia, which Mr. Wontner read from just now, that there is such a thing as pure scammony?—Yes, there is a sample here, what I call a specimen or a cabinet sample. I believe, having examined it, that that is as pure as can be.

I have not for one moment sought to allege that you have adulterated this personally.—I am very glad to hear you say it.

Mr. Wontner: I understand you to say that pure scammony is only found in cabinet specimens, that it is not that which comes into the market as a stable commodity?—No, it is not.

(*Professor Attfield, sworn. Examined by Mr. Wontner.*)

Are you a Fellow of the Chemical Society, and Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain:—I am.

Did you, at the request of Mr. Squire and his firm, analyse a specimen of scammony:—Yes, I did.

Was that a specimen obtained from Mr. Cocks' bottle?—Yes.

Mr. Vaughan: How do you know that?—Mr. Francis told me so.

Mr. Wontner: Mr. Francis is here. He is a partner in the firm of Messrs. Hearon, Squire, and Francis.

What was the result of your analysis?—My analysis substantially confirmed that which has already been given by the public analyst. I found a little more resin than he did, not much.

You found about 75 per cent. I believe?—I found 76 per cent. of resin; that is to say, when it was perfectly dry.

You took the precaution to make it perfectly dry, as Mr. Squire did, before you tested it?—Excuse me, the resin was perfectly dry that I obtained; but I also made an analysis upon a perfectly dry powder, and from that powder I obtained 80 per cent. of resin.

From that analysis are you able to say whether the scammony was a fair specimen of virgin scammony as known in this country?—I am able to say it was a very good specimen.

Without taking cabinet specimens, it was a very good specimen of the scammony which is exported into this country, and usually known as scammony?—Yes.

We have heard of starch, chalk, and flour. Can you account in any way for the presence of starch, chalk, and flour in this production?—Yes.

From your knowledge of the matter?—First, so far as starch is concerned, the root naturally contains a large quantity of starch, and a portion of this starch may get into the juice; if the juice is carelessly collected, a large portion might get in. Then, as to the chalk, I have analysed many samples of scammony, and in every one have found earthy matter of some kind. In nearly every case that earthy matter included chalk. I have examined the earth picked out from the crevices in the root of scammony, and in that earth I have found chalk.

Do you know that, from the very process of collecting, the scammony necessarily contains a certain amount of dust of whatever description the soil may be, collected with the gum?—Certainly; I have found the earthy matter that I have got out of scammony to have a similar composition to the earth I have picked out from the roots of scammony.

Now, as to the flour?—With regard to the flour, the scammony during its drying has to be turned over, manipulated in various ways, and, to prevent the lumps from adhering, powder of some kind or other is commonly placed upon the lumps, much as a cook would dredge flour on dumplings or pie-paste, to prevent them sticking together, and this powder sometimes contains flour. It adheres firmly to the lumps, so that it could not all be scraped off or brushed off, and hence the scammony when ground naturally contains such powder.

Powder that could not be removed from the general body?—It cannot be rubbed off from the lumps of scammony.

And when ground together with the rest, it could not be separated?—That would be impossible.

You have not been to Smyrna, have you?—No.

What amount of flour and starch would you expect to find?—I could not easily ascertain the percentage of flour or starch in powdered scammony. I have heard the analyst describe the process he adopted; and I am of opinion, indeed, I am certain, that that process would not give the percentage of starch or flour.

Mr. Vaughan: Or sugar?—Starch or flour is converted into sugar by boiling with acid. So is gum, which is always present in scammony, which is natural to the scammony, and when the scammony is dissolved in ether and such liquids, what dissolves out is the resin and not the gum, the gum remains in the residue. It is not soluble in ether. The analyst said that it was. He must have made some little mistake there. I have made some hundreds of tests; I know all about it personally, from my own observation and study, and I assure you that the gum is not soluble in the ether.

Mr. Jenkins: The analyst did not understand the question. Mr. Wontner did not examine him so quietly as he is doing his own witness.

The witness: I understood the analyst most distinctly to state further that the percentage of starch was about 5. I was glad to hear the question asked as to how that was ascertained, because I should like to know how to ascertain the percentage of starch in scammony; and, when I found it was by boiling the residue with acid, thus converting it into sugar, and then estimating the amount of starch from that of the sugar, calculating backwards, I was astonished; because I know there must be in that substance which was boiled with acid some gum, and I know that would be converted into sugar, and when the analyst says he thus found 5 per cent. of starch, then I know that nearly the whole of what he did find must have been gum. But that there was a little starch of some cereal in the scammony I know from my own microscopic observation, but not 5 per cent.

Mr. Vaughan: The analyst said 5 per cent. of flour, he did not specify the starch.—I know there could not be 5 per cent. of flour. The fact is, flour contains starch.

Mr. Wontner: Do you know, as a matter of fact, what the standards of the different Pharmacopœias are—the British, French, and the United States?—80 per cent. is mentioned in the British Pharmacopœia.

As the highest to be expected?—80 per cent. is mentioned in the British Pharmacopœia, but in the American Pharmacopœia the scammony is recognised as of official strength if it has 75 per cent. of resin in it. In France the same number is taken, 75 per cent. I have the French Pharmacopœia here, and it states that the scammony should contain from 75 to 80 per cent. of resin. Then a great authority on materia medica, Dr. Pereira, says that "pure or virgin scammony should yield from 75 to 80 per cent. of resin."

And what do you, Dr. Attfield, as the Professor of Practical Chemistry to the Pharmaceutical Society, say it should yield. Do you agree with those?—I entirely agree with those authorities as to the percentage of resin found in the best scammony.

Do you say that this article we are summoned for is a genuine scammony or adulterated?—It is a genuine scammony, it is not adulterated. It contains natural impurities, but it is not adulterated.

Are those of such a character that it would be impos-

sible to get the scammony without getting the impurities?—I will not say it would be impossible. I have seen a pure specimen, but it was a cabinet specimen.

Virtually impossible?—Yes, as a commercial article.

Taking the method in which it is obtained?—Clearly, quite impossible.

Mr. Vaughan: Supposing the 5 per cent. of starch or flour were there, might it be considered to be a fair estimate of what you would necessarily expect to find in the collection of it?—Yes, I think so.

Cross-examined by Mr. Jenkins.

If you found 35 per cent. of flour present, should you consider that was an adulteration?—I should consider, if the flour were of the character I found in the scammony, that the scammony had been very badly collected.

I suppose you are perfectly acquainted with the Pharmacy Act. In your judgment, would that be an adulteration, for that Act says, "any person who sells an article which is adulterated shall, unless the contrary is proved, be deemed to have knowledge of the adulteration."

Mr. Vaughan: Are you speaking about the last Act?

Mr. Jenkins: I am speaking of the Pharmacy Act.

Mr. Vaughan: That is just the matter in issue. According to the evidence of Dr. Attfield, this is really no adulteration.

Mr. Jenkins: You said just now you thought it would be impossible to separate the impurities. Take the flour for instance, is there no means of separating that?—That amount of flour, or dust, or whatever it may be, which adheres, could not be detached.

Do you mean to tell me that if there were 20 per cent. of flour present in the powder it would be impossible to remove that?—If the 20 per cent. were in the scammony it would be impossible to remove it. If it were on the outside it could be brushed off.

In that sample is it outside (referring to a specimen)?—It adheres too tightly; try it yourself.

Will you explain why it could not be removed?—Because I have found you cannot do it.

I thought you said it could be done?—In such samples it could not be done; you would leave a little sticking to the surface.

According to the authorities, to several of which you referred, there ought to be from 75 to 80 per cent. of resin present. If that particular powder now under consideration only contains 73 and a fraction, would not that be below the standard?—That was when the moisture was out of it. Your analyst admitted there would be nearly 80 per cent. of resin in the dried scammony.

Mr. Wontner: You have the evidence of your own witness that he did not dry it.

Mr. Jenkins: There are two other summonses by the Board of Works against other vendors of this scammony powder. If your honour's decision should be against me upon this, I should be disposed to withdraw them, if your worship, having reference to the amount of alleged adulteration, should think it right that I should do so in my capacity as officer of the Board. The adulteration there is much larger.

Mr. Vaughan: I wish to ask a question of Mr. Francis.

(*Mr. George B. Francis, sworn. Examined by Mr. Vaughan.*)

You are a member of this firm?—Yes.

Where did you obtain that bottle of scammony from, that you gave Dr. Attfield for analysis?—Directly we heard from Mr. Cocks about the service of the summons, I called upon Mr. Cocks, and from the identical bottle containing the scammony we supplied to Mr. Cocks, I took that sample, and his assistant assured me that it was the same.

Mr. Wontner: The assistant is here, sir.

Mr. Vaughan: Is there any dispute about that?

Mr. Jenkins: No, sir; I do not for a moment dispute it.

Mr. Vaughan: I am of opinion in this case that there is no adulteration. The evidence of Dr. Attfield displaces the evidence that was given by the analyst with regard to the existence of the starch. The whole case now resolves itself really into the presence of the flour, and the presence also of the chalk; and after the evidence as matter of fact which has been given by Dr. Attfield, I can only come to the conclusion that the chalk has been introduced into the scammony in the way which has been suggested by him from the fact of its being a chalky soil in which the root itself has been grown. If chalk has been picked out by Dr. Attfield, from the interstices of the scammony root, it must be perfectly clear that the earth in which it has grown, if not entirely chalk, was very largely impregnated with it. As regards the chalk, therefore, it seems to me that very likely indeed it was introduced into this from the circumstance of its being collected by Greeks or Turks, or whoever they might be, who were employed for the purpose of getting at these roots. As regards the presence of flour, I think the explanation given by Dr. Attfield is a very satisfactory one. He says, this is a sticky substance, as everybody must know, and that, for the purpose of preventing the lumps from adhering one to another, there is some powder which is required to be placed between them. That powder appears sometimes to be flour, or some farinaceous substance, and I think it exceedingly creditable that no other powder of a deleterious character is employed instead of that. It appears that the quantities which are in this specimen of scammony are really such quantities as are necessarily, in fact, to be expected to be found in such a quantity as has been produced here to-day; and I think, therefore, under those circumstances, it is rather hard that a summons should be taken out against the defendant. But the summons having been taken out, I am satisfied that no adulteration is shown here. Having paid some attention to the evidence which has been produced before me in this case, I am not at all satisfied that there has been any adulteration, and I think the summons must be dismissed.

Mr. Wontner: What do you say, sir, as to the costs? Before a former colleague of yours, Mr. Arnold, a similar experiment was tried without the local authorities taking any trouble to inquire; and Mr. Arnold therefore dismisssed all the summonses, granting full costs, both of the attorney and all the witnesses, against the Board. I really think that before taking out this summons they might have looked, at least, into one or two of the standard works, and there they would have found the very explanation which has been given to you to-day. The analyst himself says that when he analysed it he thought it was a very fair sample. It is very hard to bring people here and bespatter them, without making sufficient inquiry beforehand; and I trust you will mark your sense of this case by giving costs against the Board. Although this Act is a most salutary one, it is very hard if it is to be used as a weapon of oppression instead of, as it was intended, to prevent fraud upon the public.

Mr. Jenkins: I believe, sir, your personal knowledge will tell you that the Strand Board of Works are by no means hasty in taking these proceedings. But under the Act, upon receiving the certificate of the analyst, we are bound to do so. The instructions given in this district are that the inspector shall go, without distinction, to every shop of the different kinds; and members of the Board who are in trade are treated in the same way. Having received the certificate of the analyst that an adulteration had taken place, I submit we had no option but must come here and ask your decision in the first instance. There is no favour shown in any shape or form; and I have never suggested one word against the firm, some of the members of which have been called before you to-day.

Mr. Vaughan: It is suggested that the analyst had communicated to the inspector his opinion as regards the specimen.

Mr. Jenkins: That was after the summons was taken out. The certificate was sent to us. No doubt my friend has exercised a very considerable amount of ingenuity in getting the weakest case before you first.

Mr. Wontner: I beg your pardon; it is the first upon the list.

Mr. Vaughan: I should like to have the inspector recalled.

(*Mr. F. Taylor, recalled. Examined by Mr. Vaughan*)

Were you told by the analyst that this was a very good specimen or a very fair specimen?—A very fair specimen, after the summons was taken out.

Did you communicate that to the solicitor of the Board?—No.

Why did you not?—I had no occasion that I know of.

Surely it is your duty to communicate all circumstances that come to your knowledge. The analyst gave his certificate and he communicated something to you which you ought to have communicated to the solicitor?—It was not till after the summons was taken out.

That makes no difference, because a summons may be withdrawn after it is taken out.

Mr. Jenkins: I was not aware of it till I heard it here to-day.

Mr. Vaughan: I do not know that I can impose costs, Mr. Wontner, in this case. There is no doubt the inspector ought to have communicated to the solicitor of the Board what he heard from the analyst on the subject, and then the summons could have been withdrawn. I think, for the future, when an analyst does find a fair specimen, that circumstance ought to be communicated to the Board, whether the summons has been taken out or not, because then they would be able to determine what course should be taken.

Mr. Jenkins: If I had known it, I should instantly have stopped the summons.

Mr. Wontner: The analyst told Mr. Francis, in conversation, that it was a very good specimen, and if he could have stopped the summons he would.

Mr. Vaughan: It does not appear to have been brought home to the knowledge of the solicitor.

Mr. Wontner: I do not want to press the application further.

Mr. Vaughan: I must say, in all these cases, if the quantities of ingredients supposed to be adulteration introduced into the article, is there without any knowledge to implicate the vendor, I think that circumstance ought to be taken into consideration before taking out a summons. No doubt this is a case of great hardship. I dismiss the summons, and with regard to the others I understand they are withdrawn.

Mr. Jenkins: I would just mention this before I withdraw them. The analyst certifies in one case an adulteration to the extent of 34 per cent. If you think, after that, I am justified in withdrawing the summons, I will do so.

Mr. Vaughan: I cannot tell you.

Mr. Jenkins: I was very careful just now to ask the witness whether he thought 34 or 35 per cent. would be an adulteration.

Mr. Wontner: Perhaps as *amicus curiæ* you would allow me to observe that, turning to the authorities, I find it stated over and over again that all these impurities are introduced in Smyrna by the merchants there, and the articles are sent over here with the impurities mixed up so that it is quite impossible to separate them from the article sold; and it is equally impossible for the merchant here to say that those specimens which are not so good are not scammony.

Mr. Vaughan: You must bear in mind that the facing of tea is done in China and sent over here. No doubt that is an adulteration, and I suppose there would be a difficulty in removing the face of the tea; but the question is whether that ought to be sold.

Mr. Wontner: As a matter of information, will you allow me to say that I have here the PHARMACEUTICAL JOURNAL and report, showing the different quantities imported in each year since 1866 down to 1870. In 1866 the quantity was 9886 lbs, and it has increased from that to 25,592 lbs, whereas the yielding capacity of the roots in Asia Minor remains always the same. Therefore, to satisfy the largely growing public demand, I suppose the people over there find it necessary to add something to it.

Mr. Jenkins: That is an argument in favour of our coming here.

Mr. Vaughan: It shows that the dealers in scammony should be very careful.

The other summonses were then adjourned for a fortnight.

POISONINGS BY CARBOLIC ACID, GIVEN IN MISTAKE FOR MEDICINE.

An inquest was held in the Birkenhead workhouse, on Friday, the 12th June, on the body of Patrick Richards, aged 56 years, who was accidentally poisoned on the previous Tuesday by having some carbolic acid administered to him by mistake, instead of a dose of black draught. The inquest had been adjourned for a *post-mortem* examination of the body to be made.

Meshech Boswell, an inmate of the hospital, stated that between nine and ten o'clock on Tuesday morning the deceased, who occupied the next bed to witness, asked the head male nurse, Thomas Barlow, for some opening medicine. Barlow left the ward, and immediately brought something of a dark colour in a measure, and put the half of it in a glass. When he had taken about one-half of it, the deceased said three times that it was very hot. Barlow then tasted it, and exclamed, "Oh, dear, I have given him the wrong." The doctor was immediately sent for, but before his arrival a mustard emetic was given to the deceased. Witness considered Barlow a very kind and attentive nurse.

At this stage of the inquiry, the coroner and the jury adjourned to the hospital dispensary. On the mantelpiece there were a number of bottles, containing both poisonous and harmless drugs. The bottles were mixed together, and there appeared to be no proper arrangement of the different medicines. In front of the mantelpiece there were two large blue glass bottles, side by side, one labelled "House mixture," and the other (from which the fatal draught had been taken) "Carbolic acid." The latter was also labelled "Poison" in red letters, but the word was nearly obliterated. The coroner pointed out that one bottle on the mantelpiece bore the direction "A teaspoonful of this mixture to be taken three times a day," whilst "Muriatic acid" was written on a label underneath turned upside down.—Dr. Daniels, one of the Union medical officers, who was in attendance, wished to make some explanations, but the coroner told him he must leave the jury to judge for themselves.

Dr. Henry Wilson deposed that before this occurrence he had been acting medical officer at the workhouse for six days. He attended the deceased, who had ulcerated legs. Witness had never prescribed for him. On Tuesday morning, at 20 minutes to ten o'clock, Mr. Williams, the master of the workhouse, came for witness, and asked him to accompany him to the hospital. In about ten minutes witness saw the deceased, who was then lying across the bed with his face downwards. The man had been placed in that position by the nurse and his assistant, who were endeavouring to make him vomit. Witness, on examining the deceased, found that he had lost all power of vomiting. He was comatose and insensible. Every means was resorted to to make the deceased vomit, but without effect, and death ensued 20 minutes after witness reached the hospital. Barlow, the nurse, told witness that the deceased asked him for a dose of opening medicine early in the morning, and that he had given him what he thought was black draught, and in quantity an ounce and a half, and that he had immediately discovered that he had administered instead carbolic acid. Witness had since made a *post-mortem* examination of the

body, and, from the appearance of the stomach, had no doubt death was caused by carbolic acid.—In answer to the coroner, the witness said the nurse had access to the hospital dispensary any time he pleased, the key being under his charge.—The Coroner: I suppose you have various preparations made up, and kept in different bottles as a convenience? For instance, you have black draught? Witness: Yes.—The Coroner: And it is kept in a large bottle? Witness: Yes.—The Coroner: There are other medicines besides black draught kept there? Witness: Yes; I see there is a cough mixture there. The Coroner: Does the hospital attendant supply patients who may ask for black draught, without your knowledge? Witness: So far as this case is concerned, I know nothing about it; but it is the custom in hospitals to do so if a patient asks for it. If there is a rule to the contrary, it is exceptional. Barlow had informed him that the bottle containing the black draught was kept on the mantelpiece; but he (witness) never used it. The first time witness saw the black draught was on Tuesday on the mantelpiece. The bottle containing the black draught was labelled "House mixture."—The Coroner: Did you see another bottle on the mantelpiece next to the bottle containing the "house mixture?" Witness: Yes; that bottle was labelled "Carbolic acid," and underneath was the word "Poison," with the chemist's name. The bottle containing the carbolic acid was precisely similar in size and appearance to the one containing the black draught.—The Coroner: And there were a number of other bottles on the mantelpiece? Witness: Yes; the contents of some of the bottles were harmless, whilst others were not, according to the dose.—The Coroner: Did you notice muriatic acid there? Witness: I did. The witness added that when he saw the bottle containing the carbolic acid it was so placed that the label was not visible, but the label on the bottle containing the black draught was visible. In reply to Mr. Pugh, Dr. Wilson said it was customary for the hospital attendant to administer black draught. The nurse, Barlow, told witness that when he took the bottle to pour into the glass what he supposed to be black draught the label was turned from him. On Tuesday morning Barlow had been dressing the wounds of some patients with carbolic acid, the smell of which he might retain for some time—perhaps a day. In some hospitals, the black draught was usually under the charge of the nurse; but under ordinary circumstances it was not kept by itself. It was not kept under lock and key. He considered it a very dangerous practice to keep harmless and poisonous drugs together, but in this case he considered it was unintentional. In the Birkenhead Hospital dispensary there was a want of space; indeed, there was not a shelf in the room. In witness's opinion, all bottles containing poisons should be kept distinct from other medicines. In answer to a juryman, Dr. Wilson further stated that when in the bottles the carbolic acid and the black draught appeared to be of the same colour, but when poured out they presented a different colour.

The Coroner said it would perhaps be satisfactory to the jury if Barlow made a statement, but it was a matter entirely for his own consideration.

Thomas Barlow, the nurse, then made a statement to the effect that on Tuesday morning he had been dressing the legs of some patients in No. 6 ward with carbolic acid and water. Afterwards he went into the ward where the deceased was, and dressed a carbuncle. As he was leaving the ward, Richards asked him for a black draught, as he was very much constipated. To oblige the old man, he (Barlow) went to the dispensary and brought up what he thought was a black draught, and measured an ounce and a half. When he had taken a portion of the draught, the deceased said it was very hot. He (Barlow) then tasted what was left in the glass, and, finding that it burnt his mouth, he discovered his mistake, and exclaimed, "Oh, dear, I have given him a wrong medicine." He instantly sent his wife for the doctor, and he gave Richards a dose of castor oil, which he swallowed. Mrs. Barlow also brought a mustard emetic, but the deceased did not vomit. The doctor was soon in attendance, and remained with the deceased till he died.

The Coroner, in addressing the jury, remarked that Barlow, the nurse, had made what appeared to be a very candid statement of the facts, which was corroborated by the evidence of Dr. Wilson. There could be no doubt that the deceased died from the effects of carbolic acid, administered by Barlow, the hospital attendant; and it would be for the jury to say whether he (Barlow) was guilty of gross and culpable negligence or not. If the jury thought there was a reasonable excuse for the mistake the nurse had made, then they might give him the benefit of the excuse, and reduce the case to one of excusable homicide. In order to arrive at the latter conclusion, the jury must be satisfied that Barlow exercised due and ordinary caution when he administered the carbolic acid. The case was a very serious one, not only as regarded Barlow, but as it affected the workhouse, for it might create a great prejudice against the management. With respect to the dispensary, there could be no doubt there was an immense amount of confusion as regarded the placing of the bottles. On the mantelpiece there was a large number of bottles, some of them containing deadly poisons, whilst others contained medicines of a harmless character. In an establishment of so much importance it was necessary that everything should be conducted in a correct and systematic manner; and all medicines of a poisonous character should be kept apart and entirely separate from everything else. It would be much safer and better if poisonous medicines were kept under lock and key, and that these should be in charge of the medical officer. However, it appeared to be an act of great carelessness on the part of Barlow—who, it might be supposed, could read and write—that he did not look at the labels on each bottle to see what he was taking. If the jury considered Barlow guilty of gross and culpable negligence, then they must hold him responsiblble.

The jury, after a short deliberation, returned the following verdict:—"The deceased died from the effects of carbolic acid, administered by Thomas Barlow, a nurse in the Birkenhead Union Hospital; and they further find that Barlow did not exercise due caution before administering what he considered to be a black draught. The jury add a presentment that there has been great confusion and irregularity in the arrangement of the different medicines in the hospital dispensary, and they recommend that, in future, poisons be kept under lock and key, quite distinct from medicines of a harmless nature."

The Coroner said he quite concurred in the verdict of the jury.

Upon this verdict, Barlow was discharged by the Coroner; but it was understood that he will be brought before the magistrates.

Mr. Williams, the master of the workhouse, said he hoped the unfortunate affair would not reflect any discredit on the management of the establishment, because attendance to the surgery was altogether out of his sphere of duty. He had been master of the establishment only a short time, and the matter might do him a great deal of harm.

A Juryman stated that in considering their verdict the jury never for a moment supposed there had been any mismanagement on the part of Mr. Williams; indeed, his name was never taken into consideration in the matter at all. The jury also expressed their sympathy with Barlow.

The Coroner remarked that attendance to the surgery was no part of Mr. Williams's duty.—*Liverpool Mercury.*

An inquest has been held at Gorton, on the body of Samuel Burford. The deceased hurt his thumb whilst at work, from which he suffered great pain. In order to obtain rest he purchased some chloral, and in the night he asked his wife to give him a draught of it. She went downstairs for it, but took no light, and in mistake gave her husband a draught of carbolic acid, from the effects of which he died the same night. It was stated that Mrs.

Burford had always been on the most affectionate terms with the deceased, and they had lived very happily. The jury returned a verdict of death by misadventure.—*Liverpool Mercury.*

Review.

A Treatise on Food and Dietetics, Physiologically and Therapeutically Considered. By F. W. Pavy, M.D., F.R.S. London : J. and A. Churchill.

In his preface to this work, Dr. Pavy says, "From the fact that the subject of food is one of deep concern, both to the healthy and the sick; that the information which has been obtained during the last few years has completely revolutionized some of the cardinal scientific notions formerly entertained; and that no modern systematic treatise of the kind here presented exists in the English language, I have been encouraged to think that the task I have undertaken may not be deemed superfluous. Whatever the result attained, I have steadily striven, sparing no pains for the purpose, to render the work instructive and useful." In this endeavour Dr. Pavy has completely succeeded, and he has, moreover, rendered his book exceedingly interesting; so that it may not only be studied carefully for the sake of the valuable information it contains, but may serve to pass an idle hour pleasantly as well as profitably.

It is easy to see, even although Dr. Pavy had not stated it in his preface, that much labour has been expended in collecting the numerous facts regarding foods of all sorts, their properties, uses, and employment; scattered as these necessarily are in books and periodicals of the most various sorts, and many of them inaccessable to ordinary readers.

The author commences with a brief but clear exposition of the correlation of the physical forces, and shows the necessity of food to supply energy to the organism. The origination and constituent elements of food are next dealt with; the classification, chemical relations, digestion, assimilation, and physiological uses of the alimentary principles discussed; and the use and value of each as a force-producer are stated. The difficult question of the comparative values of nitrogenous and non-nitrogenous principles in this respect is admirably treated, all the most important evidence being carefully collected and clearly placed before the reader. In speaking of the production of fat as a result of the splitting up of nitrogenous matter, however, Dr. Pavy states that although it is highly probable, we have nothing in the nature of proof. Now, Voit and Bauer's experiments on the production of fat in the organism after phosphorus poisoning do seem to furnish the proof required; for these observers found that fat was rapidly produced in the poisoned animals, although they received no food whatever, and all fat had been previously removed from the body by prolonged abstinence. The conversion of starch into sugar by the saliva is said by Dr. Pavy to be arrested in the stomach. This is true of the dog, in which the acidity of the gastric juice is sufficiently great to stop the action of the saliva; but not of man, in whom the acidity is less, so that the conversion of starch into sugar continues so long as the stomach is healthy, and only ceases when an abnormal quantity of acid is present in it. Such slight oversights as these, however, hardly detract from the value of the book; and, indeed, their slightness is a good evidence of its general accuracy. The description of food stuffs is most complete, and supplies a desideratum long felt both by medical practitioners and the general public. Nothing is more common than the question put by a patient to his medical adviser, "What shall I eat?" and not unfrequently his adviser is non-plussed, and gives a random answer. Dr. Pavy's book supplies the information wanted, and by stating the digestibility of various food, enables both practitioner and patient to select the proper sorts. Beverages of all sorts, water, tea, coffee, cocoa, alcohol, wines, etc., are fully discussed, and their proper use explained.

The injurious effects of tea in irritable states of the stomach is simply stated, but we think the author might with advantage have laid more stress on its power of causing flatulence. The description of the effect of alcohol on the system, and of its use and abuse, is exceedingly good and deserves to be read with great attention. A few pages are devoted to the preservation of food, and then follows a section on the principles of dietetics, and the rules which regulate the relations of diet to work. The next division on practical dietetics, including diet of infants and diet for training, is, perhaps, the most important in the book, and contains many valuable hints on the proper times for meals, and the quantity and quality of food to be taken at each. The book concludes with a section on therapeutic dietetics, including a number of recipes for dietetic preparations for invalids, and a list of hospital dietaries. Not the least valuable of Dr. Pavy's contributions to dietetics is the "fluid meat," which he has had prepared by Messrs. Darby and Gosden, and which is mentioned in this section. Unlike Liebig's extract, which contains merely the extractive matters of meat, which have little or no nutritive value, the fluid meat contains all the albuminous matters, artificially digested and ready for absorption, without requiring any further digestion in the body. It is, therefore, of great value when the digestive system is weakened by disease; and a similar preparation, though made by a different process, is now being employed in Germany. Dr. Pavy has omitted all mention of the curative use of diets consisting of single articles, such as the whey cure and grape cure, the omission of which we hope he will supply in another edition. It would be hardly fair to conclude this notice without mentioning the beautifnl paper on which the book is printed. Altogether the work is worthy of the author's high reputation, and we can thoroughly recommend it as one which will well repay perusal.

BOOKS RECEIVED.

Nouveaux Elements de Pharmacie. Par A. Andouard, Pharmacien, etc. With 120 engravings. Paris : J. B. Baillière et Fils. 1874. From the Publishers.

On Food : its Varieties, Chemical Composition, Nutritive Value, Comparative Digestibility, Physiological Functions and Uses, Preparation, Culinary Treatment, Preservation, Adulteration, etc. By H. Letheby, M.B., M.A., Ph.D., etc. Second Edition. London : Baillière, Tindall and Cox. 1872. From the Publishers.

Water Analysis : A Practical Treatise on the Examination of Potable Water. By J. Alfred Wanklyn and Ernest Theophron Chapman. Third Edition. Entirely Re-written by J. Alfred Wanklyn, M.R.C.S., etc. London : Trübner and Co. 1874. From the Author.

Notes and Queries.

PILLS OF IODINE IN COMBINATION WITH ALBUMEN.—In a note in *L'Union Pharmaceutique* (vol xv. p. 97), M. Collas states that iodine can be administered advantageously in the pill form in combination with albumen. As has been before pointed out by Professor Guerri, of Florence (Pharm. Journ. [3] vol. iii. p. 462), iodine combines with albumen in constant and definite proportions. The iodine is completely covered, and its presence can only be ascertained by the destruction of the organic matter. The iodized albumen may be prepared by well shaking together an albuminous solution and iodine in very fine powder, or in solution, in an appropriate vehicle. The mixture is at first of a full blackish-brown colour; but after being left in contact some hours it becomes decolorized, and no longer gives the violet colour with starch. The product is then dried with a gentle

heat, and made up into the pill form, the quantity used being such as that each pill shall correspond to 5 milligrams of iodine. M. Collas says that these pills have been found useful in the Hôpital Beaujon, and that their administration has been continued during several weeks without inconvenience.

EXTRACT OF VANILLA AND TONKA.—The following formula for an Extract of Vanilla and Tonka for flavouring purposes is given by Dr. E. P. Nichols (*Trans. Amer. Pharm. Soc.*, 1873, p. 599):—

Take of Vanilla Beans	4 ounces.
Tonka Beans	8 ounces.
Deodorized Alcohol, proof .	8 pints.
Simple Syrup	32 ounces.

Cut and bruise the beans, macerate for fourteen days in one-half the spirits, with occasional agitation, pour off the clear liquor and set aside, pour the remaining spirits on the magma, and heat by means of a water-bath to about 170° Fahr., in a loosely covered vessel, keeping it at that temperature two or three hours, cool and strain through flannel with slight pressure, mix the two portions of liquid and filter through felt; add the syrup. If a genuine extract of vanilla is desired, take of vanilla beans six ounces, omit the tonka, and proceed as above. This process so exhausts the beans that percolation is unnecessary. The loss by evaporation is very slight, if a little care is taken in properly covering the vessel, and preventing too high a temperature during the heating process. This extract is not quite as elegant in appearance as that made by percolation without heat. It could probably be made perfectly clear without any diminution of its flavouring qualities, but Dr. Nichols made no experiments in this direction.

Dr. Nichols recommends that in making the extract the long bean should always be selected, and that handsome-looking beans should not be bought when offered considerably under the market price.

Correspondence.

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

CARBOLIC ACID SUPPOSITORIES OF THE "ADDITIONS TO THE BRITISH PHARMACOPŒIA."

Sir,—Mr. Pratt, of Barnstaple, would greatly oblige several of your readers by giving further particulars of his experience in making the Carbolic Acid Suppositories of the B. P. Addendum, "in a short time, with no trouble," according to the directions given.

How much powdered starch did he find to be a "sufficiency?" Did he use carbolic acid in "crystals?" It would also be interesting to know whether they were pressed into a mould, or shaped in any other way, and what he found them to weigh when finished; also the source of the powdered soap used, and whether he found it to agree with the B. P. tests, as I believe different samples of curd soap vary considerably, but although I have tried several samples of soap I have never succeeded in making the suppositories properly by following the legal form. Several friends who have tried the formula also agree that a satisfactory result cannot be obtained without some modification of the directions given; and Mr. Umney, in his well-known paper, published in the Journal of the 4th of April, states—"The Carbolic Acid and Soap Suppository does not work well, the quantity of moisture being alone derived from the carbolic acid seems to me insufficient; at any rate, it will not admit of starch being used."

Mr. Pratt's experience of the "simple directions of the B.P. Addendum," therefore, appears to be singular.

T. HOWELL WILLIAMS.

44, *Seven Sisters Road, N., July 16th*, 1874.

CASTOR OIL—DERIVATION OF ITS NAME.

Sir,—In the recent review of the 'Pharmaceutical Lexicon,' by H. V. Sweringen (June 13th) this observation occurs:—

"In one 'tracing of the original,' however, which he does give, he follows Webster and other lexicographers in saying that 'castor oil' is a corruption of 'castus oil,' the plant producing it having formerly been called 'Agnus castus.' We should like to learn whether this is fact or fancy."

The learned Dr. Paris, in his 'Pharmacologia,' has the following:—

"Castor oil will suggest itself as another example [of verbal corruption in medical botany]; this oil, from its supposed efficacy in curing and assuaging the natural heat of the body, and in soothing the passions, was called by the French 'Agnus Castus,' whence the inhabitants of St. Kitts, in the West Indies, who were formerly blended with the French in that island, called it *castor* oil."

I simply give this for what it is worth; if Dr. Paris is correct, it is, of course, a "fact;" but, should more recent authorities have found out that he was in error, then it will remain a "fancy." I, for one, should be pleased if any of your correspondents can corroborate or disprove Dr. Paris's statement.

WM. ROGERS.

HIGHER REMUNERATION FOR CHEMISTS.

Sir, Probably Mr. Fairlie would wish a chemist's prices regulated by some such method as in the following anecdote, which an "old salt" has just told me:—

"A darkey was engaged to kill a calf; when the task was completed, came the question of payment. 'How much for killing the calf, Sambo?' 'Four dollars, massa.' 'Four dollars for killing a calf! how do you make that out?' 'Two dollars for kill calf, massa, and *two dollars for know how*.'"

J. BURT.

We are glad to satisfy the expectations, and confirm the belief of our worthy contemporary, the *British Medical Journal*, by stating that Dr. Dobell was not a party to the introduction into this Journal of the notice which appeared the week before last of certain pharmaceutical novelties exhibited at the soiree lately given by him. We cannot, however, acquiesce in the opinion that "the proceeding" was, on our part, "a breach of professional propriety," or in the assertion that it "calls for energetic protest on the part of those who wish to retain a due standard of professional decorum." Of Dr. Dobell's intent or expectation in regard to this matter we cannot say anything, since we have no cognizance, and were induced to publish simply from the desire to supply our readers with information likely to be useful to them.

E. Cotterell.—Previous to the receipt of your letter we had noticed that the paper did not contain anything which had not been published before.

P. and P.—(1) Because the preparation contains a larger proportion of the active principle than the same weight of the crude drug. (2) Yellow wax has been recommended. See vol. i. of the present series of this Journal, p. 566.

"*Student.*"—You are mistaken. Dr. Redwood did not write "Syrupus Tolulani," but "Syrupi Tolutani," and therefore no correction was required.

"*G. L. Napier.*"—(1) The Juries Bill has not yet passed the House of Commons; in its present state it does contain an exemption of chemists and druggists from jury service. (2) If you refer to recent numbers of this Journal you will find full reports of the subject respecting which you ask for information.

"*Ignavus*" (who should have enclosed his name and address) will find all the details in the Calendar of the Pharmaceutical Society, which may be obtained from the Secretary, price 1*s*.

"*Elcho.*"—The triple, as imported, is, we believe, generally used.

"*Crinis.*"—Recipes for "Lime Juice and Glycerine" were given in vol. i. of the present series, pp. 658 and 716.

L. S.—The colour described is wholly due to the action of astringent matter in the Compound Tincture of Cardamons upon the Sulphate Iron. There is an Electuarium Anthelminticum in the French Codex in which the powder of Male Fern is an ingredient.

"*June.*"—It it customary to use Sp. Chloroformi.

COMMUNICATIONS, LETTERS, etc., have been received from Dr. F. Porter Smith, Dr. Symes, Mr. Shaw, Mr. Burt, Mr. C. R. Blackett, Mr. Pittman, Mr. Fairlie, Mr. Napier, Mr. J. F. Brown, Mr. Humpage, Mr. Holdsworth, Mr. Jackson, "A Pharmaceutical Chemist," "Excelsior."

THE PURITY OF DRUGS AND PHARMACEUTICAL PREPARATIONS.

BY THE EDITOR.

THE case reported in last week's Journal of prosecution for the sale of adulterated scammony, and the letter of Mr. Urwick in the present number, as well as some other instances that have recently been made public, all tend to impress upon the retail dealers in drugs the responsibility of their business. They also tend to suggest to retailers the indispensable necessity of exercising considerable caution in regard to the quality and purity of the drugs and preparations they sell, so as to protect themselves from the consequences of prosecution under the Adulteration Act.

On a recent occasion, both Mr. Horner and Mr. Hodgkinson, in giving evidence before the Select Committee on the Adulteration Act, expressed a decided opinion that the wholesale dealers in drugs and pharmaceutical preparations, exercised a protective influence in favour of retailers. According to their view, the practice of the wholesale dealer is to take care that only drugs of unquestionable quality are supplied to those who require it. They also stated, quite as decidedly, that there was no difficulty in obtaining drugs and preparations of good quality—that in fact it was wholly a matter of price, and, for those who demanded it, there would be no hesitation in guaranteeing the articles supplied.

As an illustration of the necessity of exercising caution in purchasing pharmaceutical articles, I will mention an instance that recently came under my own observation. A manufacturer of citrate of iron and quinine was offered what appeared to be an excellent sample of sulphate of quinine, at a price much below that now ruling for either the English or foreign makes of this article. It was the produce of a well-known Continental maker, and was offered by a house of unquestionable respectability acting for him in England. The reason given for the low price, and for not selling the salt in bottles, with the maker's label, was the very plausible one, that it contained "a very trifling per-centage of cinchonidine." By accident, the sample came into my hands, and on analysis I found it to consist of—

Sulphate of cinchonidine, 60 per cent.
Sulphate of quinine, 40 "

Assuming that the 2,000 ounces of this article offered for sale had been purchased, without further inquiry, and converted into citrate of iron and quinine (?), it does not require much power of imagination to appreciate the possible consequences that might have ensued if some of that preparation had found its way into the hands of a competent public analyst; or to perceive what damage and discredit might have fallen upon the manufacturer and dispensers who had made and employed it.

NOTES ON THE MEDICINAL PLANTS OF THE SCROPHULARIACEÆ.

BY JOHN R. JACKSON, A.L.S.

This order, which is for the most part composed of herbaceous plants, is usually considered as comparatively unimportant in an economic point of view. With us this is to some extent true, the foxglove *(Digitalis purpurea)* being the only officinal plant of the group; but in other countries many species are esteemed as valuable medicines. The family is very widely distributed; its members are most abundant in temperate regions, but some are nevertheless found in other climates. Though many of the plants are acrid and bitter, their medicinal properties vary very much, as will be seen in the following consideration of the different species. Thus, in the foxglove, which is so well known that we need not describe the plant, the effects are remarkable for their varied operation, altering the frequency of the pulse, or enfeebling the action of the heart in various degrees in different persons.

In North America many of *Scrophularieæ* are used in medicine. *Scrophularia nodosa*, L., the figwort, a plant growing some two or three feet high, and found in woods and thickets over a good part of Europe, was at one time officinal in the Dublin Pharmacopœia, the leaves being used in the preparation of an ointment.

In some parts of Europe, as well as in America, they are occasionally used, as well as the roots, for making poultices for ulcers, tumours, burns, and cutaneous eruptions. The leaves have a rank, disagreeable smell and an acrid bitter taste, and the root has also a nauseous odour. The leaves of this plant were, at one time, supposed to have tonic, diaphoretic, and anthelmintic properties, and were advocated for the cure of scrofula. Farmers occasionally use a decoction of the leaves for curing scab in pigs.

The great mullein, *Verbascum Thapsus*, L., a well known British plant, in gravelly, sandy, or chalky soils, is common also in neglected fields and along roadsides in the United States. The thick woolly leaves have a mucilaginous, bitter taste, which is extracted by infusion in water. They are demulcient and emollient, and were at one time much valued not only in domestic practice but by practitioners in catarrh and diarrhœa. Sir James Smith testifies to their value in the following words: "A pint of cow's milk, with a handful of the leaves of this mullein boiled in it to half-a-pint, sweetened, strained, and taken at bed-time, is a pleasant emollient and nutritious medicine for allaying a cough or removing the pain and irritation of the piles." The leaves, steeped in hot water, are not unfrequently used by country people as poultices in hæmorrhoidal complaints. In Sweden and Norway a decoction of the leaves is given to cattle suffering from cough or pulmonary diseases. The flowers, it is said, when dried in the sun, give off a fatty substance, which is used in Alsace as a cataplasm. Porcher, in his 'Resources of the Southern Fields and Forests,' thinks that sufficient attention has not been paid to this plant as a medicine, and strongly recommends the desirability of making a careful analysis. In an enumeration of the uses to which the plant is put in North America, he states that the leaves steeped in hot water are applied externally as a feebly anodyne emollient dressing for sores, for the relief of headache and frontal pains, and are much used by the poorer classes. The leaves of this plant and the bark of the root of sassafras, in equal parts, boiled in water and concentrated, then mixed with powdered sassafras bark to form pills, are said to be valuable in the treatment of ague; and finally he refers to a report of "several cases, in which the paroxysms of intermittent fever were completely prevented by the administration of the warm infusion of the fresh root. Four ounces of the fresh root to one pint of water reduced one-half by boiling, of which two ounces

were given every hour, commencing four hours previous to the expected chill."

Other species of *Verbascum* have been said to possess similar properties to the species just mentioned.

In the genus *Veronica*, which is well known in this country as including some of the prettiest of our native flowers, we find several species have been used at various times in medicine. The well known and beautiful little plant, the germander speedwell (*Veronica chamædrys*, L.), was at one time valuable amongst the old herb-doctors as a vulnerary, and Gerarde recommends the root as a specific in pestilent fevers.

The leaves of the common speedwell (*V. officinalis*, L.) are astringent and bitter, and were, even up to a comparatively recent date, not only used as medicine in this country but also as a substitute for tea. The plant grows in South Carolina, and, though not at present included in the United States Dispensatory as an officinal medicine, it is nevertheless, after careful examination, reported to contain "in the fresh juice and an extract from the herb, a bitter principle, soluble in alcohol, but scarcely so in ether; an acrid principle, red colouring matter, a variety of tannic acid, a crystallizable fatty acid, with malic, tartaric, citric, acetic, and lactic acids; a soft, dark, green, bitter resin and mannite." The Brooklime (*V. Beccabunga*, L.), also a British species and found in moist places, was formerly valued as an antiscorbutic, the leaves and young tender stems being the parts used. In some parts the leaves are occasionally applied as a styptic to wounds, and when bruised are also applied to burns. Like the former, this species has been used in North American practice for purifying the blood.

Within the last few years, some attention has been given in America to the Virginian veronica or culversroot (*Veronica Virginica*, L.). It is a perennial plant, common in the United States in mountain valleys, and grows to a height of three or four feet. The root is the part used; it is bitter and nauseous, and imparts its active properties to boiling water. The fresh root is an active cathartic and emetic. A large teaspoonful of the root in a gill of boiling water, repeated every three hours, is said to be an efficient purgative, operating with mildness and certainty, and peculiarly adapted to typhoid and bilious fevers.

The *Gratia Dei*, so called in olden times on account of its active medicinal properties, and known also as the hedge hyssop by the herbalists, is the *Gratiola officinalis*, L. It is a perennial herb, common in moist places in the South of Europe, where it is used in dropsy, jaundice, scrofula, chronic hepatic affections, etc. In large doses, it is poisonous. "According to Vauquelin, the purgative property depends upon a peculiar substance analogous to resin, but differing from it in being soluble in hot water. Dr. Whiting has announced the existence of veratria in it, which accounts for its active properties." Though not used in medicine in this country, it is said to have formed the chief ingredient in a once famous nostrum for gout, known as "eau médicinale." In some of the meadows of Switzerland the plant is said to be so abundant that it is dangerous to allow cattle to graze in them.

In a recent American list of "Pure Medicinal Preparations prepared *in vacuo*" at New Lebanon, occurs a preparation from *Chelone glabra*, L. The plant is known as the snake-head, or balmony, and grows in damp soils. Its action is described as follows in the catalogue above referred to: Tonic, cathartic, and anthelmintic, valuable in jaundice and hepatic diseases, likewise for the removal of worms. Used as a tonic in small doses in dyspepsia, debility of the digestive organs, and during convalescence from febrile and inflammatory diseases. Fluid extract: dose, 1 dram. Chelonin: dose, 1 to 2 grains. Amongst the medicinal plants prepared by the society known as Shakers, the foliage and twigs of *Chelone glabra* are included.

In Kumaon and other parts of India, the roots of *Picrorrhiza kurroa*, Royle, are used in medicine as a tonic and antiperiodic, and are sold in the bazaars, where they occur in short brittle pieces, of a dark colour, somewhat irregular, about the thickness of a goose-quill, but tapering towards the extremities, and covered at this part with numerous small rootlets. They have a dark brown fracture when broken across, and an intensely bitter taste. This medicine is placed in the Indian Pharmacopœia amongst non-officinal articles, with the remark that "it would be desirable to have more information with regard to this root and its properties." Other Indian *Scrophulariaceæ* included in the Pharmacopœia, but not officinal, are, *Herpestis Monniera*, H.B.K., and *Celsia Coromandeliana*, Vahl. The first of these is regarded by the Hindoos as a powerful diuretic and aperient; the juice of the leaves, in conjunction with petroleum, is used as a local application in rheumatism, and the juice of the leaves of the *Celsia* is said to have been given with advantage in cases of acute and chronic dysentery.

Small quantities of the flowers of *Lyperia crocea*, Eckl., have occasionally been brought into this country from the Cape of Good Hope as a dye, but have hitherto failed to attract buyers. As imported, the flowers have somewhat the appearance and smell of saffron. Dr. Pappe, in his 'Floræ Capensis Medicæ Prodromus' says:—"This bush deserves notice as a drug, and in all probability will, ere long, become an article of colonial export. It grows abundantly in some parts of the Eastern districts, whence it has found its way into the dispensary. The flowers, which are called *Geele bloemetjes*, closely resemble saffron in smell and taste; they possess similar medical properties, and as an antispasmodic, anodyne, and stimulant, ought to rank with the *Crocus sativus*. Here they have as yet been only used with success in the convulsions of children, but they deserve a more general trial. On account of the fine orange colour which they impart, they are in daily request among the Mohamedans, who use them for the purpose of dyeing their handkerchiefs. This drug has been observed to be sometimes adulterated by the admixture of other plants of the same genus, which are less efficacious."

Amongst plants of lesser utility belonging to the same order, it will suffice to mention the eyebright, *Euphrasia officinalis*, a decoction or infusion of which is still occasionally used in some parts as a wash for disorders of the eye. It is astringent and slightly bitter. The yellow toad flax, *Linaria vulgaris*, is said to be purgative and was at one time used by the herb doctors for the cure of dropsy. *L. Cymbalaria*, some species of *Antirrhinum*, *Pedicularis palustris*, and *P. sylvatica*, have all been used by herbalists, but they are not of sufficient importance to call for further remark.

A NEW REMEDY FOR HAY FEVER AND SNEEZING.

BY HORACE DOBELL, M.D.,

Senior Physician to the Royal Hospital for Diseases of the Chest.

At this season of the year, when "sneezers" and sufferers from "hay-fever" are in the depths of their miseries, it is merciful to make public any reasonable suggestion for their relief. I have, therefore, much pleasure in being able to bring forward a little contrivance and a prescription, by the combined use of which immense comfort may be given to many sufferers.

The prescription is as follows :—

Chloral Hydrate and Camphor (of each)	16 grains.
Carbolic Acid	20 ,,
Pure Morphia	12 ,,
Oleic Acid (enough to dissolve the morphia)	20 ,,
Castor Oil (the clearest and finest) . .	7 drachms.

Rub well together to make a lotion.*

The "contrivance" is for the efficient application of the above remedy, and consists of a miniature bottle contained in a little box-wood case, so that it can be carried easily in the pocket. To the lid of the box is attached the cork of the bottle, and to the cork, in the same fashion as the spoon of a cayenne-pepper cruet, is fixed a little club-shaped rod of polished ivory, long enough to reach to the bottom of the bottle, and also to the upper extremity of the nostril. The little bottle is kept half full of the lotion above prescribed, and the little rod immersed in it. Directly the patient feels the tickle or other signal of a coming sneeze, he uncorks his bottle, withdraws the ivory club, wet with the oleaginous lotion, and gently pushes it up the nostril till it reaches the seat of the sneeze-signal ; there it should be gently pressed so as to apply the lotion to the part. After this the club is withdrawn and returned to its little bottle of fluid, where it becomes at once charged for a fresh application. As often as the sneeze threatens, the operation should be repeated. Very often one application will keep off a threatened *fit* of sneezing altogether, even though its first effect may be to excite a sneeze.

I have requested Messrs. Savory and Moore to keep this little appliance ready-made and charged with the lotion, so that it can be sent by post without difficulty or delay. It has been of so much comfort in cases within my own practice, that I am sure it is worth while for any one who has not yet found a remedy to give it a trial.

In cases accompanied by much throat irritation, it is advisable to combine with this treatment the use of the "Lozenges for Postnasal Catarrh," prepared from a prescription formerly published by me ("On Winter Cough, etc.," 2nd edition, p. 204), and always kept ready-made by Bell, Savory, Squire, Corbyn, Hanbury, and other leading chemists.

I may add that, when there is great prostration, and a tonic is required, Tincture of Eucalyptus Globulus will sometimes answer better than quinine, especially if there is much feverishness.

None of these remedies should be used without consulting the doctor in attendance on the case.

* As different perfumes affect different patients peculiarly, no scent is added in this formula ; but any one who prefers it may have it scented by the addition of whatever perfume is known to suit best.

INSECT-DEVOURING PLANTS.*

(*Concluded from page* 1001.)

Sarracenias.—In cases of insecticide, next to be considered, such evidence of intent is wanting ; but other and circumstantial evidence may be had sufficient to warrant conviction. *Sarracenais* have hollow leaves, in the form of pitcher or trumpet-shaped tubes, containing water in which flies and other insects are habitually drowned. They are all natives of the eastern side of North America, growing in bogs or low ground, so that they cannot be supposed to need the water as such. Indeed, they secrete a part, if not all, of it. The commonest species, and the only one at the north, which ranges from Newfoundland to Florida, has a broad-mouthed pitcher with an upright lid, into which rain must needs fall more or less. The yellow *Sarracenia*, with long tubular leaves, called "trumpets" in the Southern States, has an arching or partly upright lid, raised well above the orifice, so that some water may rain in ; but a portion is certainly secreted there, and may be seen bedewing the sides and collected at the bottom before the mouth opens. In other species the orifice is so completely overarched as essentially to prevent the access of water from without. In these tubes, mainly in the water, flies and other insects accumulate, perish, and decompose. Flies thrown into the open-mouthed tube of the yellow *Sarracenia*, even when free from water, are unable to get out—one hardly sees why, except that they cannot fly directly upwards ; and a microscopic *chevaux-de-frise* of fine sharp-pointed bristles which lines most of the interior, pointing strictly downwards, may be a more effectual obstacle to crawling up the sides than one would think possible. On the inside of the lid or hood of the purple northern species the bristles are much stronger ; but an insect might escape by the front without encountering these. In this species the pitchers, however, are so well supplied with water that the insects, which somehow are most abundantly attracted thither, are effectually drowned, and the contents all summer long are in the condition of a rich liquid-manure. That the tubes or pitchers of the southern species are equally attractive and fatal to flies is well known. Indeed, they are said to be taken into houses and used as fly-traps. There is no perceptible odour to draw insects, except what arises from the decomposition of macerated victims; nor is any kind of lure to be detected at the mouth of the pitcher of the common purple-flowered species. Some incredulity was therefore natural when it was stated by a Carolinian correspondent (Mr. B. F. Grady), that in the long-leaved, yellow-flowered species, the lid just above the mouth of the tubular pitcher habitually secretes drops of a sweet and viscid liquid, which attracts flies and apparently intoxicates them, since those that sip it soon become unsteady in gait and mostly fall irretrievably into the well beneath. But, upon cultivating plants of this species, obtained for this purpose, the existence of this lure was abundantly verified; and although we cannot vouch for its inebriating quality, we can no longer regard it as unlikely. No sooner was it thus ascertained that at least one species of *Sarracenia* allures flies to their ruin, than it began to appear that—just as in the case of Drosera—most of this was a mere revival of obsolete knowledge.

The Insect-destroying Process.—This was well described sixty years ago, the part played by the sweet exudation indicated, and even the intoxication hinted at, although evidently little thought of in those ante-temperance days. Dr. James Macbride, of South Carolina—the early associate of Elliott in his "Botany of South Carolina and Georgia," and to whose death, at the age of thirty-three cutting short a life of remarkable promise, the latter, touchingly alludes in the preface to his second volume—sent to Sir James Edward Smith an account of his observations upon this subject, made in 1810 and the following years. This was read to the Linnean Society

* From the *Garden*, May 23, 1874.

in 1815, and published in the twelfth volume of its "Transactions." From this forgotten paper (to which attention has lately been recalled) we cull the following extracts, premising that the observations mostly relate to a third species, *Sarracenia adunca*, alias *variolaris*, which is said to be the most efficient fly-catcher of the kind:

"If, in the months of May, June, or July, when the leaves of those plants perform their extraordinary functions in the greatest perfection, some of them be removed to a house and fixed in an erect position, it will soon be perceived that flies are attracted by them. These insects immediately approach the fauces of the leaves, and, leaning over their edges, appear to sip with eagerness something from their internal surfaces. In this position they linger; but at length, allured, as it would seem, by the pleasure of taste, they enter the tubes. The fly, which has thus changed its situation, will be seen to stand unsteadily; it totters for a few seconds, slips, and falls to the bottom of the tube, where it is either drowned or attempts in vain to ascend against the points of the hairs. The fly seldom takes wing in its fall and escapes. . . . In a house much infested by flies, this entrapment goes on so rapidly that a tube is filled in a few hours, and it becomes necessary to add water, the natural quantity being insufficient to drown the imprisoned insects. The leaves of *S. adunca* and *rubra* [a fourth species] might well be employed as fly-catchers; indeed, I am credibly informed they are in some neighbourhoods. The leaves of the *S. flava* [the species to which our foregoing remarks mainly relate], although they are very capacious, and often grow to the height of 3 feet or more, are never found to contain so many insects as those of the species above mentioned.

"The cause which attracts flies is evidently a sweet viscid substance, resembling honey, secreted by or exuding from the internal surface of the tube. . . . From the margin, where it commences, it does not extend lower than one-fourth of an inch.

"The falling of the insect as soon as it enters the tube is wholly attributable to the downward or inverted position of the hairs of the internal surface of the leaf. At the bottom of a tube split open, the hairs are plainly discernible pointing downwards; as the eye ranges upward, they gradually become shorter and attenuated, till at, or just below, the surface covered by the bait, they are no longer perceptible to the naked eye nor to the most delicate touch. It is here that the fly cannot take a hold sufficiently strong to support itself, but falls. The inability of insects to crawl up against the points of the hairs I have often tested in the most satisfactory manner."

From the last paragraph it may be inferred that Dr. Macbride did not suspect any inebriating property in the nectar, and in a closing note there is a conjecture of an impalpable loose powder in *S. flava*, at the place where the fly stands so unsteadily, and from which it is supposed to slide. We incline to take Mr. Grady's view of the case. The complete oblivion into which this paper and the whole subject had fallen is the more remarkable when it is seen that both are briefly, but explicity, referred to in Elliott's book, with which botanists are familiar. It is not so wonderful that the far earlier allusion to these facts by the younger Bartram should have been overlooked or disregarded. Fine writing was his foible; and the preface to his well known "Travels" (published at Philadelphia in 1791) is its full-blown illustration, sometimes, perhaps, deserving the epithet which he applies to the Palms of Florida—that of pomposity. In this preface he declares that "all the *Sarracenias* are insect-catchers, and so is the *Drosera rotundifolia*." "Whether the insects caught in their leaves, and which dissolve and mix with the fluid, serve for aliment or support to these kinds of plants, is doubtful," he thinks, but he should be credited with the suggestion. In one sentence he speaks of the quantities of insects which, "being invited down to sip the mellifluous exuvia from the interior surface of the tube, where they inevitably perish," being prevented from returning by the stiff hairs all pointing downwards. This, if it refers to the sweet secretion, would place it below, and not, as it is, above, the bristly surface.

Why should these plants take to organic food more than others? If we cannot answer the question, we may take a probable step towards it. For plants that are not parasitic, these, especially the Sundews, have much less than the ordinary amount of chlorophyll—that is, of the universal leaf green upon which the formation of organic matter out of inorganic materials depends. These take it, instead of making it, to a certain extent. What is the bearing of these remarkable adaptations and operations upon doctrines of evolution? There seems here to be a field on which the specific creationist, the evolutionist with design, and the necessary evolutionist, may engage in an interesting, if not decisive, "triangular duel."

ORANGE-COLOURED GLASS AS A MEANS OF PROTECTING VOLATILE OILS.*

BY WILLIAM PROCTER, JUN.

The query, What is the actual value of orange-coloured window-glass as a means of preventing the chemical action of light on volatile oils? appears to have been suggested by the use made of such glass by photographers, to prevent the decomposition of chloride and iodide of silver in the working of their processes, so as to avoid the need of being in a dark room. It is still a mooted point how far such glass will prevent the passage of actinic rays, and philosophers even disagree as to where in the spectrum, or beyond it, lies the greatest chemical influence. The question as presented above is, however, a practical one, intended to decide whether oils in colourless glass bottles, if kept in cases glazed with orange-coloured glass, will be as exempt from actinic action as though placed in a dark closet, and if so, whether orange-coloured glass is the proper material to construct glassware for this and other purposes where actinic action is to be avoided? About six months ago a closet was prepared with glass doors of orange colour, and the regular set of dispensing bottles of half-pint capacity arranged in it on shelves, to the number of about thirty distinct oils. The bottles had previously been kept on open shelving; and before being placed in the closet each bottle was emptied, thoroughly cleansed of resinous and other deposit, washed with alcohol and dried, when the clear oils were returned. At the same time two small vials were filled with oil of peppermint and two with oil of lemon, both oils being of the best quality. One of each was kept in the oil closet and the other set in a closet near the window of colourless glass. The writer was too much occupied with other matters to make corresponding experiments in and out of the closet with all the oils, and hence no result was arrived at of a character satisfactory in resolving the query *pro* or *con*. None of the oils in the closet exhibited deposition of resin, crystalline matter, or other deposit worthy of note. So far as could be remembered, their colour was but little changed; but as, in all respects except the light, they were subjected to the previous conditions surrounding them, being frequently opened for dispensing, it will be interesting to ascertain if their modified condition as regards light really retards atmospheric oxidation. The oil of peppermint kept in the closet appeared of the same colour (nearly colourless) as that kept in the light, but its odour was less marked to a perceptible degree. The oil of lemon, in both conditions, had a flocculent sediment, but was otherwise so nearly alike as to appear the same when applied to the nose, yet the oil in the vial exposed to light was evidently lighter in colour by bleaching.

A vial of (expressed) oil of orange-peel, after two months' retention in the closet, was found to have undergone the usual deterioration.

* Paper read before the American Pharmaceutical Association at Richmond, Va., September, 1873.

THE SELECT COMMITTEE ON THE ADULTERATION ACT.

At the sitting of the Committee on Thursday, June 18, the first witness examined was Dr. Hassall.

Asked as to his opinion of the effects of the Act, he said that on the whole it had been greatly beneficial in lessening adulteration; but he thought it would be an improvement if facilities were given for obtaining samples direct from the manufacturer, so as to hit directly those who adulterated or manufactured adulterated articles. The retailers were in a great measure answerable for the adulterations, for they did not pay for the adulterated articles the price which would be charged for genuine articles, and the dealer who did not desire to sell adulterated articles ought to be placed on his guard even by the price charged to him wholesale. Besides, the retail dealer could make the wholesale trader or manufacturergive him a warranty as to the genuineness of the goods bought by him; and, moreover, it would not be too hard to insist that the dealer himself should know something of the goods in which he dealt. It was witness's decided opinion that all articles should correspond strictly with the names under which they were sold—cocoa should consist wholly of cocoa, and should not be, under that name, an admixture of cocoa, sugar, and starch, as it often was; and mustard, when bought as such, should be mustard, and not, as it too frequently was, a mixture of mustard, turmeric, wheaten flour, and sometimes cayenne pepper. There might be a demand for these mixtures; but they should be sold for what they were, and not for what they were not. Questions were put relating to Dr. Voelcker's evidence respecting analysts' analyses of late and the position of the new official analysts. Witness said he thought such a position should be made one worth occupying by able men. He demurred to Dr. Voelcker's views as to the difficulty of distinguishing animal fats when mixed in butter, as stated by that gentleman when speaking of some analyses made of compositions sold as butter; and the witness declared that there is a method for analysing the fats in so-called butter, and, with all respect to Dr. Voelcker, he thought that gentleman had been rather hard upon the analysts in discrediting some of their work. Some allowance should be made, for there had been a suddenness in the demand for educated analysts; but the demand would create the supply. Referred to the adulteration of tea, the witness said he should most decidedly say that any artificial colouring of tea whatever was an adulteration, for this was practised to make a tea assume a higher quality, and to make one class of tea appear to be another; but he should not say that the usual colouring in cheese and butter was adulteration. He then read a long statement as to the definitions he would place on adulteration, and the admixtures and abstractions which might be lawfully allowed without detriment to the purchaser, such as a certain amount of salt in bread, the abstraction of a certain amount of oil from cocoa, the recognition of a certain quantity of salt and water in butter, and the like; but he made no reference (purposely, he said) to the adulteration of drugs. He thought the two acts should be incorporated, and not, as now, the one taken to read by the other, and he thought that analysts should be appointed for large districts. He was opposed to the idea of a Board of Analysts, as proposed by some witnesses, for the review of analyses, and he spoke in marked terms of the little value to be attached to the evidence of the class of men who were ready to give evidence of defence on every occasion. Moreover, with respect to the suggestion made that there should be a public laboratory at Somerset House, he pointed out that the Government analysts had enough to do to protect the revenue; but, while he was against any court of appeal, he thought the Government Inspectors were quite competent to stop the adulterated teas in bond. He thought that if tea was inspected and stopped in bond when adulterated there would be little adulterated tea in this country. In answer to Mr. Colman, the witness said that "corn-flours" were of a starchy nature, and should not be given as food except in combination with other foods, such as eggs or milk. He had lately been thinking why "corn-flours" were not made as wheaten flours were made, so as to leave in them the nitrogenous qualities of the corn (which are taken from "corn-flours"). It occurred to him that the flours would, as food, be better than they were as now prepared, if their nitrogenous properties were in them; but then they would not be applicable to the same uses to which they were now applied—their quick preparation and their uses as blanc-mange. He referred to a paper, which he was about to read, in reply to a question from the examiner, and, at the suggestion of the Chairman he put it in, and this, he said, showed the differences between butter fats and other fats, and gave the mode by which the characteristic qualities of each could be distinguished. In reply to Mr. Backhouse, he thought that one of the necessary qualifications of an analyst was that he should have a knowledge of medicine. He thought that many analysts were not sufficiently well paid to make the appointments tempting to experienced men; but the chief obstacle to the appointments being properly and efficiently filled was the liability which the analyst had of being called to a court to give evidence, for this caused him a grievous loss of time. He was not opposed to the payment by fees, but this made appointments of little value; for he held one for a place (the Isle of Wight) which had not yet sent him a single sample for analysis. In reply to Sir Charles Dilke, the witness said that at the present time a good deal of education was going on in the laboratories of analytical chemists to qualify persons under the present or any future Act. Sir Henry Peek handed the witness some samples of nutmegs, and asked if they were pure. The witness looked at them, and said that possibly they were "limed;" and Sir Henry asked, if they were, could witness say they were adulterated. The witness said he should like to see what proportion of lime there was in the nutmegs before he answered, and, of course, he allowed, logically, he ought to object to the limed nutmegs as he did to faced tea. He was not aware, he said, in answer to Sir Henry, that years ago the Dutch Government would not permit any but "limed" nutmegs to be exported, and, if that were so, then we should have to put up with it; but it should be said on the label that the things were limed. Sir Henry asked if the witness thought it was the duty of a Government to teach the people what they ate and drank; and he replied that it was the duty of the Government to protect the people, and the people should know what they ate and drank. Told a case where a person was fined because 5 per cent. of water was found in milk, he said he should not have prosecuted in such a case, but he most decidedly should in a case where 20 per cent. had been found—a point at which Dr. Tidy said he should not, and there he differed with Dr. Tidy.

The next witness was Professor Wanklyn, M.R.C.S., public analyst for Bucks, Buckingham, and High Wycombe. He said he had analysed more than 1,000 samples of milk bought in London in 1871 and 1872 (before the passing of the Adulteration Act), and had found 90 per cent. of them to be either watered or skimmed, or else both watered and skimmed. Since the passing of the Act he had not had such extensive opportunities of examining the London milk, and could not say absolutely whether or not there had been much improvement. On the subject of milk-standards, he said his standard was founded on a most laborious investigation, undertaken for the Royal Agricultural Society of Sweden, on results obtained in Switzerland and America, and on his own investigations. Milk was very constant in certain particulars. The usual yield of fat was $3\frac{1}{2}$ per cent. By high feeding the fat might be sent up to a little above 4 per cent., and, under exceptional circumstances, it might fall to 2 per cent. The very wide range given by some witnesses, he attributed to mistaking experimental error for variation in the milk. Some degree of confusion had arisen from

taking the yield of cream to represent the proportion of fat present in the milk. The lactometer was not to be depended on, because it confounded watered milk with exceptionally rich milk. He had been concerned in two butter cases at Sittingbourne wherein the dealer had been charged with selling butter adulterated with foreign fats, and wherein Dr. Wright and himself had found no signs of foreign fats. In a butter case at Liverpool, a similar charge brought against a dealer had been disposed of by Dr. Anderson of Glasgow. He did not agree with Dr. Hassall as to the possibility of detecting admixtures of common fats with butter, and would undertake to prepare such mixtures which Dr. Hassall would not be able to distinguish from pure butter; and, in answer to the chairman, said he agreed with Dr. Voelcker in this particular. In reference to tea, he said the facing of it was a perfectly legitimate practice, and was to be defended on the same grounds as the colouring of cheese, or, indeed, as the dyeing of our clothes. The facing of tea was not injurious to health, and did not add sensibly to the weight of the tea. Cocoa in its unprepared state would not be a saleable article in this country. He considered that the sale of cocoa, either simply deprived of some fat or else mixed with starch or sugar, was perfectly legitimate, the mixed cocoa, indeed, being more perfect as a dietary than the unmixed. Corn-flour he looked upon as a perfectly legitimate article of commerce. It did not, indeed, constitute a perfect dietary, but it was nutritious and wholesome, and well deserved its popularity. In reply to the question as to modifications or alterations of the Act, he proposed to insert "sensibly" or some such adverb before "increase the weight," in order to stop "fancy prosecutions." He objected most strongly to all reference to Somerset House as a final Court of Appeal in disputed cases, on the ground that the chemists at Somerset House would not sufficiently command the confidence of the general body of chemists, and that such Government sanction would practically be to license blundering. If there were no legislative interference, disagreements between analysts would rectify themselves. The main obstacle to the proper working of the Act was the backward condition of that branch of chemical analysis which related to adulteration, and this would be remedied in process of time.

The last public sitting of the Committee was held on Monday.

The first witness called was Major Donnelly, of the South Kensington Museum Department, who was told by the Chairman (Mr. C. S. Read) that the Committee had had various suggestions that it was essential, for the proper carrying out of an Adulteration Act through analysts, that those who received public appointments to make analyses should prove their capabilities by undergoing examination before some public department; and the Committee desired to know if any public department could undertake this. The witness replied that the College of Chemistry, which had been removed to South Kensington and was under Dr. Frankland, possessed everything necessary for such examinations. Some communication had been made to the Local Government Board on this subject, but nothing had been absolutely done. Asked if the Science and Art Department or Somerset House would be the better to have this responsibility, he said he could not give an opinion on that; but he thought the South Kensington laboratory was the larger. He saw no difficulty in analysts passing an examination at South Kensington, and he thought four days or a week would be ample to test a man's capabilities. He thought, too, that an examination, and the passing such under a public department, would give more confidence than was now given, and would, moreover, have the collateral advantage that there would be greater uniformity of agreement among the analysts as to what was or what was not to be considered as adulteration. In reply to Mr. Welby, the witness said there were students at the laboratory at South Kensington, and the full course of study was about two years. Some were there for trade purposes, some for training as manufacturers, and there were also some Japanese; but he did not mean that only analysts who had been brought up there as chemists should be appointed to public positions. A properly qualified chemist could go through his examination in a few days. In reply to Sir H. Peek, the witness said the laboratory was to some extent supported by the fees of students, but, of course, there was a grant of public money. Sir H. Peek asked if some of the public analysts now appointed received half the instruction given at South Kensington (the point of time was directly referred to), and the witness replied that he believed not.

Mr. Greenwell, the vestry clerk of St. Marylebone, gave evidence as to the necessity of there being corrections in the Acts of 1860 and 1872, so as to make clear the intention of the Legislature that the metropolitan local authorities should receive the penalties in aid of the expenses incurred in carrying out the law. He believed that in all parts of the country the local authorities received the penalties recovered; but that in London the Receiver of Police had claimed the penalties under the Police Act of 1839, notwithstanding that the Adulteration Act of 1860 had specially ordered that these penalties should go to the local authorities.

Mr. W. Rogers, the solicitor of the Westminster Board of Works, complained of the interpretation of the Act by London magistrates. Some of these required the analyst himself to be present to give evidence, and when this was required there was a failure of justice if he were not brought. Other London magistrates did not require to have the analyst, but took the certificate as evidence, and in that case no expenses were allowed for bringing the analyst.

The inquiry then reverted to the tea question, with especial reference to the correctness of the evidence given by Mr. Whitworth Jackson ("A Wholesale Tea Dealer," of the *Times*). Mr. Robert Jackson, the father, and Mr. William Jackson, the uncle, of this witness, stated that with the exception of some time during which he with his father carried on the Himalaya Tea Company, his experience was confined to his father's business, which was carried on at Manchester. Both denied emphatically the principal assertions made in the evidence referred to, and Mr. William Jackson said that a large part of what Mr. Whitworth Jackson had stated existed only in his own imagination and the other part consisted of exaggeration.

The witness, Mr. Whitworth Jackson, whose father had just been giving evidence against him, then advanced, and said he wished to corroborate his own evidence. He was proceeding to read a statement as to his opinion of the evidence given in opposition to his own and to disprove his, when he was stopped by the Chairman, who requested him to give any facts if he had any to give. The witness then declared that the practices to which he referred in his letter to *The Times* occurred in his father's house, and proceeded to state the reason why he had not made the statement before when under examination.

The Committee conferred together for a moment, and then ordered the room to be cleared. When the doors were again opened, the Chairman said he had been requested by the Committee to say that they unanimously declined to receive any further evidence from Mr. Whitworth Jackson.

Mr. Lumley, Q.C., the counsel of the Local Government Board, then gave evidence as to the improvements he suggested in the Acts. He suggested that the Acts should be incorporated; and he then went on to give such detailed criticisms on the Acts as to show that the need of improving their language, meaning, and purpose, was such that if carried out the statute would be altogether a different one. The witness gave a lengthy review of the law on adulterations, and stated some of the judgments which had been passed.

The Committee then adjourned *sine die*, the Chairman having previously said that this would be the last witness.

The Pharmaceutical Journal.

SATURDAY, JUNE 27, 1874.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*
Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACY IN IRELAND.

IN the present number of the JOURNAL will be found the Bill to which reference was made last week in our article on the subject of Irish Pharmacy. It turns out to be the Bill of the College of Physicians, a rough draft of which we published some weeks since.*

The second reading of this Bill was to have come on in the House of Commons last Tuesday, but it was postponed, and probably the Bill may not come before Parliament for some time. Meanwhile, it will be desirable to consider what would be the effect of its provisions, should it become law as it stands. In its present form the Bill does not, in effect, differ materially from the rough draft previously published, its leading principle being the extension of the British Pharmacy Acts to Ireland. But an important addition has been made, of a clause providing that the Pharmaceutical Society of Great Britain shall appoint examiners for Ireland, who are to conduct the Society's examinations in Dublin, just as they are now conducted in Edinburgh for North Britain.

The object contemplated by this Bill appears to be one in every way consistent with requirements that are acknowledged to be very inadequately provided for in Ireland under existing conditions. Moreover, the introduction of the Bill is but a somewhat tardy attempt to carry out the intention of the Legislature in regard to Ireland, at the time when the Pharmacy Act (1868) was passed.

However, there is reason to believe that there will be some opposition to the measure. On a former occasion we expressed ourselves unable to state what would be the attitude assumed by the Apothecaries' Hall of Ireland in regard to the Bill proposed by the College of Physicians. All we could then do was to conjecture that the body of apothecaries would not be altogether averse to it. We came to this conclusion, no less from the knowledge of the recognition by that body that the requirements of the public in regard to the dispensing of medicine were insufficently provided for, than from the views publicly expressed by the Governor and Directors of the Hall as to the maintainance of the standard of pharmaceutical qualifications.

By degrees, however, it has become apparent that there are, on the part of the Apothecaries' Hall, objections to the course proposed by the College of Physicians. During the last few months those objections have been put forward more definitely; and it is at length clear that the Apothecaries' Hall of Ireland desires to maintain, not only the standard of qualification for the practice of pharmacy, but also the monopoly it has hitherto enjoyed in granting licences to keep open shop for the sale of medicines and compounding of prescriptions.

We have, in fact, in these circumstances, another instance of the conflict between vested interests and consideration of the interests of the public. The Apothecaries' Hall bases its claim on the plea that the power and control exercised under existing statutes of the Irish and Imperial legislations were justifiable, and have proved, for nearly one hundred years, highly conducive to the public safety, by confining the compounding of medical prescriptions to persons duly educated and examined. In this respect, it is only just to admit that the influence of the Apothecaries' Hall has been eminently beneficial; and that the fact of there being a law to prevent incompetent persons from dispensing medicine in Ireland, was a good reason for not making the Pharmacy Act of 1868 apply at once to Ireland. But beyond this the argument will not stretch, and it is of no avail when urged in support of opposition to a measure intended to provide for undeniable and admitted public wants.

The truth is, that while the Apothecaries' Hall of Ireland does not itself provide an adequate supply of qualified pharmacists to satisfy present requirements in Ireland, its privileges operate as a barrier to the provision for those wants in other ways quite as well calculated to ensure competency as the licence granted by the Hall. However highly we may appreciate the wholesome restrictive influence of the Hall in times past, we cannot regard that as a reason for its action in the present being inconveniently obstructive.

It is, we think, equally illogical to object to the extension of the Pharmacy Act to Ireland, on the ground alleged by the Apothecaries' Hall, that for several years to come, registration under the Act of 1868, as a chemist and druggist, will afford very inadequate proof of pharmaceutical knowledge, or of competency to compound medical prescriptions. In regard to this point, it is urged that, in England, until the Pharmacy Act of 1868 came into operation, any person, however ignorant or incompetent, might keep open shop for the dispensing and compounding medical prescriptions. That this is a fact must, as a matter of history, be admitted as well as deplored; just as in the same sense we rejoice that a better state of things has prevailed in Ireland. But though all persons engaged in business as chemists and druggists, in Great Britain on the 31st December, 1868, were at once admitted to be registered as such under the Act, without any further proof whatever of competency, and though the oper-

* PHARM. JOURN., p. 847.

ation of the Act was only prospective as regards education and examination being obligatory, we fail to perceive what valid argument against the extension of the Act to Ireland can be deduced from those circumstances.

If it be the maintenance of pharmaceutical competency alone that is desired by the Apothecaries' Hall of Ireland, it seems to us that there are other ways of striving to attain such a desirable object besides root and branch opposition to the extension of the Pharmacy Acts to Ireland. They might well refer to the precedent afforded by the course of events in this country, and demand that the application of those Acts to Ireland should take place in the same order that they came into force here; that the licensed class should at first be the pharmaceutical chemists, as corresponding more fully with the licenciates of the Hall, in regard to competency for carrying on the business of a pharmacist. The historical interest of the Hall in the well-being of pharmacy, might well claim respect for such a demand. So, likewise, might they reasonably and consistently claim that the full extension of the 1868 Act to Ireland should not come into force until after such time as the "chemists and druggists" of the old stock, to which objection is taken, should be exhausted.

As regards the injustice to Irish chemists and druggists that it is assumed would result from an extension of the Acts of 1868, it seems that all difficulties might be got over by suitable adjustment of the period at which the Act should come into operation. There would then be no ground for complaining that Irish chemists and druggists were debarred from selling articles classified as "poisons," which they now are entitled to sell, nor would any inconvenience to the public on this score be caused in rural districts.

But perhaps the strongest reason for objecting to the continuance of the power and control of the Apothecaries' Hall of Ireland in regard to purely pharmaceutical matters is the fact that the educational system, as well as the qualification of the Hall, are essentially those of a medical institution. As we pointed out on a previous occasion, the curriculum requisite for obtaining the licence to dispense prescriptions comprises subjects wholly foreign to a pharmaceutical career; it involves an outlay of money and expenditure of time wholly unnecessary, and quite inconsistent with the growing tendency to separate the practice of medicine from that of pure pharmacy.

Since writing on this subject last week, we have received from Dr. LEET, the Registrar of the Apothecaries' Hall of Ireland, a rough draft of the Pharmacy Bill for Ireland proposed by the Governor and Council of the Hall, together with a copy of the answer to the letter of the King and Queen's College of Physicians. Most of the points referred to in that communication have already been dealt with, on the present and previous occasions; and we have in the present number printed such portions of the amended Pharmacy Bill of the Irish Hall as present any deviation from the British Pharmacy Acts.

With these data before them, and by reference to the reports of proceedings relating to Irish Pharmacy which we have from time to time published lately, our readers will be enabled to become acquainted with the main facts of the case, which will sooner or later come before Parliament for decision.

ENGLISH PHARMACY SEEN THROUGH "SILVER" SPECTACLES.

"INTELLIGENT foreigners" who visit England are apt to fancy that in a few weeks they acquire a sufficient insight into the character and customs and politics of her people to qualify them for expressing weighty judgments *de omnibus rebus et quibusdam aliis;* an opinion, however, that is usually confined to the critic. But none the less useful is it—

"To see oursel's as others see us,"

when the eyes of those "others" are educated eyes. It is therefore with pleasure that we find recorded in the *Revista Farmacéutica*, the organ of the Argentine Society of Pharmacy, the impression respecting English pharmacy produced during a recent visit to this country upon the mind of Señor JUAN J. J. KYLE, who, twenty years since, was an assistant to a present member of the Council of the Pharmaceutical Society, residing at Liverpool, but who is now the principal editor of our South American contemporary, and Professor of Chemistry in the College of Buenos Ayres.

Señor KYLE says that he had the opportunity of seeing many pharmacies, both in England and Scotland. He also visited the "celebrated School of Pharmacy in London, the property and the glory of the Pharmaceutical Society of Great Britain," and had the "pleasure of becoming acquainted with the active Secretary of the Society, Mr. BREMRIDGE, the illustrious Director of its Laboratories, Dr. ATTFIELD, and the intelligent Curator of its Museums, Mr. HOLMES." From these gentlemen, as soon as it was known that he was a member of the Pharmaceutical Society of the Argentine Republic, he received a prodigality of attention, and was conducted "through all the grand edifice in Bloomsbury Square." This establishment he considers to be a "noble, and at the same time, useful monument to the perseverance of its founders, whose sole motive was the desire to elevate English pharmacy to the rank of a profession, from the low social position it occupied not many years since." This leads to a description of the various ways by which the Society has sought this object, and an expression of opinion that "grand results have crowned its noble efforts and rewarded its perseverance." Señor KYLE says it has been a source of "great satisfaction to be able to congratulate his old friends upon having obtained so flattering a result during the years he has been absent from

England." He also appreciates "the pride they must have in possessing a museum so rich in pharmaceutical products, perfectly classified, a library the shelves of which bear thousands of scientific books, and a well-appointed laboratory."

The system of instruction in the School of Pharmacy, and the various examinations, are described by Señor KYLE with an apprehension of details which testifies that he made good use of both eyes and ears during his visit. Concerning them he says, "With a system of teaching, such as indicated, and theoretical and practical examinations like these, there can be no doubt that the new generation of English pharmacists will occupy a position in the scientific world more distinguished than had been possible previous to the foundation of the Pharmaceutical Society."

The working of the Adulteration Act in relation to chemists and druggists seems to have attracted the special attention of Señor KYLE, for he refers both to the citrate of magnesia case, and that of the sweet spirit of nitre. Respecting the latter he says: "This celebrated case showed that the application of the new law against adulteration by persons incompetent because of their small practical acquaintance with pharmacy may prove very unbearable to the pharmaceutical body." Of Dr. DUPRÉ, the chemical analyst in this case, he expresses the opinion that his "incompetence in dealing with a question of pharmacy was manifest." He then adds that, "if this analyst had been practised in the art of pharmacy, he would not have presented the sorry figure he did before the tribunal at Westminster two months since, though without doubt the decision of the magistrate in this case will exercise a salutary influence in avoiding abuses of the law, such as that sought by the Westminster Board of Health."

In the internal administrations of the pharmacy, Señor KYLE noticed an abbreviation in the hours of labour, which he covets for his own countrymen. After telling them that in a great number of establishments the doors are now closed at eight in the evening, and are only open two or three hours on holidays (*dias festivos*), he says, "When shall we, in Buenos Ayres, be able to imitate our English colleagues, and emancipate ourselves from the slavery of a system which obliges the Argentine pharmacist to stand from seven o'clock in the morning until eleven at night, working-days and holidays, at the service of the public?" The value of legs as a pharmaceutical qualification in this country is also commented on. "It is very curious to read the advertisements in the periodicals. An assistant who seeks an engagement frequently announces the number of feet and inches of his stature, and offers to remit his *carte de visite*."

One great defect appears to Señor KYLE to exist in the laws regulating pharmacy in this country. It is that the English pharmacist may keep open as many shops as he wishes, without providing for them competent superintendents. This he thinks to be a grave defect, which will lead to much abuse if not remedied.

The last extract that we shall be able to borrow from Señor KYLE's account of his visit may, we hope, be thought suitable for quotation by some of our medical contemporaries who are so ready to dilate on the duties of pharmacists. Señor KYLE says, "There exists in England an anomalous hybrid race, who are neither medical men nor pharmacists, *pur et simple*, but who, without hindrance, practice at the same time the arts of HIPPOCRATES and GALEN. These gentlemen keep a more or less complete shop, and prepare their own prescriptions in their own way without being under any inspection whatever, and without being subject to any species of regulation. Notwithstanding this, the medical men complain because in some pharmacies the pharmacist ventures to prescribe a soothing draught or purgative pill at the request of a customer who does not consider himself sufficiently unwell to consult a doctor; and they do not see the inconsistency of allowing a medical man who sells tinctures and other things, of the actual composition of which he is completely ignorant, to arrogate to himself privileges that ought to belong solely to the professional pharmacist. In this state of affairs, which undoubtedly will disappear with time, it is not strange that many pharmacists see themselves compelled to associate with pharmacy a dealing in perfumery and cigars, or to accept the post of postal or telegraph agent." We hope that our Buenos Ayres colleague's prophecy that this state of things will disappear, may some day come true, and the sooner the better!

SECOND LIST OF SUBSCRIPTIONS FOR PAINTING THE PORTRAIT OF THE LATE MR DEANE.

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Mr. Baynes . .	1	1	0
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Other gentlemen desiring to join in this testimonial are requested to send their names to Mr. Sandford, 47, Piccadilly.

ON Wednesday of last week, at a meeting of the members of the Croydon Microscopical Club, under the presidency of HENRY LEE, Esq., F.R.S., Mr. HENRY LONG, Pharmaceutical Chemist, was presented with a handsome binocular microscope, in recognition of the active part he took in the formation of the club, and of his services as Honorary Secretary.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 18th June, 1874. Professor Frankland, F.R.S., Vice-President in the Chair. The ordinary business of the Society having been transacted, the papers and memoirs, of which there were a large number, were read. The first was "On the Action of Chlorine, Bromine, etc., on Isodinaphthyl," by Mr. W. Smith. Dr. Armstrong then read four communications from the Laboratory of the London Institution: No. XIII., on "Coal Tar Cresol and some Derivatives of Paracresol," by H. E. Armstrong and C. L. Field; No. XIV., on "The Action of the Chlorides of the Acids of the Sulphur Series on Organic Compounds," by H. E. Armstrong and W. H. Pike; No. XV., on "Chloro-bromo and Iodo-nitro Phenolparasulphonic Acids," by H. E. Armstrong and F. D. Brown; and No. XVI., "Note on the Decomposition of Dichloronitrophenol by Heat," by H. E. Armstrong and F. D. Brown. The sixth paper was by Mr. G. Neison, on "The Products of the Decomposition of Castor Oil:" No. III., on "Decomposition by Excess of Alkaline Hydrate," in which he has succeeded in elucidating the conflicting statements of the different chemists on this subject. The seventh was on "Hydrogen Persulphide," by Dr. W. Ramsay; the eighth, "Suberone," by Dr. C. Schorlemmer and Mr. R. S. Dale; the ninth, on "The Action of Nitrosil Chloride on Organic Bodies: Part I., on "Phenol," by Dr. W. A. Tilden; the tenth, eleventh, and twelfth, "An Apparatus for Determining the Moisture and Carbonic Anhydride in the Atmosphere," "A Method for Determining Ozone in the Presence of Chlorine and Nitric-oxide," and on "The Constitution of Urea," by Dr. D. Tommasi; the thirteenth, on "The Restitution of Burnt Steel," by Mr. S. L. Davies; fourteenth, on "The Action of Earth on Organic Nitrogen," by Mr. E. C. Stanford; and fifteenth, "Aniline and its Homologues in Coal Tar Oils," by Mr. W. Smith. This, the last meeting of the session, was finally adjourned, at a late hour, until November next.

PARIS SOCIÉTÉ DE PHARMACIE.

A meeting of this Society was held on Wednesday, June 3, under the presidency of M. Planchon. Among the papers read were a note from M. Schlagdenhauffen, on the action of permanganate of potash upon the sulphides; a note from M. Chapuis, pharmacien militaire, on the estimation of cinchonas, which was referred to the committee entrusted with this subject; and a thesis upon the elimination of arsenic.

Dr. De Vrij communicated a series of notes. The first was relative to the presence of an ammoniacal salt in normal urine, a fact that he had established long since and which had been recently confirmed. The second referred to a variety of *Cinchona*, which has been described lately under the name of *C. Hasskarliana*, and which he said was a hybrid between a sickly *C. Calisaya* and a vigorous *C. Pahudiana*. In a third he referred to the discovery of the presence of the new alkaloid, quinaminc, in a red bark, from the foot of the Himalayas, which has already been described in this Journal. He next gave a caution against a possible cause of error in the estimation of barks. He had noticed that caustic soda, which he employed, to the exclusion of ammonia, for the precipitation of the mixed alkaloids, precipitated also a product analogous to quinovic acid; he therefore recommended the employment of a great excess of soda, decantation from the precipitate, and the treatment of the latter with an acid. Finally, Dr. De Vrij rectified an error which he had committed in attributing to ozone the coloration of ether by iodides, it being due to peroxide of hydrogen.

M. Roucher described to the Society his researches upon digitalin, which he has communicated to the Academy of Medicine. He recognizes three principles: the crystallized digitalin of Nativelle, the globular digitalin of Homolle, and the soluble digitalin studied by Lefort, all three having active properties. He had found that the crystallized digitalin changed into globular digitalin under the influence of dilute alcohol, and even of pure water. Its crystals were at first transformed into globules covered with crystalline points, and then into crystalline masses.

M. Limousin said that the word globular was wanting in precision. The product of transformation was either crystalline or amorphous; there was no alternative.

M. Roucher said he had recognized the fact, but he could not explain it, and he offered to repeat the experiment of the conversion of crystallized into globular digitalin before the Society, under the field of a microscope. In reply to a question, he said that he had not been able to effect the inverse transformation of globular into crystallized digitalin.

M. Boudet reported to the Society the state of the labours of the Committee upon the International Codex, which are very advanced, and will be terminated in time for presentation to the Congress at St. Petersburg. He also requested the Society to appoint a member of the Committee as a delegate from the Society to the Congress and to vote a sum of money to cover a portion of the expense, the delegate offering to make up the deficiency of the sum allowed. The latter proposition was referred to a special committee.

M. Bussy proposed that the Committee should present a summary of its work before the departure of the delegate. It was decided that such a summary should be presented for the Society's approbation at the next meeting, under the form of a report by the delegate charged to represent the Society at the Congress.

M. Guichard reported that he had determined the nature of the crystals extracted from tolu, which he had exhibited at the last sitting; he considered them to be pure cinnamic acid. Those from benzoin were a mixture of cinnamic and benzoic acids.

PHILADELPHIA COLLEGE OF PHARMACY.

The last meeting of the session was held in the Hall of the College, on May 9th, under the presidency of Mr. A. P. Brown.

Professor Maisch presented a specimen of the flowers of *Pyrethrum roseum*, used in the preparation of insect powders. A discussion took place, during which it was stated that the powder made from the above flowers possessed a more decided and somewhat different odour from that generally seen in the United States market; and it was stated that, in powdering, large quantities of insect powder flowers were fraudulently mixed with old chamomile flowers, matricaria, etc.

Professor Maisch exhibited a sample of the leaves of *Liatris odoratissima*, which are used for perfuming tobacco, preserving cloths, etc., and according to Professor Procter contain coumarin.

Mr. A. P. Brown called the attention of the meeting to the miserable quality of the oil of sandal wood as generally furnished by the wholesale druggists. He showed a specimen of pure oil which possessed the usual persistent odour, whilst the other was of a thicker consistence, weaker in odour, and had the smell of oil of copaiba in addition.

A communication from Mr. Wilder was read, as follows:

Cudbear *versus* Cochineal.

I have often wondered why cudbear (*Lecanora tartarea*) never has been proposed as a colouring agent for elixirs, etc., instead of *cochineal*. It has at least that one good property of not reacting with salts of iron either proto-or sesqui-salts. Its only fault is that, when the alcoholic solution is largely diluted with water, it acquires a bluish (violet) tinge, very perceptible by shaking. This can, however, be remedied by the cautious addition of a drop or two o

any diluted acid. I say cautious, because, with acids, its rich carmine colour turns brick-red (which colour in itself is beautiful enough).

Thinking that the cudbear might react with some salts, so as to give a muddy or otherwise unsightly colour, I examined its behaviour to the following tests :

Ammonia.—Violet shade (gives a splendid show-colour.)

Acids.—Brick-red (according to proportion and strength; diluted acids act either as simple diluents or brighten the colour.)

Ammon. chlorid., *Potass. nitr.*, *Potass. bicarbon.*, *Sodii bicarbon.*, *Magnes. sulph.* } A bluish (violet) shade.

Alumen.—Brightens rather.

Tinct. ferri chlorid.—A coarse brick-red.

Ferri protosulph.—Nothing particular.

Zinci sulph.—Violet shade.

Potass. iodid.—Nothing particular.

Donovan's solution.—Brick-red.

Dilute tinct. iodine., *Bromine water.* } Brick-red.

Plumb. acet.—Dirty-violet.

Potass. bromid.—Nothing particular.

Water.—A violet shade.

To repeat, it ought to be preferred because of its cheapness, and because it does not react with iron salts.

After a discussion by the members on the advantage of using yellow wax in ointments, the meeting adjourned.

SOCIETY OF ARTS.

Pyrites as a Source of Sulphur, Iron, and Copper.

BY DR. C. R. A. WRIGHT, F.C.S.

(*Concluded from p.* 1007.)

In order to gain a larger yield of sulphur from pyrites various processes have been suggested; thus Gossage proposed to expel a portion of the sulphur by heat, and then to act on the residue with hydrochloric acid, whereby sulphuretted hydrogen is evolved. By the action on this of a limited quantity of air at a red heat, water is formed and sulphur set free; or by the action of sulphur dioxide, three proportions of sulphur are obtainable by virtue of the reaction—

$$2\,SO_2 + 4\,H_2S = 3\,S_2 + 4\,H_2O$$ (Duclos' process).

Dyar and Chisholm roasted the pyrites so as to obtain sulphur dioxide, and then decomposed the gas whilst still hot by hydrogen, whereby sulphur was set free and steam formed; the hydrogen for this purpose being obtained (mixed with carbonic oxide) by blowing steam through a mass of red-hot coke. Newton used either carburetted hydrogen or red-hot coke for the same purpose, and Spence proposed an improved arrangement in which the coke is contained in a vertical tube in the centre of the pyrites burner, so constructed that the sulphur dioxide formed must pass through the tube, the requisite heat being therefore generated by the combustion of the pyrites itself. It was subsequently found, however, that the same result may be more simply attained by charging an ordinary kiln with a mixture of pyrites and coal or coke. In all these processes the essential point is the separation of the sulphur from the non-volatile constituents of the pyrites by making it unite with oxygen, and the removal from the sulphur dioxide thus produced of the oxygen by means of some more powerful reducing agent.

Rodgers obtained free sulphur by blowing steam through the heated pyrites, when sulphuretted hydrogen is formed, from which the sulphur is obtained, as in Gossage's plan; and so on for other processes.

The chief commercial use of pyrites, however, so far as its contained sulphur is concerned, depends not on the extraction from the mineral of free sulphur, but on its transformation into compounds obtainable at a dearer rate from free sulphur; *i.e.*, on the use of pyrites, not as a source of sulphur, but as a cheap substitute for that substance. Several of these applications are of considerable antiquity; thus, by "weathering" (exposing to the oxidizing action of air and moisture) yellow iron pyrites, copper pyrites, galena, blende, or analogous minerals, the sulphates of the metals present are gradually formed. The formation of green, blue, and white vitriol in this way, and the production from green vitriol of Nordhausen sulphuric acid by dehydration and distillation, are manufactures of considerable antiquity in the history of chemical technology. The manufacture of alum, from alum-schist (an argillaceous rock containing a good deal of yellow iron pyrites disseminated through it) also depends on the same process. During the oxidation of pyrites, two proportions of sulphuric acid and one of ferrous oxide may be regarded as formed; of the sulphuric acid half therefore becomes converted into ferrous sulphate, whilst the other half forms sulphate of alumina by attacking the aluminous mineral in which the pyrites is imbedded. By dissolving the product obtained by gently roasting or calcining alum-schist in water, a solution of aluminium and iron sulphates is produced; and by adding to this solution chloride of potassium or ammonia, double decomposition takes place between the alkaline salt and the iron sulphate, iron chloride being formed, and potassium or ammonium sulphate, which crystallizes out along with the aluminium sulphate in the form of either potassium or ammonium alum; or sulphate of potassium or ammonium may be employed in lieu of chloride.

Longmaid's well-known process for the preparation of sulphate of soda, by heating together a mixture of pyrites and common salt, partly depends on the same principles; the sulphur of the pyrites takes up oxygen, and the two unite with the sodium of the salt simultaneously; ferric chloride and its decomposition products, produced by the action of air and moisture, ferric oxide, hydrochloric acid, chlorine, etc., are formed, the latter two escaping as gases. This process, it may be noticed in passing, is virtually the parent of a number of other methods since proposed for the manufacture of sulphate of soda, chloride of copper, and chlorine. The process of Henderson for the extraction of copper from pyrites (described below); the recent method of Robinson and Hargraves for the manufacture of sulphate of soda without the use of vitriol; and, to some extent, Deacon's chlorine process, may all be regarded as deducible from Longmaid's process, the essential reactions characteristic of these various methods taking place in their common parent-process.

The most important use of pyrites, however, as a substitute for sulphur, consists in its employment on the large scale as a means of producing sulphur dioxide, for the manufacture of sulphites, hyposulphites, sulphates, antichlors, disinfectants, etc., and principally for the production of sulphuric acid and its derivatives.

The use of pyrites for this purpose instead of sulphur, appears to have been first put in operation on the large scale in this country by Hill, of Deptford, as early as 1818. One disadvantage attending the substitution of pyrites for sulphur in the vitriol manufacture is, that to produce a given amount of vitriol, more chamber space must be allowed. When sulphur only is burnt, the resulting sulphur dioxide is diluted only with that amount of nitrogen (leaving out of consideration unchanged air) associated originally with the oxygen of the sulphur dioxide; but when pyrites is burnt, the resulting sulphur dioxide is diluted not only with this amount of nitrogen, but also with that originally associated with the oxygen taken up by the iron of the pyrites. The reactions by which the sulphur dioxide is formed are respectively indicated by the equations—

$$4\,S_2 + 8\,O_2 = 8\,SO_2$$

$$4\,FeS_2 + 11\,O_2 = 8\,SO_2 + 2\,Fe_2O_3$$

i.e., the quantities of air requisite for burning sulphur and

pyrites respectively, so as to produce the same amount of sulphur dioxide in each case, are in the proportion of 8 to 11.

Another disadvantage is the much greater degree of impurity of the acid made from pyrites owing to the volatilization and mechanical carriage of various substances from the pyrites burner to the vitriol chamber. Of these substances arsenic is by far the most objectionable, whilst iron, zinc, thallium, selenium, etc., are frequently introduced into the vitriol. For many practical purposes these impurities are not of any consequence, but the impregnation of sulphuric acid with arsenic produces as a final result the contamination of a large number of chemical products with that deleterious substance. Saltcake, hydrochloric acid, soda-ash and crystals, soap, and many other products requiring the manufacture of sulphuric acid as a step to their production, frequently contain traces and even more of arsenic derived from this source; and the widespread presence in many substances of household use, and even articles of food and medicine, of this objectionable ingredient, is in all probability not without influence on the general health of the population, besides lending additional complications in the detection of arsenic in toxicological investigations.

It is unnecessary to review in detail the various improvements made during the last half-century in the apparatus employed in the production of oil of vitriol from pyrites, and in the method of practically carrying out the manufacture. Experience shows that a slightly different form of kiln or pyrites burner is requisite, according to the nature of the sulphur ore used, in order to carry the combustion to the furthest possible extent. Slaty ores, like Wicklow pyrites, require much deeper kilns than ores containing little earthy matter, like Huelva pyrites. Ores containing more than traces of lead are very apt to flux or frit more or less, thus glazing and agglomerating the lumps, and rendering perfect combustion difficult or impossible. The same result may follow if the temperature in the kiln rise too high with certain other kinds of ores, the lower sulphides of iron first produced and the clayey and earthy matter present being frequently fusible at a sufficiently high temperature. Ores containing much earthy matter (such as Wicklow pyrites, which practically consists of a slaty mass through which pyrites is disseminated) are more difficult to burn, so as to utilize nearly the whole of the sulphur present, than ores containing little quartz or other earthy matters, such as Huelva pyrites; in any case it is practically impossible to utilize the whole of the sulphur present. On an average 100 parts of Huelva (or other analogous) ore, containing 43 per cent. of sulphur to start with, will yield, when burnt as thoroughly as is practicable on the large scale, about seventy parts of residual iron oxide, containing (besides the copper, etc., originally present) about 2·5 to 3·0 per 100 of sulphur, partly as a cupriferous kernel in the centre of each lump. Not unfrequently, however, the amount of sulphur present considerably exceeds this amount, owing to inefficient treatment during the burning of the pyrites. Hence about two parts of sulphur per 100 of original ore remain unburnt, or four parts of sulphur per 100 of sulphur originally present are not utilized. With such ores as Wicklow pyrites, containing only about 30 per cent. of sulphur to start with, a much larger quantity remains unburnt. One hundred parts of such ore, as usually burnt in the kilns, yield about 80 parts of burnt ore, containing on an average about 5 per cent. of unburnt sulphur (for the most part contained as green or unburnt mineral forming the core of the larger fragments, the smaller fragments and dust usually not containing more than 2 or 3 per cent. of sulphur, owing to the combustion being less hindered by the earthy admixtures in the case of smaller pieces). Hence about four parts of sulphur per 100 of original ore, or 13 parts per 100 of original sulphur remain unutilized. *Ceteris paribus*, the more free from earthy admixtures is the pyrites used, the less is the amount of sulphur lost by being left in the burnt pyrites. Of the portion thus left part is present as a basic persulphate of iron, part as sulphate of lime, etc., according to the nature and amount of the earthy matters present in the original ore.

The amount of sulphur left behind in the burnt ore from a given class of pyrites necessarily varies with other circumstances, such as the exact size and shape of the kilns, the methods of stoking and of removing burnt ore and of supplying green ore, and notably with the duty performed by each kiln, *i.e.*, with the quantity of pyrites passed through it in a given time; thus I have obtained the following average numbers as the results of several months' working on a uniform quality of pyrites (Huelva), 25 to 30 tons of pyrites being burnt daily—

Cwt. of pyrites per kiln per diem.	Per centage of sulphur in burnt pyrites.
5·8	2·85
6.8	2·88
7·0	3·01
7·5	3·08

The diminution in the effectiveness of the combustion as the duty becomes progressively increased is here well marked, although not very great. The following table illustrates the average composition of the burnt ore produced in the latter of these four periods as compared with that of the green ore used :—

	Green ore.	Burnt ore.
Iron	44·28	64·88
Sulphur	49·07	3·08
Copper	2·75	3·75
Arsenic	0·38	—
Quartz	2·34	2·90
Oxygen and matters not determined .	1·18	25·39
	100·00	100·00

In the process of alkali-making, the sulphur originally employed in the form of pyrites is finally rejected as a nearly valueless by-product in the form of vat-waste, consisting essentially of calcium sulphide, intermixed with oxide and carbonate, together with earthy matters. The discussion of the numerous processes proposed for the regaining of the sulphur from this source is somewhat removed from the object of the present paper. One of these, however, is sufficiently akin thereto to warrant a description; this is the method for the preparation of a factitious pyrites, patented by J. Lowthian Bell in 1852, the process utilizing not only the alkali waste, but also the burnt pyrites, which (when not containing copper) forms another by-product of little value. The process, as recently described by the patentee (*Transactions of the Newcastle Chemical Society*, 1869, p. 117), is as follows :—A blast furnace, 25 feet high, and 11 feet across the widest part, is charged with a mixture of—

	Parts.
Coke	4
Dry vat-waste (or an equivalent amount of moist)	3
Burnt pyrites	1½
Clay	2

This mixture is thus smelted in the same manner as iron ores by means of a hot-blast, heated to about 640° Fah., from 1200 to 1500 cubic feet of air per minute being forced in at the tuyeres; if the temperature rise too high, metallic iron almost free from sulphur makes its appearance, but when the operation is perfectly conducted fused sulphide of iron collects in the crucible of the furnace, and is drawn off from time to time at the tapping hole. The earthy matters of the burnt pyrites and the clay fuse together, forming a compact slag of vitreous fracture sufficiently hard to be a good road material. This retains some of the iron of the pyrites, and is hence black. Like the slag of an iron blast-

furnace, this slag is lighter than the molten metal, and simultaneously produced, and hence floats thereon, and is thus easily separated, flowing out continually at the "slag-hole." The chemical actions taking place during this operation appear to be the conversion of the peroxide of iron into protoxide, and the reaction of this on the sulphide of calcium forming lime and ferrous sulphide. In this way a "factitious pyrites" is obtained, which when freshly fractured has a deep bronze colour, and a metallic lustre with somewhat crystalline structure; sometimes, however, it has a granular appearance, and is of a darker tint. The average composition is—

Iron	65·0
Sulphur	31·0
Oxygen	4·0
	100·0

Or ferrous sulphide intermixed with a little oxide of iron. Hence the substance is, strictly speaking, not a factitious pyrites (or iron disulphide), but only a factitious iron monosulphide. This material may be employed instead of ordinary pyrites in the kilns of vitriol works, but considerable difficulty attends its utilization; being very hard and compact it will not burn readily by itself, and even when used intermixed with lumps of ordinary pyrites it is difficult to make the substance yield up more than about half of sulphur in the form of sulphur dioxide, *i.e.*, the burnt residue from it contains a large quantity of sulphur. Hence, in 1853, a slight modification of the process was patented, whereby the fused sulphide is made to flow out of the furnace into water, and a black powder or slime produced. This is then formed into cakes or bricks, which, after drying, burn much more readily than the hard fused masses. A peculiar mode of treatment is, however, requisite in order to obtain all the associated sulphur. The surplus peroxide of iron left after the burning is completed is used over again in the furnace to produce a fresh quantity of factitious pyrites.

Owing to the practical difficulties in burning the product, the circumstance that the interior lining of the furnace wears away rapidly, necessitating frequent stoppages for repairs, and the fact that the whole of the sulphur is not regained, from 3 to 5 per cent. being present in the slag on an average, it results that at the present price of pyrites this method of regaining sulphur from vat-waste is barely remunerative; nevertheless, the process is one the difficulties of which are not insurmountable, and which might possibly be worked to advantage in case of an increase of price in the natural mineral.

Modifications of Bell's process, and processes similar thereto, have been subsequently proposed, but have not yet come into use. Thus Cookson patented, in 1854, the smelting of galena by means of impure finely-divided iron, obtained by heating burnt pyrites, and carbonaceous matter; thereby lead, and a kind of factitious pyrites are formed. Pattinson patented, in 1853, the use of manganese in lieu of iron, whereby a sulphide of manganese is formed.

Several other processes have been proposed of late years for the production of hyposulphites of sulphur or of sulphur dioxide from vat-waste. Of these many have proved commercially unsuccessful; others, notably that of Mond, have met with a considerable amount of success. These processes, however, scarcely come under the head of the subjects of the present paper.

Owing to the difficulty experienced in burning off all the sulphur present in pyrites, the impure oxide of iron thence obtained in the vitriol works has not been used to any great extent as an iron ore. Occasionally, however, the burnt pyrites of the vitriol maker is used for this purpose (when free from copper), being mixed in along with other ores. It is noticeable as a curious fact that no marked increase in the amount of sulphur present in the pig-iron made appears to be occasioned by the presence of even several per cent. of sulphur in the burnt pyrites used, at any rate when clay ironstone (Cleveland ore) is smelted therewith. As stated above, in Bell's process for making factitious pyrites, metallic iron almost free from sulphur is often obtained, instead of sulphide of iron, if the temperature rise too high in the smelting process. In an iron blast-furnace, also, direct experiment shows that the great majority of the sulphur introduced into the furnace in the materials—limestone, coke, and iron ore—issues from the furnace in the slag, only a small portion being taken up by the pig-iron.

By the process for extracting copper from burnt cupriferous pyrites, described below, a peroxide of iron tolerably pure and nearly free from sulphur is obtained as a by-product. This "purple ore" is now used as a source of metallic iron to some considerable extent, partly for the production of spongy metallic iron (obtained by heating along with coal-dust or other carbonaceous matter) used for the precipitation of copper, partly as "fettling" for the beds of puddling furnaces. As stated above, an impure metallic iron, obtained similarly from ordinary burnt pyrites, was also used by Cookson as a means of reducing galena to the metallic state.

Many kinds of pyrites yield, on burning, an impure oxide of iron of sufficiently bright tint to be used as a pigment after due washing and grinding. A considerable diversity of shades can thus be obtained, and the colouring matters possess great stability.

Until a comparatively recent period, few attempts were made to extract copper from pyrites containing only a small percentage of that metal; the ordinary methods of copper smelting being only commercially applicable to substances somewhat richer in that metal. Poor cupriferous ores were occasionally smelted in a cupola furnace, whereby a regulus was obtained, which was refined in the usual way; or preferably such ores were intermixed with richer ones, and the whole smelted together; but the quantity of copper actually derived from this source did not amount to more than a very small percentage of the total annual make. Various processes for obtaining copper from such ores have, however, been used of late, and this manufacture has now attained to very considerable dimensions.

It has long been known that by exposure to air cupriferous pyrites becomes oxidized, so that a solution of copper sulphate (*inter alia*) is obtainable by lixiviating the mass; this oxidation naturally takes place in mines where copper pyrites is raised, so that the drainage water of such mines often contains an amount of copper worth saving, the process employed being very simple, viz., causing the water to flow through vats or reservoirs containing scrap iron; the iron thus acts on the copper sulphate in virtue of the reaction

$$Cu\,SO_4 + Fe = Fe\,SO_4 + Cu\,;$$

metallic copper being thrown down, and a solution of ferrous sulphate produced. Most of the processes prepared within the last 35 years for the extraction of copper from cupriferous pyrites have been based on reactions similar to that naturally taking place in the copper mines, viz., the oxidation of copper sulphide to sulphate soluble in water. Thus, in 1840, Cookson took out a patent for the production of copper sulphate from cupriferous pyrites by a process of oxidation in the dry way; the pyrites was subjected to a regulated roasting, whereby the sulphur associated with the iron was burnt off, leaving an oxide of iron, whilst that combined with the copper was left unaltered; on calcining this residue at a different temperature, the copper sulphide takes up oxygen, forming copper sulphate. The mass being lixiviated, a solution of blue vitriol is obtained, from which the crystallized substance is obtained by evaporation, etc; the purified copper sulphate may be converted into metallic copper by heating with an equivalent quantity of copper sulphide in closed vessels. Similar processes have also been proposed by several others, only differing from this in details, and not in general principles; various special roasters and calcining kilns have also been patented for this purpose.

Recently, a modification of this process has been proposed by Monier, viz., roasting cupriferous pyrites along with soda, whereby sulphates of iron, sodium, and copper are formed; on increasing this heat, the first of these is decomposed, the two other sulphates being unaltered; on lixiviation these are dissolved out, and by crystallization they are more or less separated. The crystals of copper sulphate thus obtained are dried and heated to redness, along with small coal; in this way a mixture of copper oxide and metallic copper is produced, which is reduced and refined in the usual way. It is stated by the inventor that the whole of the copper contained in cupriferous pyrites can thus be extracted readily, and with very little loss; from a ton of pyrites containing 84 lbs. of copper ($3\frac{3}{4}$ per cent.) $82\frac{1}{2}$ lbs. of metallic copper can be obtained, the loss being only $2\frac{1}{2}$ lbs; *i.e.*, the copper actually extracted is 97 per cent. of that originally present, the working loss being only 3 per cent.

Leister patented, in 1859, a process for the oxidation of the sulphide of copper left in burnt cupriferous pyrites by the wet process; viz., the conjoint action of the air and of perchloride or persulphate of iron solution obtained most conveniently by moistening the burnt pyrites with hydrochloric or sulphuric acid; the weathering is not absolutely indispensable in this process, much copper being dissolved out by merely digesting the burnt pyrites with hydrochloric acid or ferric chloride solution. From the solution of copper salt thus obtained, the metallic copper is precipitated by means of scrap iron; the resulting iron liquor being exposed to the air to peroxidize it, and used over again for a fresh batch of pyrites. In 1861, Mease, and also Hæffely patented analogous processes, the waste acid manganese chloride from the bleaching powder manufacture being used instead of hydrochloric acid; the latter inventor subjected the burnt pyrites to methodical lixiviations in tanks like those used in the alkali works, whereby the whole or nearly the whole of the copper was extracted at the end of a week. By adding soda waste to the copper liquor thus obtained, copper sulphide was formed as a precipitate, and from this metallic copper could be obtained by the ordinary processes; or the sulphide could be oxidized to crystallizable blue vitriol. This process had the merit of using up simultaneously what were thus three waste products, viz., vat-waste, still-liquor, and burnt-pyrites.

From experiments made by myself some years ago, it appears that the action of ferric solutions on sulphide of copper is of an oxidizing nature, the copper being converted into a soluble salt (sulphate and chloride), the ferric salt becoming reduced to ferrous salt; so that although at first sight such processes as that of Hæffely appear to be dissimilar in character from the natural or artificial oxidation of copper sulphide, they nevertheless really depend on the same principles. Access of air during the lixiviation of burnt pyrites with solutions of ferric salts facilitates the operation by reconverting the ferrous salt formed in ferric salt; and heating the liquor, by injection of steam or otherwise, causes the extraction of the copper to take place much more quickly than is the case in the cold. With ordinary calcined Huelva pyrites, I have found that the copper present can be readily extracted in this way, but little labour being required, and little loss of copper being occasioned; there, however, are practical inconveniences which have led to the adoption in preference of a somewhat different process, known as Henderson's.

Like Cookson's and Monier's processes, Henderson's method depends on the power possessed by copper sulphide to take up oxygen when heated; in this process, however, the conversion of the copper into a compound soluble in water, is facilitated by the addition to the pyrites of common salt; the chief result of roasting this mixture is the formation of sulphate of sodium and chloride of copper along with some chloride of iron. The whole process, therefore, simply consists in an adaptation of Longmaid's well-known process (described above) to pyrites from which the great majority of the sulphur has been removed by a sort of calcination. The following is a description of the practical working of this process, which has altogether distanced its rivals as a means of extracting copper from poor cupriferous pyrites.

The ores most suitable are those of character analogous to the Huelva and Tharsis ore, *i.e.*, containing only a few per cent. of quartz or other earthy impurities, and averaging about 3 or 4 per cent. of copper after burning. The larger lumps are broken up into pieces usually not exceeding the size of a small orange, and the dust separated by screening; the "smalls" are either made up into balls with water, clay, etc., and burnt, or are roasted separately in a special kind of kiln, analogous to a blind salt cake furnace, whilst the larger lumps are passed through the ordinary pyrites kilns, at the rate of 5 to 7 cwt. per day per kiln, according to size. The burnt ore thus produced by the vitriol maker retains from $2\frac{1}{2}$ to 5 per cent. of sulphur, according to the care and skill employed in the burning. In order to extract the copper, it is usually convenient to mix various kinds of burnt ore, or even burnt ore with "green smalls" (the unburnt smalls sifted out on breaking up the lumps), in such a way as to produce a mixture containing about half as much again of sulphur as of copper, *i.e.*, for 3 per cent. of copper, $4\frac{1}{2}$ per cent. of sulphur; to this is then added as much salt as represents about four times the copper present, the whole is then passed through crushing machines, and thoroughly intermixed.

The moderately intimate mixture of materials in coarse powder thus produced, is subjected to a roasting process for several hours, at the end of which time most of the copper has become converted into compounds soluble in water, whilst the remainder is almost wholly soluble in dilute hydrochloric acid. Some care is necessary, especially towards the end of the operation, to prevent the temperature rising too high, otherwise a good deal of the chloride of copper formed is partially decomposed and rendered insoluble in water. The temperature is somewhat moderated towards the end of the process, a dull red heat being maintained for the first two or three hours. About six hours usually suffice to work off a charge. The furnaces employed for this roasting resemble those employed for the manufacture of salt cake (blind salt cake furnaces), being heated either by a fire-place for the purpose or by the gases of a gas-generating furnace. Rotary furnaces are also in use in some works, whereby manual labour is saved; larger charges can also be worked off with this form of furnace. Throughout the roasting process the materials are stirred from time to time with a paddle. The progress of the action may be estimated by withdrawing a sample and treating it first with water, then with hydrochloric acid, and lastly (after washing with water) with nitric acid. On saturating with ammonia the liquors thus obtained, the relative tints of the blue cuprammonium-salt solutions produced afford a means of determining approximately the amounts of copper converted into soluble chloride, etc., products insoluble in water, but soluble in hydrochloric acid (basic chloride, etc.), and of sulphide as yet unchanged. Owing to the presence of traces of moisture in the air, etc., there is always a certain amount of hydrochloric acid gas formed, and in escaping, this carries with it a small quantity of copper chloride, the more the higher the temperature of roasting; the gases and vapours evolved are condensed by a coke tower, precisely similar to that used in the alkali works, the resulting acid liquor being used for the extraction of that part of the copper which is insoluble in water; inasmuch, however, as the liquor usually contains arsenic, antimony, etc., the copper obtained by its help, or that extracted directly from it, is less pure, and consequently of an inferior quality and value. The amount of copper thus volatilized is, however, only minute, when proper precautions are taken against over-heating during the roasting. According to Phillips, two tons of metallic copper only are practically regained from these liquors,

whilst 800 tons are prepared altogether, *i.e.*, the copper volatilized is only about 0·5 per cent. of the total amount.

It is practically found undesirable to treat with salt, etc., ores containing more than 6 per cent. of copper. Richer ores require a longer period of roasting, and hence more copper salts are obtained in a form insoluble in water, but soluble in acid. It is almost always practicable to work with a nearly uniform material and by a uniform process, by suitably mixing together richer and poorer varieties, and otherwise regulating the composition of the ore employed. On an average 97 to 98 per cent. of the copper actually present is rendered soluble in either water or acid, the residual oxide of iron retaining only a minute amount of copper.

The roasting being completed, the substance is placed in tanks either of tarred wood or stone, or some analogous material, and is then lixiviated with hot water, heated by injection of steam or otherwise. The aqueous liquors thus obtained are drawn off and treated separately, the insoluble portion being washed with fresh water, and the weaker liquors thus obtained being used for the treatment of a fresh batch; the lixiviation is thus methodically conducted in much the same way as the analogous process in the case of black ash, so as to obtain liquors as concentrated as possible. The insoluble portion is then again lixiviated with dilute hydrochloric acid or with the acid liquor condensed in the coke tower. From the copper solutions thus obtained, the metal is precipitated by the simple process of allowing the liquors, clarified by standing and settling, to run into precipitating tanks constructed of wood (tarred) or stone, and filled with scrap iron, steam being injected to heat the liquor and promote the action, partly by facilitating it through the increased temperature, partly by getting up a circulation and currents.

The residue left after all the copper that can be extracted has been washed out, is the purple ore referred to above; it usually contains from 0·08 to 0·20 per cent. of copper, and 0·15 to 0·25 per cent. of sulphur, and is either sold for fettling for puddling furnaces, or is reduced by heating with small coal, etc., and the resulting spongy iron employed, instead of scrap iron, in the precipitation tanks. This spongy metal is, of course, more rapid in its action than solid malleable iron or cast-iron. According to Bischof, the copper thus thrown down by means of spongy iron is much more free from arsenic than that precipitated by solid scraps, as several hours' contact is required before the arsenic it deposited, whilst copper is thrown down immediately.

The copper precipitated from the aqueous liquors usually contains 75 per cent. and upwards of metal, and only requires melting and refining to be fit for use. The impure copper thrown down from the acid liquors or from the tower liquor is frequently of an inferior character, and is often too impure to be used directly. By melting this with green ore (unburnt pyrites) or with soda waste, a copper "regulus" is obtained, which is refined in the way ordinarily practised by the copper smelter. In this way certain objections have been obviated which originally applied to the copper obtained by Henderson's process, viz., that it was apt to contain impurities of various kinds, rendering it unfit for certain purposes, *e.g.*, making brass. By treating separately the aqueous and acid liquors, the impurities present in the latter are prevented from contaminating the metal obtained from the former.

After the copper has been thrown down, the liquors contain, *inter alia*, sulphate of soda, which can be readily extracted by evaporation and crystallization.

Some varieties of pyrites contain a notable amount of silver, though insufficient to render its extraction profitable as a separate business. Most of this valuable metal can, however, be extracted by the following modification of Henderson's process, due to Claudet. The whole of the common salt used in the roasting process is not converted into sulphate, some remaining unaltered. Thus the aqueous extract first obtained is brine, containing copper, iron, sodium salts, etc., dissolved therein. Now the process that converts the copper compounds present in the burnt ore into chloride, also transforms any silver present into chloride, which salt is almost wholly dissolved out from the roasted mass by the agency of the brine, silver chloride being much more soluble in this menstruum than in plain water. Silver iodide, however, is very much less soluble in brine than is silver chloride. Hence, by adding to the aqueous liquors first obtained (before separation of the metallic copper) a soluble iodide, a precipitate is formed containing most of the silver originally present in the pyrites used in the first instance.

In practically working this process the liquors containing the silver, *i.e.*, those obtained by lixiviation with water before treatment with acid, are run into a wooden settling tank. When the suspended matter has deposited, the clear liquors are drawn off into another tank, and a solution of iodide of potassium added (crude iodide solution from kelp may be used), and the whole well mixed. After 48 hours' rest, a deposit is thrown down consisting chiefly of sulphate of lead, iodide of silver, and some copper compounds, and also containing a small quantity of gold. The clear liquor is run off and precipitated by iron to extract the copper. The deposit is washed with water and then with dilute hydrochloric acid to remove the copper compounds, and is then digested with metallic zinc, whereby the silver iodide is decomposed, metallic silver being set free and soluble zinc iodide formed. The solution of this latter salt is used over again to precipitate a fresh batch, as iodide. Most of the lead sulphate is also decomposed by the zinc, so that the resulting mass when dry has about the following composition (Claudet):—

Silver	5·95
Gold	0·06
Lead	62·28
Copper	0·60
Zinc oxide	15·46
Iron oxide	1·50
Lime	1·10
Sulphuric acid	7·68
Insoluble matter	1·75
Oxygen, loss, etc.	3·62
	100·00

From this mass the silver and the gold are separated by the ordinary process in use in the refining of these materials.

Usually the deposit of silver iodide, etc., is not removed at once from the depositing tank, but is allowed to remain in while successive batches are worked off, whereby labour is saved, the deposit being only treated with zinc, etc., at intervals as it accumulates.

The cupriferous pyrites of Spain and Portugal contain from 0·002 to 0·003 per cent. of gold and silver; from 16,300 tons of such ore, after burning off most of the sulphur in the vitriol works, 739 lbs. of silver and 7 lbs. of gold were extracted at Widnes, or about 340 grains ($\frac{3}{4}$ oz. avoirdupois) per ton. The cost of preparation of this, including 300 lbs. of iodine * consumed during the operation, was £416, leaving a clear gain of £3,250 (Claudet).

The high degree of perfection now attained by the processes in use for utilizing the valuable constituents of pyrites, and the great industrial importance of these operations thus briefly and imperfectly described, afford a proof, were any such needed, of the advantages to be gained in the arts and manufactures generally by an attentive study of the principles of pure abstract science, and the modes of thought and methods of experimental investigation associated therewith. Each new fact observed and each new principle established by the labour of purely scientific experiments, no matter how apparently far removed from manufacturing

* The price of iodine has risen considerably since 1871, when these figures were obtained.

operations, is yet of high value, not only on its own account as increasing the common stock of knowledge, but from its indirect influence on other branches of inquiry more immediately susceptible of adaptation to the wants and necessities of mankind, independently of which it can never be affirmed that even the most abstruse experimental inquiries, and those having apparently nothing whatever in common with ordinary industries, may not at a future period afford the starting-point for processes and manufactures of great commercial value. "From nothing nought comes," has long been an axiom; conversely it may be truthfully said that "nothing leads to nought," and, of all things, experimental inquiry into the secrets of Nature has the least tendency to lead to valueless consequences.

Parliamentary and Law Proceedings.

Apothecaries' Licences Bill.

The following Bill to amend the law "for the licensing and practice of Apothecaries, Chemists, and Druggists, has been prepared and brought into the House of Commons by Messrs. Errington, Blennerhassett, and Butt. It was read a first time on Wednesday, June 17th. It was set down for second reading on Tuesday, the 23rd, but was postponed to Thursday, the 25th inst.

"Whereas a great deficiency exists throughout Ireland of establishments and shops for the sale of medicines and compounding of prescriptions, and great inconvenience is thereby entailed on the public in many parts of the country, which it is expedient to remedy:

"Be it therefore enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

"1. *From and after the passing of this Act* every person duly qualified to practise as apothecary under the Apothecaries Act (England), fifty-fifth year of George the Third, chapter one hundred and ninety four, or as chemist and druggist or pharmaceutical chemist under the Pharmacy Acts, shall be deemed to be qualified in like manner to practise as apothecary, or chemist and druggist, or pharmaceutical chemist, and to keep open shop for the sale of medicines and compounding prescriptions in Ireland; and shall not be subject for so doing to any prosecution or penalty, notwithstanding anything to the contrary in the Apothecaries Act (Ireland), thirty-first year of George the Third, chapter thirty-four.

"2. Every person duly licensed and qualified by the Apothecaries Hall of Ireland under the authority of the Apothecaries Act (Ireland), thirty-first year of George the Third, chapter thirty-four, to practise as an apothecary and keep open shop for the sale of medicines and compounding prescriptions in Ireland, shall in like manner be deemed to be qualified to practise as an apothecary and keep open shop for sale of medicines and compounding prescriptions in Great Britain and shall not be subject to any penalty for so doing, notwithstanding anything to the contrary in the Apothecaries Act (England), fifty-fifth year of George the Third, chapter one hundred and ninety-four, or the Pharmacy Acts.

"3. It shall be lawful for the Council of the Pharmaceutical Society of Great Britain and they are hereby required to appoint fit and proper persons in Ireland, to meet at Dublin for the purpose of conducting such examinations as are provided for and contemplated by the fifteenth and sixteenth Victoria, chapter fifth-six, in the same manner as is prescribed by that Act for conducting such examinations in Scotland."

The Amended Pharmacy Bill for Ireland, proposed by the Governor and Company of the Apothecaries' Hall, Dublin.

The following are the principal clauses of a draft Bill, an early copy of which has been supplied to us by Dr. Leet, by which it is intended "to regulate the practice of pharmacy in Ireland, to institute a Pharmaceutical Society, and to alter and Amend the Act passed by the Parliament of Ireland, in the thirty-first year of the reign of His Majesty George the Third, intituled, 'An Act for the more Effectually Preserving the Health of His Majesty's Subjects, for Erecting an Apothecaries' Hall in the City of Dublin, and Regulating the Profession of an Apothecary throughout the Kingdom of Ireland.'"

"Whereas it is expedient that a Pharmaceutical Society should be instituted for Ireland, and that the Licentiates of said Society, registered under this Bill, may keep open shop for the dispensing and compounding of prescriptions of duly qualified medical practitioners; also that a register should be kept of chemists and druggists who sell poisons.

"And whereas, it is expedient and necessary that such persons should possess a competent practical knowledge of their business, and to that end, that from and after the day herein named, all persons should, before commencing such business, be duly examined as to their qualifications and practical knowledge, and that registers should be kept, as herein provided, and also that the Act passed in the Parliament of Ireland, in the thirty-first year of his Majesty George the Third, intituled 'An Act for the more Effectually Preserving the Health of His Majesty's Subjects, for Erecting an Apothecaries' Hall in the City of Dublin, and Regulating the Profession of an Apothecary throughout the Kingdom of Ireland,' should be amended:

"Be it enacted by the Queen's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same as follows:

"1. From and after One Thousand Eight Hundred and Seventy , it shall be unlawful for any person, other than a duly qualified apothecary, to keep open shop for dispensing or compounding medical prescriptions in Ireland, unless such person shall be a pharmaceutical chemist within the meaning of this Bill, and be registered under this Bill.

"2. Pharmaceutical chemists within the meaning of this Bill shall consist of all persons who shall be duly examined and licensed in pharmacy, and registered as pharmaceutical chemists under the provisions of this Bill.

"3. Chemists and druggists within the meaning of this Bill shall consist of persons who have kept open shop for the sale of drugs and poisons before the passing of this Bill and of those who shall be duly registered under this Bill as hereinafter specified.

"4. The Examiners for the purpose of this Bill shall consist of four members of the Court of the Apothecaries' Hall, who examine on the subjects specified in Clause 5 of this Bill, together with not more than eight other examiners selected by members of the Pharmaceutical Society of Ireland, five to form a quorum, provided that *until* said conjoint Board be formed, the examinations may be carried on for the time being by six of the aforesaid members of the Court of the Apothecaries' Hall, assisted by six examiners nominated by the King and Queen's College of Physicians. Also of such local examiner or examiners as may be at any time appointed by the Governor and Council of the Apothecaries' Hall, or by the Pharmaceutical Council, as the case may be, to conduct in provincial towns the preliminary examination of Apprentices and Students, and the modified examination of Chemists and Druggists provided for in Clause 17 of this Bill.

"5. All such persons as shall have been so appointed to conduct examinations under this Bill shall be, and the same are hereby declared to be, fit and proper persons to conduct all such examinations as are provided for or contemplated by this Bill, and shall respectively have full power and authority, and are hereby authorized and required to examine all persons who shall present themselves for examination under the provisions of this Bill, in their knowledge of the Latin and English Languages, in Arithmetic, in Botany, in Materia Medica, in Pharma-

ceutical and General Chemistry, in Practical Pharmacy, in the British Pharmacopœia, and such other subjects as may from time to time be determined by any bye-law of the General Council of the Pharmaceutical Society of Ireland. Every candidate for the certificate of Pharmaceutical Chemist shall also furnish proof of having been engaged for a period of three years at Practical Pharmacy. Provided always that such examinations shall not include the Theory and Practice of Medicine, Surgery, or Midwifery, or any branch of Medicine or Surgery; and that the literary examinations of any other legally constituted examining body may be accepted, if approved of by the Council, in lieu of the preliminary examinations of this Board, and the said examiners are hereby empowered to grant or refuse to such persons, as in their discretion may seem fit, certificates of competent knowledge and qualification and skill to exercise the business or calling of Pharmaceutical Chemists, or Chemists and Druggists, or, as the case may require, to be engaged or employed as Students, Apprentices, or Assistants, respectively; provided, nevertheless, that in case of rejection, a rejected candidate may present himself for re-examination after six months."

6. This clause provides that the Council of the Pharmaceutical Society of Ireland shall, within three calendar months after its formation, appoint a fit and proper person to act as Registrar under this Bill, and shall have power to remove the said Registrar, or any future Registrar to be appointed under this Bill, from said office, and to appoint a new Registrar in the room of any Registrar who may die, or retire, or be removed from office, and also to appoint and remove, and pay suitable salaries to, a Treasurer and such Clerks and other Officers as may be requisite for carrying out the purposes of this Bill.

"7. For every examination and registration, and for every certificate of same, such reasonable fees or charges shall be paid as shall from time to time be fixed and determined by any by-law to be made by the General Council of the Apothecaries' Hall of Dublin, or by the Council of the Pharmaceutical Society, as the case may be; provided always, such fees or charges shall at no time exceed the fees laid down respectively in each case in Schedule (A) to this Bill annexed, and such fees shall be paid to the Treasurer, and shall by him be applied as the said Council of the Apothecaries' Hall, or of the Pharmaceutical Society, shall direct in furtherance of the provisions of this Bill.

"8. The Registrar to be appointed under or by virtue of this Bill shall from time to time make out and maintain a complete Register of all persons certified as Pharmaceutical Chemists by the examiners appointed under this Bill, also a separate Register of all persons certified in like manner as Chemists and Druggists, and also as Apprentices, Students, or Assistants, respectively; and shall keep a proper Index of these Registers, and such other registers and books as may be necessary for giving effect to the by-laws which shall from time to time be made in conformity with the provisions of this Bill."

Clauses 9, 10, 11, 12, 13, provide for the making and correction of the several Registers, and resemble the analogous clauses in the English Pharmacy Act, 1868.

"14. From and after the one thousand eight hundred and seventy , any person who not being a duly registered Chemist and Druggist, or Pharmaceutical Chemist, shall keep an open shop or wareroom for the retailing or dispensing of poisons, as set forth in the Poisons Act of 1870, 'to regulate the sale of poisons in Ireland,' or which may be hereafter added according to the provisions of said Act, provided that the exceptions therein specified, with respect to the duly qualified Apothecary, shall also apply to the Pharmaceutical Chemist registered under this Bill; or any person who, not being a duly registered Pharmaceutical Chemist, shall keep an open shop or wareroom for the dispensing or compounding medical prescriptions, or who shall take, use, or exhibit the name or title of Pharmaceutical Chemist, or Pharmaceutist, or Pharmacist, or Dispensing Chemist, or Chemist and Druggist in Ireland, or make use of any sign or title, implying that he is registered as a Pharmaceutical Chemist, or as a Chemist and Druggist under this Bill, or any Pharmaceutical Chemist who shall take or employ any person as Student, Apprentice, or Assistant, without such person having obtained the proper certificates hereinbefore directed, or who shall compound any medicines of the British Pharmacopœia, except according to the formularies of the said Pharmacopœia, each and every person so offending shall for every such offence be liable, on summary conviction before one or more Justices of the Peace, to pay a penalty not exceeding five pounds, and when recovered, such penalties shall be applied to the purposes of this Bill; but nothing in this Bill contained shall prevent any person from being liable to any other penalty, damage, or punishment, to which he would have been subject if this Bill had not passed; nor extend to, or interfere with, the business of any legally qualified Apothecary, or the lawful business of any Veterinary Surgeon.

"15. Upon the decease of any Pharmaceutical Chemist or Chemist and Druggist actually in business at the time of his death, it shall be lawful for any executor, administrator, or trustee of the estate of such Pharmaceutical Chemist, or Chemist and Druggist, to continue such business for a period not exceeding twelve months, and provided such business shall be *bonâ fide* conducted by a Pharmaceutical Chemist, or Chemist and Druggist as the case may be, registered under this Bill, provided always, that registration under this Bill shall not entitle any person so registered to practice Medicine or Surgery, or any branch of Medicine or Surgery.

"16. It shall, nevertheless, be lawful, anything to the contrary notwithstanding, for the examiners appointed under this Bill to admit to examination any Chemist and Druggist being twenty-one years of age, who shall have been in business as such in Ireland (on his own account, for a term of five years before the passing of this Bill) and who shall, within six months after it has passed into law, make application in writing for examination to the Registrar under this Bill, accompanied with a certificate according to Schedule (C) to this Bill; and every such Chemist and Druggist who shall have satisfied the examiners as to his knowledge, skill, and competency to carry on and conduct the business of a Pharmaceutical Chemist, shall receive the Certificate of Pharmacy from the said examiners, and shall be entitled to be placed on the Register of Pharmaceutical Chemists of Ireland; and the person so certified shall pay the same fees as other Pharmaceutical Chemists under this Bill; provided always that in case of rejection the rejected candidate may be re-examined after six months.

"17. Any person who has been in business as a Chemist and Druggist in Ireland before the passing of this Bill shall be entitled to be registered in the list of Chemists and Druggists of Ireland under this Bill, on producing a certificate according to Schedule C of this Bill; but any person who has not been so engaged before the passing of this Bill, shall produce a certificate of being twenty-one years of age, and shall pass a modified examination, to be determined on by the Council of the Apothecaries' Hall or of the Pharmaceutical Society, as the case may be, in order to entitle him to have his name inserted in the registered list of Chemists and Druggists of Ireland, for the purposes of this Bill; but registration in this list shall in nowise qualify or empower to compound medical prescriptions.

"18. It is hereby further enacted, that a Pharmaceutical Society shall be instituted, to be named "The Pharmaceutical Society of Ireland;" and authority is hereby given for the formation of such Society; and in order to the formation of same, it shall be lawful for every person who has been duly licensed and registered as a Pharmaceutical Chemist by this Bill, and also for every duly qualified Apothecary, upon payment of an annual sub-

scription of one guinea each to the treasurer appointed under this Bill, to become a member of said Society, and to have a voice and vote in all general meetings of the Society; and the Governor and Council of the Apothecaries' Hall of Dublin are hereby authorized and required, within one year after the passing of this Bill, to convene a meeting of all members of the Society, to be held at their Hall in Dublin, or at such other place as may be agreed on, by written or printed summonses, to be issued ten days previous to the day agreed upon for holding such meeting; and it shall be lawful for the members in assembly at such meetings to appoint a President, Vice-President, Council, and Secretary, for conducting the business of the Society; and like meetings of the Society shall be holden annually. And it shall be lawful for said Council to arrange at any time with the Council of the Pharmaceutical Society of Great Britain for a reciprocity of privileges and practice between the legally registered Pharmaceutical Chemists, and Chemists and Druggists, respectively, throughout the United Kingdom.

"19. At all general meetings of the Society, it shall be lawful for the Society to make all such By-laws and Rules for the advancement of Pharmacy and for the good government of the Society as the members present shall in their wisdom, and by a majority of votes determine, provided always, that said By-laws and Rules shall be consonant with, and not contrary to, any of the provisions of this Bill; and it shall also be lawful for the Society, at every such annual meeting, for the members present to elect from among themselves, by a majority of votes, examiners not exceeding eight in number, exclusive of provincial examiners, to be conjoint examiners with those on the Pharmacy Court of the Apothecaries' Hall, as specified in clause 4 of this Bill.

"20. It is hereby enacted that the exemption of Pharmaceutical Chemists from service on all Juries and Inquests, under the Juries Act, 1862, be applicable to the Pharmaceutical Chemist duly registered under this Bill.

"21. The parts hereinafter mentioned of the aforesaid Act of the Thirty-first of George the Third, chapter thirty-four, shall be, and the same are hereby altered and amended, that is to say, so much of the fourth section as would allow each one hundred pounds share to be subdivided into ten pounds shares, and any duly qualified Apothecary to purchase one such share; and so much of the tenth and of the twenty-fifth sections as relates to seven years' apprenticeship; so much of the twenty-fourth as would increase the Certificate Fees of Licentiates to five guineas, of Assistants to two guineas, and of Apprentices to half-a-guinea; and so much of the twenty-sixth as renders an Apothecary liable to a penalty for taking an apprentice for less than seven years, or would render him liable to a penalty for employing a duly qualified Pharmaceutical Assistant, or would subject a duly registered Pharmaceutical Chemist to a penalty for compounding medical prescriptions.

"Schedule A.

Scale of Fees for Certificates.

Chemists and Druggists	1 Guinea.
Apprentices and Students	2 Guineas.
Assistants	3 Guineas.
Pharmaceutical Chemists	5 Guineas.
The Fee for Registration	5 Shillings."

Schedule B and C relate to the form of the Register and of the certificate.

WARBURG'S FEVER TINCTURE.—ACTION FOR LIBEL.

On Saturday, June 20, there was brought before the Lord Chief Justice of the Queen's Bench and a special jury, an action for libel, by Messrs. Savory and Moore against the defendant, who is the sole maker of a tincture called "Warburg's Fever Tincture."

Mr. Powell, Q.C., and Mr. Mirehouse were for the plaintiffs; Mr. Digby Seymour, Q.C., and Mr. J. A. M'Leod were for the defendant.

An order had been given by the Government to the plaintiffs, who are the Government medical contractors, for a supply of the tincture to the troops in Africa. This came to the defendant's ears, and he, believing that the order would be for a large quantity, and knowing that there was only a very small quantity in the market, wrote to the Government official on the subject, and received a reply that a sufficient quantity of the tincture had already been supplied. He wrote again, saying that if that were the case the tincture was not his, but a spurious imitation, and asking who was the author of this scandalous fraud. This was the libel complained of. The tincture was supplied by the plaintiffs, the quantity being 50 bottles only, and it was all of the defendant's own make. There was a good deal of correspondence, and concessions on both sides were asked for. No apology was made, as, under the circumstances, the defendant said he did not feel justified in making one.

After the plaintiffs' case had been opened by Mr. Powell a discussion occurred as to the circumstances which had led to the defendant's mistake. Eventually it was agreed that the Lord Chief Justice should say what should be done between the parties, and a verdict for 40*s.* was taken, the costs to be paid by the defendant, and all imputations on both sides were withdrawn.—*Times.*

Obituary.

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

On the 6th April, 1874, Mr. William Morgan, Pharmaceutical Chemist, of Newport, Monmouthshire. Mr. Morgan had been a member of the Pharmaceutical Society since 1853.

On the 7th May, 1874, Mr. John Joseph Baines, Chemist and Druggist, of Preston.

On the 6th June, 1874, Mr. Charles George Beale, Chemist and Druggist, of St. George's road, Brighton.

On the 18th June, 1874, Mr. Henry Bramley, Chemist and Druggist, of Knaresborough.

Notes and Queries.

[403.] BLEACHING OF CORAL.—*Incognitus* wishes to be informed as to the best method of cleaning and whitening coral.

FOWLER'S SOLUTION AND MAGENDIE'S SOLUTION.—In a paper read before the Alumni Association of the New York College of Pharmacy, Mr. John Vanderbeugle reports that having investigated the precipitate which forms when Fowler's Solution and Magendie's Solution are mixed together, he has found it to consist of pure morphia. The precipitate appears always to be formed upon the combination of these two solutions, owing to the arsenical solution being slightly alkaline. By acidulating with a small quantity of sulphuric acid the precipitation is prevented.

THE CONSTITUENTS OF FRASERA WALTERI.—The root of *Frasera Walteri*, which is sometimes called "American Calumba," has been examined by Mr. George W. Kennedy, of Pottsville (*Trans. Amer. Phar. Assoc.*, 1873, p. 635), to ascertain whether it contained berberine. He arrived at the conclusion that that alkaloid was not present. The bitter principle was isolated in crystals soluble in alcohol and water, insoluble in ether, neutral to test paper, and not precipitated by tannic acid. This Mr. Kennedy considered to be gentiopicrin, or, as he prefers to call it, "gentianin." Gentisic acid was also obtained in pale yellow needle-shaped crystals, insoluble in water, soluble in alcohol and ether, and reddening litmus paper. From the foregoing it would appear that *Frasera Walteri* contains the same active constituents as gentian, and Mr. Kennedy thinks it should be called American Gentian rather than American Calumba.

Correspondence.

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

Prosecutions of Chemists and Druggists under the Adulteration Act.

Sir,—The public will be much indebted to the Bow Street Magistrate for improvement in the machinery for working the Adulteration Act, hitherto so defective that a conscientious analyst—bound as he is to testify as to *any* inconsistency he may find between the samples brought to him and the names they bear—has felt helpless to avert unjust prosecutions which are repugnant to good sense and technical knowledge, but which the ignorance of unpractical officials makes them so prone to. "For the future, when an analyst does find a *fair* specimen, that circumstance ought to be communicated to the Board." So says Mr. Vaughan. This will be appreciated by the analysts as much as by any of the parties concerned, for those, on both sides of the Thames and also the Avon will be acquitted of malevolence by all who know them personally. As to the recent case in the latter neighbourhood, it would be interesting to have a few points cleared up, for not only the report, but also Mr. Howard's subsequent explanation, is "not very clear" to me at least.

First, passing over (as accidental) the omission from the report of the name of the locality, it being sufficiently indicated I suppose by the names of Messrs. Stoddart and Tilden, when we come to the question of the alleged impurities in the Ferri et Quiniæ Citras, according to the summons resulting from the certificate—there were cinchonine and quinidine. According to Mr. Stoddart's own deposition, not only were these present (the former about ·5 per cent.), but "the salt was not wholly soluble in water;" and, as the salts of the alkaloids implicated *are* soluble in that menstruum, are we to attribute it to the dark resinous matter which Mr. Stoddart complained of, according to Mr. Howard (but not the report), and attributed to decomposition of quinine (into quinicine) by overheating? But at what period in the course of manufacturing? Simply of the quinine, according to the report, or after combination with the iron (either in solution or scaling) as Mr. Howard seems to mean?

Then comes "the precipitated alkaloid." Mr. Stoddart says the part insoluble in ether was cinchonine and quinidine, but instead of the former it was "unquestionably a trace of cinchon*idine*" according to Mr. Howard, who hints at its derivation from "most of the barks used for quinine making" "by a slight defect in manufacture," "which cannot in any way be called an adulteration." And it was submitted in defence that allowing such to be present it would not result in any pecuniary gain or other advantage to the vendor. But, Sir, has it not been the freedom from such defects in their unrivalled preparations, that has placed Messrs. Howards in the proud position they have so long occupied, enabling them to command extra *prices* for extra *care?*

The present case shows the value of a creditable name: but for that would it not be a noteworthy coincidence that these impurities (as corrected by Mr. Howard), viz. dark resinous matter (cinchonidine and quinidine) are precisely those constituting the chief part of that waste product "amorphous" quinine, obtained in the course of quinine making? The established reputation of the firm alone is sufficient to preserve them from the suspicion of having made the citrate with any such substance.

And here I should like to ask whether others have noticed, as I have repeatedly, with surprise, a decided residue (insoluble in ether) from Messrs. Howard's citrate. If the fault is in my own manipulation, how is it that what I know to be B.P. specimens do not give similar results, though subjected to exactly similar treatment, at the same time.

I should mention that in testing I use limited quantities of ether, otherwise considerable quantities of the other alkaloids would escape detection if present.

The same applies still more to Quiniæ Sulph., where the B.P. directs half an ounce of ether to 10 grains of the sulphate, just four times as much as would do if Liebig's method be followed of using only "ɱ xx. of Liq. Ammon." without any more water. With the ℥ss. ether about 16 or 18 per cent. cinchonidine might be taken up.

As for quinidine, is not its solubility in ether such that it is better to trust to its showing itself in crystallizing during slow spontaneous evaporation of the ether (*e.g.* in a narrow test tube, not a watch glass)? But does Mr. Stoddart keep to the German practice of applying the name to cinchonidine, the isomer of cinchonine ($C_{20}H_{24}N_2O$ instead of $C_{20}H_{24}N_2O_2 + 2H_2O$)?

F. P. Catford.

36, *Princes Square, Kennington.*

Where does the Starch come from?

Sir,—Would you let me ask, while the scammony question is to the front, where the starch comes from? Pereira says that virgin scammony is free from starch, and I have tested some lump virgin scammony this morning, and find it free from starch; while some virgin powder scammony I have obtained contains a large amount of the same, the highest price having been given for each.

While it is our duty to put a stop, if possible, to frivolous and catch prosecutions, it is no less the duty of every member of our body to seek for purity.

W. W. Urwick.

60, *St. George's Road, Pimlico,*
June 24, 1874.

Carbolic Acid Suppositories.

Sir,—In reply to Mr. T. H. Williams, I would state that Calvert's carbolic acid in crystal was the acid used.

The curd soap was obtained from a leading London wholesale house.

The directions of the B. P. Addendum were followed, and the suppositories readily prepared.

The mass was divided by weighing, and the suppositories finished off on a slab; I find they now weigh sixteen grains each, no doubt they have lost a trifle since they were made.

I have sent Mr. Williams a specimen per post.

Edward Pratt.

June 22nd.

Excessive Labour in Pharmacy.

Sir,—Not only regarding remuneration, but also the hours occupied, all persons, with the exception of those engaged in pharmacy, have successfully asserted their claims.

If we draw comparisons between professional and non-professional men, of every grade and class—particularly taking into consideration the time engaged each day—there will be but one conclusion, that the only slave left is the chemist and druggist; and when we consider that once round the clock does not, perhaps, in any pharmacy in England, measure the masters' or the assistants' term of daily labour—that he is on duty from twelve to fourteen or more hours a day, there cannot be a more appropriate name for the chemist than the pharmaceutical slave.

And regarding this point, none of us will readily admit that we are slaves. We seem, each and all, to be deaf to the sound of the word. We know for a certainty that in one sense, both for master and man, pharmacy means slavery, and we are at the same time indifferent to alter our state.

But why should we work so long? By excessive labour, close attention to business, confinement, want of recreation, our physical forces are daily exhausted, and result in impaired health and premature age.

And I believe we are destined not to be allowed to work so long, much longer. There are, thank God, more humane people outside the Pharmaceutical Society than in it, and it will be the outsiders who will help the few Wilberforces amongst us with a merciful hand.

And I maintain that, as a body of men, we are not humane. We work ourselves longer and harder than we should work our own horses. Acknowledging no end to the day, we are not humane to ourselves or our assistants.

Six weeks have elapsed since I had half an hour's walk. I have been unable to leave my pharmacy, on account of my staff of assistants not being complete; and I have had to fill the vacancy myself, and do double duty of master and man. More than a month I advertised for an assistant, with the small result of "three" applicants. The first, having no character, I dare not engage. The second found a more genial sphere in town. The third has come, who would not accept of any offer unless he could have three hours for recreation every other day, and do no work on Sundays. There was no alternative but to engage him, or I must continue to work myself and probably bring on illness.

And I cannot blame my new *employé*. After all, he asked nothing that a humane person should consider unreasonable. But I have put to myself this question—How is it possible to grant this with other demands? Only by closing the business earlier, say at 7 o'clock, and one afternoon a week. It is the want of assistants that will compel me to do this.

I do not expect any sympathy from our London fraternity. My tale will be most likely pooh poohed by them, for they will say that they readily find assistants. If my pharmacy were in London, where there is the central school, I should expect forty applicants to one here. The London school is the grand attraction for young men, and makes the practice of pharmacy there easy and cheap.

Were we unanimous, there would be no difficulty in closing earlier, and in having one afternoon a week. Sir J. Lubbock's Bill should be watched and supported. I admit it is a charity at any time, even in the night, to supply articles of real necessity. But every country chemist knows that as long as he keeps open his pharmacy he is abused by thoughtless people who will not obtain what they require until the last minute.

There is nothing that I see at present but Sir J. Lubbock's Bill to protect us from excessive labour, and it should be invited, welcomed, supported. A provision, however, should be made in it by which *medicines only* should be supplied after the eighth or ninth hour of duty, say at four or five o'clock each day.

Mr. Urwick's wish regarding the appointment of a country member as pharmaceutical chief will be supported by many, but we must not lose sight of the fact, that we require in our present difficulties a Jacob Bell, who will at the same time be a Wilberforce, and his staff should consist of men of nearly the same calibre. All our chieftains should be those who, by their example and self-denial, and endeavours to ameliorate our condition, show themselves worthy of the honours which are in our hands to bestow.

"Nisi Prius" seems hopeless. May I advise him to replace his hopelessness by confidence, determination, and energy, founded on just demands. I am glad of the companionship of Mr. Fairlie. Our demands deserve the immediate attention of the whole trade, for low remuneration and excessive labour are the greatest evils in our business. We may be encouraged, too, by the example of Mr. Arch, who in a few weeks effected a great change regarding the payment and labour of agricultural labourers.

A Country Major Associate.

Higher Remuneration for Chemists.

Sir,—I read with much interest Mr. Fairlie's letter on the question of prices in last week's Journal, and agree with him in thinking that no time can be better than the present for taking action thereon. It is much to the honour of the leading London establishments that they put their price on the prescriptions they dispense, and thus proclaim the amount charged, for the guidance of their brethren. Why cannot the leading man or men in each town or district do the same, and influence, if he can, his neighbours to act with him? If, however, they will not so unite, there are, I think, but few who would not agree that if a marked prescription fell into their hands they would not charge less. At all events, let them promise to mark what they charge; and then a full-priced chemist would know how to act better than he now does. I have prevailed on some in this neighbourhood so to unite, and it works satisfactorily. When the trade will co-operate as Mr. Fairlie suggests, by all means follow this plan; but where there is no disposition in the body so to act, I am satisfied that individual effort may do a great deal in bringing about an improvement. Let two or three of the best men in a large town unite as to prices, and the others will gradually come in; or if not, this limited combination will benefit their individual businesses.

Whilst writing on prices, allow me to suggest that in all mixtures when the doses exceed eight, an extra charge should be made. For example, an 8oz. mixture, containing 16 doses, should be put at 2*s.* 6*d.*; a 2oz bottle, containing 16 doses, 2*s.* or 2*s.* 6*d.*, especially noting in the bill in brackets, the number of doses or *vivâ voce*; and then a 3oz. bottle, containing 24 doses, and charged 3*s.* 6*d.* would not cause, as it sometimes now does, any surprise; and may induce the medical profession to order fewer doses. This plan has been adopted by some chemists and works well.

Turnham Green, 15th June, 1874. B. Humpage.

Hunter *v.* Freeland.

Sir,—The following subscriptions, in addition to those already announced, have been received on behalf of the fund raised to reimburse Mr. Freeland, Bathgate, for the heavy expenses—amounting to £267—incurred in defending himself in the case of "Hunter *v.* Freeland," published p. 768 of the present volume:—

	£	s.	d.
Gardner and Ainslie, Edinburgh	1	0	0
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J. A. Clarke, ,,	0	10	0
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,, T. Buchanan ,,	0	5	0
,, A. M. Robertson, Glasgow	1	1	0
A. Reid, Glasgow	0	5	0
Jas. Inglis, ,,	0	2	6
A Friend, ,,	0	2	6
Do. ,,	0	5	0
J. Shannon, ,,	0	5	0
A Friend, ,,	0	2	6
W. Whyte, ,,	0	10	0
J. Nicol, Partrick	0	5	0
A. Brunton, ,,	0	5	0
J. McMillan, Glasgow	0	10	6
W. Pettigrew, Glasgow	0	5	0
W. A. Ward, Glasgow	0	5	0
J. Mathieson, ,,	0	5	0
John Currie, Eglinton Street, Glasgow	0	10	0
D. B. Kerr ,,	0	5	0
George Muir ,,	0	5	0

Erratum.—In the list published before, p. 768, *for* R. C. Rait Parker, 10*s.* 6*d.*, *read* R. C. Rait, Partrick, 10*s.* 6*d.*

"*Non mi ricordo*," "*Apis*," *T. P. B.* and *B. T. C. A.* should bear in mind the rule as to anonymous communications.

"*Minor.*"—It is important that the specimens should be thoroughly dried, and kept in a dry place.

F. W. S.—We fear that the low standard of education, illustrated in the communication received by you, is that which obtains more generally than is usually supposed.

T. Martin.—Mr. Errington's Bill is printed at p. 1018; the fact of its introduction was mentioned last week on p. 1018.

R. H. Parker.—Bentham's 'Handbook to the British Flora,' or the 'Handbook of British Plants,' by W. Lowndes Notcutt, published at 171, Fleet Street.

"*Enitar.*"—The sample of gum appears to be a good one. We have tried it, but have not observed the gelatinization of which you complain.

H. Young.—The purchase of foreign degrees is a discreditable practice. There are persons who carry on the traffic in this country, but we are unable to furnish any information respecting it.

R. Calvert.—We have received your letter; it shall have due attention.

J. F. Brown.—The bark is that of the *Atherosperma moschata*, or Australian Sassafras, and an infusion of it is used as tea in Australia. The wood is used as timber. The specimen has been handed to the Curator of the Museums.

Theta.—No; you would have to pass exactly the same Minor examination as if you had not passed the Modified. We should be happy to furnish you with any other information, but this is really the only answer that can be given correctly.

J. T. Walker.—If you refer to Watts's Dictionary of Chemistry you will see that, according to the characters given of the borates of zinc and magnesium, borax would not be a satisfactory test.

Student.—Apply to the Secretary for a copy of the pamphlet entitled "Hints to Apprentices and Students."

Communications, Letters, etc., have been received from Mr. J. T. Walker, Mr. W. T. Martin, Dr. Leet, Mr. Pocklington, Mr. Lloyd, Mr. Young, "Minor," "A Student."

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