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CANADIAN

PHARMACEUTICAL JOURNAL

VOL. X, No. 6. TORONTO, JANUARY, 1877. WHOLE No. CIII.

Original and Selected Papers.

A FEW NOTES ON VANILLA. *

BY P. L. SIMMONDS.

One of the most profitable and least troublesome cultures of humid tropical climates is certainly that of the vanilla orchid, of which there are several species, as the true vanilla (*V. sativa*, Scheed), the wild or simarona (*V. sylvestris*). and the pompona(*V. pompona*). It is grown from Mexico to Peru, on the American continent, has been introduced into several of the West India Islands, and is extensively cultivated in Reunion and Mauritius. The pods or fruit vary greatly in length. Those of Brazil are in general much larger than those grown in Mexico, and in France the pompona pods are known as "vanillons." Those of the province of Sergipe are 8 or 10 inches long by 6 to 12 lines broad. Those of Minaes are 6 to 9 inches long by 4 to 6 lines broad.

Vanilla in Brazil is very badly prepared; in fact, no attention is given to the culture, but the pods are merely collected in the woods as they ripen. It is considered in that country to have medicinal properties, and is much employed by the Spaniards and Portuguese to cure various maladies: being reckoned stimulant and stomachic, it is added to chocolate to make it more digestive. It is largely used in confectionery and perfumery. A kind of liqueur and a syrup are also prepared with it in Brazil.

In the "Medical Flora" it is stated that "vanilla exercises a powerful action on the animal economy, and justifies the attributes

*From the Chemist & Druggist.

of tonic, stimulant, and comforting, which are accorded to it. The truly active and strong impression which it makes on the nervous system by its fragrant aroma, and on the stomach when taken internally, is rapidly and sympathetically transmitted to all the organs, the functions of which it more or less accelerates. Hence, when the system is lowered, vanilla facilitates digestion and nutrition, augments the cutaneous transpiration or the secretion of urine, and acts as a tonic in various other ways. It is recommended in cases of dyspepsia, melancholy, hypochondria, and chlorosis, where the digestive functions are sluggish or torpid."

In Guatemala the Indians of Vera Paz collect a good deal of vanilla growing wild in the woods along the banks of the river Polochic and in the forests to the north-west of Coban, and this orchid is also found growing on the coast of Suchitepequez.

In 1871 the number of hectares under culture with vanilla in Reunion was 593, and the produce 56,203 lbs., of the approximate value of 153,282*l.*, raised at the cost of little more than 5,100*l.*

The production in this island is shown by the following figures:—

	Hectares.	Produce Kilos.
1866	223	15,494
1867	218	16,162
1868	230	15,041
1869	303	19,063
1870	334	18,512
1871	593	25,547

The hectare is nearly 1½ English acres, and the kilo. a little more than 2lbs. avoirdupois.

The British consul at Reunion, in his report dated May 1, 1875, states "The great demand for this perfume latterly in the markets of Europe has brought large profits to the planters of it, and the plantations have multiplied on all sides to such a degree that the next crop will double that exported this year, which amounted to 20,854 kilos., and the quantity which will appear in the market towards the month of August next is calculated at about 40,000 kilos. Unless circumstances arise which are at present unforseen, and also by reason of the newness of some of the plantations, the colony can produce in two or three years from 50 000 to 60,000 kilos. of vanilla. I learn that this cultivation is also extensively carried on in Madagascar and Mauritius, and it is feared by persons interested that this extended cultivation will create a supply too great for the demand, or, in other words that prices will go down."

Vanilla is cultivated more particularly by the small proprietors than by the great. Its produce assists a part of the population who are averse to work and the small extent of whose lands has not allowed them hitherto to think of attempting a cultivation like that of the sugar cane, maize, manioc, or coffee, which would

require the assistance of labourers or field-hands. Provided the soil be fertile, moist, and shaded, it needs but a small space to accomodate thousands of vanilla plants, and this produce, being of considerable value, yields to the cultivator a profit which no other plant on the island can give. The crop of Reunion in 1864 sold at an average of 50*s*. the pound, therefore a sum of 104,000*l*. was circulated, principally among the small planters and coloured population. It would be rash to expect such prices in future, but even admitting a reduction to 30*s*. the pound, it would still be advantageous to continue this cultivation.

For exportation in good condition vanilla should be packed in tins well soldered, in quantities of about 10 pounds.

In December, 1868, when the market was glutted, vanilla realised but 6*s*. a pound: subsequently it went up at a bound. It was 15*s*. per lb. in March, 1860; 28*s*. per lb. in August, 1871; 45*s*. in August, 1873; 57*s*. to 60*s*. in 1875; and now it is quoted 20*s*. to 40*s*.

Besides the large consumption of vanilla as a flavouring essence, it is also used to a small extent in scenting tobacco, snuff, and cigars, and as a perfume; and more recently a new demand for vanilla has arisen, especially in Germany, the pod having been found to yield a fine brown colour.

Vanilla flourishes in Bangalore and Calcutta, and thrives in Ootacamund, where the cold is even more intense.

A few hundred pounds of vanilla are raised in Guadeloupe. In 1869 260 kilos were gathered there, and in 1871 149 kilos were shipped to France.

It was from Reunion that the vanilla orchid was carried to Mauritius. We have not the returns of the exports for the last few years, but the shipments from that island for the five years ending 1871, with the declared values, were as follows:—

	lbs.	£
1867	—	1,488
1868	4,014	966
1869	5,351	2,004
1870	4,986	2,860
1871	4,920	3,345

Among the vegetable odours assimilating somewhat to vanilla are the Faham leaves, of Mauritius, from another orchid, *Angræcum fragrans*, which somewhat resembles the perfume of vanilla and Tonquin beans. The leaves of some other orchids such as *Orchis fusca*, dried carefully, also possesses the odour of those of the Faham.

Siam benzoin, especially that in tears, and the balsams of Tolu and Peru, have a pleasant perfume, like the vanilla. That of the Tonquin bean (*Coumarouna odorata*), long used in perfumery, and the dried flowers of the melilots, especially the blue melilot, have also a pleasant odour. Of Tonquin beans 20,770 lbs. were shipped

in 1874 from the single port of Ciudad Bolivar, in Venezuela, to New York.

The advance in price of vanilla gave a great impetus to the culture, and many small proprietors who embarked in it made large profits, but the extension of culture has not reached the limits which were expected. Owing to the alarm created by the reports of the artificial production of vanilline from the cambium sap of pines a panic arose among the growers, and less attention was given to the culture.

Subjected to the action of a ferment, emulsion for instance, coniferine divides into glucose and a compound crystallized in beautiful prisms which melt at 73°. The latter substance is readily soluble in ether, less soluble in alcohol, almost insoluble in water. Under the influence of oxidizing agents the product of fermentation undergoes a most remarkable metamorphosis. By treating it with a mixture of potassium bichromate and sulphuric acid, ethylic aldehyde is first formed, then an acid substance, soluble in water, which can be removed by agitation with ether. By evaporating the ether starlike groups of crystals are obtained, which melt at 81°. These crystals have the savour and odour of vanilla. On comparative examination it was found that they were identical with the aromatic principle of vinilla, and which is frequently observed on vanilla pods in the form of delicate needle-shaped crystals. According to analysis the body obtained by oxidation contains $C_8H_8O_3$, exactly the composition which the recent researches of M. Carlis attribute to the aromatic principle of vanilla. Artificial vanillin is now prepared on a large scale in Germany from the cambium sap of pines. It is not made pure, but sold in the form of an extract, or rather an alcoholic tincture, which contains 2 per cent.— the average amount found in vanillin is not entirely identical with that of vanilla; but in its diluted state, and paricularly when used as a flavour, its odour is not distinguished from vanilla. The price of the alcoholic solution will be about two-thirds that of vanilla.

At the Philadelphia Exhibition Dr. William Haarmann of Holzminden, on the Weser, showed this new artificial vanillin of his discovery; also a glass of coniferine, the glucoside contained in the cambium of coniferous woods from which vanillin is made. The latter is identical in composition, melting point, flavour, and all other properties with vanilla acid from the vanilla bean. Vanillinic acid (a by-product), vanillinic sugar, vanillinic alcohol, and vanillinic glycerine were also shown. These works were established in 1875, and employ in the summer months about 46 workmen.

More recently Dr. K. Reimer has found not only a new source of it but an equally novel and simple method of preparation. This is the creosote of wood-tar from the beech-tree. The resemblance of creosote and carbolic acid is so close that for a long time there was no certain method of distinguishing them, and one was frequent-

ly sold for the other. When carbolic acid is mixed with chloroform and an excess of caustic soda, and after the reaction is over the chloroform is distilled off, a substance remains which contains salicylic acid. By decomposing with acid an oily salicylic aldehyde remains, that can be purified by combination with bisulphite of soda and again decomposing with dilute acid. In this way an artificial winter-green oil is obtained. Guaiacol, a constituent of beech-wood tar creosote, if treated in this way, yields the aldehyde of vanillic acid or vanilline. S. Marasse, who discovered guaiacol in creosote in 1870 (*Ann. Chem. Pharm.*, ciii. 59), stated in his essay that it has a pleasant odour like vanilla, an odour also peculiar to guaiacum wood (Pockholz) and its resin, gum guaiacum, from which guaiacol was first made by Unverdorben in 1826.

It is probable that the numerous phenols will enable us to prepare other natural flavours artificially; at all events it opens an attractive field for research.

In the *Moniteur Scientifique* of Dr. Quesneville for October there are two elaborate and interesting articles "On the Combinations of Coniferine and Vanilline" and On certain Derivatives of Vanillic Acid," by F. Tiemann.

ON SYRUP OF LIQUORICE ROOT AND BROWN MIXTURE.*

BY A. P. BROWN, PH.G.

A short time ago, having occasion to make some ammoniacal glycyrrhizin, it occurred to me that the use of ammonia in preparing syrup of liquorice root would be an advantage, I therefore devised the following formula:

Take of	Liquorice root, . . .	4 troyounces
	Cold water, ...	q. s.
	Water of ammonia, . .	1 fluidounce
	Granulated sugar, . . .	13 troyounces.

Grind the root in a mill, and place in a wide-mouth bottle, with a tightly-fitting stopper, pour upon it one pint of water, mixed with the water of ammonia, macerate for forty-eight hours, then transfer it to a funnel and allow the liquor to drain from it, and add sufficient water until two pints of liquid has passed; allow it to stand until the particles have subsided, then decant and evaporate to eight fluidounces, filter and, having added the sugar, dissolve it with the aid of heat.

*Read at the Pharmaceutical Meeting October 17th, and published in the Am. Jour. Pharm., Nov.

Experiments were made with the ordinary liquorice root and the Russian peeled root, and of the two the syrup made from the Russian root is decidedly the finest. The cortical portion of liquorice root is acrid, without possessing the peculiar virtues of the root, the Russian root being deprived of the epidermis, will of course, make the best preparation.

The syrup thus prepared is of a dark-brown colour, and contains all the sweet principles of the root without the starch and other inert matter. It is used to mask the bitterness of quinia, and is well adapted for children.

Sulphide of magnesium, iodide and bromide of potassium lose most of their taste when mixed with this syrup.

I have prepared brown mixture from liquorice root and ammonia by the following process:

Take of	Liquorice root, . . .	4 troyounces
	Water of ammonia, . .	1 fluidounce
	Water, ...	q. s.

Proceed in the same manner as for syrup of liquorice root, but instead of evaporating to eight fluidounces, evaporate to twelve fluidounces, and mix this with the gum arabic, sugar and other ingredients. Lastly, add water of ammonia until a clear solution is obtained, taking care not to add an excess.

Brown mixture, prepared by the above process, is of a brownish-yellow colour, and almost entirely free from sediment.

NOTE RESPECTING THE STRENGTH OF COMPOUND SYRUP OF PHOSPHATES (PARRISH).*

BY W. L. HOWIE, F. C. S.

The object of this paper is not to put forward any new fact or process for the preparation of any of the phosphate syrups, but simply to bring prominently before the trade through this Conference the question of what should be considered the standard strength of compound syrup of phosphates (Parrish). I need scarcely say one word of the importance of a thorough understanding being come to on this point; the extent and universality of the demand, as well as the class of ailments for which this syrup is prescribed, place it on a par in importance with any item of the Pharmacopœia, and it is to be regretted that the state of our knowledge of the subject, perhaps as much as anything else, has excluded from past editions of that work an article in such common use.

At first sight the question seems a very simple one, since Par-

*Read before the British Pharmaceutical Conference.

rish, in his "Practical Pharmacy," attaches to the original recipe the statement that "each teaspoonful of the syrup contains about two and a half grains phosphate of calcium and one grain phosphate of iron," and this has apparently been adopted without question by various writers on the subject, who have furnished us with what was meant to be improved formulæ. On closer examination, however, we perceive that a decision is not so easily arrived at. If we consider the quantities of iron and lime salts ordered by Parrish in his formula in relation to the bulk of the finished product, we find that such a strength is absolutely impossible, and that the statement must have been the result of a miscalculation, while inaccuracy in figures is, unfortunately, not singular in the work in question. In the paper on "Phosphate Syrups," published in the Journals last April, I was at some pains to state this matter as clearly as I could, and trusted the question of strength might be taken up and discussed. Since then three papers have appeared on the subject, one by Mr. Earnest C. Saunders in the *Pharmaceutical Journal* for July 15, and another by an anonymous contributor in the last issue of the *Chemist and Druggist*, both of whom, on the question of strength, fall back on the statement the accuracy of which is questioned. The third paper is by Mr. E. B. Shuttleworth, in the CANADIAN PHARMACEUTICAL JOURNAL for August, and appeared in our own Journal for the 26th of the same month. In it Mr. Shuttleworth seems to accept the result of the formula as the standard, and to my knowledge many others hold the same opinion. In appealing to this Conference I trust we may be enabled to come to a decision which shall serve as a guide so long as we must follow an empirical formula for the preparation of this valuable remedy.

For the sake of those who may not have read the former paper I shall endeavor to state as concisely as possible the more important points. In Parrish's formula there are ordered 10 drachms sulphate of iron, which would produce 257.5 grains triferrous phosphate, were none wasted in following the process, and the finished syrup measures as nearly as possible 45 fluid ounces, or 360 fluid drachms. Were all this iron utilized we would only have .715 grains per fluid drachm, and if allowance be made for loss through imperfect precipitation, we have almost exactly half a grain (.501) per fluid drachm. The lime, also, is over stated. Twelve drachms of phosphate of calcium, the quantity ordered in the formula, gives exactly 2 grains per fluid drachm, and this makes no allowance for any moisture, which is present to a large extent in commercial samples, nor for loss in the re-precipitation and washing which Parrish directs. You will therefore follow me, that the syrup prepared according to Parrish's own directions cannot contain as tribasic phosphates the quantities of lime and iron which he asserts, but that something less than 2 grains of phosphate of calcium, and ½ grain phosphate of iron per fluid drachm is the extreme result of the formula This same

error is reproduced in the "Companion to the Pharmacopœia" by Peter Squire, whose firm have long prepared what in this country is known as the genuiue syrup, an examination of which I have found to bear out what has just been stated. The quantities of iron and lime obtained from the samples I have examined being somewhat under the theoretical yield of the formula. With the view of still further sifting the matter, I have lately procured, through the kindness of Mr. P. S. Smith, several sealed bottles of the syrup direct from Parrish's pharmacy in Philadelphia; but unfortunately it turns out to be such poor stuff, as you will perceive by consulting the table,

PARRISH'S SYRUP. STRENGTH PER FLUID DRACHM.

	Sp. Gr.	Total Iron calculated as $Fe_3P_2O_8$.	Phosphate of Calcium. (Indefinite).	Hydrochloric Acid.
English	1.320	.447 grain.	1.37 grain.	none.
American No. 1.	1.212	.160 "	0.87 "	present.
" " 2.	1.235	.200 "	1.06 "	present.

that we must consider it almost out of the argument. The negative evidence, however, which may be deduced is that evidently no attempt is made to arrive at Parrish's stated strength.

It might be asked, why not discard Parrish's recipe altogether and adhere to the statement, and on it found a new formula, the product of which would have a closer relation to the object aimed at? In the first place by so doing we would produce a new syrup—not Parrish's; and though it is not denied that it is quite possible to produce a syrup having this extreme strength, yet it must be borne in mind that it is not a chemical preparation we are fabricating, but a syrup the popularity of which is in great measure due to its palatable character; and further that being given to young persons and children, the extreme strength, if really existing, besides making the syrup somewhat disagreeable on acocunt of its acidity and smaller proportion of sugar, would require to be prescribed in most cases in fractions of a teaspoonful. You will notice that this latter argument does not apply to the B. P. phosphate of iron syrup, nor to Easton's, though both of these preparations when the original formulæ are followed are not up to the stated strength, yet with them it would I think be quite consistent, as far as the dose is concerned, to improve the formula so as to make it agree with the statement; Easton's syrup being very seldom indeed prescribed for any but adults and the quantities per fluid drachm given in the statement being no more than a moderate dose.

I therefore consider that the strength of one grain of iron and two and a half of lime per fluid drachm rests only on a loose and inaccurate statement which has been freely reproduced on labels, etc., and which unless care be taken might be made a point in a

prosecution under the "Sale of Food and Drugs Act" in which the sufferer might be one who on the best evidence, and believing he was doing best for both physician and patient, had closely followed the originator of the formula.

It is but right to state that on the label of the American syrup no reference to the strength is made; the name being "Parrish's Compound Syrup of Phosphates (Chemical Food) a wholesome Tonic without Alcohol," etc., which latter allusion, those familiar with the patent medicine trade of the United States will doubtless appreciate.

PREPARATIONS OF MALT.

BY RICH. V. MATTISON, PH.G.

For several years past there seems to have been an observed tendency among physicians toward the use of a class of preparations more or less representing the saccharine and albuminoid constituents of malted barley, and a number of medicinal preparations have been gradually introduced, some of which have found considerable favor among the profession as a slightly-tonic and valuable nutrient food, employed in dyspeptic and other stomachic disorders, caused by the non-assimilation of starch food.

Probably the most widely known in this country is the "Hoff's Malt Extract," which most of the members present may remember particularly, on account of the great difficulty experienced in being able to obtain it during the late Franco-German war, and the notoriety which one of our eminently-respectable houses at that time attained, through being able to supply, as genuine, a preparation put up in the ordinary London Stout bottles, with *fac simile* German labels. The genuine preparation does not seem to the writer to be properly called an extract of malt, since it certainly partakes more of the nature of a malt liquor, the principal difference being that it is of sweeter taste and less spirituous—more sugar and less alcohol than the ordinary malted liquors of commerce. The fact, however, of its containing a notable proportion of alcohol renders it, in the opinion of the writer, an objectionable article; not objectionable as a malt liquor, understand, but as an *extract of malt*, since a large portion of the sugar has been converted by fermentation into alcohol.

The nutrient properties of a good malt extract consist in the amount of malt sugar, diastase, etc., that is obtainable therefrom by the assimilative organs of the human system, and to insure the proper amount of these principles depends upon the proper observance of four rules, viz.:

*Read at a meeting of the College of Pharmacy, Phila., and published in the Am. Jour. Pharm., Dec. 1876.

1st. The barley must be malted properly and carefully, to insure the formation of as large a quantity of diastase as possible, that by its action in mashing all the starch may be converted into sugar. The chemical change may be thus represented, the starch taking up the elements of water:

$$\underset{\text{Starch.}}{3C_6H_{10}O_5} + H_2O = \underset{\text{Glucose.}}{C_6H_{12}O_6} + \underset{\text{Dextrin.}}{2C_6H_{10}O_6}$$

2d. The ground malt must be *mashed* carefully, with due regard to the temperature, so as to insure the largest amount of sugar being extracted with the smallest amount of water.

3d. The evaporation of the extract with a low degree of heat, to avoid charring any of the delicate constituents of the extract.

4th. The most scrupulous cleanliness must be observed at all times in and about all mash-tubs, kettles, capsules or other vessels used in its preparation.

A word as to the object of the preparation may not be out of place. It is well known that in the human economy the salivary glands and the pancreas secrete analogous principles, each having for its object the conversion of amylaceous principles into saccharine, that existing in the salivary secretion being known as ptyalin and that of the pancreatic juice as pancreatin. In the malted barley there is found a substance analogous to these, and having just as strong and subtle power of changing starch into sugar as the pepsin in the gastric secretion has the power of converting albuminous substances into peptone. This substance in malted barley is called diastase, and is formed during the process of germination or malting. A small portion of this substance has the power of converting an almost indefinite proportion of starch into sugar.

These facts being known, it is obvious that when the animal system is incapable, through deficiency of the natural secretions, of converting starch food into sugar, we must add some artificial saliva, as it were, to perform the work and make good the deficiency, and hence it is that the heavy feeling in the stomach observed after eating heartily of potatoes, corn-starch and other graminaceous or amylaceous food, is promptly removed by taking a small quantity of a good extract of malt.

Barley grown in high latitudes like Michigan, Canada and the like, is generally the best, because of its containing more starch, which, in the process of mashing, is converted into sugar, and of course, there being more sugar, the yield of extract is larger, thus making the operation more successful, pecuniarily, to the manufacturer.

The process of malting we need not describe, being familiar to us all, and for the purposes of the malt-making pharmacist may be practically ignored, it being better to purchase the malted barley of a professional maltster.

The barley, then, being properly malted, is ground coarsely,

and a tub, preferable of cedar, with a false bottom, perforated, and of a capacity of say 20 gallons (an old-fashioned upright churn answers very well), is filled with about 14 gallons of water, at a temperature of from 168° to 172° F. Into this tub about half a a bushel of malt is added, little by little, until the whole is well stirred in. The tub is then well covered and set away in a warm room, and allowed to remain perfectly at rest for a period of three or four hours, taking care that the temperature does not fall below 150°F.

This is the process of *mashing*. At the expiration of the allotted time, the stop-cock below the perforated diaphragm is opened, and water of a temperature a little above the extract, which is now being drawn off below, and which we shall now call the *wort*, is sprinkled by means of a sieve or plant sprinkler, upon the top of the malt until the wort being drawn off below is almost tasteless or of so low a specific gravity that it will not pay the cost of evaporation. In large operations this sprinkling is done by means of a patented revolving instrument called a "sparge," and which much resembles a lawn sprinkler, that revolves by the pressure of the water being ejected from each side in opposite directions, the water being supplied from a large tank in which it is heated by steam, and the exact temperature being easily controlled by valves commanding abundant supplies of both cold water and steam. This wort that we have drawn off from our mash-tub or percolator, we now place in the capsule or copper kettle, and evaporate by means of a water-bath to the required consistence; the first run should have a high specific gravity, and contain about a pound of malt sugar to the gallon of wort. We present samples of this evaporated wort, which is now our malt extract.

A word now regarding cleanliness. The mash-tub and all other wooden or metal utensils should be washed out at least once a week with dilute solution of caustic potash or soda, and any barrels, tubs, etc., should be kept filled with lime water when not in use, as the tendency of the wort which may be left in them is very great toward fermentation, and a few grains of malt accidentally left in the tub, and which have undergone putrefactive change, may completely spoil the subsequent batch of malt at the next mashing.

Extract of malt with iron is easily prepared by the addition of a syrupy solution of ferric pyrophosphate, in the proportion of four grains to the tablespoonful.

Extract of malt with pepsin has been proposed as a valuable preparation in dyspeptic troubles, since it would certainly have valuable digestive properties, acting upon both amylaceous and albuminous substances.

Extract of malt with cod liver oil is proposed as the acme of all emulsions of cod liver oil. When we reflect on the fact of cod liver oil being simply food and not medicine, and then combine this with

a preparation having of itself the property of transforming non-assimilable food into that which may be easily assimilated, beside being a valuable nutrient, we have as an emulsion (and it makes a perfect emulsion without the use of any gum, sugar or other vehicle) a preparation of double the nutrient value of the ordinary emulsions of cod liver oil. A preparation, also, that is very pleasant to the palate as well as the stomach, a fact that, in these days of elegant pharmacy need not be overlooked.

Samples of this preparation, consisting of 50 per cent. each of cod liver oil and extract of malt, are here presented. It is easily prepared, is both pleasant and permanent, and may be mixed with water without separating the oil.

ARRANGEMENT OF A DRUG STORE.*

BY HANS M. WILDER.

Whoever has clerked in more than one store will have noticed a remarkable difference in the ease with which he found himself at home behind the counter.

In some stores, it might not require hour to learn where to look for a particular drug or preparation; while in other stores he would, even after several weeks, be totally in the dark respecting the whereabouts of many articles not used every day. The reason why is plain enough: in stores of the first class some kind of system has been followed *and adhered to*, while in the other class of stores the arrangement seems mainly to be based on a loosely followed alphabetical order, and chiefly to be due to hap-hazard and supposed convenience.

Practically it matters very little what kind of system is adopted, *so it be but adhered to.* The following two ways of arranging will be found most convenient.

1. In strict *alphabetical* order (following the U. S. Ph. nomenclature)—of course, necessarily modified by the various sizes of shelf-furniture, requiring more than two alphabets. Poisons and alkaloids are best placed on the prescription counter.

2. What might be called a *pharmaceutical* arrangement. The solid, crude drugs (*simplicia*, such as form the bulk of the wholesale dealer's stock) are classed according to their origin—animal, vegetable, mineral—and a particular section of the shelvings and drawers allotted to each. These three head-divisions are further subdivided according to their general character: the animal division comprises so few drugs that these are best arranged alphabetically;

*From the Druggists' Circular.

the mineral drugs—colors by themselves and the remainder in alphabetical order. The vegetable division is the largest, and will naturally be subdivided into berries, bark, flowers, herbs (including the leaves) gums (and gum resins), roots (including rhizome, bulb and other ground parts), seeds, and so on; all these subdivisions are again arranged alphabetically.

The preparations are classed according to their nature: Vinegars, acids, elixirs, oils (essential and fixed separate), spirits, tinctures, wines and so on. Compound powders to be separated from powdered drugs, which latter are to be put not under Pulvis, but according to their respective names. Salts by themselves in the alphabetical order of their elements; calcium, potassium, sodium, ferrum, and so on. Alkaloids, poisons, and rarer metallic salts on the prescription counter.

In this way, each class has got a particular space or section destined for it, and it will be easy to understand that any newcomer will in less than a quarter of an hour know perfectly in what part of the store to look for a certain article. The different sizes of tinctures and saltmouths will necessitate the use of several alphabets; and want of sufficient space will often oblige to modify the above arrangement.

Speaking of different sizes calls to my mind a remark I have made: the often very absurd disproportion between the size of the bottle and the probable call for its contents, which is very often found in this country. Large bottles do make more show than smaller ones; but the contents, taking a longer time to be disposed of, are very apt to deteriorate before the last has been used; on the other hand, nothing looks poorer than a row of large bottles only one-eighth or one-sixth full. To mention particulars: I have seen in small stores quart bottles labelled Vinum ipecac., pint bottles for Tinctura veratri viridis not to speak of pint bottles for essential oils, and similar incongruities. The size of saltmouths is generally more sensibly adapted to their contents.

A still more ready way of ascertaining the whereabouts of the articles consists in making a general index, where all articles are arranged alphabetically. Mark each section (between two uprights) with a letter or Roman numeral; number the shelves from top downwards, and in the same way the row of drawers and the shelves in the closets; finally, make a diagram of the store, where all the sections are marked.

Suppose that gum arabic is in the second row of drawers of section C (or III), in the index we should write: Acacia C (or III) Dr. 2. Or: powdered rhubarb on the fourth shelf (from the top) in section F (or VI), the index says: Rhei pulv. (or Rad. rhei. pulv.) F (or VI) 4. Or: pyro-acetic acid on the first shelf of closet in (or under) section A (or I), the index has: Acid. pyro-acetic. A (or I) cl. i. Abbreviation of prescription counter would be P. C., of coun-

ter, C, and so on; treat the cellar in the same way. This is very tedious work (the writer has made nearly thirty indexes), but it amply repays the trouble. With such an index there can be no such things as: I cannot find such and such an article. Besides it generally saves entirely the trouble of re-arranging. I should think that such an index might profitably be printed, so that only the blanks would have to be filled; in Germany they have had them in printed form for the last fifty years; it forms a huge folio volume, with sufficient space between the names to insert not only the place, but also the prices and other remarks.

CHROMIC INKS.*

As long ago as 1848, Professor F. Runge invented what he called a chromic ink, from its containing chromate of potash. His directions for its preparation, published at the time in Dingler's Journal, were as follows: A decoction of logwood is first made in the proportion of 10 to 80, that is 10 lbs. of logwood is boiled with enough water to produce 80 lbs. of the decoction. To 1,000 parts of this logwood extract, when cold, is added 1 part of yellow chromate of potash, stirring rapidly. It is ready for use at once. Gum and other additions are injurious, he says, to this ink.

The following year W. Stein proposed an improvement on Runge's ink, saying that the great fault of this ink was that it soon became thick like sour milk. This he overcame by adding four grains of corrosive sublimate to each bottle. This would restore thick ink to its pristine quality, and improve its colour, changing it from deep indigo blue to pure black.

In 1867, C. Puscher described a new ink similar to the above, made as follows: Boil 10 ozs. of logwood in 20 ozs. of water, then boil again in 20 ozs. more of water, and mix the two decoctions; add 2 ozs. of chrome alum and boil another quarter of an hour. One oz. of gum arabic is added, and we have 25 ozs. of deep black ink.

Bottger says that a simple method of preventing geletinizing in chromic ink is to add to the water in which the extract is made some carbonate of soda. His method of operation is as follows: Dissolve 15 part of extract of logwood in 1,000 parts of distilled water to which 4 parts of carbonate of soda has been added at boiling heat, and add 1 part of yellow chromate of potash, dissolve in a little water.

*Scientific American.

ALBUMINATE OF SANTONINE AND SODIUM.*

According to Pavesi, a combination of santonine and of bicarbonate of sodium with soluble albumen forms a valuable vermifuge. The preparation is made in the following manner: 1 part of santonine, 4 parts of sodium bicarbonate, and 2 parts of dried soluble albumen are warmed with a sufficient quantity of water at 60° or 70° until all are dissolved, and then evaporated to dryness at a very gentle heat. The albuminate of santonine and sodium forms brilliant white scales, soluble in water. The mineral acids precipitate santonine and albumen, with disengagement of carbonic acid. The reasons for which Pavesi gives the preference to this combination over the use of santonine are the following. The after effects of santonine, among others, that of yellowness of vision, are entirely obviated. The preparation is not decomposed in the stomach, because the bicarbonate of sodium in the combination retains the santonine in solution, the coagulation of the albumen is prevented, gently purgative sodium salts are introduced into the body, and finally, by the disengagement of a small quantity of carbonic acid, an active digestion is produced.

The properties claimed for this preparation should be examined by more extended researches.

THE AMERICAN LEECH TRADE.

One of the oldest American leech dealers has been interviewed by the correspondent of a contemporary. His opinions are as follows:

"The American leech I believe to be utterly valueless. I have received fine-looking specimens from Mississippi and Pennsylvania, but I found them wholly worthless. They are far inferior to even some European varieties of the hirudo decora, which cannot easily be induced to bite unless blood be drawn to excite them. I consider six Swedish leeches equal to at least one hundred of any American variety. Those exported to America are generally full of blood, and at Rhode Island there are immense purging ponds in which the newly-arrived leeches are placed, and left to digest their last meal. Until it has been perfectly digested they are useless. These ponds belong to Mr. Witte, who does nearly all the importing for American leech doctors, and he charges an extra price for the ponded leech, because the leeches must remain at least a year in the purging pond. It takes a year for them to get rid of one good meal. The leech can live on almost nothing; its vitality is absolutely pro-

* Journal de Pharmacie de Geneve, July 5, 1876, p. 82, in Chemist and Druggist.

digious; it has been known to live in the human stomach, and to make its home in the human intestines[?] They live to a prodigious age, from fifty to one hundred years[??] But it is a curious thing that they are constitutionally delicate creatures. If deprived for a considerable time of clay or turf to burrow in, they are liable to disease. They are carried off by epidemics peculiar to leech life, some of which appear to be skin diseases. I have to nurse them pretty carefully, and when I find one leech sick I put him in the leech hospital A milk diet frequently restores sick leeches to perfect health."—*Med. and Surgical Reporter.*

PEPTONE-FORMING FERMENTS IN PLANTS.

E. V. Gorup and H. Will have examined the secretion of the pitcher-plants, *Nepenthes phyllamphora* Willd., and *N. gracilis*, Korth. The secretion of irritated glands, that is, of such pitchers or fly-traps, which contained insects, was collected separately from that of irritated glands. The former liquid, which has an acid reaction, was found to dissolve fibrin, albumen, flesh, and legumin with ease, and to convert them into peptones; gelatine was likewise dissolved and converted into a non-gelatinizable substance; starch, however, was not altered by it. On the other hand, the secretion of non-irritated glands had a neutral reaction and did not possess any digestive powers, but it acquired them in a high degree by the addition of formic, acetic, propionic, citric or malic acids. The acid exudation of the pitcher-leaves of these plants may therefore be considered as a solution of true vegetable pepsin. Just as pepsin alone, without the presence of an acid, is devoid of digestive powers, so is this vegetable exudation while in a neutral condition. And when acidified, the latter is incapable of forming diastase, and has the above-mentioned peculiar effect upon gelatine, agreeing in these respects likewise with common pepsin solutions.—*Ber. d. Deutsch. Chem. Ges.*, 9, 673 *in New Remedies.*

ON MUSTARD-PAPER.

Good mustard-paper can only be prepared from good mustard-flour which has been *entirely* deprived of oil. The least trace thereof remaining in the powder prevents its adhesion to paper, or causes it to stick to the skin; and besides, through the gradually developed rancidity of the oil, the paper becomes after a while altogether inert.

To ascertain the absence of fixed oil, a sample of the paper or the powder is macerated for a few hours with petroleum benzine, and the solution filtered into a test-tube. If the liquid appears colourless, no oil is present; but if a yellow tint is noticed, this is due to oil. The fixed oil of mustard colours any of its solvents intensely yellow, which circumstance is taken advantage of during the removal of the oil, to recognize the progress and completion of the exhaustion. Presence of oil in the paper therefore communicates to it a yellowish appearance, while it should otherwise appear of a *whitish gray* colour. In applying mustard paper, the effect should be felt in 40, or at most 60 seconds.—*Ap. Zeit. in New Remedies.*

REPORT ON THE ASSAY OF OPIUM FOR MORPHIA.*

BY EDWIN LAWRENCE CLEAVER, F.C.S.

In order to thoroughly criticize the different processes in present use for the estimation of morphia in opium it is necessary to have a thorough knowledge of the following points:—

1. What are the constituents of opium?
2. In what state of combination do they exist?
3. The action of solvents and reagents on these principles.
4. The action of solvents on opium.
5. The action of alkalies on solutions of opium.
6. The action of heat, acids, etc., on morphia.

This paper will therefore be divided into two parts. The first consists of remarks on the foregoing heads; the second of the application of these remarks to point out the advantages and disadvantages of the existing processes used for opium analysis.

PART I.

The principal constituents of opium are as follows:—Morphine, narcotine, narceine, codeine, thebaine, verine, a substance resembling caoutchouc, probably two resins, meconic acid and calcium salts, and a substance we will designate by the name of extractive.

Of these the morphine in all probability exists combined with the meconic acid to form soluble meconate of morphine.

The narcotine is either entirely free or partly combined with acid.

The remaining alkaloids are probably in a state of combination.

The meconic acid is partly free and partly combined.

The action of different solvents and reagents on the principles of opium are as follows:—

Water (distilled).—Morphine is soluble to the extent of one part

*Read at the meeting of the British Pharmceutical Conference, and published in the Pharmaceutical Journal and Transactions.

in 1,000; narcotine in 10,000; narceine is sparingly soluble though more so than morphine; the meconic acid is freely soluble; the resin, caoutchouc, etc., are insoluble.

Alcohol.—Morphine is sparingly soluble in cold alcohol, freely in boiling. The remaining alkaloids, resin, and caoutchouc are soluble.

Fusel oil.—All the alkaloids are freely soluble in fusel oil. The resin is also slightly soluble.

Ether, Benzol, Bisulphide of Carbon.—Morphine is soluble to the extent of one part in 2,000; the remaining alkaloids are freely soluble. The resin is insoluble; caoutchouc soluble.

Acids.—The whole of the alkaloids and resins are soluble in acids.

Fixed Alkalies.—Morphine is freely soluble in solutions of fixed alkalies; narcotine is insoluble. In the presence of morphine narcotine is dissolved by lime water; narceine is soluble. The remaining alkaloids are insoluble. The resin is partly soluble.

Ammonia.—Morphine is sparingly soluble in ammonia, a 1 per cent. solution dissolving five parts in 1,000. The narceine and codeine are soluble. The remaining alkaloids and resin are insoluble.

Action of Solvents on Opium.

It follows from the foregoing remarks that when opium is treated with the water solution contains meconate of morphine, salts of narcotine and other alkaloids; resin, taken into solution by the free acid present; calcium salts, meconic acid and extractive.

An alcoholic solution will, in addition to the above, contain more narcotine, caoutchouc, fat and resin.

The question here arises as to whether water will thoroughly exhaust the opium of its morphine. Opinions on this point are divided, but I believe that, provided the solution produced be acid, water will effectually exhaust the acid.

It may be said that opium after prolonged treatment with water has a bitter taste, thus proving some constituent to be present; but that this bitterness is not due to morphine may be proved by treating the marc with benzol, ether, or bisulphide of carbon, when the bitterness is entirely removed. Preliminary treatment with one of the above mentioned solvents is recommended by some authors, and this plan has the advantage that the quantity of water required for the after treatment of the opium is much less than if the preliminary exhaustion be omitted, and also that the narcotine being nearly all removed, the point of exhaustion is more easily noticed by the solution dropping through devoid of bitterness. It must, however, be remembered that a slight loss of morphine is entailed by the preliminary treatment, but the amount may be calculated by adding ·005 gr. for every 10 c.c. of solvent used to the amount of morphine afterwards found.

Hot water is also recommended by some, but I do not think much advantage is gained by its use, as the following experiment will prove.

No. 1. 100 grains of dried powdered opium were treated with hot water. It yielded 69 per cent of extract and 12·2· per cent. of brown crystalline morphine.

No. 2. 100 grains of the same opium were treated with cold water through percolators; five fluid ounces of water were used and then the solution had a very bitter taste. It yielded 54·3 per cent. extract and 11·9 per cent. of coloured crystalline morphine.

No. 3. 100 grains were treated first with boiling benzine and afterwards percolated with water. It required under 3 ounces of liquid to render the marc tasteless, whilst in the previous experiment 5 fluid ounces were required, and even then the solution obtained was slightly better. The liquid yielded 54·7 per cent. of extract and 12·2 of coloured crystallized morphine.

It will be seen from these experiments that although hot water dissolves more from opium than cold water, yet the yield of morphine is not greater. The effect, however, of first using benzine is more marked and the increased yield of morphia I believe to be due to the fact that less water being used, less time was required to evaporate the solution, and thus destruction of the morphia by heat is avoided. I also tried the effect of mixing opium with chalk, and then adding water, and percolating.

100 grains of opium, as before, yielded 45 per cent. of extract, which gave 11 9 per cent. of brown crystalline morphine.

The difference in extract yielded by the plan is due to the fact that the free acid being neutralized by the chalk, the meconic acid, part of resin, the whole of the meconate of calcium, and part of narcotine are removed from solution and so diminish the weight of extract obtained. The results obtained by this process compared with others will be given further on.

Action of Alkalies on Infusion and Tincture of Opium.

Ammonia.—If excess of solution of ammonia be added to infusion of opium a precipitate is obtained, which consists chiefly of morphine, but contains small quantities of narcotine and other alkaloids, meconate of calcium, and resin. This precipitate is either crystalline or amorphous, accordingly as the solution was hot or cold when precipitated. If the solution be concentrated until about equal to twice the weight of opium employed, and ammonia added to the boiling liquid, with constant stirring, the resin is precipitated, melts and adheres firmly to the sides of the containing vessel or to the glass rod used for stirring. The liquid can then be poured off immediately, when the morphine, etc., will begin to be precipitated owing to the change of temperature. The crystals so obtained are free from the resin and light brown in colour. The morphine is not entirely

precipitated by ammonia from infusion of opium, owing to the solubility of morphine in water and in ammonia. If the ammonia be added in slight excess only, and the liquid allowed to stand until the smell of the ammonia has disappeared, then the amount of morphine left in solution should correspond to the amount of liquid used, unless there be any constituent in the infusion of opium which prevents the complete precipitation of morphine. This, according to Professor Dragendorff, is the case. The following experiments, however, tend to prove that, provided the excess of ammonia be nearly driven off, the amount of morphine left in solution is in direct accordance with its solubility in water.

6·48 grains of dried Turkey opium were exhausted with water, and concentrated to 35 c.c. It yielded ·800 gram of morphine. The solution, which with the wash water measured 70 c.c., was shaken repeatedly with fusel oil; fusel oil removed and evaporated. The residue was treated with dilute acid and precipitated with ammonia. This last operation was performed entirely with about 10 c.c. of liquid. It yielded ·067 gram of morphine, which with ·010 to be added for loss of morphine in the 10 c.c. of liquid gave ·077 or only ·055 gram in excess of the theoretical quantity, which may be accounted for, as the morphine was not quite free from colour.

Five grams of Persian opium treated as above yielded ·400 gram of morphine, and 50 c.c. of liquid was used. This treated by amylic alcohol gave ·053 gram of morphine.

6·480 grams of a very rich sample of Persian opium gave ·907 of morphine, 6·80 c.c. of wash water were used. This by treatment with amylic alcohol yielded ·087 gram of morphine.

There is, however, one point in connection with the precipitation of morphia by ammonia to which especial attention must be paid. It is that solutions of opium from which the morphine has been precipitated by slight excess of ammonia, if left to stand until the smell of ammonia has disappeared, redissolve a large quantity of the precipitate, so that care must be taken that the liquid should always have a *slight excess* of ammonia present. It is, I believe, to the neglect of this fact that opium contains some ingredient which hinders the precipitation of the morphine.

When, however, ammonia in strong excess was allowed to remain in the liquid, the amount of morphine extracted by amylic alcohol was much greater, in one case as much as 3 per cent.

If the opium before treating with water has been mixed with chalk, then the precipitate obtained by ammonia consists of morphine, narcotine, and resin, the meconate of calcium being entirely got rid of. If the opium has been treated with boiling benzine, bisulphide of carbon or ether, previous to infusion, then the precipitate consists of morphine, meconate of calcium, resin, and minute quantities of other alkaloids. The following experiment will illustrate the difference in composition of the precipitate under these different circumstances.

No. 1. 6·480 grams of dried opium treated with cold water, the solution evaporated to half an ounce, ammonia added in slight excess, and allowed to stand twenty-four hours, gave 1·695 gram of precipitate; of this 1·506 was soluble in boiling alcohol. The alcoholic residue, etc., treated with bisulphide of carbon lost ·358 gram. The remainder dissolved in dilute acid, and treated with slight excess of ammonia, yielded ·870 gram of morphine.

No. 2. 6·480 grams mixed with chalk, and treated as above, gave 1·258 of precipitate by ammonia. Of this 1·200 was soluble in alcohol, ·267 in bisulphide of carbon, and ·858 of morphine.

No. 3. 6·480 grams treated with bisulphide of carbon and afterwards exhausted with water yielded 1·332 gram of precipitate by ammonia, of which 1·137 was soluble in alcohol, and ·008 in bisulphide of carbon and yielded ·880 of morphine.

From this it will be seen—

	1	2	3	4
Precipitate by Ammonia	26·06	19·6	20·5	18·3
Portion soluble in Alcohol	23·08	18·5	17·2	16·1
" " $C.S_2$	5·5	4·1	0·1	
Morphine contained in precipitate	13·28	13·25	13·59	13·7

That a large quantity of morphine escapes precipitation by ammonia is a point strongly to be remembered, as in the case of a bad opium containing only from 2 to 4 per cent. of morphine, more morphine might remain in the liquid than was precipitated.

It has been proposed to take the weight of the precipitate given by ammonia as a criterion of the goodness of opium, and good opium should certainly not give less than 14 to 15 per cent. of it, but it should be borne in mind that it does not contain more than half its weight of morphine.

If ammonia be added to infusion of opium (which has been acidified by hydrochloric acid) until exactly neutral, the resin and meconate of calcium are precipitated, whilst soluble hydrochlorate of morphine remains in solution; the precipitate can then be filtered off and then ammonia be added to the filtrate in slight excess; a light coloured precipitate is obtained, which consists of morphine and narcotine in a very pure form.

Potash, soda, and lime, added to infusion of opium, cause a precipitate of narcotine, and resin, and meconate of calcium, but the morphine is dissolved by the excess of alkali present. If the solution be filtered quickly the morphine soon separates out, and is in a very pure form, but there is some loss in the process, as I have never been able to recover by this means as much morphine as by other processes. Lime water also dissolves narcotine to some extent, provided morphia be present.

Action of Heat on Morphia.—If morphine or its salts be boiled with water for some time, the solution becomes coloured; if acids in excess be present the action is more marked, whilst with alkalies

the action is stronger still, and a flocculent brown precipitate is soon formed. The following experiments may prove useful as showing that, provided allowance be made for the solubility of morphine in water, the precipitate is complete :—

I took ·583 gr. of pure morphine, dissolved in acid and treated with slight excess of ammonia. After twenty-four hours the precipitate was collected, dried and weighed; it gave ·552 gr. of morphine; the wash water was 30 c.c. equivalent to ·030 of morphine, thus making the total ·113 gr.

·113 gr. of pure morphine, treated as above, gave ·100 gr. of precipitate and 13 c.c. of liquid, which would correspond to ·013 gr. of morphine, thus making the total ·113.

Ammonia added to tincture of opium, or to an alcoholic solution of the precipitate produced by ammonia, produces a precipitate of part of the morphine and part of the narcotine present, the amount remaining in solution depending on the strength and quantity of the alcoholic liquid; if the liquid be tincture of opium, then the precipitate contains meconate of calcium.

PART II.

In commencing my criticisms on the processes in use I will begin with the most simple, and then proceed to describe others more complicated.

Arnoldi's process (*Jour. Chem. Soc*, 1874). Opium is exhausted with water, the solution treated with animal charcoal, concentrated and precipitated by ammonia. The precipitate is collected, dried, and weighed as impure morphine. The author states that good opium should yield above 14 per cent.

The objections are—

1. That the morphine is not entirely precipitated by ammonia.

2. That the precipitate, though called impure morphine, does not contain much more than half its weight of morphine.

3. The use of animal charcoal ensures loss of alkaloid, as the undermentioned experiment will prove :—

2·435 grams of pure morphia were dissolved in acid and boiled with animal charcoal. The morphine was precipitated, and the amount obtained, allowing for loss by solubility, was 2·405 gr., thus indicating a loss of over 1 per cent.

A second experiment showed even a higher loss.

The process given by Professor Fluckiger in the "Pharmacographia" is better, but far from perfect. It is as follows :—Opium is exhausted by boiling ether, the residue dried, treated with water, and precipitated by ammonia. This precipitate recrystallized from boiling alcohol.

Professor Fluckiger himself describes the process as imperfect, and gives his reasons. He is one of the very few who seem to have taken notice of the loss of morphine by virtue of its solubility and of its destruction by heat. The chief objections to the process are—

1. The long continued boiling with ether (twenty or thirty times repeated with fresh quantities) takes away some of the morphia, and care must be taken that the ether employed is free from alcohol and water.

2. The loss of morphia by virtue of its solubility.

3. In crystallizing from alcohol much morphia remains in solution, but the crystals deposited are very pure.

The small proportions of morphine found by Professor Fluckiger tend to prove the correctness of these statements.

Guibourt's process (*Journal der Pharmacie et Chimie*) consists in exhausting opium with water, precipitating by ammonia, and washing the precipitate first with dilute alcohol to remove narcotine and colouring matter, and afterwards dissolving the morphine by means of strong alcohol. The alcoholic solution is evaporated, dried and weighed.

The objections to this process are loss of morphine by washing the precipitate with dilute alcohol, and in the precipitation with ammonia.

The residue obtained by the evaporation of the alcoholic solution is not pure morphine, but contains narcotine and resin.

Schacht's process (*Archiv der Pharmacie*, 1863).—The process is an improvement on the last mentioned. It consists in exhausting opium with water by two or three macerations, treating with animal charcoal, concentrating and adding ammonia. The precipitate is weighed, treated with ether, and the ethereal solution evaporated and weighed. The portion insoluble in ether is treated with strong alcohol, the alcoholic solution evaporated, dried and weighed; or it is washed with water and dilute alcohol and again weighed, the weight being taken as pure morphia.

This process has the following objections:—

1. The amount of water used by macerating three successive times necessitates long applications of heat for evaporating, which tends to destroy the morphia. The meconic acid present is also split up and forms other coloured matters, which helps to make the morphine impure.

2. The animal charcoal used retains alkaloid.

3. If the alcoholic solution be evaporated, the results are high, as it contains colouring matter and resin.

4. If washed with alcohol (dilute) and water, morphine is dissolved away.

5. No mention is made of the morphine lost in precipitating.

It is, however, the best of those processes in which water is used alone as a solvent, and by slightly modifying, as follows, can be made to produce very good results.

The solution from which the morphine has been precipitated by ammonia should either be measured and allowance made for the morphia dissolved, or it should be treated with amylic alcohol as before described.

1. The opium should be first treated with benzine, as by that means less water is required for exhaustion, and the marc should be percolated, not macerated.

2. The use of animal charcoal should be precluded, the morphia being purified by being dissolved in acid, made neutral, filtered, and then adding ammonia.

The process devised by .Merck, consists in exhausting with water, and precipitating by means of carbonate of soda and heat. The precipitate is dissolved in acetic acid and made neutral, filtered, and excess of ammonia added.

This process has the following objections :—

1. The alkali and heat cause destruction of the morphine.

2. No account is taken of the loss by precipitation. It has the advantage that the method of purification proposed avoids loss of morphine.

Guillermond's process consists in treating opium with alcohol, and adding ammonia to the alcoholic solution. The morphine so produced is very pure, but as a large quantity remains dissolved in the alcohol, it is only a comparative method. The precipitate also contains meconate of calcium.

The process of Staples, which consists in adding alcohol to concentrated infusion of opium, then after filtration mixing more alcohol and ammonia, is also open to the same objections as the last.

The process of Mohr which has been adopted, with slight modifications, by the compilers of the B. P., consists in exhausting opium with water, mixing with milk of lime and boiling; the filtered liquid is mixed with hydrochloric acid and concentrated. It is then made exactly neutral with ammonia, filtered, and mixed with excess of ammonia. The precipitate dried and weighed. This process if properly and carefully carried out is one of the best, as, by the use of lime, the resin and meconate of calcium, also meconic acid, is removed from solution. The objections to it are—

1. That the large quantity of water used and the subsequent evaporations cause loss of morphine.

2. That no account is taken of the loss of morphia by non-precipitation.

The modifications I would introduce are as follows :—

1. The opium should be first treated with bisulphide of carbon or benzine.

2. The dried residue should then be mixed with its own weight of lime and two or three times its bulk of some inert powder, such as pumice or glass. It is then to be percolated with water, the first part of percolate being returned as fast as it runs through. By this means much less water will be required to exhaust the opium than would otherwise be the case. After the opium is exhausted, which will be known by the liquid dropping through devoid of taste, the solution should be exactly neutralized with dilute sulphuric acid

and filtered and the precipitate washed. The clear solution is then to be evaporated over a water-bath until its bulk is about half an ounce, and again filtered if requisite; then ammonia is to be added in slight excess, and the liquid allowed to stand twenty-four hours. The precipitate can then be collected, washed with ether, and dried, and to the amount found must be added the amount corresponding to the quantity of water used in precipitating and washing. The morphia obtained by this process is of a dull white colour, crystalline, perfectly soluble in alcohol, acids, and alkalies.

In concluding these few remarks, which I hope may prove useful as indicating which methods are most likely to give correct results, I beg to state that I do not consider the subject in any way exhausted, and that I still intend to work upon opium analysis, and hope to communicate further results at another meeting of the Conference.

Table showing amount of morphine obtained by different processes on samples of dried powdered opium:—

	Arnoldi.	Fluckiger.	Guibourt.	Schacht.	Schacht Improved.	Guillermond	B. P.	B. P. Improved.
Turkish.....	26	9·5	10·2	11·0	12·8	9·8	12·1	13·0
Persian	25	8·0	9·0	11·0	13·0	8·7	12·3	13·4
Indian	13	3·0	3·6	4·0	5·2	3·2	4·9	·65

THE DRUG WAREHOUSES OF THE EAST AND WEST INDIA DOCK COMPANY.*

A very interesting article in the *British Trade Journal* for November is devoted to the description of the warehouse accommodation provided in London by the East and West India Dock Company, for the convenience of the merchants, brokers and buyers concerned in the foreign produce imported by the vessels using the docks. We extract from it the following paragraphs relating to the drug stores:—

"The warehouse in Billiter Street is set apart for the storage of the most valuable articles of importation, such as the finer drugs, ivory, feathers, china ware, etc. In the drug department one sees such costly articles as musk, vanilla, ambergris, and the various

* Pharm. Jour. & Trans.

kinds of essential oils undergoing manipulation. Each package of musk is carefully sorted, and every individual pod subjected to close scrutiny, for Ah Sing has a peculiar knack of deftly introducing different foreign substances into the pods and closing them up again. Some mysterious compound known as 'Chinaman's Earth' is a favourite adulterant of this highly-priced natural perfume. Ambergris, a peculiar secretion of the sperm whale and the base of many scents, was not a great number of years ago accounted worthless, but as much as five guineas an ounce has since been paid for it. Essential oils occupy an important place in the drug warehouse. We noticed a large vat for the reception of cassia oil, capable of holding 206 gallons. This oil has to be turned out of its original packages and "bulked," or mixed together, buyers being chary of investing in an article which exhibits very unequal quality. . .

"In Fenchurch Street is the greatest drug store, perhaps, in the world, and here also are worked and warehoused such leading import staples as silk, tea, cigars, etc. . . . . While, as already mentioned, the finer sorts of drugs find their way to Billiter Street, it is to this place that the great staples are diverted The stowage capacity is immense. Rooms upon rooms, and cellars of vast extent, are crammed to overflowing with the medicinal produce of many climes, and the money value of the drugs here accumulated is little short of fabulous. Articles like jalap, ipecacuanha, and aloes, are stored in separate rooms, fitted with tiers of racks for the reception of the packages. Of ipecacuanha root alone the stock is valued at £6000, and it not unfrequently reaches £15,000. China rhubarb is stored in a small building apart from the general drug block, as from its peculiarly penetrating and slightly nauseous smell its proximity to other drugs is not desirable. The present stock is about 850 cases, and their average value may be set down at £16 a case. Every package that is received in the drug department requires "working," that is, it has to be classified, sorted, sampled, etc. The responsibility of this work fall on the experienced foreman, under whom is a staff of thirty assistants. The practice of years has made him a consummate judge, and at a glance he is almost able to appraise a parcel at its true value. In few trades are greater judgment, discrimination, and experience necessary than in the drug trade. The warehouse system is an immense advantage to the brokers in this line, for they can depend on these qualities being exercised on their behalf. The parcels entrusted to them for sale undergo manipulation in this warehouse. They are supplied from the same source with descriptive particulars for their catalogues, and practically all they have to do is to knock down the lots on the day of auction.

"The wholesale druggists muster strongly in the drug showroom at Fenchurch Street prior to the public sales, which occur every fortnight. Here they see the bulk of goods down for disposal,

and at such times every nook and corner of the place is occupied with drugs. Attached to the show-room is a most complete museum, containing specimens of nearly every article in the Pharmacopœia. One could well spend a day in this department alone without exhausting all that is to be seen."

TURPENTINE AS AN ILLUMINATOR*

At a recent sitting of the Academy of Sciences, a paper was read by M. A. Guillemare, on the difficult problem of lighting by means of matter exclusively extracted from resinous trees. When it is sought in an ordinary lamp, intended for rape oil or petroleum, to burn spirits of turpentine or the oil called pyrogenic, extracted from resin (colophone) by fractional distillation with four per cent. of quicklime, two obstacles present themselves hitherto considered insurmountable: 1, resinous liquids do not go up the wick for more than a few minutes, the capillary action soon ceases; 2, in all lamps commonly sold these same liquids burn incompletely and emit a dense smoke. Two points had therefore to be considered: How to purify resinous liquids to perfection, and how to construct a special burner. In this pursuit M. Guillemare has found that the resinous liquids above alluded to became milky in contact with ammonia, which produced an emulsion consisting of a solution of resin and naphthalin. Now the distillation of these substances by an open fire does not rectify them, as is generally supposed. But when the operation is effected on a substratum of water, the steam carries over the pure essence quite free from resin and naphthalin. The purity of the distillate may be tested by ammonia which then produces no emulsion. In order to get rid of the smoke M. Guillemare has contrived a burner enclosed within two cones, the construction of which cannot be understood without diagrams; but the result is a dazzling light superior to all others.

To Clarify Honey.—For the purification of natural honey various artificial means have been proposed, as tannin and albumen, charcoal, bole, shreds of filtering paper, and many others; but it may be accomplished readily, without any foreign agents, by the following method of K. Dannenberg. Add to the honey *one-half its weight of water*, boil it for 15 to 30 minutes, according to the quantity of the honey, skim diligently, and add during the boiling as much *cold water as will interrupt the boiling for only 15 or 30 seconds;* repeat this 5 or 6 times. After the boiling has continued for about half an hour, the honey is strained while hot, and evaporated on a steam or water-bath to the proper consistence.—*Arch. d. Pharm.*, Sept. 1876, 256, *in New Remedies.*

*Journal of Applied Science.

Editorial.

THE DUNKIN ACT AS AFFECTING DRUGGISTS.

The question arises whether the Temperance Act of 1864 interferes with the sale of liquor by druggists, and some of our readers, who reside in districts where the Act is in force, are somewhat uncertain of their precise position. As far as we understand the Dunkin Act we believe it was not intended to interfere in any way with the sale of liquor required for *bona fide* medicinal purposes. Indeed in one of the sections it is so stated, but there may, nevertheless, be legal technicalities which are not apparent to a non-professional enquirer, and which might bear an interpretation adverse to the interests of druggists and patients. However, from a careful examination of the Act in question, we have been unable to find anything of the kind, and are of opinion that, provided liquors are sold in quantities of less than twelve ounces, and *for medicinal purposes only*. that neither the law nor those who administer it would interfere with the present custom. Any attempt of this kind would be unreasonable, unjust, and absurd, for though it may be competent for a government to look after our luxuries and say that we must take our liquor in five-gallon swallows or not at all, it is certainly not the business of legislators to meddle with our physic, nor do we think they would care to assume the responsibilities of such a course.

CURES FOR THE OPIUM HABIT.

If there is one man more than another who deserves the name of scoundrel it is he who, under the guise of friendship, tenders to those in distress, assistance which is only calculated to aggravate their sorrow, and plunge into still deeper misery the unfortunate recipient. A fellow being striving against temptation; battling manfully but hopelessly against the encroachments of an overwhelming vice: or struggling to break the self-bound fetters of habit, calls forth our kindest sympathy and support. Heartless is he who witholds a helping hand, and worse than human is the man who, for his own sordid ends, proffers false aid, and helps but to destroy.

Not the least of these harpies are those who prey on the victims of alcohol or opium, and under deceptive names present as antidotes the very substances whose effects they are supposed to counteract.

Some years ago, there was published in the *American Journal of Pharmacy* an analyis of a so-called "cure for the habitual use of of opium," which showed the compound to contain a considerable amount of morphine; and in a late issue of the *Boston Medical and Surgical Journal* there appears a report of a committee, appointed by a State Medical Society, in which these opium antidotes are made the subject of investigation. A preparation put up by Mrs. J. A. Drollinger was sent to Dr. Squibb, of Brooklyn, for analysis, but as the time of that gentlemen was so much taken up by other professional engagements, he sent the specimen to Messrs. Walz & Stillwell, analytical chemists, of New York, who report that the "sample is glycerine colored with anilin red, and containing in solution crystallized sulphate of morphine amounting to about seven grains to the ounce." Another antidote, analysed by the Assayer for the State of Maine, and prepared by "Dr. S. B. Collins, the great Narcologist of the Age," gave 3.2 per cent. of sulphate of morphine, or fourteen grains to the ounce.

The committee suggests that some action be taken which will result in the wide dissemination of the information which has been acquired concerning these dangerous remedies, and it certainly becomes the duty of the press, and the medical profession, to do all in their power in furtherance of this laudable purpose.

NEW REGULATIONS REGARDING THE PHARMACEUTICAL EXAMINATIONS IN GREAT BRITAIN.

The new regulations which govern the admission of candidates to both Minor and Major examinations in Great Britain came into force at the opening of the year. According to the new order of things, every candidate will have to file a declaration that he has been registered and employed as an Apprentice or Student, or has for three years been practically engaged in the translation and dispensing of prescriptions. A resolution has also been passed that candidates who fail in passing the examination cannot again go up without the payment of additional fees. Under the old system it

has been customary to return the examination fee, less one guinea, but this sum has not been found sufficient to pay the expenses of examination. Unsuccessful candidates can go up again, within one year from the date of failure, by paying the reduced fee of two guineas. This alteration will, to a great extent, keep out those candidates who have presented themselves to try what they could do, merely as a preliminary experiment.

The *Pharmaceutical Journal* of Great Britain contains a list of names of somethree hundred persons who are in default of fees payable under the Pharmacy Act. Appended is a notice that unless the Registrar be communicated with before Dec. 30th, 1876, the names will be erased from the Register.

SEASONABLE PERIODICALS.

The Chemists' and Druggists' Diary for 1877 appears in its usual handy form, being interleaved with blotting paper, and containing ample space for recording the business doings of the day. There are also well aranged blanks for a Laboratory Record, Cash Account, etc. A special feature this year ia a collection of useful formula, well classified, most of them new, and no doubt many of them useful.

Vick's Floral Guide. The initial number of this handsome catalogue is before us, and is in no respect behind its predecessors. Most of our readers are aware that three small nnmbers, containing anything new in the flower and seed line, and also an enumeration of plants suitable to the season, are published during the year. The annual subscription is twenty-five cents, which may be remitted to Mr. Vick, Rochester, N. Y.

The Popular Health Almanac, published by Mr. Steiger, of New York, and edited by Professor Frederick Hoffman, has entered upon its second year. The present number is similar in design to that which preceded it, and contains many useful articles and hints on health knowledge, accidents and emergencies, etc. The almanac is designed to take the place of those sent out by the patent medicine vendors, and is offered to druggists at a very low price. Particulars may be learned from the publisher.

DRUGGISTS' ASSISTANTS' ASSOCIATION.

The regular monthly meeting of this Association was held in the rooms of the School of Practical Science, on Wednesday, Dec. 4th. The chair was taken by Mr. Cousens, and, after the transaction of routine business, the treasurer read a financial statement of the result of the concert, from which it appeared that, after the payment of all expenses, there would still be an encouraging balance in the hands of the Society.

Mr. Shuttleworth read a lengthy paper "on the Phenomena of Solution and Crystallization," which will appear in a future number of the JOURNAL, and for which the author was accorded a vote of thanks, when the meeting adjourned.

Editorial Summary.

FILTERING PAPER.—In a paper read before the British Pharmaceutical Conference, Mr. Greenish gave the result of a microscopical examination of the filtering papers in common use. This investigation was undertaken in order to ascertain whether the fungoid growths, often observed in solutions kept by pharmacists, were traceable to the filtering medium, as it was observed that unfiltered solutions were not so liable to the presence of fungi as those which had passed through paper, and also that in several instances the fungus had formed around a fibre from the paper. These results were principally noticed in regard to the circular, grey, foreign paper. Swedish filtering paper, which ranks perhaps higher than any, is obtained from the factories of the Munktell family, and is always in great demand. It is composed of flax fibre, which has evidently done duty before being made into paper. Formerly, this paper yielded a very trifling amount of ash, but it appears that this amount has materially increased, so the composition must have changed. The value of this paper depends to some extent on the purity of the water used in the manufacture. Next to the Swedish is the Rhenish paper. This is also composed of flax, but it is not so close in texture, and the fibres are more crushed and broken than in the Swedish paper. The English white papers have a little cotton mixed with the flax, and are very much crushed and torn. The common gray papers of home and Dutch manufacture contain considerable wool, said to be used to render the paper more open. Dyed wool, jute, esparto and other fibres are often present; in fact, such paper may be regarded as a microscopical curiosity shop, as far as fibres are concerned. The presence of wool must operate injuriously

in the filtration of alkaline liquids, and it is evident that paper of this kind is unfitted for nice work. A sample of Japanese paper was shown by Mr. Greenish. It was prepared from the fiber tissue of the paper mulberry tree, a substance yielding the longest fibre of any paper-making material. The paper was described as being only adapted for filtering flies out of syrup, and it is difficult to imagine what the Japanese use it for. It is generally supposed that Chinese and Japanese paper is made from straw, but all the specimens examined by the author were found to consist of mulberry fibre.

NEW VARIETY OF EXTRACT OF LIQUORICE.—A new variety of extract of liquorice, of Italian origin, has made its appearance in the Russian markets, and has been examined by M. A. Peltz (*Pharm. Zeits. f. Russ.*), who describes it as occurring in irregular masses, and of a dull appearance, tough consistence, and possessing a purely sweet, not burnt, taste. Examination showed it to be of first-class quality as will be seen from a comparison of the composition of the various kinds, as in the following table. The new variety is that at the foot of the list :

Variety.	Moisture. Per cent.	Dried Extract. Per cent.	Glycyrrhyzin. Per cent.	Starch. Per cent.	Sugar. Per cent.
English.....	1.2	38	2.44	27.10	13
Calabrian.....	2.0	47	1.53	35.50	11
Bayonne	3.7	48	2.19	35.10	14
Astrachan.....	7.3	50	18.14	1.33	12
Spanish	4.12	55	3 15	8.85	14
Kasan	4.5	57	14.74	2.62	14
Sicillian	4.1	60.5	4.67	5.00	16
Boracco	3.7	67.5	4.95	13.12	15
Morean.....	—	79.0	11.88	5.33	16
Italian	14.0	75.0	15.0	2.50	10

It will be seen that though the Morean variety yields more extract it is accounted for by the amount of sugar; whilst the Kasan variety which contains almost the same amount of glycyrrhizin as the Italian has the disadvantage of an unpleasant, almost tarry taste. The new article, notwithstanding its good qualities, is said to have been offered at a low price.

CONTAMINATION OF WATER BY IMPURE ICE.—The *Scientific American* speaks of the prevalent notion that water purifies itself by

the process of freezing, and denies the correctness of the conclusion. Instances are given where outbreaks of intestinal disorders were clearly traceable to impure ice. One of these is noted in the recent annual report of the State Board of Health of Massachusetts; and another relates to the occurrence of a malady which attacked a large number of persons staying at one of the principal hotels at Rye Beach, N. H. After considerable search, the source of the trouble was found in the pond from which the ice supply had been taken, and which had been allowed to become stagnant. These facts have an important bearing on the ice supplies of our cities, and stringent laws should be enacted, and rigidly carried out, in order to prevent the cutting of ice near the city fronts. In Toronto we we have often seen ice taken out from within a few yards of the outlets of the sewers.

PINK COLORATION OF SOLUTIONS OF CHLORIDE OF LIME.—As almost every one will have observed who has had anything to do with solutions of chloride of lime, and especially with the preparation of solution of chlorinated soda, when heat is employed, there is often a beautiful pink color communicated to the liquid, which disappears on filtration through paper, or when the liquid is evaporated almost to dryness. In the manufacture of chlorate of potassium this color is also frequently observed. It has been attributed to the presence of manganese, and, until lately, chemists were content with the explanation. Mr. T. P. Blunt has, however, been making some experiments on the subject, and which are reported in the *Chemical News*. He has failed in finding the slightest traces of manganese, and says that the coloring matter, when separated, turns out to be iron, prabably in the form of a lime salt of ferric acid. It may be noted that when cold water is used for exhausting the chloride of lime the pink colour is not produced, but a temperature at or near the boiling point is necessary to develop it.

NEW FORM OF DISPENSING COPAIBA RESIN.—Mr. A. Balkwill contributes to the *Pharm. Jour. & Trans.* the following form for the administration of copaiba resin. It is said to "give great satisfaction to the prescriber and his patient. It is no trouble to make, and in elegance of appearance, permanence, and therapeutic action, the mixture is preferable to any yet met with:"—Resinæ Copabiæ, one and a-half drachms; Ol. Amygdal. Dulc., four drachms; Mucil. Acaciæ, one and a-half ounces; Liq. Potassæ, half a drachm; Ol. Cinnamomi, six drops; Aqua to six ounces; a sixth part three times a day. Dissolve the resin in the almond oil with gentle heat, then add the liq. potas., and form an emulsion.

EXTEMPORANEOUS PILL COATING.—Mr. H. Hildebrand, (*Pharmacist*), recommends powdered elm bark as forming an effectual coating, not so elegant as sugar, but yielding pills equally easy of administration. Children and persons having what is called a sweet-tooth, often swallow their sugar-coated pill with reluctance—rolling it as a sweet morsel under the tongue. Any attempt to toy with the elm-coated pellet will be found ineffectual, as the pill becomes so slippery that it at once rolls down the throat. In order to produce this coating it is only necessary to moisten the pills with simple syrup, diluted with one-fourth its bulk of water, and then roll with a sufficient quantity of the powdered bark. The pills are delivered in a box containing powdered elm, so no time need be lost in drying.

ARTIFICIAL SUBSTITUTE FOR BEESWAX.—M. Gustav Hell, (*Pharm. Post.* in *Chemist and Druggist*), states that, a short time ago, large quantities of a very presentable artificial wax were to be found in the market. This article was almost identical in appearance with beeswax, and possessed the ordinary characteristics of color, brittleness, fracture and adhesiveness. On the outside of the cakes a honey-like smell was perceptible, but on breaking the pieces a distinct pitchy or resinous odor could be detected. On fusion, this smell became quite unmistakable. The factitious wax was offered at a moderate price, and commanded a ready sale. The author subjected it to a thorough examination, and found it to consist of a mixture of 60 per cent. of paraffin and 40 per cent. of common resin. The cakes were thinly covered with genuine beeswax.

NEW ADULTERANT OF HONEY.—M. Meniere (*Repert. de Pharm.*) says that deep-colored honeys, as those of Bretagne, have lately been in considerable demand in France. In order to meet this, and also to supply an article yielding greater profit, a novel adulteration has been resorted to by some of the Paris dealers. Roasted bread, in powder, has been added to ordinary honey, in quantities ranging from ten to twenty per cent. the weight of the honey. This admixture may be at once detected by the addition of water, which leaves the bread undissolved, so that it may be separated by filtration.

SYRUP OF RHUBARB.—Mr. A. F. W. Neynaber contributes to the December number of the *Druggists' Circular* several formulæ for rhubarb preparations; amongst others, one for the syrup corresponding with that of the U. S. P. Three troy ounces of rhubarb, in

powder of 20 meshes, is percolated with a mixture of six fluid ounces of alcohol, and nine of water This is followed by water, until a pint of percolate is obtained, to which is added twenty-two troy ounces of sugar. The syrup is then boiled and strained, and when cold should measure 32 fluid ounces.

SPUN GLASS AS A FILTERING MEDIUM.—It is said that spun glass is preferable to asbestus as a filtering medium, and is well adapted to the filtration of strong acids and alkaline solutions, nitrate of silver, Fehling's solution, albumen, collodion, etc. It is used in Germany and Austria, and at a late meeting of the Society of Pharmacy of Paris it was introduced to the notice of those present, and was stated by M. Limousin to be capable of many useful applications in chemistry and pharmacy.

DEVELOPMENT OF HEAT IN RECENTLY POWDERED MYRRH.—Mr. E. N. Butt, (*Pharm. Jour. & Trans.*) states that having powdered a quantity of picked myrrh, he found that in a short time, the paper bag containing the powder became sensibly warm. A thermometer placed in the powder showed an increase of heat from 62° to 108° F, and it is probable that in the lower portion of the contents of the bag, which had become pasty, a higher temperature might have been observed. This result is attributed to the rapid oxidation of the oleo-resin when exposed to the air.

DEVICE FOR DISPLAYING SPONGES.—A correspondent of the *Druggists' Circular* describes a novel device for holding and displaying sponges in the shop. It is called the "sponge chain," and is thus formed: About fifteen rubber bands or rings, of say three inches diameter, and one fourth of an inch wide, are united together by split steel rings, thus forming a chain, the links of which are alternately rubber and steel. The sponges are inserted into the rubber rings, where they are held fast enough for all purposes, but may be easily withdrawn for sale.

PAPER BARRELS.—According to the *Paper Trade Journal* there are now in the United States some eight or ten factories for the manufacture of paper barrels. The paper stock is obtained from wheat straw. Pasteboard is formed from sheets of paper, and of

this the barrels are formed. They have on each end a light iron hoop, and are rendered waterproof by being painted with a suitable composition. Their cost is about 10 per cent. less than that of wooden barrels, and they are much lighter.

CULTIVATION OF THE OLIVE IN CALIFORNIA.—According to the *American Grocer*, the olive tree flourishes well in California, especially about San Diego, and already many plantations have been set out, and some are bearing. The average yield expected from trees that have arrived at maturity, (tenth or twelfth year), is twenty-five gallons of olives, equal to about five gallons of oil, per tree. Sixty trees to the acre is the usual number. Trees bear generally very unevenly; at Santa Barburn there is a tree which, for three years in succession, has borne about forty-eight dollars worth of fruit; another, which, at the age of twelve years, bore over two gallons of fruit.

ABSORPTION OF ALKALOIDS BY SILICATED CARBON.—Mr. Wanklyn, (*Sanitary Record*), says that a solution containing 8.26 grains of soluble sulphate of quinine to the gallon may be entirely freed from alkaloid, by passing it through a fllter containing a depth of six inches of the so-called silicated carbon.

FREEZING MIXTURE.—By mixing together equal weights—say about half a pound of each—of snow at 32° F., and commercial hydrochloric acid, of 22° Baume, (sp. gr. 1,180), a temperature of —37.5° C. (—35.5° F.) may be reached. By making a similiar mixture, and having the acid previously cooled to—18° C., M. Weitz has succeeded in freezing mercury, which would indicate a temperature of—40° F.

CHLORAL FOR REMOVING WARTS.—A solution containing about twenty grains of chloral hydrate to the ounce of water, is recommended by Dr. Craig, as being effectual for the removal of warts. The operation is said to be painless.

CHLORAL OINTMENT.—An ointment, useful in eczema and allied affections, is made by incorporating from thirty to sixty grains of chloral hydrate with one ounce of simple ointment.

ADULTERATION OF LYCOPODIUM.—It is said that lycopodium, which, it will be remembered, is composed of the sporules of the club moss—is largely adulterated with various pollens. The French and Italian lycopodiums are stated to be specially liable to this adulteration or substitution. By examination with the microscope the fraud may be at once detected.

OLEIC ACID is suggested as a test for distinguishing genuine amber from any imitation consisting of, or containing copal. Oleic acid dissolves copal readily.

Varieties.

ADULTERATION OF OIL OF CLOVES.—This oil has for several years, especially in Germany, been found adulterated with carbolic acid. This may be recognized by shaking the suspected oil with 50 parts of hot water, slowly evaporating the aqueous portion to a small bulk and testing with a drop of ammonia and a pinch of chloride of lime. In presence of phenol a green colour, changing to a permanent blue, is developed (*Flückiger's test.*)

THE REMOVAL OF GREASE SPOTS FROM MARBLE.—The German *Building News* (*Bauzeitung*) says:—To remove grease spots from marble is no very easy task—for the most part the grease penetrates deeply, and is very obstinately retained by the crystalline substance. A satisfactory result is obtained most quickly by smearing a semi-fluid paste of benzole and chalk mud, in a layer about 20 millimetres thick, over the spots, and covering with a wet cloth. The operation must be repeated until the spots disappear.—*Chemist & Druggist.*

HOPS AS A FERMENT.—L. Pasteur has also made experiments with the view of throwing light upon the assertion of Sacc that hops contain a peculiar ferment (see this journal, pp. 320 and 467), and arrives at the conclusion that the presence of hops has no influence upon the fermentation of dough, and that its principal office appears to be, to impart to the bread a peculiar bitterish taste which may be relished by some persons.—*Chem. Centralbl.*, from *Comp. rend.*, vol. 83, p. 107., *Am. Jour. Pharm.*

REAGENT FOR GLUCOSE.—A. Soldaini, reccommends to dissolve 15 grams of precipitated carbonate of copper in a warm solution of 416 grams potassium bicarbonate in 1400 c.c. of water. The reagent is reduced by grape and milk-sugar, but not by cane-sugar, dextrin or starch-paste, unless they contain glucose. Normal urine, tartaric and uric acids are without action, but tannin and formic acid produce, when heated, a separation of cuprous oxide.—*Phar. Cen. Halle*, No. 42., *in Am. Jour. Pharm.*

ANTIDOTE TO STRYCHNIA.—The East Indian physicians recommend nicotia as the surest antidote, which is given in exceedingly small quantities in sherry several times a day. In default of nicotia, a decoction of tobacco leaves (½ ounce to a pint) is given.

EXTRACT OF BEEF.—Bouchardat warns against the incautious use of this extract, under the mistaken notion that an increase of dose will be followed by a corresponding increase of benefit. Both he and Stuart Cooper have shown that large doses of the extract are quite injurious. He further asserts that it cannot at all be compared to meat-juice (expressed in the cold from raw meat) as a strength giver.—*Bull. Therap.*

NEW REAGENT FOR URIC ACID.—Mr. Didelot recommends, in the *Repertoire de Pharmacie*, a new and simple method for detecting uric acid in guano, bird manure, etc. A few drops of nitric acid having been poured on a small quantity of the dry substance, when a glass rod is dipped into the mixture and rubbed on a spatula or a bright piece of iron, the metal immediately assumes a Prussian blue color. The reaction, according to the author, is extremely delicate—more so, perhaps, than the usual ammonia test.

Registrar's Notices.

RENEWALS SINCE OCTOBER 31ST.

Ansley, H. W., Port Dover.
Armstrong, O. L., Teeswater.
Armstrong, Wm., Orangeville.
Austin, Chas. A., Simcoe.
Austin, Jonathan, Simcoe.
Berry, G. W., Lucknow.
Bredin, R. G., St. Thomas.
Blogg, J. K. Toronto.
Brown, Thos. H., Paris.
Burtt, R. C., Chatham.
Brydon, Wm., Toronto.
Chandler, E., Bellville.
Chandler, J. Jun., Springfield.
Chidley, George, Clinton.
Corbett, R., Shelbourne.
Cummines, Thomas, Welland.
Davids, Joseph, Toronto.
Dawes, John, Brooklin.
Dyke, T. J., Mooretown.
Eadie, A. B., Wingham.
Eby, M. F., Port Elgin.
Fead, W., Cannington.
Fleming, J. H., St. George.
Foster, R. A., Picton.
Foster, W. O., Simcoe.
Gamsby, G. A., Port Hope.
Gayfer, John, Ingersoll.
Geen, A. L., St. Catharines.
Gray, H. R., Montreal.
Greenwood, W. W., St. Catharines.
Hawley, A. W., Trenton.
Huffman, J. C., Napanee.
Huffman, T. C., Napanee.
Johnston, James, Sydenham.
Lang, A. B., Owen Sound.
Lang, G. J. B., Owen Sound.
Lawrason, J. P., St. George.
Lutz, C., Elmira.
Mann, Thos. F., Aylmer.
Magann, Geo., Hamilton.
Meacham, J. B., Dundas.
Meek, J. H., Strathroy.
Miller, Henry, Galt.
Miller, William, Markham.
Mitchell, T. A., London.
Morris, E., Bowmanville.
McKenny, Thos., Thornbury.
O'Connor, T. J., Toronto.
Patton, R. M., Chatham.
Perry, J. J., Napanee.
Radley, S. D., Chatham.
Robinson, W. H., London.
Rosser, H., London.
Strong, W. T., London.
Stewart, J., Alliston.
Turner, A., Brockville.
Turner, A. Jun., Brockville.
Walmsley, D., Elmira.
Warren, John, Brooklin.

NEW REGISTRATIONS.

McEwen, F., Carleton Place.
Patterson, James, Almonte.

DRUGS, MEDICINES, &c.	$ c.	$ c.
Acid, Acetic, ffort	0 13 @	0 14
Benzoic, pure	0 22	0 2,
Citric	0 90	1 00
Muriatic	0 03½	0 05
Nitric	0 10	0 13
Oxali	0 15	0 17
Sulphuric	0 03	0 05
Tartaric, pulv	0 44	0 47
Ammon, carb. casks	0 18	0 20
" jars	0 19	0 20
Liquor, 880	0 20	0 22
Muriate	0 14	0 15
Nitrate	0 45	0 60
Æther, Acetic	0 45	0 50
Nitrous	0 40	0 42
Sulphuric	0 45	0 50
Antim. Crude, pulv	0 15	0 17
Tart "	0 50	0 55
Alcohol, 95 per ct.....Cash	2 13	0 00
Arrowroot, Jamaica	0 18	0 22
Bermuda	0 50	0 65
Alum	0 02¾	0 03½
Balsam, Canada	0 33	0 38
Copaiba	0 65	0 70
Peru	2 90	3 20
Tolu	3 20	3 40
Bark, Bayberry, pulv	0 18	0 20
Canella	0 17	0 20
Peruvian, yel. pulv	0 35	0 50
" red "	1 60	1 70
Slippery Elm, g. b	0 18	0 20
" flour, packets	0 28	0 32
Sassafras	0 12	0 15
Berries, Cubebs, ground	0 20	0 25
Juniper	0 06	0 10
Beans, Tonquin	1 00	1 20
Vanilla	18 00	24 00
Bismuth, Alb	2 25	2 50
Carb	2 40	2 65
Camphor, Crude	0 33	0 35
Refined	0 35	0 40
Cantharides	1 65	1 75
Powdered	1 80	1 90
Charcoal, Animal	0 04	0 06
Wood, powdered	0 10	0 15
Chiretta	0 23	0 30
Chloroform	0 90	1 55
Cochineal, S. G	0 80	0 85
Black	90	0 95
Colocynth, pulv	0 60	0 65
Collodion	0 70	0 80
Elaterium	oz	4 00
Ergot	1 40	1 50
Extract Belladonna	1 65	1 80
Colocynth, Co	1 25	1 75
Gentian	0 50	0 60
Hemlock, Ang	0 00	0 95
Henbane, "	2 50	2 60
Jalap	4 50	5 00
Mandrake	1 75	2 00
Nux Vomic	oz 0 40	0 50
Opium	oz 1 25	
Rhubarb	5 00	5 50
Sarsap. Hon. Co	1 00	1 20
" Jam. Co	3 50	4 00
Flowers, Taraxacum, Ang	0 70	0 80
Arnica	0 17	0 25
Chamomile	0 30	0 35
Gum, Aloes, Barb. extra	0 70	0 80
" " good	0 40	0 50
" Cape	0 16	0 20
" " powdered	0 20	0 30
" Socot	0 50	0 75
" " pulv	1 00	0 00
Arabic, White	0 31	0 58
" powdered	0 60	0 75
" sorts	0 19	0 24
" " powdered	0 42	0 50
" com. Gedda	0 13	0 16
Assafœtida	0 15	0 20
British or Dextrine	0 13	0 15
Benzoin	0 35	0 75
Catechu	0 12	0 15
" powdered	0 25	0 30
Euphorb, pulv	0 40	0 45
Gamboge	1 00	1 20
G aiacum	0 35	1 00
Myrrh	0 50	0 80

DRUGS, MEDICINES, &c.—*Contd*	$ c.	$ c.
Sang Dracon	0 60	
Scammony, powdered	5 50	6 00
" Virg. "	14 50	—
Shellac, Orange	0 50	0 55
Gum, Shellac, liver	0 35	0 40
Storax	0 40	0 45
Tragacanth, flake	1 10	1 75
" common	0 53	0 65
Galls	0 22	0 30
Gelatine, Cox's 6d	1 15	1 20
Glycerine, common	0 23	0 25
Vienna	0 25	0 28
Prices	0 60	0 75
Honey, Canada, best	0 16	0 17
Lower Canada	0 10	0 12
Iron, Carb. Precip	0 16	0 20
" Sacchar	0 40	0 55
Citrate Ammon	1 10	1 20
" & Quinine, oz	0 40	0 85
" & Strychine	0 17	0 20
Sulphate, pure	0 07	0 09
Iodine, good	3 20	3 50
Resublimed	3 90	4 20
Jalapin	1 25	1 50
Kreosote	2 50	2 60
Leaves, Buchu	0 22	0 32
Foxglove	0 25	0 30
Henbane	0 35	0 40
Senna, Alex	0 27	0 60
" E. I	0 14	0 20
" Tinnevilly	0 20	0 30
Uva Ursi	0 15	0 17
Lime, Carbolate.....brl	5 50	—
Chloride	0 05	0 06
Sulphate	0 08	0 12½
Lead, Acetate	0 13	0 14
Leptandrin.....oz.	0 60	—
Liq. Bismuth	0 45	0 55
Lye, Concentrated	1 30	1 50
Liquorice, Solazzi	0 50	0 55
Cassano	0 23	0 40
Other brands	0 14	0 25
Liquorice, Refined	0 35	0 45
Magnesia, Carb..... 1 oz.	0 20	0 25
" ..... 4 oz.	0 19	0 20
Calcined	0 60	0 65
Citrate.....gran.	0 70	0 75
Mercury	0 80	0 85
Bichlor	0 90	1 00
Chloride	1 05	1 10
C. Chalk	0 50	0 55
Nit. Oxyd	1 15	1 25
Morphia Acet	3 45	3 55
Mur	3 45	3 55
Sulph	3 60	3 70
Musk, pure grain.....oz	25 00	.....
Canton	0 60	0 70
Oil, Almonds, sweet	0 55	0 60
" bitter	14 00	15 00
Aniseed	3 25	3 50
Bergamot, super	5 50	6 00
Caraway	3 20	3 50
Cassia	1 75	2 00
Castor, E. I	0 12	0 13
Crystal	0 22	0 25
Italian	0 24	0 26
Citronella	1 00	1 10
Cloves, Ang	3 75	3 80
Cod Liver, Imp. Gal	2 00	2 10
Croton	1 40	1 50
Juniper Wood	0 80	1 00
Berries	2 75	3 00
Lavand, Ang.....oz.	0 00	1 00
Exotic	1 25	1 50
Lemon, super	3 50	3 75
ord	0 00	0 00
Orange	2 40	2 60
Origanum	0 65	0 75
Peppermint Ang	15 00	16 00
" Amer	4 00	5 00
Rose, Virgin	8 50	8 75
" good	6 60	6 75
Sassafras	0 80	0 90
Wintergreen	3 60	4 00
Wormwood, pure	5 00	6 00
Ointment, blue	0 80	0 90
Opium, Turkey	7 60	7 75
pulv	9 75	10 00

DRUGS, MEDICINES, &c.—*Cont'd*	$ c.	$ c
Orange Peel, opt.	0 35	0 36
" good	0 15	0 20
Pill, Blue, Mass.	0 90	1 00
Potash, Bi-chrom	0 14	0 16
Bi-tart	0 30	0 32
Carbonate	0 13	0 15
Chlorate	0 27	0 30
Nitrate	8 00	9 00
Potassium, Bromide	70	0 80
Cyanide	0 55	0 60
Iodide	2 75	2 90
Sulphuret	0 25	0 35
Pepsin, Boudault's...oz	1 25	—
Houghton's.... doz.	8 00	9 00
Morson's....oz.	0 85	1 10
Phosphorus	1 10	1 20
Podophyllin	0 50	0 60
Quinine, Pelletier's	—	2 45
Howard's	3 45	—
" 100 oz. case.	3 40	—
" 25 oz. tin..	3 40	—
Root, Colombo	0 13	0 20
Curcuma, grd	0 12½	0 17
Dandelion	0 17	0 20
Elecampane	0 16	0 17
Gentian	0 08	0 10
" pulv	0 15	0 20
Hellebore, pulv	0 00	0 00
Ipecac, "	1 30	1 40
Jalap, Vera Cruz	90	1 15
" Tampico	0 70	1 00
Liquorice, select	0 12	0 13
" powdered	0 15	0 20
Mandrake "	0 20	0 25
Orris, "	0 20	0 25
Rhubarb, Turkey	2 10	2 25
" E. I.	1 00	1 10
" " pulv	1 10	1 20
" " 2nd	0 60	0 70
" French	0 75	—
Sarsap., Hond	0 35	0 50
" Jam	0 95	1 00
Squills	0 10	0 15½
Senega	0 80	9 90
Spigelia	0 30	0 32
Salts, Epsom	2 0	2 50
Rochelle	0 30	0 32
Soda	0 01½	0 02
Seed, Anise	0 13	0 16
Canary	0 07½	0 08
Cardamon	1 75	1 85
Fenugreek, g'd	0 08	0 09
Hemp	0 06½	—
Mustard, white	0 16	0 17
Saffron, American	0 50	0 60
Spanish	10 00	11 00
Santonine	15 00	15 50
Sago	0 08	0 09
Silver, Nitrate.....Cash	14 50	16 00
Soap, Castile, mottled	0 11	0 14
Soda, Ash	0 03¾	0 05
Bicarb. Newcastle	4 00	4 25
" Howard's	0 14	0 16
Caustic.	0 03¾	0 04
Spirits Ammon., arom	0 35	0 35
Strychnine, Crystals	1 80	2 00
Sulphur. Precip	0 12	0 13
Sublimed	0 03½	0 05
Roll	0 03	0 03½
Vinegar, Wine, pure	0 55	0 60
Verdigris	0 35	0 40
Wax, White, pure	0 70	0 80
Zinc. Chloride.....oz	0 10	0 15
Sulphate, pure	0 10	0 15
" common	0 06	0 10
DYESTUFFS.		
Annatto	0 35 @	0 60
Aniline, Magenta, cryst	2 00	2 60
" liquid	2 00	—
Argols, ground	0 15	0 25
Blue Vitrol, pure	0 07½	0 09
Camwood	0 07	0 08
Copperas, Green	0 01½	0 02
Cudbear	0 16	0 25
Fustic, Cuban	0 03	0 04
Indigo, Bengal	2 40	2 50
Madras	0 75	0 80
Extract	0 26	0 30

DYESTUFFS—*Continued.*		
Japonica	0 06¾	0 07
Lacdye, powdered	0 33	0 38
Logwood	0 02½	0 03
Logwood, Camp	0 02¾	0 03
Extract	0 12	0 13
" 1 lb. bxs....	0 15	—
" ½ lb. "	0 16	—
Madder, best Dutch	0 09	0 10
2nd quality	0 08	0 09
Quercitron	0 03	0 03
Sumac	0 06	0 08
Tin, Muriate	0 10½	0 12½
Redwood	0 05	0 06
SPICES.		
Allspice	0 13 @	0 14
Cassia	0 25	0 28
Cloves	0 48	0 50
Cayenne	0 17	0 20
Ginger, E. I.	0 14	0 15
Jam	0 25	0 30
Mace	1 10	1 10
Mustard, com	0 20	0 25
Nutmegs	1 00	1 05
Pepper, Black	0 15	0 16
White	0 26	0 28
PAINTS, DRY.		
Black, Lamp, com	0 09 @	0 10
" refined	0 25	0 30
Blue, Celestial	0 08	0 12
Prussian	0 65	0 75
Brown, Vandyke	0 10	0 12½
Chalk, White	0 01	0 01½
Green, Brunswick	0 07	0 10
Chrome	0 16	0 25
Paris	0 26	0 28
Magnesia	0 20	0 25
Litharge	0 07	0 09
Pink, Rose	0 12½	0 15
Red Lead	0 06¾	0 08
Venetian	0 02½	0 03½
Sienna, B. & G	0 07	0 08
Umber	0 07	0 10
Vermillion, English	0 90	1 00
American	0 25	0 35
Whiting	0 85	1 00
White Lead, dry, gen	0 08½	0 09
" " No. 1	0 07	0 08
" " No. 2	0 05	0 07
Yellow Chrome	0 09	0 15
" Ochre	0 02½	0 03½
Zinc White, Star	0 09	0 11
COLORS, IN OIL.		
Blue Paint	0 12 @	0 15
Fire Proof Paint	0 06	0 08
Green, Paris	0 30	0 37½
Red, Venetian	0 07	0 10
Patent Dryers, 1 lb tins	0 10	0 12
Putty	0 03¾	0 04½
Yellow Ochre	0 08	0 12
White Lead, gen. 25 lb. tins..	2 35	—
" No. 1	2 10	—
" No, 2	1 85	—
" No. 3	1 60	—
" com	1 30	1 25
White Zinc, Snow	2 75	3 00
NAVAL STORES.		
Black Pitch	3 00 @	3 25
Rosin, Strained	3 75	4 00
Clear, pale	4 50	6 00
Spirits Turpentine Imp. Gall..	0 75	0 78
Tar Wood	4 50	4 75
OILS.		
Cod Imp. Gall.	0 84 @	0 86
Lard, extra "	1 25	1 27
No. 1 "	1 14	1 16
No. 2 "	1 02	1 05
Linseed, Raw per 7½ lbs.	0 60	0 61
Boiled "	0 64	0 65
Olive, Common Imp. Gall.	1 26	1 30
Salad "	2 01	2 10
" Pints, cases	4 00	4 20
" Quarts	3 25	3 50
Seal Oil, Pale Imp. Gall.	0 84	0 86
Straw "	0 80	0 82
Sesame Salad "	1 56	1 60
Sperm, genuine "	2 55	2 75
Whale refined "	2 55	2 75