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CANADIAN

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Original and Selected Papers.

SOME NOTES ON THE PREPARATION OF PHOSPHORIC ACID.

BY E. B. SHUTTLEWORTH.

So much has lately been said on this subject that one almost requires to apologize before making any additional contribution. There are some points, however, upon which I feel tempted to offer an opinion, and, at the same time, would take the opportunity of modifying, amending, or confirming certain statements made in a former paper, published about five years ago,* in which was advocated the use of acid of a much greater degree of strength than that usually employed for the oxidation of the phosphorus. During two years of the intervening period the process indicated was followed, and frequent operations on comparatively large quantities of material afforded ample opportunity for experience.

I am still of the opinion that nitric acid of sp. gr. 1.24 may be safely used. The closest attention of the operator is, however, required throughout, and should the action become violent, by reason of the too great concentration of the acid, or too high a temperature, cold distilled water must be at once added. The frequent addition of cold water, sometimes in unnecessary quantity, forms

*Can. Jour. Pharm., Vol. v., p. 19.

an objection to the process, as the acid becomes too dilute, and loss of time is the result. Another objection is that open vessels—or at least nothing more than an inverted funnel, placed over the phosphorus—must be employed. The loss of acid, by evaporation, is, therefore, considerable.

In view of these objections I have modified the process, and for about three years have worked it successfully. The improvements may be thus stated, and relate to an operation upon ten pounds of phosphorus:—The employment of a partially or almost closed vessel resembling a tubulated long-necked mattrass, and of ten gallons capacity. The use of a water-bath, the temperature of which can be quickly reduced by the addition of cold water: the action may thus be checked without diluting the acid. At the commencement 1 pound of phosphorus, 24 pounds of nitric acid sp. gr. 1·315, and 6 pounds of water, are used. Further quantities of phosphorus of like amount are successively added as dissolved, together with additions of 8 pounds of acid sp. gr. 1·315. Further additions of water are seldom or ever required. The quantity of acid of 1·315—50 per cent. HNO_3—consumed during an operation, ranges from 72 to 78 pounds. The quantity required, theoretically, is 67·72 pounds.

In regard to the concentration of the phosphoric acid, I have found it best to drive off as much as possible of the water and nitric acid in the same vessel in which the oxidation has been carried on, merely removing the upright head or neck. In this way an acid of oily consistence may be obtained which may be further evaporated in platinum or porcelain. Berlin ware and enamelled ware are both sensibly attacked.

Previous to reading the paper presented by Mr. L. Dohme* at the meeting of the American Pharmaceutical Association in 1874, I had been in the habit of carrying the heat as far as incipient redness, allowing the acid to cool, and, next day, dissolving the solid mass in water. Acid so prepared always mixed, without precipitation, with solution of ferric chloride. Mr. Dohme's statement that the concentration should not be carried beyond 450° occasioned, therefore, some surprise. On the next occasion on which ten pounds of phosphorus were oxidized, a thermometer was kept in the acid during concentration, and the temperature carefully kept under the

*Proc. Amer. Pharm. Assoc., Vol. xxii., p. 431.

point indicated. On testing a sample of the product it was found that ferric chloride produced an instantaneous precipitate. The entire product, after cooling, was therefore diluted with water and reduced again, by heat, to the syrupy condition, as directed by Mr. Dohme and others,* and on further dilution mixed in all proportions with the test indicated. From this experiment I infer that the conclusion arrived at by the gentleman referred to will not always hold good, but is dependent on certain conditions not yet perfectly understood.

The process devised by Mr. Markoe, and described at the last meeting of the American Pharmaceutical Association,† is a very ingenious one, and may possibly be of use when economy of time is an object. It is not, however, free from danger, as the sequel has proved; and though the late accident could not be charged to the process, yet in inexperienced or careless hands the liability to danger is considerable. There is also a possibility that other compounds than those desired might, under certain conditions, be formed. On the score of economy the process will not compare favourably with that described above.

Toronto, Jan. 11, 1876.

NOTES ON SOME MEDICINAL PLANTS OF THE COMPOSITÆ.‡

BY JOHN R. JACKSON, A.L.S.

No natural order has such distinct botanical characters as have the Compositæ, and no other order perhaps with the exception of Leguminosæ has so wide a distribution over the surface of the globe. The properties of the order also vary considerably, for while some species abound in a very bitter aromatic principle, others are tonic and stimulant, while others again abound in a milky poisonous juice. The aromatic principle is notably present in the common Chamomile (*Anthemis nobilis*) and the Wormwood (*Artemisia Absinthium*) both of which are used as stimulant tonics. It is not so

*Proc. Am. Pharm. Assoc., Vol. xxii., p. 511.

†Can. Pharm. Jour., Vol. ix., pp. 112, 161, 197.

‡From the *Pharm. Jour. & Trans.*

much to these and other plants that are well known for their medicinal properties and which are used occasionally in European practice, as to those that have properties imputed to them but are nevertheless but little known, that we wish now to draw attention. Amongst officinal Compositæ included in the Pharmacopœias either of Britain or India are the Chamomile (*Anthemis nobilis*), Santonica *Artemisia* sp., probably a variety of *A. maritima*), Elecampane (*Inula Helenium*), Arnica (*Arnica montana*), Dandelion (*Taraxacum officinale*), Pellitory of Spain(*Anacyclus Pyrethrum*), and Prickly Lettuce (*Lactuca virosa*). Amongst other plants having medicinal properties, and which are occasionally used or have been recommended, may be mentioned the *Artemisia indica*, a plant with a strong aromatic smell and a bitter taste, occurring frequently on the mountains of India. An infusion of the leaves and tops of the plants are said to form a mild but efficient stomachic tonic, and it has been administered successfully in nervous and spasmodic affections arising from debility. The common wormwood *(Artemisia absinthium)* is too well known as the source of Absinthe, to need more than a mere mention of its use for the preparation of that beverage. At one time it was very highly esteemed as a tonic, febrifuge and anthelmintic. It is said to impart a strong bitter taste to the flesh of sheep which feed upon it; many of the species possess similar properties to the above, and are used in a like manner. The Southern wood (*Artemisia Abrotanum*) for instance, at one time so common in English gardens, and originally a native of the South of Europe, was formerly used as a tonic and vermifuge; it was also considered to be obnoxious to insects and was often placed with clothes to keep away moths, the old French name of Garde-robe having arisen from this fact. The Mugwort (*Artemisia vulgaris*), a well-known weed growing in hedgebanks in this country and distributed over Europe, North Africa, Siberia, Western Asia to the Himalayas, was at one time strongly recommended as an emmenagogue. The dried leaves bruised, rubbed between the hands and formed into small cones, were considered a good substitute for Chinese moxa, which was prepared from *Artemisia moxa*. Under the name of Wormseed the herbalists sell the flower stalks and heads of several species of *Artemisia*.

In the genus *Vernonia*, one of the largest of the Composite order, *V. anthelmintica*, common in waste places throughout India, furnishes from its seeds by pressure a green-coloured oil or fat. These seeds are seen in most of the Indian bazaars; they are of a brown colour and have a bitter nauseous taste. Amongst the natives they are highly valued as an anthelmintic, being bruised and administered in honey in doses of about a drachm and a half,divided equally and taken at an interval of a few hours, followed by an aperient. Their effect is said to be to expel the worms in a lifeless state. "In Travancore, the bruised seeds ground up in a paste

with lime juice are largely employed as a means of destroying pediculi." They were regarded by Dr. Gibson as a valuable tonic and stomachic, and besides this they are also said to possess diuretic properties. From the evidence in favour of their use as an anthelmintic, they would seem to warrant further and more careful trials.

Another Indian plant, *Notonia grandiflora*, has been advocated as a remedy for hydrophobia. The manner of preparation and administration, as given in the Indian Pharmacopœia, is as follows: "About four ounces of the freshly gathered stems, infused in a pint of water for a night, yield in the morning, when subjected to pressure, a quantity of viscid greenish juice, which, being mixed with the water, is taken as a draught. In the evening a further quantity of juice, made up into boluses with flour, is taken. These medicines are directed to be repeated for three successive days." The flowers of *Chrysanthemum Roxburghii*, also an Indian plant, have been used as a substitute for chamomiles in India. The root when chewed imparts a sharp tingling sensation to the tongue, and it has been suggested that it might be used as a substitute for pellitory.

The genus *Eupatorium*, though at the present time furnishing no plants of really acknowledged medicinal value, was formerly considered of some importance, the common hemp agrimony (*Eupatorium cannabinum*) being used for coughs, intermittent fevers, dropsy, etc. Externally it was applied in the form of a cataplasm to tumours, ulcers, etc., and the expressed juice mixed with vinegar was a favourite application in some forms of cutaneous diseases. For internal application it was recommended to boil a handful of the leaves and young tops in a quart of water or whey, which should be taken in frequent doses; or the expressed juice was also recommended in doses of from two to three ounces. The dried leaves were used in the form of tea, and the root boiled in water in the proportion of an ounce of the former to half a pint of the latter, was administered in dropsies. It is described by Boerhaave as being in very great use amongst the turf diggers of Holland, who use it in jaundice, scurvy, foul ulcers, and those swellings of the feet to which they are liable.

A South American species, *Eupatorium Ayapana*, is very aromatic and has a slight bitter and astringent taste. It is generally used as an antidote for snake bites both for inward and outward application. In Mauritius an infusion is made which is used in dyspepsia and generally in affections of the bowels and lungs. In the cholera epidemics which visited the island in 1854 and 1856 this plant it is said "was extensively used for restoring the warmth of the surface and languid circulation." The plant has become naturalized in India, Ceylon, and Java. In the former country the bruised leaves have been used successfully in the case of foul ulcers; a decoction is made and used as a fomentation. Though the plant was formerly very highly extolled for its medicinal virtues, it has now

to a great extent fallen into disuse; nevertheless it is probable that upon further trial it might be found useful as a tonic, stimulant, and diaphoretic.

Several species of *Eupatorium* are used medicinally in North America, foremost amongst these being the thoroughwort, or bone-set (*E. perfoliatum*). It is widely diffused, growing principally in damp situations; in the form of a warm infusion it is emetic, sudorific, and diaphoretic; but if taken cold it acts as a tonic and febrifuge. The leaves and flowers reduced to a powder are purgative even in doses of from ten to twenty grains. It is said to have been frequently prescribed with advantage in rheumatism, typhoid pneumonia, catarrhs, dropsy, and influenza. Porcher, in his 'Resources of the Southern Fields and Forests,' tells us that the plant is extensively cultivated among the negroes on the plantations in South Carolina, as a tonic and diaphoretic in colds and fevers, and in the typhoid pneumonia so prevalent among them. He says "I have found this and the Senega Snakeroot (*Polygala senega*) convenient and useful prescriptions; the latter with tartar emetic solution, to promote expectoration, and the former with flax-seed tea as a stimulant diaphoretic—combining them with spirit of turpentine when it has assumed the typhoid form. . . . The infusion of the roots and leaves is usually preferred, of which one to three ounces may be taken several times a day; of the root in powder the dose is thirty grains. As an emetic and cathartic a strong decoction is used, made by boiling an ounce of the herb in three half pints of water to one pint, given in doses of one or two gills or more." Thoroughwort tea is used by many physicians in South Carolina, in fevers, and is considered by them as the "very best of the indigenous antiperiodics as a substitute for quinine." Other species of North American *Eupatorii* having medicinal properties are the *E. purpureum*, purple thoroughwort, or gravel root; *E. teucrifolium*, wild horehound; *E. fœniculaceum*, dog-fennel; and *E. rotundifolium*. The first possesses properties somewhat similar to *E. perfoliatum*; it is a diuretic, and one of the proper remedies for calculus. The second is tonic, diaphoretic, diuretic, and aperient, being commonly used in fevers and colds. The fresh juice of *E. fœniculaceum* is said to relieve pain caused by the bite of insects, and it is sometimes strewed on floors to keep away insects. Though it seems doubtful whether the plant really contains any tannin, it attracted a great deal of attention in South Carolina in 1861, in consequence of its reputed power of tanning leather in an incredibly short space of time. The uses of *E. rotundifolium* are similar to those species already described.

At one time it was thought that the leaves of *E. glutinosum* formed the matico of the Peruvians, but it has been proved since that the *Piper augustifolium* of Ruiz et Pav. (*Artanthe elongata*, Miq.), is the source from whence true matico is obtained. Several

other plants, however, produce leaves similar in appearance to those of *Artanthe*, and these leaves sometimes come to this country as matico. Two or three species of *Erigeron* are used in North America as tonic and diuretic medicines, foremost amongst these is the flea-bane (*E. canadense*). It is an annual plant, common in waste places in many parts of England, especially in the neighbourhood of London, having been originally introduced from the United States, where in many parts it is frequent in sandy soils. It is frequently used in cases of dropsy and diarrhœa as a stimulant, tonic, diuretic, and astringent. The plant is much used by the herb doctors, who administer it in the form of infusion. An infusion of the powdered flowers is considered antispasmodic, and is used in cases of hysteria and affections of the nerves. An oil is also obtained from the plant, which is said to possess remarkable styptic properties. The frost root (*Erigeron philadelphicum*)—also a North American plant, as its specific name implies—has similar properties to the *E. canadense*, and has a great reputation for the cure of calculus and dropsy. Other species of reputed medicinal value in North America are *E. strigosum* and *E. pusilum*. In the genus *Solidago*, which includes the golden rod of our thickets (*Solidago Virgaurea*), several species have reputed medicinal properties. The British species itself was formerly considered a useful medicine in diarrhœa and dysentery. The golden rod of North America (*S. odora*) is used as an aromatic stimulant and diaphoretic; it is said to lessen nausea, allay pain arising from flatulence, and to cover the taste or correct the operation of irritating or unpleasant medicines. It is said, when applied outwardly, to have the power of relieving pain arising from headache. The flowers, when dried, have been used as a wholesome and not unpleasant substitute for tea.

Other species, such as *S. sempervirens* and *S. procera*, have reputed medicinal properties. In the genus *Baccharis*, which includes a large number of species found principally in North and South America, many are of medicinal value. Thus the Brazilians prepare from the stems of *B. trimera* an infusion which is used as a sudorific and tonic, while from *B. genistelloides* an extract is obtained used in cases of fever. In Parana portions of the stems of *B. microcephala* are put into warm baths for the relief of rheumatism; and in North America, *B. halimifolia*, under the names of sea myrtle or consumption weed, is used as a demulcent in cases of consumption and for coughs. It is somewhat mucilaginous, and has a bitter taste.

In America, *Ambrosia artemisiæfolia*, known as the rag weed, and *Ambrosia trifida*, the great rag weed, are both used medicinally, the former as a substitute for quinine and the second for arresting excessive salivation. *A. maritima*, a plant of Italy and the Levant, has a sweet smell and an aromatic bitter taste, and is said to be useful as a tonic.

The genus *Blumea* is remarkable for furnishing the peculiar camphor called Ngai camphor by the Chinese, so well described by the late Mr. Daniel Hanbury in the *Pharmaceutical Journal*, vol. iv., p. 709, 3rd series, and also referred to in the notes on the India Museum at page p. 241 of the present volume. *B. balsamifera*, the plant which furnishes this camphor, is said to be in very general use in Java and China as an expectorant, and in Cochin China as a stomachic, antispasmodic, and emmenagogue. Other Indian species as *B. lacera* and *B. aurita*, are said to have a strong smell of turpentine, and to be used by the natives in dyspepsia.

Eclipta prostrata, also an Indian plant, common in wet places, is described as being purgative and emetic, these properties residing particularly in the roots. *E. erecta* and *E. procumbens*, both North American species, yield a dark or black dye used for dyeing the hair. *Liatris*, or wild vanilla, and *Aplotaxis*, or costus root, we have before noticed in the *Pharmaceutical Journal*, the former at page 322, vol, iv., 3rd series, and the latter at p. 723, vol. iii, 3rd series; it is also referred to in the notes on the Indian Museum before quoted.

Besides those we have enumerated many other plants belonging to this order are used in various parts of the world for their medicinal properties. We have pointed principally to those of America and India as countries in which the properties of the plants would most likely be discovered or experimented upon by Europeans. We have far from exhausted the list of either country, nor have we introduced those of acknowledged utility, such as *Taraxacum*, *Lactuca*, and others which grow equally well in India and America as in England; neither have we included British plants, which formerly appeared in herbals but which are now no longer used.

RESEARCHES UPON BUCHU.*

BY PROF. E. S. WAYNE.

Buchu from the examinations of previous analysts has been shown to contain an ethereal oil in small quantity, and also that this oil contained a camphor which could be separated from it by exposure to cold. No other proximate principle peculiar to the drug has been proven to exist in it.

In handling large quantities of this drug in a manufacturing way, I have noticed some facts and peculiarities not mentioned by others, and find that the essential oil above mentioned is not always so simple a body as stated.

Some time since, having occasion to distil off the remaining alcohol from a partially exhausted lot of buchu, I obtained in the

*From the American Journal of Pharmacy, Jan. 1876.

last runnings of the still a quantity of oil of buchu, in all, about twelve ounces, and, upon examining it in various ways, I found that upon treatment with strong liquor sodæ, nearly one half of the oil dissolved to a clear solution; this solution was separated from the oil unacted upon, and then neutralized by hydrochloric acid, which caused the separation of a white solid crystalline mass; this was thrown into a beaker glass and washed with water, then dissolved in boiling water, and set aside for results. Upon examining the same some time afterwards, I found that the whole had assumed a highly crystalline state, was colourless, and resembled salicylic acid in form; and upon examining them further, found that they were in fact that acid, and gave all the reactions for that substance, and with ferric chloride gave the beautiful colour reaction, a deep purplish red. I was very much astonished at the result of my examination, and read a paper upon the same at a college meeting some six months ago, and should have published the same then, but wished to verify the above further experiments, and since then have made several examinations, but not with the same results.

My next experiment was to distill with water 20 pounds of buchu; (in all these experiments the short variety was used) the oil collected and treated with soda as in the former experiment. I found that the oil obtained from this lot did not dissolve, or lose the same volume that the former did, but that a part formed a clear solution, which, upon being separated and neutralized with hydrochloric acid, became milky turbid in appearance; this was set aside over night, and in the morning the same was found almost transparent, and filled with a mass of long needle-shaped crystals—these were separated by filtration, washed with cold water, and suffered to dry on the filter—they were tested in solution in water, with negative results, except with nit. silver and ferric chloride; that of the ferric chloride was very marked and decided; upon addition of this reagent to the colourless solution it caused an intense blueish black colour even in very dilute solutions, as decided as that of salicylic acid with this reagent, but of a different colour.

Failing in this experiment to obtain the same results as in the former, and thinking over the matter, I thought that probably the alcohol might have caused some change in the former; a quantity of fluid extract of buchu, about six pints, was distilled with the addition of water. I obtained only a small quantity of oil, which, in every respect, gave the same reactions as with that obtained by distilling the buchu with water. With this experiment the investigation was left at rest, until this Fall, when it was again taken up, and whilst engaged in it, Mr. Wm. M. Thompson, of W. H. Merrell & Co., brought me as a curiosity a few crystals of a substance that he said was obtained in attempting to distill off the alcohol from a lot of buchu magma. I immediately recognized them as being the same substance I found in the two last experiments; and learning from him that the whole was just about the same as the mass

that I had originally distilled, and found salicylic acid in the oil, I made a request of Messrs. W. H. Merrell & Co., through him, that the same be placed at my disposal, to which they kindly consented. I received a barrel about three-fourths full of the magma, and distilled it with water. I obtained from it a portion or all of the alcohol, and by continuing the distillation and cohobating the watery distillate obtained six gallons of a milky distillate, but only slight traces of oil floating upon it. This distillate was set aside over night, and upon examining the same in the morning, found there had formed nearly two inches deep upon the bottom of the vessel holding the liquid, a mass of long needle-shaped crystals, some an inch and a half long; the supernatant liquid was syphoned off, and the crystals then collected on a filter. These were tested as the former, and with ferric chloride gave the same dark bluish-black colour. The water syphoned off also gave the same, and the alcohol distilled from the magma gave the same result. I obtained no oil to test for salicylic acid, and could not detect it in any of the distillates. From this lot of buchu I have obtained nearly three ounces of this crystalline body, in long needle-shaped colourless crystals, having an odour indicative of their origin, yet different. What it is, I am not yet able to say, but shall examine it more fully and report at some future time.

Buchu, from what has been shown, evidently contains some substance, that by its chemical change, will yield salicylic acid, and probably it is the crystalline body I have found in the three last experiments. This is sparingly soluble in water at ordinary temperatures, freely at the boiling-point; which solution upon cooling, becomes turbid from separation of oil drops, which afterwards turn to crystals soluble in alcohol and ether; and the aqueous solution with ferric chloride forms an intense, I may say, inky blue colour, so intense as to render the solution opaque even in a test tube half an inch in diameter.

Nitrate of silver also occasions a precipitate of a purplish colour, deeper than that of chloride silver, exposed to the action of light.

Cincinnati, Dec., 1875.

EXTEMPORANEOUS COATING OF PILLS.*

BY A. F. W. NEYNABER, NEW YORK.

Why can pills as they are made in the retail prescription department not be coated there also with sugar, gelatine, or some such-like substance?

They can easily be coated with gelatine according to the directions given in the old edition of Griffith's Formulary, or in Wood & Bache's U. S. Dispensatory, 12th or 13th edition, with a little experience of the pharmaceutist.

*From the Druggists' Circular, January, 1876.

Pills can also be coated in the retail prescription department with sugar.

The success in coating pills rests chiefly with the first process in mixing the *mass*. The state of dryness of the pills has the most influence on the operation of coating with sugar as well as with gelatine, and pills can be *thoroughly* dried only if they have been prepared with the proper excipients. Here we come to the most important part in making pills, the excipients used. The success of the "manufacturer" of pills is mainly due to the employment of the proper excipients, enabling him to dry the pills thoroughly.

A pill may be soft and yet be not as soluble as a hard pill. If we have gum resins or resinous extracts, and add a little spirit, we will produce a pill of softness and plasticity, but when we take such a pill between our fingers and try to mix it with water, we will find that it may adhere to the skin, and cannot be well washed off without using alcohol or some other solvent of resin. On the other hand, if we take compound cathartic pills, prepared strictly as the U. S. Pharmacopœia directs, by using the different substances in the form of powders, and having beaten them into mass with water, we shall have a pill which will fall into powder again when put into water. The excipient should be such as will not *combine* much with the resinous or other ingredients, but form rather a *layer* between the powders employed. A layer of soluble substances between powders less soluble in water (such as gum-resins or resinous extracts), will produce a pill that can be dried to become perfectly *hard*, and yet that will fall into powder when put into water, the water washing out the layer. Soft pills are apt to lose shape; and pills containing moisture cannot be kept in well-closed bottles, lest they become mouldy.

The success in making pills is based on the excipient used.

Pills which have been thoroughly dried can be coated with sugar as follows: boil 32 ounces of best white sugar, with 12½ ounces of distilled water to a syrup, and use enough of this syrup (temp. 120° to 150°) to moisten the pills in a small copper kettle or pan, exposing it to a heat sufficient to dry the pills while kept in motion and worked with the hand. After this first coat is dry, the operation is repeated until the pill is covered with sugar sufficiently. A very soluble coating for pills is the following composition: 1 ounce of flaxseed, ½ ounce of Irish moss; boil with eight fluid ounces of water, strain, add 4 ounces of sugar, boil and use in the same manner as a solution of gelatine is used for coating pills.

If pills in very small quantities are to be made and coated with sugar or gelatine, in a retail prescription department, the mass should be made as *hard* as it possibly can be made, and allow cutting; after being cut it should be exposed to a draft of dry air so long as time will allow. Thus pills can be made and coated in small quantities within an hour or less time.

SEASONABLE COSMETICS.

Under this title the *Laboratory* gives the following formula:

Camphor Ice.

Benzoinated Lard	8 troy ozs.
Camphor	2 troy ozs.
White Wax	4 troy ozs.
Oil Lavender	3 fluid drachms.

Melt at a gentle heat and pour into suitable moulds.

Camphor Ice and Glycerin.

Olive oil	6 troy ozs.
Spermaceti	6 troy ozs.
Camphor	3 troy ozs.
White Wax	1 1.2 troy ozs.
Ess. Bitter Almonds	2 fluid drachms.

Prepare as above.

Cosmoline Tablets for Chapped Hands.

Cosmoline	1 troy oz.
Cocoa Butter	3 troy ozs.
Oil Lavender	1 fluid drachm.

The above produces a very handsome preparation which is preferred by some to whom preparations containing camphor are objectionable.

Cold Cream.—(English.)

Oil of Sweet Almonds	8 troy ozs.
Rose Water	8 fluid ozs.
White Wax	1-2 troy oz.
Spermaceti	3·4 troy oz.
Camphor	1·4 troy oz.

Turnbull's Cold Cream.

Oil of Sweet Almonds	4 fluid ozs.
White Wax	1 oz.
Rose Water	2 ozs.
Borax	1-2 drachm.
Oil of Roses	5 drops.

The wax should be melted with the oil of almonds, and the rose water, in which the borax has been dissolved, added. The mixture should be stirred till cold, when the oil of roses may be added.

Liniment for Chilblains.

Calomel	1 drachm.
Camphor	1 drachm.
Simple Cerate	4 ozs.
Oil of Turpentine	2 drachms.
Almond Oil	2 drachms.

THE GROWTH AND USES OF BENZOIN.*

The Benzoin, or frankincense, in commercial parlance called "Benjamin," is a more common article of commerce than camphor. Although in general request for the ceremonies of the Romish, Mahomedan, Hindu, and Chinese worship, there is no evidence that the Greeks or Romans, or even the early Arabian physicians, had any acquintance with Benzoin; nor is the drug to be recognized among the commodities which were conveyed to China by the Arab and Persian traders between the tenth and thirteenth centuries, although the camphor of Sumatra is expressly named. The first mention of benzoin occurs in the "Travels of Ibn Batuta," who, having visited Sumatra during his journey through the East, A. D. 1325–49, notes that the island produces *Java Frankincense* and camphor. There is no further information about the drug until the latter half of the following century, when it is recorded that in 1461 the Sultan of Egypt sent to Pasquale Malipiero, Doge of Venice, amongst other articles, a present of 30 *rotoli* of *Benzoi*. Agostino Barberigo, another Doge of Venice, was presented in similar manner, by the Sultan of Egypt, with 35 *retoli* of aloes wood, the same quantity of *Benzin*, and 100 loaves of sugar. The occurrence of benzoin in Siam is noted in the journal of the voyage of Vasco da Gama, and the Portuguese traveller Barbosa, who visited Calicut, on the Malabar coast, in 1511, mentions *Benzin* among the more valuable items of export. In the early part of the seventeenth century there was direct commercial intercourse between England and both Siam and Sumatra. An English factory existed at Siam until 1623, and benzoin was doubtless one of the commodities exported.

The tree which produces this so-called gum does not attain to any considerable size. It is an inhabitant of the hot plains, and flourishes best in the rich moist lands fitted for the cultivation of marsh rice. The plants are propagated from a seed, which resembles a small brown nut, and but little care is required except to keep the shrubs clear from weeds. Before the sixth or seventh year the gum is obtained by making incisions in the bark, when the substance exudes, and is scraped off in like manner as the opium poppy. The first juice is the purest and most fragrant, and hardens on exposure to the air, when it becomes brittle and transparent. The resin is white and transparent, and about three pounds are given by each tree. The white Benjamin is termed *cowrie luban* in India, and is a superior kind. Afterwards a browner description is extracted, and finally, when the tree has become exhausted, and has been cut down, an inferior kind is obtained from the scraping of the wood. The three different varieties accordingly bear relative values in commerce. The resin which exudes during the first three years is said to be

*From the Chemist and Druggist, December.

fuller of white tears, and therefore, of finer quality than that which issues subsequently, and it is termed by the Malays *Head Benzoin*. That which flows during the next 7 or 8 years is browner in colour and less valuble, and is known as *Belly Benzoin*; while the third sort, obtained by splitting the tree and scraping the wood, is called *Foot;* this last is mixed much with bark and refuse. Benzoin is brought for sale to the ports of Sumatra in large cakes, called *Tampangs*, wrapped in matting. These have to be broken, and softened either by the heat of the sun or by that of boiling water, and then packed into square cases, which the resin is made to fill. A variety of the Sumatra benzoin is distinguished by the London druggists as *Penang Benjamin* or *Storax-smelling Benjamin*. The quality is very fine, full of white tears—some of them two inches long—the intervening resin being greyish. The odor is very agreeable, and perceptibly different from the Siam, or the usual Sumatra sort.

The only account of the collection of *Siam Benzoin* is that given by Sir R. N. Schomburgk, for some years British Consul at Bangkok. He represents that the bark is gashed all over, and that the resin which exudes collects and hardens between it and the wood, the former of which is then stripped off. This account is confirmed by the aspect of some of the Siam benzoin of commerce, as well as by that of pieces of bark, but it is also evident that all the Siam drug is not thus obtained. Schomburgk adds that the resin is much injured and broken during its conveyance in small baskets on bullock's backs to the navigable parts of the Menam, whence it is brought down to Bangkok. The most esteemed sort is that which consists entirely of flattened tears or drops, an inch or two long, of an opaque, milk-like, white resin, loosely agglomerated into a mass. More frequently the mass is quite compact, consisting of a certain proportion of white tears of the size of an almond downwards, imbedded in a deep, rich amber-brown translucent resin. Occasionally the translucent resin preponderates, and the white tears are almost wanting. In some packages the tears of white resin are very small, and the whole mass has the aspect of a reddish-brown granite. There is always a certain admixture of bits of wood, bark, and other accidental impurities. The white tears, when broken, display a structure with layers of greater or less translucency. By keeping, the white milky resin becomes brown and transparent on the surface. It is very brittle, the opaque tears showing a slightly waxy, the transparent a glassy fracture. It easily softens in the mouth, and may be kneaded into the teeth like mastic. It has a delicate balsamic, vanilla-like fragrance, but little taste. When heated it evolves a more powerful fragrance, together with the irritating fumes of benzoic-acid; its fusing point is 75° C. The presence of benzoic acid may be shown by the microscopical examination of splinters of the resin under oil of turpentine. Siam benzoin is imported in cubic blocks, which take their form from the

wooden cases in which they are packed while the resin is still soft. The Sumatra kind is imported in cubic blocks, exactly like the Siam, from which it differs in its generally greyer tint. The mass, however, when the drug is of a good quality, contains numerous opaque tears, set in a translucent, greyish-brown resin, mixed with bits of wood and bark. When less good, the white tears are wanting, and the proportion of impurities is greater. In odor it is both weaker and less agreeable than the Siam drug, and generally falls short of it in purity and handsome appearance, and hence commands a much lower price.

The medicinal properties of benzoin are very slight, but it is employed for many different purposes. The Java chiefs are fond of smoking it with tobacco, and the worst kind is more esteemed by the Arabs than their own best olibanum or frankincense. In perfumery it enters into a large number of preparations, such as fumigatory pastilles, *Poudre à la Marchale* &c.; the alcoholic tincture, mixed with 20 parts of rose water, forms the cosmetic virginal milk. In certain varnishes on snuff-boxes and walking-sticks, when heated in the hand, the agreeable odour of benzoin is emitted, and it is added to the spirituous solution of isinglass, with which court plaster is made. The use of benzoin for religious observances among nations in various stages of civilization, and the steady demand for it in all ages, declare that it is one of those commodities the taste for which is inherent in our nature, and not the result of a particular caprice with any individual people, as in the case of Malay camphor with the Chinese.

PLANTS AND SNAKE POISON.*

The authoress of *Two Years in Natal* writes: "Some assert that the reason snake-bites have no effect on cats is that they know some plant which is an antidote to the poison, and which they eat immediately, if bitten. How far this is true I cannot say. Certainly the anecdote that I gave in my paper, *Two Years in Natal*, is perfectly true, and I believe the snake that bit the cat to be of a very poisonous, if not a deadly nature; it is much feared by the natives, and is considered by them to be most dangerous. Cats appear to have no fear of snakes, for I saw the same cat that had been bitten follow and attack a green imamba. The snake escaped up a tree, but there is no doubt the cat had every intention of killing it could he have caught it. I believe the word *imamba* to be merely a Kaffir name for two sorts of snakes that are found in Natal, the green and the black. The *last* is the most deadly snake to be found in South Africa. I never heard the imamba called by any other name."

*From Land and Water.

* * * The following facts are *apropos* to the inquiry whether there exists any herb which gives immunity from poisonous snake-bites. So lately as 1860, a cure for the bite of the black snake and other venemous reptiles (*adders* only accepted) was sold at Hobart town, and elsewhere in Tasmania. It was called "Underwood's antidote," and the method of its discovery (if his account is reliable) is a singular illustration of animal instinct. Underwood was a convict, an assigned servant, working as a sawyer on the river Huon. One day in 1851, in the bush, he witnessed a battle between a black snake and a guana. The latter, whenever it was bitten, ran to a certain herb, swallowed some of the leaves, and then renewed the contest. Underwood made a strong decoction from this plant, and tested its efficacy on the following day. His little dog was bitten on the neck by a black snake. Some of the extract was poured down the animal's throat, and the wound was fomented. No ill effects followed. This was the first instance of any cure for the bite of this poisonous reptile. Even immediate cauterization had failed to neutralize the poison. The convict offered to disclose the secret for a free pardon. A conditional pardon only was offered. He therefore declared that his secret should die with him. Whether he adhered to this resolution, my informant does not know. Underwood sold his antidote at half a crown a bottle, raising his prices to half a sovereign and upward, as experience proved the value of his specific. Having no necessity to labor for a living, he wandered over the island, carrying inside his blue serge shirt two black snakes coiled round his body, allowing them to bite him on the tongue and various parts of the body. At New Norfolk on one occasion, Underwood being drunk and quarrelsome, was ordered out of the house. The convict refused to go. An attempt was made to expel him. Underwood drew forth his snakes, and holding one in each hand, danced about the room, while the angry reptiles hissed and erected their poison-fangs. Tho eccentric snake-charmer was very soon left in undisputed possession of the premises. The enraged landlord sent for two constables. Underwood practiced the same manœuvre, and "the active and intelligent officers" took to their heels. By the time reinforcements arrived the convict had decamped. At a public house near Launceston, in 1855 or 1856, Underwood became, in his turn, the victim of a practical joke which nearly proved fatal. He had permitted a snake to bite him as usual, but the antidote was not forthcoming. Some one had stolen it. And not till the lapse of an hour, when Underwood had become seriously unwell, was it restored, thus proving that the serpents which he carried about were really venomous, and the efficacy of the antidote after the delay of an hour. But evidently the convict would never have dared to impose a fictitious remedy on his customers. I do not know whether Underwood is still living, but if his antidote could be procured and analyzed we might be enabled to discover the herb which furnished it.

[The power of certain plants to neutralize or cure the effects of bites has been an object of belief for 2,000 years, both by savage races and among highly-cultivated people; but careful investigations into the matter are still to be made, and till they have been made the whole question must remain undecided. On the one hand, we have the universal testimony of the Greek physicians, the Roman naturalists, and the mediæval practitioners in past times, and the general use, both in the Old and New World, among the semi-civilized inhabitants of the present day. On the other side there is the general disbelief of modern physicians, founded on the want of precise data and any well-authenticated and undoubted cases of cure. With regard to the plants themselves, the principal genus credited with these properties is *aristolochia*, the numerous species of which are widely diffused over both hemispheres, one of them (*A. serpentaria*, L.) being the "snake-root" which the first settlers in North America found largely in use among the Indians, and several species growing in the Mediterranean region, one of which may not improbably be the plant alluded to by Dr. Schliemann. Other American "rattle-snake seeds" are *actæa racemosa*, *polygala senega*, *eryngium virginicum*, *liatris scarosa*, and *nabalus*, all of which, with others, are considered to possess alexiteric virtues.]

NOTES ON THE PREPARATION OF PURE CHEMICALS.*

BY LOUIS SIEBOLD.

The preparation of pure pharmaceutical chemicals is so wide a subject that the remarks which I shall have the honor of addressing to you to-night must necessarily be confined to the consideration of but a small number of these substances. No reference will be made on this occasion to the purification of the mineral acids, as I have dealt with that subject in a previous report which was read at the Bradford meeting of the British Pharmaceutical Conference.

Oxalic Acid.—The standard of purity of this preparation required by the B. P. is unattainable by the official process, for the mere recrystallization of the commercial acid from its solution in boiling water never yields a product which is entirely dissipated by a heat below 350°. The alkaline oxalates, which are the principal impurities in the crude acid, are less soluble in a solution of oxalic acid than in water, and therefore do not remain in the mother liquor, but always crystallize along with the acid. Some chemists have expressed a doubt that perfectly pure oxalic acid can be at all pro-

*Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, and published in the Pharm. Jour. and Trans.

duced from the commercial article, and prefer the acid prepared from sugar, for the purposes of quantitive analysis. It certainly appears difficult, if not impossible, to procure the chemically pure acid from manufacturers of pure chemicals. Such a preparation can, however, be obtained by the following process:

Agitate the powdered commercial acid with five times its weight of distilled water at about 100° F. for some time, allow the mixture to stand in a cool place for about six hours, then filter the solution, evaporate it to about two-thirds of its original bulk, and stir well while it is cooling. Collect and wash on a filter the crystals which have formed, and purify them twice by recrystallization from boiling distilled water. The acid thus obtained leaves no residue whatever when ignited in a platinum crucible. The large portion left undissolved by the tepid water, along with that still contained in the evaporated solution, may be recrystallized and sold as commercial acid. Stolbe recommends the commercial preparation to be crystallized from a hot solution in H Cl, and then to be recrystallized from boiling water; but the product in this case is, according to my experience, less satisfactory than the one obtained by the method I have just described. The purification of oxalic acid by sublimation yields a very pure preparation, but is an exceedingly wasteful process.

Sodium Carbonate.—Pure crystallized sodium carbonate is easily obtained by repeatedly recrystallizing the commercially pure salt. The anhydrous carbonate is generally made by washing and heating the bicarbonate, but though the process, if carefully worked, is a very good one, it frequently seems to fail with those engaged in the production of this salt on a large scale, for it is difficult to procure it from manufacturers and dealers in a fit condition for delicate analytical operations. The failure is mostly due to insufficient washing of the bicarbonate. In washing, large quantities of the latter with distilled water, the solution passing through the funnels cease to give indications of chloride and sulphate long before these impurities are completely removed, for the moist bicarbonate contained in the funnels soon forms a compact mass which is not uniformly penetrated by the water. If the mass is then rendered homogeneous in a mortar and again transferred to the funnels, the further washings acidulated with pure HNO_3 will again produce distinct reactions with $AgNO_3$ and $BaCl_2$, and it is only by repeating this process several times that a perfectly satisfactory result is obtained. Not less than four fluid ounces of the washings should be submitted to each test at a time.

Potassium Carbonate.—The B. P. preparation made from pearl ash, though good enough for some, is hardly suitable for all pharmaceutical purposes, as the appreciable quantities of sulphate, chloride, and other impurities which it always contains find their way into a number of other chemicals in the preparation of which it

is used. I think that besides this product from commercial pearl ash, a purer carbonate, such as may be readily obtained from cream of tartar or from a mixture of cream of tartar and pure nitre of incineration, etc., should have been mentioned in the Pharmacopœia. The preparation obtained from pure nitre and charcoal generally contains traces of cyanide, which are difficult to remove. For analytical use, I prepare carbonate of potassium by washing the powdered bitartrate with dilute hydrochloric acid, and afterwards with distilled water, then crystallizing it from boiling distilled water, incinerating the washed and dried crystals, etc. In this manner I always obtain a carbonate absolutely free from chloride, sulphate, phosphate, and silica, and also from sodium, and impurity rarely absent in even the best commercial specimens of pure carbonate of potassium. Purified binoxalate also yields an excellent product.

Sodium and Potassium Nitrates.—The Pharmacopœia directs the sodium nitrate to be made from the native salt by crystallization from water, and requires it to be free from chloride and sulphate. Every chemist who has had anything io do with the purification of this salt will agree with me if I say that no amount of crystallization and recrystallization will produce a salt of the required purity. I admit that sodium nitrate thus prepared may be pure enough for medicinal use, but then the Pharmacopœia ought not to insist on a degree of purity not attainable by the official process. For analytical purposes it ought to be quite pure, and in that state it can only be obtained from pure nitric acid and pure sodium carbonate. Pure potassium nitrate is very easily obtained from the commercial nitrate by repeated and interrupted recrystallization, as there is a much greater difference between its solubility in hot and cold water than is the case of the sodium salt. Yet we frequently find that nitrate of potassium, sold as pure by houses of high reputation, is not what it is represented to be, probably because fine crystals are more appreciated by many than purity. I need not point out how very annoying it must be to the analyst engaged in testing for traces of chlorine, sulphuric acid, etc., always having to compare the silver and barium reactions obtained with those produced by his own reagents.

Potassium Permanganate.—The application of sulphuric acid for neutralizing the free alkali in the solution of permanganate previous to its crystallization as recommended in the B. P. is objectionable, as it is impossible to separate the sulphate without sacrificing a very large quantity of the permanganate. Carbonic acid is preferable, and yields a preparation which, whence thrice recrystallized, is chemically pure, as it proves to contain 100 per cent. of $KMnO_4$ when tested by volumetric analysis. Staedeler's process of passing chlorine through the solution of the fused mass in cold water yields a much larger quantity of permanganate than the ordinary method, but invariably causes the formation of chlorate which is difficult to remove.

Sodium Chloride.—The salt is never required in a pure state for pharmaceutical use. For the purposes of quantitative analysis it is generally obtained like chloride of barium, by precipitating it from its solution by hydrochloric acid gas. The purification of common salt by means of barium chloride and sodium carbonate is now less frequently resorted to, as it is assumed to yield a product which is not free from magnesium. By operating in the following manner, however, a perfectly pure chloride of sodium can be obtained in large quantities. The iron present in the filtered solution of common salt is peroxidized by chlorine, and solution of barium chloride is then added in sufficient quantity to remove the sulphuric acid; the filtered solution is mixed with pure sodium carbonate in excess, and boiled for an hour, so as to precipitate the calcium, magnesium and iron, along with the excess of barium. The filtrate is evaporated to dryness, the residue dissolved in water, the filtered solution again evaporated, and the residue once more dissolved. This solution when filtered, neutralized by pure hydrochloric acid, and evaporated, leaves the salt in a chemically pure condition.

Bismuth Subnitrate.—The common occurrence of impurities in this and other preparations of bismuth has been pointed out repeatedly (see 'Year Book of Pharmacy,' 1871, pp. 179 and 180, and 1873, p. 150). An examination of a number of trade specimens made a short time ago, has convinced me that these preparations have not much improved since Mr. Ekin issued his report in 1873. Arsenic occurs in them but rarely, and silver less frequently than it used to do, but subchloride is contained in nearly every sample, and traces of lead are by no means uncommon. Scarcely less objectionable than the presence of these impurities is the very variable composition of commercial samples of the subnitrate. While the B. P. preparation corresponding to the formula $BiONO_3$, H_2O or $Bi(HO)_2NO_8$ should leave 76·3 per cent. of oxide on heating, the oxide yielded by nine specimens, which I examined, varied between 77·5 and 84 per cent. Nearly all trade specimens are more basic than the B. P. compound, and considerable difference in their composition is evidently due to variations in the time of contact with the acid liquid, the temperature at which the operation is conducted, and the quantity and temperature of the water used for washing. The precipitate does not settle down as rapidly one time as another, and unless it is separated from the acid liquid very soon after it is formed, it will never have the exact composition represented by the above formula. Last year I prepared two samples of the subnitrate, one in July and the other in November, both from the same materials, and in strict accordance with the direction of the B. P.; upon examination, one yielded 78·1 and the other 76·9 per cent. of oxide. Both emitted the odor of nitric acid some time after they were made. The precipitation by boiling instead of cold water, as recommended in the German Pharmacopœia, yields a preparation which is somewhat

more basic than that of the B. P., but suffers no change on keeping. The nitric acid used in the process should be quite pure, for every trace of HCl, which it may contain, is sure to pass into the precipitate. The solution of the purified bismuth should be diluted with water, then allowed to settle, decanted from the sediment, and evaporated to the point of crystallization. If these crystals be washed with water accidulated with HNO_3, then dissolved in water and the solution poured into the water intended for precipitation, a purer preparation than that directly produced from the concentrated acid solution of the metal is obtained. A subnitrate free from impurities can thus be prepared, but I doubt that any process, no matter how strictly followed, will produce constant results as regards the composition of the products.

Bismuth Subcarbonate.—This compound, which commonly contains the same impurities as the preceding one, may be obtained in a pure state by observing the same precautions as mentioned in reference to the subnitrate. It is a much more satisfactory preparation than the latter, as it does not present the same variation in its composition. The eight samples I examined left, upon heating, quantities of oxide varying from 88·5 to 90·8 per cent., the variations being due to the presence of smaller or larger quantities of subchloride, and to differences in the amount of water. The formula $2(Bi_2O_2CO_3)$, H_2O, or 2 ($BiHOCO_3$), Bi_2O_3, requires 89·8 per cent. I do not know whether or not the subnitrate possesses any superiority from a medicinal point of view over the carbonate; if it does not, I think the time has come for medical men to discuss the question whether the latter might not take its place entirely.

Bismuth Oxide.—The trade specimens of this substance appear to be very unsatisfactory. Of five samples which I have recently examined, all contained subnitrate and a considerable amount of subchloride; four contained sodium compounds; and one gave a distinct indication of lead. Upon heating they lost from 2 to 6 per cent. in weight. Unless the subnitrate is boiled with large excess of solution of soda for a considerable time its decomposition is incomplete, and an impure oxide is the result. Prolonged washing is required to effect the complete removal of the alkali. I do not know why the much simpler process of heating the pure subnitrate has not been adopted in the B. P., for I find that with less trouble and care it yields a preparation as pure and as soluble in acid as the best that can be produced by the official process. Considering the unsatisfactory state of the three bismuth compounds as met with in commerce, pharmacists, I feel sure, will all be glad to know that so able a gentleman as Mr. Ekin intends to re-investigate the whole subject, and to report his results at the next meeting of the British Pharmaceutical Conference.

PLEASURES AND UTILITY OF BOTANICAL STUDY.

In the opening address to the pharmaceutical students of the college at Bloomsbury Square, Mr. Ekin called attention to the many pleasures attendant on a knowledge of botany—the delightful explorations through the country, green meadows, the bright hedge-rows and the tangled woods. "You will read," says he, "with much more interest and profit books of travel if you are able from your own knowledge of some of the forms of vegetation named in them to realize and picture to yourselves foreign floras. And knowledge of this sort is of no little practical use, as it enables you to advise as to the judicious plantlng of our towns and neighbourhoods, where, notwithstanding so much has been done and is being done in this direction, so much still remains to be learnt.

"You cannot occupy a half holiday, during your stay in London, to a better purpose than by an occasional visit to Kew. In spite of the vivid and faithful descriptions by such naturalists as Bates and Wallace, the most fertile imagination fails to arrive at anything like a satisfactory conception of tropical scenery, and the delightful impressions in seeing for the first time in the palm house at Kew such trees we have so often read about, as the banana, screw pine, banyan, date palm, cocoanut palm, and mangrove, are never to be forgotten.

"But for hardier trees and shrubs your own neighbourhood will amply furnish you with sufficient examples. To mention only a few of the many which I find from personal observation to be everywhere common, we may start from Canada, which gives us so many of our coniferæ, with the hemlock spruce *(Abies Canadensis)*, which, from its abundance and beauty, is frequently referred to by the American poets under the name of hemlock.

To the United States we owe perhaps more than to any other part of the world, with the single exception of Japan, trees of great diversity and surpassing beauty. The oaks and maples, the buck-eyes *(Pavias)*, the locust trees *(Robinias)*, erroneously called acacias in England, the *Catalpa syringæfolia*, the noble *Liriodendron tulipifera*, the tulip tree, the *Aralia spinosa* with its large bipinnate leaves and handsome spikes of flowers, the *Juglans nigra*, and various species of *Carya*, yielding the hickory nuts and butternuts, etc., the mere mention of which recalls to us our early schoolboy days, when we pored over "Queechy" and the "Wide Wide World;" the *Taxodium distichum*, the deciduous cypress, the prevalent tree in the swamps of the Southern United States and Mexico, the hiding-place formerly of many a hunted slave, and interesting not only from its beautiful feathery foliage, but as being, in common with the *Sequoia sempervirens*, closely allied to fossil tertiary species which countless ages ago were spread over Europe, where no congeners are now indigenous. To California, besides for some of our

most valuable pines, such as *P. Sabiana* and *P. insignis*, we are indebted for the majestic but somewhat formal *Sequoia gigantea*, the mammoth tree of the Americans, and the Wellingtonia of our gardens, and for the equally majestic *Sequoia sempervirens*, the redwood of the timber trade.

"South America gives us the *Araucaria imbricata*, and one or two species of *Libocedrus* from Chili; the *Araucaria Brasiliensis*, forming large forests in south tropical Brazil, and which is hardy in the warmer parts of England, and last, but not least, the beautiful *Berberis Darwinii*, now to be found in every garden and discovered by Darwin during the famous voyage of the Beagle on the coasts bordering on the Straits of Magellan.

"Leaving Europe, notwithstanding our considerable indebtedness to it, and hastening on as I must, just noticing the cedar of Lebanon, the horse-chestnut of Asia, the *Cedrus Deodara*, *Abies khutrow*, and *Pinus excelsa* of the Himalayas, all coniferæ of rare beauty, and leaving the *Caraganas* and *Spiræas* of Siberia on the North, we come through China, with its *Photinias* and thorny *Gleditschias*, to Japan. Owing to the general similarity of the climate of Japan to our own, we owe to it many of our most valuable introduced hardy shrubs and trees, without which our gardens and pleasure grounds would be shorn of half their beauty. In every cottage garden are to be found the evergreen Japan euonymus, privets and honeysuckles, whilst even in the areas of our houses, in crowded streets, the aucuba will flourish. Among the most striking of the Japan coniferæ are the *Cryptomeria Japonica*, the Japanese cedar, which forms a large proportion of the vast forests which clothe the slopes of the mountains there, *Thujopsis dolobrata* and *Retinisporas* of endless variety and beauty.

"Then there are the charming miniature maples. The paper mulberry (*Broussonetia papyrifera*), from the bark of which the tapa cloth of Polynesia is fabricated; the singular maidenhair tree or ginko (*Salisburia adiantifolia*) with its fern-like leaves; the *Paulownia imperialis*, with its immense leaves and purple flowers; and the two noble trees *Sophora Japonica* and *Ailanthus glandulosa*, which latter now being generally planted on account of the great beauty of its glossy dark green foliage, and of which we have already in England some fine specimens, acquires additional interest from its being the food of the silk-producing insect (*Bombyx cynthia*), lately introduced into South Europe.

"Not to weary you with a further list of names which must necessarily be uninteresting and uninviting, I hope I may have said enough to induce you to enlarge your botanical boundaries and search out for yourselves the treasures from other lands that are to be found at your doors, promising you that however dry it may be and is to read mere descriptions, the actual study of the trees themselves is full of interest.

"What funds of interest, too, are to be found in what may be called the bypaths of botany, in examining into the history, etymology, and poetry of the common English names of plants.

"I am tempted to give just one or two illustrations, for which I am indebted to the writings of Mr. Ellacombe, and to pick at hazard one of the commonest and at the same time one of the prettiest flowers that grow, the daisy, the favourite flower of Chaucer, who thus gives the likeliest derivation of its name:

'The daisie, or else the eye of the day,
'The emprise, and the flour of flours all.

"Some of you may be surprised to hear that the forget-me-not, at the beginning of this century, was known only by its old English name of mouse-ear, which is the exact translation of the pretty Greek name ————, dating from the time of Dioscorides, 1,800 years ago, and which the plant still bears as its generic name. It was not until the pretty German legend of the forget-me-not, which you all know so well, became popular in England some fifty years ago, that it bore its present name. Before that time the name was applied for very different and less romantic reasons to the ground pine *(Ajuga chamæpitys)* on account of its unpleasant and long-enduring taste. You may remember a similar idea in Shakespeare, where he makes Ophelia say:

'There's rosemary; that's for remembrance.
'I pray you, love, remember.

Rosemary being emblematic of remembrance on account of its enduring taste and smell.

"How the mere mention of culverkeys and lady-smocks recalls to us the delicious word-painting of Walton! And how eglantine and a host of other names bring back to us some of the choicest passages in the old poets! But I must not linger too long by the way. Sufficient is it to say that there is hardly an English name of a plant that will not give you some instruction or suggest some pleasing history.

LEECH HUNTING IN PENNSYLVANIA.

This is a local industry along the lower Delaware. Pennsylvania leeches are considered the best native sort, and our hunters supply the Middle States as well as their own. They have several methods of catching them, such as driving horses and cattle through shallow runs, when the leeches take hold of their fetlocks. Another ready means of taking them is by laying a bait of liver in the water, of which the leech is very fond; but the surest and quickest way is to stir them up out of the mud and scoop them out with a small net on the end of a pole.

The worthless horse leech has not diminished, but luxuriates in swarms, being permitted to live unmolested save by its natural enemies. They are all black, and easily distinguished from the medical species of commerce, which is about as long as the index finger of a lady's hand. Its skin is also black, but it is edged with a yellow line on each side, and yellowish spots on the back; and the belly, which is of a neutral red, is also marked with yellow spots.

As they are only caught in the spring and during the early part of the summer, it is necessary to lay in a winter supply, which is placed in a covered glass jar, to admit light, and the water changed three times a day. They require no other sustenance, deriving their food alone from the unseen things of the water.—*Medical and Surgical Reporter.*

EXAMINATION OF MINERAL ACIDS OF COMMERCE, VIZ.: FIVE SAMPLES EACH OF "COMMERCIAL" AND "CHEMICALLY PURE" SULPHURIC, NITRIC AND HYDROCHLORIC ACIDS.*

BY OTIS B. DICKINSON P. C.

1st. "Commercial Sulphuric Acid."

Specimens	Sp. gr.	Arsenic.	Lead.	Nitric acid.	Oxides of N.	Organic.
No. 1.	1·83	o o	o o	trace	o o	none
" 2.	1·82	o o	o o	none	trace	"
" 3.	1·82	trace	o o	trace	"	"
" 4.	1·83	o o	o o	none	"	"
" 5.	1·85	trace	o o	none	"	trace

2nd. "Chemically Pure Sulphuric Acid" of Commerce.†

Specimens	Sp. gr.	Arsenic.	Lead.	Nitric acid.	Oxides of N.	Organic.
No. 1	1·819	o o	none	trace	trace	trace
" 2	1·836	trace	"	none	none	none
" 3	1·817	none	"	"	"	"
" 4	1·829	trace	"	"	"	"
" 5	1·781	none	trace	trace	trace	o o

*American Chemist.

o o Present in considerable amount.

† The "Chemically pure" specimens of each acid were mostly obtained at drug stores.

3rd. "Commercial Nitric Acid."

Specimens.	Sp. gr.	As.	HCl.	Oxides of N.	H_2SO_4.	Na, K.	I.	HIO_3.	Organic.
No. 1	1·33	none	trace	trace	o o	trace none	none	trace	trace
" 2	1·375	trace	"	"	o o	none "	trace	"	none
" 3	1·35	none	o o	"	o o	trace "	none	"	trace
" 4	1·40	"	o o	"	o o	" "	"	"	"
5 5	1·41	trace	none	"	o o	none "	"	none	none

4th. "Chemically Pure Nitric Acid" of Commerce.

Specimens.	Sp. gr.	As.	HCl.	Oxides of N.	H_2SO_4.	Na, K.	I.	HIO_3.	Organic.
No. 1	1·399	none	none	trace	o o	none	none	none	none
" 2	... ...	"	"	"	o o	"	"	"	"
" 3	1·217	"	"	none	none	"	"	"	"
" 4	1·388	trace	"	"	o o	"	trace	"	"

5th. "Commercial Hydrochloric Acid."

Specimens.	Sp. gr.	As.	SO_2.	H_2SO_4.	Cl.	HNO_3.	Na. K.	Metals	Organic.
No. 1	1·11	trace	none	trace	o o	trace	none	none	none
" 2	1·09	"	"	"	o o	"	"	"	"
" 3	1·14	none	"	"	o o	"	"	"	"
" 4	1·16	"	"	o o	o o	"	"	"	"
" 5	1·15	"	"	o o	o o	"	"	"	"

5th. Chemically Pure Hydrochloric Acid of Commerce.

Specimens.	Sp. gr.	As.	SO_2.	H_2SO_4.	Cl.	HNO_3.	Na, K.	Metals	Organic.
No. 1	1·16	none	none	trace	none	none	none	none	none
" 2	1.141	trace	"	"	"	"	"	"	"
" 3	1·093	none	"	none	"	"	"	"	"
" 4	1·151	"	trace	trace	"	"	"	"	"
" 5	1·150	"	none	none	trace	trace	"	"	"

REDUCTION OF IODATES, BROMATES AND CHLORATES, TO IODIDES, BROMIDES AND CHLORIDES.

While the usual process for the reduction of these salts consists in fusing them, either alone, or with charcoal, G. Pellagri proposes to use a method based on the fact that potassium iodate in dilute solution is reduced by shaking with iron filings, or zinc powder (not copper or tin), and that these latter metals become oxidized.

Shaking the solution, while hot, with iron filings produces complete reduction, and there is neither any iodine carried down with the preipcitate, nor will there be any iron in solution. In too concentrated solutions, as soon as a large quantity of ferric oxide has been thrown down, the latter may again have an oxidizing effect upon the potassium iodide. In this case a complete reduction of the iodate can be accomplished only by filtering repeatedly and treating with fresh iron filings. This oxidizing action of ferric oxide was confirmed directly with pure potassium iodide. But even a concentrated solution of an iodate may be entirely reduced *in the cold* by introducing into the liquid an iron plate and a copper plate, connected *outside of the liquid* by a wire, forming a galvanic element. In this case the iron alone becomes oxidized, but on account of the small surface it takes several days to complete the reduction. Towards the end of the reaction a greenish deposit of a mixture of ferrous and ferric oxides is thrown down, which is converted into red oxide by adding a little more iodate solution. This process, which may be used in working on a large scale, involves neither loss of iodine, nor contamination with iron or copper. Zinc, in powder, acts, in the beginning, more powerfully than iron, but complete reduction can only be obtained by means of a zinc-copper element. Potassium bromate is similarly reduced to bromide by the iron-copper elements, and the same greenish compound marks the end of the reaction. Potassium chlorate, in warm aqueous solution, is likewise reduced to chloride by shaking with iron filings; but the iron-copper or zinc-copper elements act upon chlorates very slowly, and do not entirely reduce them.—*Ber. d. d. Chem. Ges.*, 1875, 1356, *in New Remedies.*

CARBOLEUM.*

Another of Faraday's discovories, that of liquid carbonic acid gas, seems likely to bear practical fruit, if the French patent of a certain Dr. Bains, a Dutch chemist, should prove equal to the anticipations of its inventor. According to him, when bicarbonate of

*Chemist and Druggist.

soda or potash is warmed in a closed space the carbonic acid can be disengaged and collected in a chamber at any tension whatever. Thus, for example, by heating to 300° or 400° C., the carbonic acid is obtained at 50 or 60 atmospheres, and condenses into a liquid condition in the reservoir at the ordinary temperature. This product is called by the inventor *carboleum*. In order to employ this liquid for the production of motive power, a result which Faraday himself foresaw, it would be necessary to warm it again, and according to the *Moniteur des Produits Chimiques*, from which we gather the outline of this invention, Dr. Bains calculates that 16 litres of carboleum produced as above would yield power equal to that of one horse for one hour, or 270,000 kilogrammetres, and that the vaporization of that carboleum during the hour would require at the most 3 hectogrammes, or something less than three-quarters of a pound of coal. The vapour, it is said, could be again condensed by suitable apparatus, and thus the problem of perpetual motion would be in a sense resolved.

From the slight account of this invention which we have quoted, it is difficult to understand what is the precise novelty of this invention. Faraday's own process was to heat bicarbonate of soda in a bent glass tube, closed at both ends, collecting and condensing the gas in the shorter leg, and Thilorier constructed an iron apparatus on a similar principle. The gradual development of vapour, and the danger of bursting the resorvoirs, have hitherto prevented the employment of this product in the manner suggested. If Dr. Bains has overcome the difficulties of applying the liquid carbonic acid gas so as to give us a new motive power, he has indeed accomplished a great work; but we fear this remains to be done. It is said, however, that he has lately had an apparatus constructed in Paris for the production of carboleum according to his system, so we may perhaps hear more of it.

GINGER-BEER OR "POP."—Take sugar 3 lbs.; bruised ginger, 2 oz; cream of tartar, 1 oz.; lemons, sliced, 4; yeast, 8 fluid oz. . boiling water 4 gal. Pour the water upon the first four ingredients; infuse for two hours and strain; then add the yeast, and when fermentation has fairly set in, pour into strong bottles and wire down the corks. Spruce Beer.—Sugar, 6 lbs.; essence of spruce, 4 oz.; boiling water, 10 gals.; yeast, 8 fluid oz. Add the water to the sugar and the essence, and ferment with the yeast, and bottle as above. Root Beer.—Take Fl. ex. American sarsaparilla, 6 fl. drs.; fl. ex. pipsissewa, 4 fl. drs.; fl. ex. wintergreen, 2 fl. drs.; root-beer flavoring, 1 fl. oz.; refined molasses, 1 gal.; water, 9 gals. Mix: introduce into a soda-water fountain, and charge with carbonic-acid gas in the usual way. Root-Beer Flavoring.—Oil of winter green, 4 fl. drs.; oil of cloves, 1 fl. dr.; oil of sassafras, 2 fl. drs.; alcohol, 4 fl. oz.—*Druggists' Circular.*

Editorial.

THE HEALING PRINCIPLE OF ARNICA.

Many physicians are sceptical in regard to the virtues of tincture of arnica as an external application. It has been said that a mixture of spirit and water—of a strength similar to that of the tincture—or even simple water itself, are quite as efficacious as the officinal preparation. Experiments in support of this are not wanting; as those performed in one of the Paris hospitals, in which tincture of arnica, spirit and water, and simple water, were employed as external applications under conditions as nearly as possible alike. In these the water dressing came out victorious. Nor are authorities wanting: Hebra, Fox, and White hold to a similar view, as also Dr. W. G. Smith, in a recent paper in the *Dublin Medical Record*. On the other hand, in favor of the drug, we have the evidence of many physicians, and also the testimony of the public, or, as the learned doctors put it, "what the old women say." The experience of the latter class has seldom much weight with the regular profession, but, in regard to the effect of an application so simple, it may be maintained that an intelligent public have some right to express an opinion. Dr. Johnson once said that to judge whether a table be a bad or good one a man need not necessarily be a carpenter, and we think the observation may legitimately be made to apply to the case of the efficacy of arnica. Viewing the question in this light, we find that there is a vast preponderance of evidence in favor of the drug.

In Phillips's *Materia Medica*, published in 1874, are some statements which have been instrumental in the revival of a discussion of this subject, and also in advancing some new views regarding the peculiar principle to which the action of the drug is to be attributed. "The ingredient in arnica long supposed to be of most consequence was *arnicine*, an amorphous bitter substance, almost insoluble in water, but freely soluble in alcohol and ether; or else the etherial oil which is also insoluble in water. For a variety of reasons it is now probable that neither arnicine nor the oil, but *trymethylamine*, an organic alkali, is the really useful constituent of arnica. Trymethylamine, C_3H_9N, is a clear, colorless fluid, very

volatile, and freely soluble in water, alcohol and ether. "The external effect of arnica involves important questions; for, while it is known that many persons have found it an excellent application for bruises and for wounds, other observers have complained that it produces either an actual erysipelas, or a peculiar violet-colored eruption, attended by great heat and pain. I venture to affirm that these are physiological consequences of the alcoholic, and not of the aqueous solution, which latter contains neither arnicine nor the oil. I have never seen inflammatory consequences follow the application of the purely aqueous lotion to wounds or bruises. For external bruises and cuts arnica is, undoubtedly, very useful; and, as already observed, the mischances that have attended its use have probably resulted from the fact that the tincture, containing arnicine and the volatile oil, has been employed. The infusion or decoction alone should be used, and it would be better to give up employing all liniments and lotions in which the tincture is present."

With the statements above expressed the *London Medical Record*, the *Philadelphia Medical and Surgical Reporter*, and other journals at once coincide. We cannot, however, agree with our contemporaries in their hasty abandonment of a stable and eligible preparation for the inelegant and changeable infusion or decoction, a form of all others most prone to decomposition. It has not been proved that any ill effects which have attended the use of tincture of arnica are chargeable to its characteristic alkaloidal or volatile constituents, and as trimethylamine is soluble in alcohol and water, it would be contained in the tincture as well as in the aqueous preparations which are recommended. It has often occurred to us that the alcoholic strength of the tincture might, with advantage, be reduced to that of diluted alcohol U.S.P., or, at most, to that of proof spirit B.P. Tincture of this strength would be decidedly less stimulating, and perhaps better fitted to represent what might be termed the peculiar specific action of the drug.

If the healing power of arnica depends altogether on the presence of trimethylamine, why not use as a liniment, or external application, a simple solution of this substance. Its vile and disgusting odor would, indeed, prove a bar to extended popularity, but its medicinal activity might in some measure make up for this serious obstacle.

We are not aware on what grounds it is claimed that trimethy-

lamine is a healing element in arnica, but, reasoning from analogy, it does not seem altogether improbable. Some of the substances from which the alkaloid is obtained have, in their turn, done good service as liniments. Of these are human urine, which in English-speaking countries was once a famous remedy, and in India, Arabia, and other eastern nations, is still held in the highest esteem. Herring brine and stale yeast, both sources of the alkaloid, have been largely employed as external remedies.

Trimethylamine does not often occur except as a result of decomposition, but its existence in some plants has been demonstrated. Amongst these may be mentioned the stinking goosefoot, *Chenopodium vulvaria;* flowers of the common pear, *Pyrus communis*, as also *P. Aucuparia*, *Cratægus oxyacantha*, and *C. monogyna*. In ergot of rye it betrays itself by its characteristic odor, but in this drug it results from a process or operation, which can scarcely be termed natural in the strictest interpretation of the term.

REMOVAL.—The old business stand so long occupied by the Messrs. Lyman has at length been abandoned for their new warehouse on Front street, near Church, where, during the last season, a spacious edifice has been erected. The building is constructed of brick, with cut stone facings, and though not of a highly ornamental order, is still quite handsome—and what is more in keeping with its character—exceedingly substantial and massive. We believe that in point of size this warehouse is not equalled by any employed for a similar purpose on this continent. The building measures 45 feet wide by 200 feet deep, and comprises six stories. The long and unbroken stretches of floor afford admirable facilities for the economization of labor and speedy despatch of business. The total floor room equals 54,000 square feet. Communication between the floors is made by means of a steam elevator, which is worked by an engine of 10 horse power, situated in one of the basement stories. The boiler in connection with this affords a source of heat by means of which the building is comfortably warmed. The Mills and Laboratory do not form part of the new building, but remain as before. The erection of this warehouse is a very gratifying evidence of the enterprise of our citizens, and a circumstance of which we have every reason to feel proud.

DEATH OF MR. CHRISTOPHER STORK.—We regret to notice the death of Mr. C. Stork, of Brampton, one of the founders of the College, and a member of the Provisional Council named in the Pharmacy Act. Mr. Stork was one of the most zealous workers for the cause of the advancement of pharmacy, and his loss will be severely felt. The event to which we have reference took place on Saturday, January 22nd. We have not, therefore, had opportunity to gather any further particulars, but hope to give a more extended notice in our next number.

Editorial Summary.

NEW FORM OF CONDENSING APPARATUS.—Mr. J. Pattinson recently delivered his presidential address before the Newcastle-upon-Tyne Chemical Society, and, in alluding to late improvements spoke of the form of a condenser which has been patented in England by Messrs. Newall & Bowman, of the Washington Chemical Works. In this apparatus condensation is effected by passing the acid gas through one or more stone cisterns, about six feet square and two feet deep, into each of which water is entering through a small orifice of about 0.06 of an inch diameter, under a pressure of about 40 lbs. The fine stream of water is projected by this pressure with great force against a small disc, and is thus dashed into fine spray, which fills the whole of the vessel, and meeting with the hydrochloric acid gas, condenses it, forming liquid hydrochloric acid of the strength usually of 28 degrees of Twaddell's hydrometer. There is a considerable amount of heat developed by the condensation of the gas, and the vapor of water laden with hydrochloric acid after leaving the vessels in which the spray producers are placed is at present passed into a small condenser of the ordinary construction (much too small to do the whole work of condensation itself), where the vapor is cooled and perfectly condensed. In places where an ordinary condenser is not already in existence to be thus utilized it is proposed to place a series of cooling pipes between each spray producer vessel in order to cool the vapor.

CONSUMPTION OF OPIUM IN CHINA.—The *Pharm. Jour. and Trans.* for December 11th contains some extracts from a Blue Book

of Commercial Reports from Her Majesty's Consuls in China. From this we learn that the consumption of Indian opium is rapidly decreasing; more especially in some Chinese provinces. The whole of the northwest and west may, in this respect, be said to be quite independent of India. Nominally, the laws of China forbid the cultivation of opium, but it appears that the authorities do not carry them out very strictly. On the contrary, the growth of opium is encouraged, and the high tariff on what is considered a necessary article tends to this result. It is estimated that about 80 per cent. of the opium used is of native growth. Opium consumers, that is, those who smoke and chew the drug, amount to about 30 per cent. of the population. Opium smoking is stated to be persistently increasing. The Chinese prefer Bengal opium, which is stated to be "mild," and free from many objections urged against other varieties. Malwa comes next, but is thought "fiery," and to produce an unhealthy condition of the skin, and to occasion heartburn. Native opium is least esteemed; possessing the bad qualities of the Malwa with others peculiarly its own.

THE ALKALOIDS OF VERATRUM VIRIDE AND ALBUM.—The *American Journal of Pharmacy*, Jan., contains a valuable and lengthy paper on this subject. The author, Dr. T. G. Wormley, first reviews the statements of previous observers, and proves the great discrepancies which exist as to the exact nature of the active principle or principles of *veratrum viride*. In regard to this a definite conclusion is arrived at by the author: "That both *veratrum viride* and *veratrum album* contain an alkaloid, which, when pure, in its behaviour with the mineral acids, and with liquid precipitants, fully responds to all the reactions of veratria or veratrin." A method for the preparation of the alkaloids of *V. viride* is given, and also for the separation of veratria and jervia. Tests for the latter alkaloid are also given. Experiments were made in regard to the recovery of the alkaloids from complex mixtures. In one of these a portion of fluid extract was administered to a cat, producing instant death. The contents of the stomach gave abundant evidence of the presence of jervia, and in the blood distinct traces were also evident. Examination of the blood of a dog gave a similar result.

NEW MEDIUM FOR THE PHOTOGRAPHIC IMAGE.—Mr. W. Willis (*Popular Science Review*) calls attention to a platinum surface for permanent photographs, and suggests a process for producing pictures by means of it. A solution of ferrous oxalate in potassic oxalate reduces salts of platinum to the metallic condition, and on

this fact, together with that of the reducing action of light on ferric oxalate, the process is based. If paper which has received a wash of chloride of platinum and ferric oxalate be exposed to light, the ferric salt is converted into ferrous oxalate. This is rendered soluble and capable of reducing the platinum salt by the action of a solution of potassic oxalate, the metal being affected according to the intensity of the light. About one-fifth the exposure usual in silver printing is required. The resulting picture has a rich, warm, velvety-black tone, and when the excess of ferric oxalate is removed by proper treatment, it is claimed that the film is absolutely unchangeable.

SHAMPOOING COMPOUNDS. — Various correspondents of the *Druggists' Circular* have supplied to that journal a number of formula for shampoo liquid, of which the following may be reproduced:

I.	Castor oil, or glycerin,	4 ounces.
	Water of ammonia,	12 drachms.
	Alcohol,	2 pints.
	Water,	1 pints.

The oil and ammonia are to be mixed together first. Perfume may be added.

II.	Alcohol,	1 pint.
	Water,	1 pint.
	Ammonia,	1 ounce.
	German cologne,	1 ounce.
III.	Alcohol,	1 pint.
	Water,	1 pint.
	Carbonate of potash,	1 ounce.
	Carbonate of ammonia,	4 drachms.
IV.	Water,	12 ounces.
	Ammonia,	4 drachms.

PHARMACY IN ST. PETERSBURG.—The editor of the *Pharm. Jour. and Trans.* supplies, from a continental authority, some additional particulars bearing on M. Mehu's paper on Pharmacy in Russia, which appeared in a former number of this journal. In 1874 there were 52 "free" pharmacies. These gave employment to 4 "magisters," 74 dispensers, 934 assistants, and 77 pupils. In the establishment of Herr Jurgens the large number of 92,964 prescriptions were dispensed during the year. Seven others follow with figures ranging from 66,028 to 40,151. The lowest number dis-

pensed in any pharmacy was 6,791. If prices are good in St. Petersburg the pharmacists have surely no reason to complain.

RELATIONS BETWEEN SPECTRAL LINES AND ATOMIC WEIGHTS.—E. Vogel (*Scientific American*) points out certain facts disclosing an intimate relation between the Fraunhofer lines of the solar spectrum and the atomic weights of the substances whose glowing vapours they represent. A list of the atomic weights of some fourteen elements, calculated on data furnished by the shortest wave lengths, shows striking coincidences with known atomic weights. Should these results be confirmed, a solution to many problems in natural science would be afforded. The author's paper is not a lengthy one, and is only designed to call attention to the subject. Further investigations will doubtless throw additional light on the matter.

COMPOSITION OF VINEGAR BITTERS.—At the last meeting of the American Pharmaceutical Association, Mr. O. Eberbach read a paper describing the details of an analysis of this compound. The liquid as taken from the original bottle was of a dirty, muddy and unsightly appearance; its odor, that of a mixture of oil of anise and aloes; its taste, sour and very bitter, with an anise flavor. Carbonic acid gas, doubtless a result of fermentation, was disengaged upon opening the bottle. Examination revealed the presence of the following substances: Cape aloes, Glauber's salt, gum arabic, gum guaiac, acetic and carbonic acids, alcohol and oil of anise.

STYRAX AS A SUBSTITUTE FOR BENZOIN IN OINTMENTS.—Mr. R. Rother (*Laboratory*) prefers styrax to benzoin for the preservation of lard and ointments. The advantages claimed are cheapness, convenience, agreeableness of odor, comparative absence of color, unlimited preservative effect. The proportion of styrax, or mode of incorporation, are not stated.

DAMIANA.—In preparing fluid extract from a sample of this drug, obtained in New York, Mr. E. S. Wayne (*Am. Jour. Pharm.*) noticed that after the filtered extract had been standing for some days in a glass vessel a crystalline crust was deposited. This was examined, but instead of being a proximate principle, as expected, was found to be chloride of potassium.

Students' Department.

Answers to the following questions must be sent in so as to be received by the editor before the twentieth of each month. Competitors must be engaged in the drug business, not being proprietors or having passed examination, and must furnish, with the answers sent, their real names and addresses. Answers to each of the questions must be written on *separate sheets* or slips of paper, and must be followed by the name and address of the competitor. It is trusted that all answers sent will be the *bona fide* work of competitors, and that no assistance will be sought except such as is afforded by books. Any attempt to copy *verbatim*, or in part, from any published work, will impair or altogether nullify any value which might otherwise have been assigned to such answer.

The same competitor may not carry off more than one First Prize and one Second Prize during the term of six months.

Answers requiring calculation and involving fractions must be given in decimals, which need not be carried beyond the third place.

The following books are offered this month as prizes:

FIRST PRIZES.	SECOND PRIZES.
PARRISH'S *Pharmacy.*	GRAY'S *First Lessons in Botany.*
GARROD'S *Materia Medica.*	WITTSTEIN'S *Pharmaceutical Chemistry.*
GRAY'S *Manual of Botany.*	ROSCOE'S *Chemistry.*
FOWNES' *Chemistry.*	PAREIRA'S *Selecta e Præscriptis.*
ATTFIELD'S *Chemistry.*	*British Pharmacopœia.*
SQUIRE'S *Companion to the Pharmacopœia.*	*U. S. Pharmacopœia.*
BENTLEY'S *Manual of Botany.*	KAY-SHUTTLEWORTH'S *Principles of Modern Chemistry.*
REDWOOD'S *Supplement to the Pharmacopœia.*	PRESCOTT'S *Proximate Organic Analysis*

Successful competitors may select from any of the above works, and, on notifying the Editor, the book selected will be forwarded by post.

Contestants may forward their answers by book post, at the rate of four ounces for one cent, provided the rules be adhered to of leaving open the ends of the package, so that the contents may be easily examined; not enclosing any matter which could be deemed correspondence; and endorsing the packet "*Manuscript. By Book Post.*"

Address *Can. Pharm. Jour.*, 147 Front street east, TORONTO.

As we are not aware what the action of the Council may be in regard to the appropriation for prizes, we have omitted the questions this month.

LAST MONTH'S QUESTIONS.

The question on chemistry, or, more properly, optics, was tolerably well answered. Only one reply was, however, absolutely correct. It would be well for students to again consult their text books, on the various subdivisions of the question, and make themselves thoroughly conversant with the details given. We need not go over the ground here, and would only allude to the 7th subdivision:—

"How may the nature of many colored liquids be discovered by the use of a prism?" Answers to this were generally incorrect. If, by means of a prism, we examine the spectrum of a ray of white light which has been allowed to pass through a colored liquid, and subsequently through a narrow aperture or slit in a piece of board or metal, we sometimes find that certain parts of the spectrum have been absorbed, or, as it were, cut out, their place being occupied by dark bands or spaces, which are often characteristic of the liquid examined. Thus, in the spectrum of a solution of Lyons blue, the orange, yellow, green, blue and indigo are entirely absorbed, leaving nothing but the red and violet. Other aniline colors give very characteristic spectra, as do also solutions of chlorophyll, cochineal, curcuma, and others. For further information on this subject consult this journal, vol. ii., p. 159, vol. iii., p. 48, or Fowne's Chemistry, 10th ed., p. 79.

In most of the answers to the questions on pharmacy, it was stated that proof spirit would be a suitable menstruum for preparing a tincture of leptandra root. The preparation of a pint of proof spirit, from alcohol of 65 over proof, appears to have been a matter of difficulty. The term *over proof* does not refer directly to the percentage of alcohol, but to a scale devised by Sykes and followed by the excise and customs in all British countries. Proof spirit, on this scale, is marked 100 : 65 over proof is therefore equal to 165 degrees, Sykes. Spirit of less strength than proof is termed under proof: thus, spirit of 65 under proof would be equal to 100 *minus* 65, or 35 degrees, Sykes. In order to find the amount of 65 over proof, equal to one pint (20 ounces) of proof, we make the following simple calculation :—

$$\frac{20 \times 100}{165} = 12.12 \text{ oz. (quantity of 65 o. p. required).}$$

Student, Grimsby, asks for information as to the best way to pursue his studies in chemistry. With reference to the pharmaceutical examination, we know of no better plan than that of obtaining a copy of Attfield's Chemistry, and carefully and diligently following it up day by day; performing all the experiments referred to, and answering, from time to time, the questions proposed at the end of each chapter or lesson. This plan will be certain to be crowned with success. The apparatus required is of the most inexpensive description, and the study full of interest. *Student* may thus qualify himself to pass the pharmaceutical, or any other examination held in Canada, and may acquit himself quite as well as those who study in our cities.

ORDER OF MERIT.

Maximum Number of Marks = 60.0.

No.	NAME.	Chemistry.	Pharmacy.	Materia Medica.	Botany.	Prescriptions.	Dispensing.	Total.
1	R. McCormick, Ottawa	9	9	10	7	10	10	55
2	A. B. Welford, Toronto.....	6	7	9	10	8	10	50
3	A. I. Thompson, Strathroy	8	9	8	8	10	6	49
4	"Ferri," London	8	7	10	5	7	10	47
5	F. P. Shannon, Colborne	8	8	8	7	6	10	47
6	W. J. Wilson, Kingston.....	10	5	9	4	10	8	46
7	W. W. Stephen, Meaford	9	7	9	6	6	7	44
8	J. R. Dodds, Orangeville	6	6	6	5	5	6	34
9	J. H. McKenzie, Mt. Forest	5	1	8	7	8	4	33
10	W. A. Fitch, Grimsby	6	0	7	5	6	7	31
11	J. Forbes, Fergus.....	9	5					

The First Prize is awarded to Mr. A. B. WELFORD, Toronto; the Second Prize to Mr. A. I. THOMPSON, Strathroy.

Mr. R. MCCORMICK takes the first place, but he has already received all the prizes which he can claim this session, and has therefore to be content with honors. Mr. Forbes' answers were received too late for estimation.

TO BLEACH SPONGE.—A writer in *Œsten. Zeitschrift f. Pharm.* objects to the use of sulphurous or chlorine gas for bleaching sponges, on the ground that they are prejudicial to the operator and his surroundings. In preference, the sponge should first be soaked in hydrochloric acid to remove chalk, then washed out with water, and steeped for five or ten minutes in a 2 per cent. solution of potassium or sodium permanganate in water. A deposit of manganese oxide imparts a deep brown colour, which is removed by steeping for one or two minutes in an aqueous solution of oxalic acid (2 per cent.) to which a little diluted sulphuric acid has been added. The sponge rapidly whitens, and is finally well washed out with water. A beautiful bleached sponge may be got without any injury to its texture by steeping the manganese browned article in very dilute sulphuric acid, and repeatedly squeezing out. The operation may be conducted anywhere without injury to health.—*Laboratory.*

Registrar's Notices.

RENEWALS.

Brydon, Wm., Toronto.
Dale, John B., Wyoming.
Dawes, John, Brooklin.
Geary, T. J., Sarnia.
Gordon, W. D., Kingston.
Gunn, W. A., Kingston.
Hall, John J., Woodstock.
Kane, J. A., Amherstburg.
Moore, H. P., Rodney.
McCammon, S., Gananoque.
Oliphant, D., Collingwood.
Smith, S. H., St. Catharines.
Werner, A., Elmira.

GEO. HODGETTS, Registrar,
305 Yonge Street, Toronto.

Drugs, Medicines, &c.	$ c.		$ c.
Acid, Acetic, fort	0 13	@	0 14
Benzoic, pure	0 22		0 27
Citric	1 05		1 15
Muriatic	0 03½		0 05
Nitric	0 10		0 13
Oxalic	0 16		0 20
Sulphuric	0 03		0 05
Tartaric, pulv	0 49		0 50
Ammon, carb. casks	0 22		0 24
" jars	0 23		0 24
Liquor, 880	0 24		0 28
Muriate	0 14		0 15
Nitrate	0 45		0 60
Æther, Acetic	0 45		0 50
Nitrous	0 40		0 42
Sulphuric	0 50		0 50
Antim. Crude, pulv	0 15		0 17
Tart "	0 52		0 60
Alcohol, 95 per ct. Cash	2 19		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	1 15		1 20
Peru	2 90		3 20
Tolu	3 25		3 50
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 15		0 18
Berries, Cubebs, ground	0 20		0 25
Juniper	0 06		0 10
Beans, Tonquin	0 62		1 10
Vanilla	14 00		20 00
Bismuth, Alb	2 50		2 75
Carb.	2 65		2 90
Camphor, Crude	0 33		0 40
Refined	0 40		0 45
Cantharides	1 85		1 90
Powdered	2 00		2 10
Charcoal, Animal	0 04		0 06
Chiretta	0 10		0 15
Wood, powdered	0 23		0 30
Chloroform	1 10		1 55
Cochineal, S. G	0 58		0 70
Black	0 75		0 90
Colocynth, pulv	0 60		0 65
Collodion	0 70		0 80
Elaterium	3 20		4 00
Ergot oz	0 70		0 75
Extract Belladonna	1 80		1 90
Colocynth, Co	1 25		1 75
Gentian	0 50		0 60
Hemlock, Ang	0 00		0 95
Henbane, "	3 00		3 20
Jalap	5 00		5 50
Mandrake	1 75		2 00
Nux Vomic oz	0 40		0 50
Opium oz	1 10		
Rhubarb	5 00		5 50
Sarsap. Hon. Co	1 00		1 20
" Jam. Co	3 50		4 00
Taraxacum, Ang	0 70		0 80
Flowers, Arnica	0 17		0 25
Chamomile	0 28		0 32
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		1 35
" pulv	1 00		0 00
Arabic, White	0 38		0 60
" powdered	0 60		0 75
" sorts	0 19		0 24
" powdered	0 42		0 50
" com. Gedda	0 13		0 16
Assafœtida	0 40		0 42
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 35		0 40
Gamboge	1 00		1 20
Guaiacum	0 45		1 00
Myrrh	0 90		0 50

Drugs, Medicines, &c.—*Contd.*	$ c.		$ c.
Sang Dracon	0 60		
Scammony, powdered	5 50		6 00
" Virg. "	14 50		—
Shellac, Orange	0 75		0 80
Gum, Shellac, liver	0 55		0 60
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 18		0 23
Vienna	0 25		0 28
Prices	0 60		0 75
Honey, Canada, best	0 16		0 17
Lower Canada	0 14		0 16
Iron, Carb. Precip	0 20		0 25
" Sacchar	0 40		0 55
Citrate Ammon	1 40		1 50
" & Quinine, oz	0 52		0 55
" & Strychine	0 20		0 25
Sulphate, pure	0 08		0 10
Iodine, good	3 90		4 20
Resublimed	5 10		5 50
Jalapin	1 25		1 50
Kreosote	2 40		2 50
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 60
Sulphate	0 08		0 12½
Lead, Acetate	0 15		0 16
Leptandrin oz.	0 60		—
Liq. Bismuth	0 50		0 60
Lye, Concentrated	1 40		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 65		0 75
Citrate gran.	0 60		0 75
Mercury	1 25		1 35
Bichlor	1 30		1 50
Chloride	1 50		1 70
C. Chalk	0 65		0 70
Nit. Oxyd	1 70		1 90
Morphia Acet	3 00		3 20
Mur.	3 00		3 20
Sulph	3 20		3 40
Musk, pure grain oz	25 20		.....
Canton	10 60		1 20
Oil, Almonds, sweet	0 45		0 47
" bitter	14 00		15 00
Aniseed	4 25		4 50
Bergamot, super	6 50		7 00
Caraway	3 20		3 50
Cassia	2 00		2 25
Castor, E. I	0 12½		0 14
Crystal	0 22		0 25
Italian	0 26		0 28
Citronella	1 05		1 15
Cloves, Ang	3 75		3 80
Cod Liver	1 50		1 60
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 80		4 00
ord	3 20		3 40
Orange	3 00		3 25
Origanum	0 65		0 75
Peppermint Ang	15 00		16 00
" Amer.	5 00		6 00
Rose, Virgin	8 50		8 75
" good	7 00		7 75
Sassafras	0 75		1 90
Wintergreen	4 40		4 60
Wormwood, pure	4 00		6 00
Ointment, blue	1 10		1 20
Opium, Turkey	6 25		6 50
pulv	8 50		9 00

DRUGS, MEDICINES, &c.—*Cont'd*	$ c.	$ c
Orange Peel, opt.	0 35	0 36
" good	0 15	0 20
Pill, Blue, Mass.	1 10	1 20
Potash, Bi-chrom	0 16	0 18
Bi-tart	0 33	0 35
Carbonate	0 14	0 20
Chlorate	0 32	0 35
Nitrate	8 00	9 00
Potass um, Bromide	60	0 70
Cyanide	0 60	0 70
Iodide	3 30	3 50
Sulphuret	0 25	0 35
Pepsin, Boudault's...oz	1 40	—
Houghton's..... doz.	8 00	9 00
Morson's.....oz.	0 85	1 10
Phosphorous	1 10	1 20
Podophyllin	0 50	0 60
Quinine, Pelletier's	—	2 45
Howard's	2 12	—
" 100 oz. case.	2 07	—
" 25 oz. tin..	2 07	—
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 17	0 20
Ipecac, "	1 50	1 60
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.	0 75	0 90
" " pulv	1 60	1 10
" " 2nd	0 60	0 70
" French	0 75	—
Sarsap., Hond	0 60	0 65
" Jam	0 95	1 00
Squills	0 10	0 15½
Senega	1 00	1 10
Spigelia	0 25	0 30
Sal., Epsom	2 50	3 00
Rochelle	0 30	0 32
Soda	0 02½	0 03
Seed, Anise	0 13	0 16
Canary	0 15	0 17
Cardamon	2 00	2 10
Fenugreek, g'd	0 08	0 09
Hemp	0 06½	—
Mustard, white	0 14	0 16
Saffron, American	0 75	0 85
Spanish	10 00	11 00
Santonine	8 50	8 75
Sago	0 08	0 09
Silver, Nitrate.....Cash	14 85	16 50
Soap, Castile, mottled	0 11	0 14
Soda, Ash	0 03¾	0 05
Bicarb. Newcastle	4 75	5 00
" Howard's	0 14	0 16
Caustic.	0 05½	0 05¾
Spirits Ammon., arom	0 35	0 35
Strychnine, Crystals	2 00	2 20
Sulphur. Precip	0 10	0 12½
Sublimed	0 03½	0 05
Roll	0 03	0 04½
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 65	2 80
" liquid	2 00	—
Argols, ground	0 15	0 25
Blue Vitrol, pure	0 09	0 10
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 85	0 90
Extract	0 26	0 30

DYESTUFFS—*Continued.*		
Japonica	0 07	0 08
Lacdye, powdered	0 33	0 38
Logwood	0 01½	0 03
Logwood, Camp	0 02½	0 03
Extract	0 12½	0 13
" 1 lb. bxs....	0 15	—
" ½ lb. "	0 14	—
Madder, best Dutch	0 11	0 12
2nd quality	0 10	0 11
Quercitron	0 03	0 05
Sumac	0 06	0 08
Tin, Muriate	0 10½	0 12½
Redwood	0 05	0 06
SPICES.		
Allspice	0 11½ @	0 12
Cassia	0 26	0 28
Cloves	0 55	0 60
Cayenne	0 20	0 25
Ginger, E. I.	0 19	0 20
Jam	0 30	0 30
Mace	1 40	1 60
Mustard, com	0 20	0 25
Nutmegs	1 15	1 25
Pepper, Black	0 20	0 21
White	0 31	0 32
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 30	0 35
Magnesia	0 20	0 25
Litharge	0 07	0 09
Pink, Rose	0 12½	0 15
Red Lead	0 07½	0 08
Venetian	0 02½	0 03½
Sienna, B. & G	0 07	0 08
Umber	0 07	0 10
Vermillion, English	1 50	1 60
American	0 25	0 35
Whiting	0 1	0 1¼
White Lead, dry, gen	0 08½	0 09
" " No. 1	0 07	0 08
" " No. 2	0 05	0 07
Yellow Chrome	0 12½	0 35
" Ochre	0 02½	0 03½
Zinc White, Star	0 10	0 12
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 11	0 12
Putty	0 03½	0 04½
Yellow Ochre	0 08	0 12
White Lead, gen. 25 lb. tins..	2 45	—
" No. 1	2 20	—
" No, 2	1 95	—
" No. 3	1 70	—
" com	1 30	—
White Zinc, Snow	2 75	3 25
NAVAL STORES.		
Black Pitch	3 90 @	4 25
Rosin, Strained	3 30	4 25
Clear, pale	5 75	7 25
Spirits Turpentine	0 53	0 56
Tar Wood	3 90	4 25
OILS.		
Cod	0 65 @	0 70
Lard, extra	1 10	1 20
No. 1	105	1 10
No. 2	0 90	0 95
Linseed, Raw	0 55	0 58
Boiled	0 60	0 63
Olive, Common	1 05	1 10
Salad	1 80	2 30
" Pints, cases	4 20	4 40
" Quarts	3 25	3 50
Seal Oil, Pale	0 67½	0 70
Straw	0 62½	0 65
Sesame Salad	1 30	1 35
Sperm, genuine	2 55	
Whale refined		