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Original and Selected Papers.

BENZOATE OF LITHIUM.

BY E. B. SHUTTLEWORTH.

This salt has been proposed as a remedy for certain disorders of the urinary organs and appears to possess advantages over the forms in which lithium has, heretofore, been exhibited. The comparative insolubility of the carbonate has always proved a bar to its general employment, and though the citrate is in this respect much more eligible—only twenty-five parts of water being required for solution—yet the salt is of an unstable and deliquescent character, and somewhat troublesome to prepare and dispense. The benzoate is not open to any of these objections, and has the additional advantage of containing, in combination, an acid which is itself of no inconsiderable repute in the treatment of patients suffering from various forms of urinary deposits.

This salt is not usually to be met with in commerce, but is not difficult to prepare. I am not, however, aware of any work of reference which contains any directions, or formula, for this purpose; and am, therefore, induced to believe that a few remarks on the subject may prove acceptable.

Benzoate of lithium may be most advantageously prepared from the carbonate:

$$\underset{74}{L_2CO_3} + \underset{244}{2HC_7H_5O_2} = \underset{256}{2LC_7H_5O_2}$$

In a wedgewood dish put one ounce, avoir, of carbonate, mixed with nine ounces of water. Heat gently by aid of a spirit lamp, and add gradually, and by small portions, benzoic acid until effervescence is no longer produced. About three and a quarter ounces will be required. Evaporate to dryness, stirring constantly, and reducing the heat towards the close of the operation. The product may, for convenience, be powdered. The yield will be nearly three and a half ounces.

By following this process a much less quantity of water and consequently less evaporation will be needed than if the benzoic acid be dissolved and the carbonate added thereto. If, by reason of impurity or discoloration of the benzoic acid, it is necessary to filter the solution, three ounces more water may be added before evaporation; and, if required, a little purified animal charcoal may be used. The benzoate may be obtained in crystals by withdrawing the heat and setting the solution aside immediately after the benzoic acid is all added.

Watts * says the lithium salt of benzoic acid is uncrystallizable. This is incorrect; the benzoate may be crystallized without the slightest difficulty. It takes the form of glistening, pearly scales, or laminæ, somewhat resembles iodide of cadmium, but less lustrous. The crystals feel soapy or greasy to the touch; have a cool, sweetish, and not disagreeable taste, and are perfectly permanent in the air. The solution has an acid reaction.

I have found the salt to be soluble in three and a half parts of water at 60° F.; in two and a half parts at 212° F.; and in ten parts of cold alcohol, sp. gr. 838.

Toronto, Jan. 13, 1875.

* Dict. of Chem. p. 552.

THE CARNIVOROUS HABITS OF SOME PLANTS.

BY DR. HOOKER, C.B., D.C.L., PRES. R.S.

The following extract is taken from an address to the Department of Zoology and Botany of the British Association. The entire address is of a very interesting character, but too long for the space at disposal. Dr. Hooker first alludes to the carnivorous habits of *Dionæa*, and passing on to the family of *Droseraceæ* in regard to which the same phenomena are observed, next takes up the genus *Sarracenia* or Pitcher-plants, with at least one species of which we are in Canada quite familiair.

The genus *Sarracenia* consists of eight species, all similar in habit, and all natives of the eastern States of North America, where they are found more especially in bogs, and even in places covered with shallow water. Their leaves, which give them a character entirely their own, are pitcher-shaped or trumpet-like, and are collected in tufts springing immediatly from the ground; and they send up at the flowering season one or more slender stems bearing each a solitary flower. This has a singular aspect, due to a great extent to the umbrella-like expansion in which the style terminates; the shape of this, or perhaps the whole flower, caused the first English settlers to give to the plant the name of side-saddle flower.

Sarracenia purpurea is the best known species. About ten years ago it enjoyed an evanescent notoriety from the fact that its root-stock was proposed as a remedy for small-pox. It is found from Newfoundland southward to Florida, and it is fairly hardy under open-air cultivation in the British Isles. At the commencement of the seventeeth century Clusius published a figure of it, from a sketch which found its way to Lisbon thence to Paris. Thirty years later Johnson copied this in his edition of Gerard's Herbal, hoping "that some or other that travel into foreign parts may find this elegant plant, and know it by this small expression, and bring it home with them, so that we may come to a perfecter knowledge thereof." A few years afterwards this wish was gratified. John Tradescant, the younger, found the plant in Virginia, and succeeded in bringing it home alive to England. It was also sent to Paris from Quebec by Dr. Sarrazin, whose memory has been commemorated in the name of the genus by Tournefort.

The first fact which was observed about the pitchers was, that when they grew they contained water. But the next fact which was recorded about them was curiously mythical. Perhaps Morrison who is responsible for it, had no favourable opportunities of studying them, for he declares them to be, what is by no means really the case, intollerant of cultivation ("respuere culturam videntur").

He speaks of the lid, which in all the species is tolerably rigidly fixed, as being furnished, by a special act of providence, with a hinge. This idea was adopted by Linnæus, and somewhat amplified by succeeding writers, who declared that in dry weather the lid closed over the mouth, and checked the loss of water by evaporation. Catesby, in his fine work on the 'Natural History of Carolina,' supposed that these water receptacles might "serve as an asylum or secure retreat for numerous insects, from frogs and other animals which feed on them;"—and others followed Linnæus in regarding the pitchers as reservoirs for birds and other animals, more especially in times of draught (præbet aquam sitientibus aviculis)."

The superficial teleology of the last century was easily satisfied, without looking far for explanations; but is just worth while pausing for a moment to observe that, although Linnæus had no materials for making any real investigation as to the purpose of the pitchers of Sarracenias, he very sagaciously anticipated the modern views as to their affinities. They are now regarded as very near allies of water-lilies—precisely the position which Linnæus assigned to them in his fragmentary attempt at a true natural classification. And besides this he also suggested the analogy which, improbable as it may seem at first sight, has been worked out in detail by Baillon (in apparent ignorance of Linnæus' writings) between the leaves of *Sarracenia* and water-lilies.

Linnæus seems to have supposed that *Sarracenia* was originally aquatic in its habits, that it had Nymphæa-like leaves, and that when it took to a terrestrial life its leaves became hollowed out, to contain the water in which they could no longer float—in fact, he showed himself to be an evolutionist of the true Darwinian type.

Catesby's suggestion was a very infelicitous one. The insects which visit these plants may find in them a retreat, but it is one from which they never return. Linnæus' correspondent, Collinson, remarked in one of his letters, and "many poor insects lose their lives by being drowned in these cisterns of waters;" but William Bartram, son of the botanist, seems to have been the first to have put on record, at the end of the last century, the fact that Sarracenias catch insects and put them to death, in the wholesale way that they do.

Before stopping to consider how this is actually achieved, I will carry the history a little further.

In the two species in which the mouth is unprotected by the lid it could not be doubted that a part, at any rate, of the contained fluid was supplied by rain. But in *Sarracenia variolaris*, in which the lid closes over the mouth, so that rain cannot readily enter it, there is no doubt that a fluid is secreted at the bottom of the pitchers, which probably has a digestive function. William Bartram, in the preface to his travels in 1791, described this fluid, but he was mistaken in

supposing that it acted as a lure. There is a sugary secretion which attracts insects, but this is only found at the upper part of the tube. Bartram must be credited with the suggestion, which he, however, only put forward doubtfully, that the insects were dissolved in the fluid, and then became available for the alimentation of the plants.

Sir J. E. Smith, who published a figure and description of *Sarracenia variolaris*, noticed that it secreted fluid, but was content to suppose that it was merely the gaseous products of the decomposition of insects that subserved the processes of vegetation. In 1829, however, thirty years after Bartram's book, Burnett wrote a paper containing a good many original ideas, expressed in a somewhat quaint fashion, in which he very strongly insisted on the existence of the true digestive process in the case of *Sarracenia*, analogous to that which takes place in the stomach of an animal.

Our knowledge of the habits of *Sarracenia variolaris* is now pretty complete, owing to the observations of two South Carolina physicians. One Dr. M'Bride, made his observations half a century ago, but they had, till quite recently, completely fallen into oblivion. He devoted himself to the task of ascertaining why it was that *Sarracenia variolaris* was visited by flies, and how it was that it captured them. This is what he ascertained :—

"The cause which attracts flies is evidently a viscid substance resembling honey, secreted by or exuding from the internal surface of the tube. From the margin, where it commences, it does not extend lower than one-fourth of an inch. The falling of the insect as soon as it enters the tube, is wholly attributable to the downward or inverted position of the hairs of the internal surface of the leaf. At the bottom of a tube split open the hairs are plainly discernible, pointing downwards; as the eye ranges upward they gradually become shorter and attenuated, till at or just below the surface covered by the bait they are no longer perceptible to the naked eye, nor to the most delicate touch. It is here that the fly cannot take a hold sufficiently strong to support itself, but falls."

Dr. Mellichamp, who is now resident in the district in which Dr. M'Bride made his observations, has added a good many particulars to our knowledge. He first investigated the fluid which is secreted at the bottom of the tubes. He satisfied himself that it was really secreted, and describes it as mucilaginous, but leaving in the mouth a peculiar astringency. He compared the action of this fluid with that of distilled water on pieces of fresh venison, and found that after fifteen hours the fluid had produced most change, and also most smell; he therefore concludes that as the leaves, when stuffed with insects, become most disgusting in odour, we have to do, not with a true digestion but with an accelerated decomposition. Although he did not attribute any true digestive power to the fluids secreted by the pitchers, he found that it had a remark-

able anæsthetic effect upon flies immersed in it. He remarked that "a fly when thrown into water is very apt to escape, as the fluid seems to *run* from its wings," but it never escaped from the *Sarracenia* secretion. About half a minute after being thrown in, the fly became to all appearance dead, though, if removed, it gradually recovered in from half an hour to an hour.

According to Dr. Mellichamp, the sugary lure discovered by Dr. M'Bride at the mouth of the pitchers is not found on either the young ones of the season nor the older ones of the previous year. He found, however, that before May it could be detected without difficulty, and, more wonderful still, that there is a honey-baited pathway leading directly from the ground to the mouth, along the broad wing of the pitcher, up which insects are led to their destruction.

From these narratives it is evident that there are two very different types of pitcher in *Sarracenia*, and an examination of the species shows that there must probably be three. These may be primarily classified into those with the mouth open and lid erect, and which consequently receive the rain water in more or less abundance, and those with the mouth closed by the lid, into which rain can hardly, if at all, find ingress.

To the first of these belongs the well-known *S. purpurea*, with inclined pitchers, and a lid so disposed as to direct all the rain that falls upon it also into the pitcher; also *S. flav. rubra*, and *Drummondii*, all with erect pitchers and vertical lids; of these three the lid in a young state arches over the mouth, and in an old state stands nearly erect, and has the sides so reflected that the rain which falls on its upper surface is guided down the outside of the back of the pitcher, as if to prevent the flooding of the latter.

To the second group belong *S. psittacina* and *S. variolaris*.

The tissues of the internal surfaces of the pitchers are singularly beautiful. They have been described in one species only, the *S. purpurea*, by August Vogt; but from this all the other species which I have examined differ materially. Beginning from the upper part of the pitcher, there are four surfaces, characterized by different tissues, which I shall name and define as follows:

1. An *attractive* surface, occupying the inner surface of the lid, which is covered with an epidermis, stomata, and (in common with the mouth of the pitcher) with minute honey-secreting glands; it is further often more highly colored than any other part of the pitcher, in order to attract insects to the honey.

2. A *conducting* surface, which is opaque, formed of glassy cells, which are produced into deflexed, short, conical, spinous processes. These processes, overlapping like the tiles of a house, form a surface down which an insect slips, and affords no foothold to an insect attempting to crawl up again.

3. A *glandular* surface (seen in *S. purpurea*), which occupies a

considerable portion of the cavity of the pitcher below the conducting surface. It is formed of a layer of epidermis with sinuous cells, and is studded with glands; and being smooth and polished, this too affords no foothold for escaping insects.

4. *A detentive* surface, which occupies the lower part of the pitcher, in some cases for nearly its whole length. It possesses no cuticle, and is studded with deflexed, rigid, glass-like, needle-formed striated hairs, which further conveys towards the axis of the diminishing cavity, so that an insect, if once amongst them, is effectually detained, and its struggles have no other result than to wedge it lower and more firmly in the pitcher.

Now, it is a very curious thing that in *S. purpurea*, which has an open pitcher, so as to receive and retain a maximum of rain, no honey secretion has hitherto been found, nor has any water been seen to be secreted in the pitcher; it is further the only species in which (as stated above) I have found a special glandular surface, and in which no glands occur on the detentive surface. This concurrence of circumstances suggests the possibility of this plant either having no proper secreting of its own, or only giving it off after the pitcher has been filled with rain water.

In *S. flava*, which has open-mouthed pitchers and no special glandular surface, I find glands in the upper portion of the detentive surface, amongst the hairs, but not in the middle or lower part of the same surface. It is proved that *S. flava* secretes fluid, but under what precise conditions I am not aware. I have found none but what may have been accidentally introduced in the few cultivated specimens which I have examined, either in the full-grown state or in the half-grown, when the lid arches over the pitcher. I find the honey in these as described by the American observers, and honey secreting glands on the outer surface of the pitcher, as seen by Vogt in *S. purpurea*.

Of the pitchers with closed mouths, I have examined those of *S. variolaris* only, whose tissues closely resemble those of *S. flava*. That it secretes a fluid noxious to insects there is no doubt, though in the specimens I examined I found none.

There is obviously thus much still to be learned with regard to *Sarracenia*, and I hope that American botanists will apply themselves to this task. It is not probable that three pitchers so differently constructed as those of *S. flava*, *purpurea*, and *variolaris*, and presenting such differences in their tissues, should act similarly. The fact that insects normally decompose in the fluid of all, would suggest the probability that they all feed on the products of decomposition.

It is quite likely that, just as the saccharine exudation only makes its appearance during one particular period in the life of the pitcher so the digestive functions may also be only of short duration. We should be prepared for this from the case of the *Dionœa*,

the leaves of which cease after a time to be fit for absorption, and become less sensitive. It is quite certain that the insects which go on accumulating in the pitchers of *Sarracenias* must be far in excess of its needs for any legitimate process of digestion. They decompose; and various insects, too wary to be entrapped themselves, seem habitually to drop their eggs into the open mouth of the pitchers, to take advantage of the accumulation of food. The old pitchers are consequently found to contain living larvæ and maggots, a sufficient proof that the original properties of the fluid which they secreted must have become exhausted; and Barton tells us that various insectivorous birds slit open the pitchers with their beaks to get at the contents. This was probably the origin of Linnæus' statement that the pitchers supplied birds with water.

The pitchers finally decay, and part, at any rate, of their contents must supply some nutriment to the plant by fertilizing the ground in which it grows.

VARNISH.*

The use of varnish has been known from the earliest historic times. Among the nations of the East, especially in China and Japan, the art of varnishing was at a very early date brought to great perfection. It was also understood by the Egyptians, and the preservation of pictures at Herculaneum and Pompeii in their original freshness and brightness of colors was due to their having been covered by a kind of wax-varnish. In modern times, the more general use of expensive furniture and the increase in the practice of finishing and decorating the interior of dwellings with hard woods has greatly enlarged the annual consumption, so that the amount of its production in the United States alone is to the value of more than four millions of dollars, and there are at least a hundred establishments engaged in its manufacture. In order to meet the special demands of different branches of industry, varnish is made in much greater variety than was the case in ancient times, while the modern spirit of enquiry, aided by the rapidly developed science of chemistry, has brought forward numerous materials, not formerly used for this purpose, very suitable for it.

Varnish is, in almost every case, made by the solution of some resinous substance in a liquid, which will evaporate in the open air, leaving a thin film of the resin deposited on the surface to which the varnish is applied, and covering it with an even coating. A characteristic of a good varnish is that it will remain brilliant after the evaporation of the solvent, and present a dry, hard surface,

*Chemist and Druggist.

rather than a soft, greasy, tarnished one. It should also adhere very closely to the surface to which it is applied, so as not to be liable, even after a long time, to scale off. It should also become as hard as possible without becoming brittle. The chief solvents used are linseed oil, oil of turpentine, and alcohol. The resins are vegetable substances, and exude from trees. The chemical constituents are oxygen, hydrogen, and carbon, and they are supposed to be formed by the oxygenation of essential oils. Those used in making varnish are copal, amber, mastic, sandarac, lac, elemi, dammar, benzoin, anime, and caoutchouc. Gamboge, dragon's blood, aloes, and saffron are used as coloring matters. Copal is obtained from Mexico, India, and Africa. The trees which yield it are the *Rhus copalinum* of Mexico, and the *Eloeocarpus copalifer* of India. In Guinea lumps of it are gathered by the natives from the sands on the coast. Another fossil variety, called Highgate resin, is found in the blue clay near London and on the walls of a trap-dyke at an old lead mine in Northumberland. This last deposit is in flattened drops. Fossil copal has also been found in the East Indies.

Amber is also a fossilised gum, which was furnished by the trees of some former geological epoch. Beds of it are found on the coast of Prussia, near the Baltic Sea, and its collection affords to the Prussian Government an annual revenue of about twenty thousand dollars, giving employment to a large number of persons. The collection is made after a storm, when the swell of the waves is moderate. The men wade out and gather in nets the seaweed which is washed up by the storm, and in which are found pieces of amber of different sizes. In mining for it, the amber-bearing beds are sometimes found as thick as two and a half feet. The largest known piece of amber is in the royal cabinet at Berlin, and weighs eighteen pounds. The value of the pieces is not entirely in proportion to their size, but according to their quality, transparency, clearness, &c.

Mastic is a gum furnished by a shrub growing on the upper shores of the Mediterranean Sea, and known botanically as the *Pistacia lintiscus*. The supply is from the island of Chios.

Sandarac is the product of the *Thuja articulata*, a small coniferous tree growing in the north of Africa.

Lac is a resin which exudes from the twigs and branches of various trees in the East Indies when bitten by an insect called *coccus lacca*, which swarms upon such trees as have a milky juice. When the crude gum is broken from the branches, and is sold with the twigs, without being subjected to any preparation, it is known as stick-lac. When stick lac is broken up and partially treated with water, it is known as seed-lac. When melted and allowed to cool in masses, it is called lump-lac. When melted and strained through cloths and allowed to harden in thin sheets or flakes, it is known as shell-lac or shellac. The best supplies are obtained from Siam, and those next in quality from Assam.

Elemi is a resin which is obtained from a variety of trees in different parts of the world. That which comes from Holland is supposed to be produced from the *Canarium balsamiferum* of the Dutch possessions in Ceylon. Other varieties of this gum come from Manilla, from the Philippine Islands, from Brazil and Mexico. This resin is afforded to commerce in a great variety of shapes, colors, and degrees of consistency, and but little is known as yet, accurately, concerning its production on the trees from which it is obtained.

Dammar or damar is a resin which exudes from various trees in the East India Islands. In China and Bengal it is used for coating the bottoms of boots and similar purposes.

Benzoin is a fragrant resin produced by the *Styrax benzoin*, and is peculiar to Bencoolen, Batak, and Palembang in Sumatra, and Brunai in Borneo. This tree is cultivated for its yield of benzoin.

Anime, a resin which comes from South America, is supposed to be the product of the *Hymenœa courbaril*, a tree native to that continent. This gum is odorous and soft, and its name is said to be derived from the number of insects which it generally contains, and which, having been attracted to it, have become imbedded in it. The *anime* of commerce, however, and that principally used, both in Europe and America, is a variety of copal, the hardest and most expensive in the market, coming from Benguela, on the coast of Africa.

The gum Kauri of New Zealand is known in commerce as one of the copal gums, of which it is the softest and cheapest. It is a product of the *Pinus kauri*, and partakes much of a resinous character.

COUMARINE.*

BY A VILLAGE PHARMACIST.

This fragrant resinous principle is very widely diffused in the vegetable kingdom. Unlike most others, it is not confined to any particular species, or even to any special natural family. In the form of vapour it rapidly diffuses itself through the atmosphere, and in this state has a powerful effect upon the brain of many persons. It is supposed, not without good foundation, to be the chief cause of hay fever. It occurs abundantly in two of our common British plants, viz., *Anthoxanthum odoratum*, a graminaceous species, and *Melilotus officinalis*, a leguminous plant. The first-named is a grass abundant in most pasture fields, and the chief ingredient in hay. When the hay grass is drying in the meadows it gives out a peculiar fragrance, well-known as the scent of new-mown hay. The theory

*From the Chemist and Druggist.

is that it is this odour which causes the dreaded hay fever. I have noticed in wet or damp seasons the hay fever is almost unknown, but makes its appearance most commonly in dry hot weather, when the coumarine, is readily taken up by the hot surrounding atmosphere. I have also observed that if a large bundle of the melilot is taken into a dwelling house and allowed to dry, as it is sometimes in the house of our village herbalists, it will cause some of the inmates to be prostrated by what is supposed to be a mild form of influenza, but which is in reality the hay fever.

As stated above, coumarine is found in many plants, and, strange to say, most of the species in which it occurrs are very peculiar plants, unlike others of the same natural order. Thus, the *Anthoxanthum odoratum*, which is now placed amongst the Graminæ, is different from all other known British grasses in that it is diandrous ; all our other grasses are triandrous. Linnæus placed it with the "Diandria trygynia." Coumarine also occurs in the tonquin bean (*Dipterix odorata*), which is a large tree of Cayenne, belonging to the Leguminosæ, but differing widely from all the plants of this large family by having a drupaceous fruit, the calyx two-lipped, the upper lip consisting of two large lobes spreading like wings, the stamens united in a sheath, split on the upper side. The Faham tea plant of the Mauritius (*Angræcum fragrans*), an orchidaceous plant, yields coumarine, and here again the flowers are of an extraordinary shape. The sweet-scented woodruffe (*Asperula odorata*) is another source. This plant belongs to the Rubiaceæ, but differs from many of the allied species in not having rough or spiney leaves and stems. Its fragrant perfume often leads village people to dry the sweet-scented woodruffe, and to place some with their Sunday clothes. Formerly it was used to scent tea.

We therefore find coumarine in the following natural orders :—Rubiacæ, Orchidaceæ, Graminæ, and Leguminosæ. It is interesting to observe that the same odorous principle which has secured such sentimental fame for our hay-fields is employed to scent snuff, give the agreeable odour to sachets, and to flavour tea and cheese, though each time extracted from a different species. Snuff is scented by powdered tonquin beans ; and the celebrated Switz cheese or Schabzieger cheese is flavoured with coumarine, imparted by the blue melilot (*Melilotus cœrulea*). Other kinds of cheese are also flavoured with the melilot.

Coumarine, or the camphor or stearoptene of the tonquin bean, is a concrete essence, the formula $C_{18}H_6O_4$. By the addition of potash it is changed into cumaric acid ($C_{18}H_7O_8HO$) ; this afterwards changes into salicylic acid ($C_{14}H_5O_4$). By using hot nitric acid it is converted into nitro-picric acid ; on the other hand, if pure cold nitric acid be employed, a white crystalline solid is produced, represented by the formula, $C_{18}\left\{\begin{matrix}H_5\\NO_4\end{matrix}\right\}O_4$. Yellow crystals are pro-

duced by a combination with chloride of antimony, and make a pretty polariscopic object. The most interesting chemical compound formed with coumarine is salicylic acid.

Coumarine is increasing in favour as a perfume, and will become exceedingly valuable as a commercial product. At present the chief source is the tonquin bean. The finest quality of the bean can be purchased for about three shillings per pound ; it might therefore, be profitable for a chemist to endeavor to produce it from one of our native species. The *Anthoxanthum* would yield it quite as pure as the tonquin bean, and, so far as the perfumer is concerned, it can be used in the raw state to make the spirituous perfume commonly known as " new-mown hay " just as well as from the bean. Our homœopathic friends are preparing tinctures, pilules, and globules from the dried flower heads, of course first prepared as a strong tincture with alcohol.

I believe, however, the *Melilotus officinalis* would yield coumarine in a much purer form than even the sweet vernal grass, although not in as large quantity. Considered from any standpoint, it is worth a trial, for any quantity of the dried herbs could be procured at a very cheap rate.

IODINE.

South America has become a competitor for the sale of this article, and the effect it has had in the price is great. In 1871 it sold at 25d per ounce but now it is quoted at 7d. The European producers will not be outdone however, but intend " working " the Peruvian competitors in such a manner that they must either join in a new arrangement or be shut out of the market altogether. Just how they can force the Peruvians to accept their terms, unless they wish to, is not quite plain.

The Iodine produced by them is very good and quite satisfactory, averaging 97½ per cent. prime, the rest water and free from lead ; moreover, it is equal to the Scotch. At present there are some difficulties experienced in resubliming, but that it will be mastered when new machinery is put in operation, which will be done in time. Large quantities come from the Nitrate of Soda districts ; and is put up in packages of 100 lbs. Spanish, subject to an export duty of 30 soles per quintal—or $1.—*Drug Bulletin.*

A CHEAP AND CONVENIENT GALVANIC BATTERY, ADAPTED FOR WEAK BUT CONTINUOUS CURRENTS.*

BY W. SYMONS, F.C.S.

For the experiments referred to in a previous paper a battery was thus constructed. Zinc plates are cut out of ordinary rolled zinc two inches square, with a narrow projection at top of three-fourths of an inch. Doubled round each side of these plates, and fastened with thread, are half-inch strips of fustian, or other stout cloth. Copper wire No. 20 or 24 is wound tight round each plate at intervals of one-eighth of an inch, leaving one and a quarter inch of wire free at the top. The fustian keeps the wire from touching the zinc. A series of ten of these plates, with blocks of wood about an inch thick between each pair, are tied tight together, and the projecting copper wire of each soldered to the next zinc, the terminal zinc and copper having each a wire projecting eight or ten inches. A thin strip of dry deal, of a suitable length, and about an inch and a quarter wide, has nailed round it narrow strips of deal a quarter of an inch square, so as to make a shallow tray. Into this tray is melted a mixture of shellac and resin. While this is still soft the ten pairs of plates, tied together with the blocks of wood, are turned upon it, so that the soldered joints are buried in the resin. In a minute or two the resin is hard, the blocks of wood can be removed, and the ten pairs of plates will be firmly fixed in the wooden tray, the terminal wires being passed through it.

The cells are made of extra stout tinfoil, or thin sheet lead, about three inches long, two and a half inches deep, and five-eighths of an inch wide, double folding the joint at the side, and also at the bottom, after neatly folding in the sides. The top sides of the cells are doubled back over thin strips of wood, about three and a half inches long. These metal cells can be more easily made on a wooden mould than paper ones, and when dipped into a mixture of melted wax and paraffin are impervious to liquids.

These cells are supported and effectually isolated by the projecting slips of wood resting on varnished strips of wood, placed across a box. Forty pairs of such cells may thus be placed in a deal box, 13 inches by 11 inches, and can be easily arranged by binding screws into a series of 10, 20, or 40 pairs, according to the requirements for quantity or intensity.

The liquid used has been one ounce of common salt in 25oz. of water, and by occasionally replenishing the cells with a liquid of half this strength a nearly uniform current may be kept up for weeks

* Paper read before the British Association at Belfast, September, 1874, and published in the Pharm. Jour. and Trans.

or months. But as there is a gradual accumulation of an insoluble salt, I have more recently tried a dilute solution of zinc chloride.

From 20 to 40 pairs of this battery have been sufficient for the experiment described; but as they can be so easily constructed, and when placed in a series of boxes occupy so little space, any experimentalist may soon furnish himself with a series of some hundreds, to serve as a water battery. Of course, when the zinc plates are worn out, the trays and wires can be used again with fresh plates.

Barnstaple, July 27, 1874.

ON THE MANUFACTURE OF BUTYRIC ACID AND BUTYRIC ETHER.*

The manufacture of butyric ether to be used in the preparation of artificial flavors and liquors has become, in some places, quite an important industry. The best and cheapest method of preparing it, says *Neue Deutsche Gewerbezeitung*, is the following: Large wooden vats, so arranged that they can be conveniently stirred with mashers, are placed in a room where the temperature can be kept nearly constant at 100° to 110° Fahr. Into each vat are placed 100 parts, by weight, of grape sugar, 25 parts of St. John's bread (fruit of carob tree (*Ceratonia siliqua*) broken up in pieces, and 50 parts purified chalk, and the vat filled about one-third full of water. After a little while fermentation begins, gas is evolved, the mass foams up strongly, and in a few weeks it forms a consistent magma. If the fermentation does not begin soon it is well to add some old cheese. The water that evaporates must be replaced daily by lukewarm water. After a few weeks—with 100 pounds of sugar five to six weeks—the magna becomes thinner and the formation of butyrate of lime begins. It is now necessary to add a certain quantity of chalk daily, to neutralize the excess of acid. In four weeks more, during which time it is necessary to add about 20 pounds of chalk, the sugar is entirely decomposed and butyrate of lime formed, part of which is in solution and part crystallized out. The whole mass can now be evaporated carefully and the acid prepared in the usual manner, or converted directly into butyric ether; 100 pounds of grape sugar will make 24 pounds butyric ether.

*Jour. of App. Chem.

CAMPHOR ICE.*

BY T. J. COVELL.

Ice. Table showing various formulas for the preparation of Camphor (The proportions are given in parts by weight :)

INGREDIENTS.	1	2	3	4	5	6	7	8	9	10	11	12	13
Ol. Amygd. Exp	16						8	8					
" " Ess													
" Lavand, flor				¼	½								
" Verbena						¼							
" Citronella						¼							
" Ricini		12											
" Olivæ			12										
" Rosmarini	⅛												
" Myrciæ									½	½		¼	
Aqua Rosæ	16												
Cera Alba	1	8	3	4	8	16	4		18	18	20	11	20
Cetaceum	1	6	12			8	3	1		8	10		10
Camphora	2	2	6	2	4	4	3	1	8	6	6	5	6
Sevum									36			22	
Sevum Benz				16	16								
Adeps						24							
Stearin com										24	24		24
Glycerin			1										

No. 1 is an English Formula, and gives a variety of Cold Cream; No 2 is a Formula used by a Cincinnati Pharmacy; No. 3 is a modification of No. 2, by the addition of Glycerin; No. 4 is in use in Philadelphia, Pa.; No. 5 is an English Formula; No. 6 is from a Broadway, New York, Pharmacy; No. 7 is of French origin; of No. 8 the pedigree is lost; No. 9 to 13 are Formulas of the writer, and have been extensively used for both wholesale and retail trade, and will give excellent results, with perfectly sweet materials. The perfume is not arbitrary but can be mixed to suit one's taste, but do not consider it economy to use Ol. Mirbane, for it will ruin any of the formulas.

The manipulation is easy to be understood; in the first and third formulas it is similar to that of the Cold Cream of the Pharmacopœia; in all the others, the wax is to be melted first, then the cetaceum and lard, then the camphor, and finally, when sufficiently cooled, the essential oils, and then cast into suitable moulds.

*From the Pharmacist.

LIQUOR OPII SEDATIVUS.

BY P. WELLS.

Since the institution of the Pharmaceutical Society, papers have from time to time appeared in the *Journal* respecting the mode of manufacture and the composition of this valuable preparation, but I have failed to note that anyone has expressed any belief in the statement of the inventor, the late Mr Richard Battley, that it was composed of opium and water. Relying on the accuracy of the statement in question, I turned my attention to the preparation of liquor opii sed. about thirty-three years ago, and at intervals since that time I have manufactured it, with a uniform result, and I now detail the process: I select twelve ounces of the finest Turkey opium, sufficiently dry to be reduced to moderately coarse powder, and this I mix intimately with a proper quantity of clean sand. Before percolation was so well understood as it is now, I thoroughly exhausted the opium with successive portions of water, but of late years I have used the percolator, and have passed water through until it came out nearly colorless. The liquors are mixed, and, after standing a few hours to deposit, are strained off and evaporated over a naked fire in an enamelled pan, by rather rapid ebullition, to about three imperial quarts. This is allowed to stand in an open jar or any other vessel for fully twelve hours, and then carefully strained through flannel to separate the resin and flocculent matter, and then boiled down to three pints. After standing for twelve hours in a cool place, it is now filtered through paper, and fourteen ounces of rectified spirit, 60 o. p., added and made up to four imperial pints with distilled water. Sometimes I have used six ounces of fine dry sherry instead of the water necessary to make up the quantity to four pints. In about a week the preparation assumes the taste and smell peculiar to liquor opii sedativus.—*From the Phar. Journal and Trans.*

FRENCH PHARMACEUTICAL WORTHIES.*

In opening his course of lectures on pharmacy at the Montpellier School recently, Professor Soubeiran gave a brief historical sketch of the chief ornaments of the profession which France has produced during the past three centuries.

When, in the thirteenth and succeeding centuries, the medical practitioners began to divide their labors and take their respective ranks in society, the apothecary was relegated to a very humble position, and treated with but scanty respect by his superiors in the

* From the Chemist & Druggist.

art of healing. As a body the apothecaries were mere traders, and scarcely distinguishable from the grocers by the population generally. But they held a high estimate of their own importance, or we should rather say of the importance of their office, and though incorporated with the "épiciers," as they were contemporaneously in England with the "spicerers," they had very strict ordinances respecting apprenticeship and examination. An old French writer (Monteils) claims that King Mithridates and various other royal personages had been apothecaries, and he added proudly that though the king could make of whomsoever he would a count, a duke, or a marshal of France, he could make an apothecary of no man who had not passed through the necessary term of apprenticeship and study. Dr. Soubeiran tells us that at that period the titles of pharmacien and pharmacopole were in use, but only as derisive or burlesque expressions. This is at any rate an illustration of the insignificance of the wit which sometimes passes for humor and often wins the applause of the crowd.

Nicolas Houel (1520-85) was the undoubted founder of modern pharmacy in France. Moses Charas (1618-98) was the author of a *Royal Galenical and Chemical Pharmacopœia*, in which, for the first time, medicines were methodically classified. Nicolas Lemery (1645-1715), however, gave a far greater impetus to pharmacy. Born at Rouen, this "most glorious of the apothecaries," as Dr. Soubeiran styles him, went to Montpellier for his technical education. While there he gave evidence of his advanced intellect by commencing some "conferences" among his comrades, which were so successful that the authorities of the school charged him to conduct a course of chemical lectures in the face of the professors from whom he had come to learn. This might be supposed to have been due to the universal incompetency of the professors at that time, but Lemery proved afterwards by his wonderful popularity as a teacher at Paris that he was a real genius in the art. He threw aside the obscure and mystical pretensions which alchemy had rooted into the teaching of every science, and made himself comprehended by everyone who came to hear him. Besides his *Universal Pharmacopœia*, he published a *Course of Chemistry* and a *Dictionary of Drugs*, all of which works became highly popular. Nicolas William Rouelle (1703-70)—why were so many named Nicolas? it might lead some ill-mannered persons to trace the origin of the art to a personage quite other than King Mithridates—was the son of a Normandy peasant, and in later years established private courses in his shop in the Rue Jacob, in Paris. This man was a veritable prophet in the enthusiasm and earnestness with which he taught the sciences connected with the profession. His ardor and originality of thought communicated itself to his pupils, and if he had accomplished nothing else he would have done enough for fame by implanting some of his spirit into the mind of Lavoisier, who, among others that after-

wards rose to eminence, was proved to have been among the scholars of Rouelle.

Among the pioneers of the science, Dr. Soubeiran also justly includes the name of "an obscure French apothecary"—Brun, of Bergerac—who observed that lead and tin increased in weight by calcination, and a friend of his, Jean Rey, of Bugne, in studying the phenomenon, was led to the belief that this increase of weight might be due to the fixation of air on the metal. This was before the genius of Lavoisier made exactly similar observations serve as the point of departure for modern chemistry.

It would be a commonplace to show how experimental science, like every other department of human thought and action, awoke to a new life about the epoch of the French Revolution, and it would be outside of our purpose and beyond the limits of our space to trace the progress of French pharmacy since that period. But is it universally known how the glory and the very realm of France itself is indebted to the genius of a pharmaceutist? Vanquelin commenced life as a laboratory boy, and came to Paris with six francs as the sum of his worldly wealth; but his patient labors won him fame, and his fame won for him the distinguished honor of being selected by the revolutionary government, at the time when all Europe had coalesced to crush the new republic. He received the notable order, "Pars, fais-nous de salpêtre, on marche au supplice—Go and make us saltpetre or die." Vanquelin knew that his masters were in grim earnest, so he went into the provinces and made saltpetre. In our day we talk of prizes stimulating energy. The Directory, to use a vulgar phrase, knew a trick worth two of that. Did any of those fraternal rulers remember how their predecessors had told Lavoisier, when, sentenced to death, he had asked for a fortnight longer to live, "in order to finish some experiments," that they wanted his head, not his experiments!

In the early part of this century French pharmaciens were the chief investigators in the field of pharmaceutical research. Derosne extracted narcotine and morphine from opium; Pelletier and Caventon discovered strychnine, brucine, quinine, and emetine. Robiquet, Labarraque, Boullay (to whom we are indebted for the process of percolation), and many others, were all trained as pharmaciens; and a French professor, inheriting the honored name of Soubeiran, may almost be excused if in tracing the development of pharmacy he leads his pupils to believe that their ancestors have almost alone borne the heat and burden of the day.

TOOTH BRUSHES AND TOOTH POWDERS.*

We take the following remarks from an article on "Dental Pathology" in the *Dental Cosmos*, written by Dr. Foster Flagg, of Philadelphia. He is referring to dental caries, the treatment of which he says is rationally based upon the reasonably thorough appreciation which we have of its causes and method of progress.

Cleanliness is well known to be exceedingly desirable in this direction, not only from the standpoint of comfort to oneself, but, as well, for the obtaining of a greater degree of acceptability to those with whom we are brought in contact. The improved appearance of the denture, the improved odour of breath, the absence, or at least diminution, of general or local dental sensibility, are all arguments in favor of this preventive of decay, even were it not notably an absolute necessity, as a general rule, for the preservation of the teeth; but my observation has led me to think that enlightened nations do not possess in their ordinary use (or perhaps I should say *abuse*) of the tooth brush nearly so good a means for arriving at this result as, possibly the rubbing-sticks, and other means of dental cleanliness, which are adopted by nations which we classify as merely civilized, or rank even so low as savage.

This conclusion has been reached as year by year I have had brought to my notice dentures the appearance of which, together with the excellent condition of surrounding gum-tissue, having called forth my admiration, I have been astonished (much more so formerly than recently) to find upon questioning, that it would be hesitatingly and apologetically admitted that the teeth *were never brushed*, and that the only cleansing was a good rinsing after meals.

On the other hand, I have had scores of exquisitely sensitive, semi-denuded, discoloured, and decaying dentures brought to me with the self-gratulatory information that the existing unfortunate condition was not due to want of care, for the teeth and gums had been thoroughly brushed five times daily for many years, and with the best and stiffest brushes that could be obtained.

I could only draw the two inferences, that in the first class of cases good healthy conditions had been maintained with but trifling attention to cleanliness; and, in the second class of cases, that injudicious excess had so woefully overstepped the bounds of necessity as to have produced a very great degree of harm.

That the proper use of judiciously-selected tooth brushes is attended with most satisfactory results is indisputable; but, as I have intimated, I have come seriously to question as to whether more harm than good is not obtained from the manner in which they are generally employed.

The brush should be selected for its moderate softness, and by

* Chemist & Druggist.

no means for its stiffness; it should have rounded edges, both of bristles and handle, that neither may wound the gums; the length of time for each brushing of the teeth should never exceed from ten to twenty seconds (by the watch); the water used should never be so cold as to cause the least uneasiness to the teeth, and the articulating faces of the teeth should be even more carefully brushed than the labial or buccal. Twice, or at most, thrice brushing daily, is as often as any dentures will permit, and great caution in regard to brushing the gums from off the necks and even roots of the teeth will have to be exercised if more than one brushing daily is indulged in.

Tooth powders, containing insoluble ingredients, such as ground barks and especially pulverized charcoal, do nothing toward preventing decay of the teeth, and are eminently injurious by their insinuation under the margin of the gums.

For very many years it has been noticed that the use of soap as an adjunct in cleansing the teeth has proved very efficacious in the prevention of decay; this is believed to have been particularly due to the alkaline reaction of certain kinds of soap formerly used, such as mottled Castile, for example; but of late years to this has been added the equally great, and possibly greater, efficacy of some of the most noted antiseptics, such as creosote, carbolic acid, &c., which, conjoined to saponaceous compounds, have wrought wonders in the retardation, and arrestation, of caries.

Together with these, or any soaps, it is advisable to use some frictional powder, gentle or harsher, according to requirements; with some the addittion of precipitated chalk is all-sufficient to prevent the tendency to yellowish discolouration which is apt to accompany the frequent use of soap alone; but again, in other instances, it is found necessary to employ powered cuttle-fish bone, or even finely pulverized (levigated) pumice stone.

It has often been suggested that materials of so sharp a grit as the last-mentioned article should be used with great caution, for fear of injury to the enamel, but my experience has led me to believe this fear entirely unfounded, as many of my patients have employed it for years, with no other result than the maintenance of freedom from the unsightly green deposit which collects so rapidly upon some teeth.

When, from testing the contents of cavities of decay and the fluids of the mouth with litmus paper, an acid condition is pronounced, great benefit will be derived from the addition of a few drops of ammonia, or a grain or two of bicarbonate of soda, to the water used for brushing the teeth, or lime water may be easily made by pulverising a piece of quicklime about the size of a walnut, and putting it into a pint bottle; add to it water, shake, allow it to settle and it is ready for use. When nearly used, fill the bottle again with water, and with the same treatment as before it is again ready. Thus lime water for a life-time may easily be had.

If more than this seems indicated, I next add to the above the directions for the topical employment of precipitated chalk. This it is most advantageous to use at night, just before going to bed. It is to be used in small quantity by dipping the end of a finger in chalk, and thus conveying from three to five grains of the powder to the interstices of the lower buccal teeth.

It is then gently rubbed into these and *allowed to remain:* so little as to be unnoticed by the senses of touch and taste, and yet enough to do great good in the desired direction.

With ordinary care, and particularly with the use of soap, the morning brushing destroys most of the power for harm pertaining to all the putrescing food and mucus, and all the fungiferous growth of the previous night; the mastication and concomitant outpouring of saliva at the morning meal completes the work of protection for the time, and although the remaining food which is left in cavities, crevices, and interstices would in time become productive of caries, yet the allowed time is insufficient for the accomplishment of much injury before the mastication and insalivation of the noon-tide food repeats the dis-lodgment of the spoiling remains, and thus again protects the denture; again, at the evening meal the same result ensues, to which is frequently added that brushing of the teeth which forms part of the preparation for the evening. Thus it is that the teeth pass through the day and early part of the night without much progress of caries; but after retiring, the remaining particles of acidifying food, the inspissating mucus, the developing fungi, all combine to make the *hours toward morning pre-eminently the period of decay* Then it is that the chalk placed between the teeth late at night, and *allowed to remain there*, comes to the rescue, and by its antacid reaction prevents, in great degree, both disintegration dependent upon acidity and parasitic growth.

In connection with these local measures, we prescribe for the good of the teeth just that which will be productive of greatest general good—gentle or powerful tonic medication, according to systemic indications, alkaline, neutral, or (as I have before intimated) powerfully acid, as may be required: good, nutritious food; above all, *rest*, both physical and mental: and the almost immediate response to treatment such as this will be alike surprising and gratifying. For a time, somewhat frequent examinations as to progress should be instituted, and the patient's attention be directed to the changes which will soon be present. The ceasing of appearance of new cavities of decay should be remarked; the absence of sensitiveness of teeth, generally and locally, should be commented upon; the unchanged condition of edges of cavites containing fillings should be pointed out, as contradistinctive to the previous early crevicing: and the continuance—the persevering continuance—of effort upon the part of the patient be faithfully and earnestly urged; and, *if doubt* as to the connection between treatment and result is even

slightly intimated; permit the cessation of effort for a few months, and the probability will be that the expense attendant upon the introduction of a few new fillings, and the reparation of several old ones, will fully and finally convince both patient and practitioner that upon mutual effort depends success, and that by natural effort everything will be gained.

PRESERVATIVE EFFECT OF CHLOROFORM UPON VEGETABLE INFUSIONS, ETC.*

BY J. B. BARNES, F. C. S.

Early in the course of the present year, Dr. George Pritchard, of Greenstreet, Kent, communicated to me the fact that he had found, by the addition of chloroform to vegetable infusions, they were preserved for a considerable time.

This appears a subject to which some interest is attached; therefore I have brought it before the meeting, together with the result of some experiments, which I have made to ascertain the minimum quantity of chloroform, necessary to effect the preservation of infusions and some other substances.

On the fourteenth of last month two sets of infusions of calumba, chiretta, malt, senna, and roses, were prepared; each set was marked No. 1, and No. 2, respectively. To eight fluid ounces of No. 1 of each sort were added five minims of chloroform, and to the same quantity of No. 2 three minims; they were well agitated, set aside, and examined from time to time. Those of calumba, chiretta, malt, and senna, when fresh, were tested with litmus paper; they were decidedly acid, and it does not appear that the acidity has increased. All marked No. 1 are as good now after six weeks as they were when new; they are clear, retain their natural odour, and do not appear to have changed in the least. Of those marked No. 2 the infusion of malt after four days had lost its agreeable odour, was turbid, and frothed considerably when agitated. After a fortnight those of calumba, chiretta, and senna, showed signs of change; they had lost their good odour, were no longer bright, and quite unfit for use, the infusion of roses alone of this set remaining good. The result is that infusions of calumba, chiretta, malt, and senna will keep good for a reasonable time by adding *five* minims of chloroform to every eight fluid ounces; and *three* minims will suffice to preserve the same quantity of infusion of roses. I have no doubt that infusions of other substances, may be preserved by

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, December 2, 1874, and published in the Pharm. Jour. & Trans., 3rd series No. 232.

the addition of chloroform in the same proportion. It will be easy to add chloroform to concentrated infusions, so that when diluted, each sixteen ounces may contain *ten* minims of chloroform. There are upon the table two samples of mucilage of acacia, marked No. 1 and No. 2; No. 1 contains chloroform in the proportion of *one* minim to the fluid ounce, and No. 2 to *two* minims; they were prepared six weeks ago, and both appear to be as fresh now as they were the day they were made.

At the same time *four* minims of chloroform were added to four fluid ounces of mucilage of tragacanth, well agitated and set aside, together with some of the same mucilage without chloroform, which, when tested immediately after it was prepared, proved neutral to litmus paper. These samples were again tested a few days since, and that containing chloroform was still neutral, whilst the other had become strongly acid, and quite unfit for use.

Having been successful so far, I thought it probable that by adding chloroform in the proportion of *four* minims to the pint, elder, orange, and rose water might be prevented from throwing down the flocculent precipitate which so commonly occurs in them, but it is not so; probably it might be if added to recently prepared water. Of course in this case the delicate odours must not be overcome by the addition of too much chloroform.

The question now arises, how does chloroform effect the preservation of infusions and mucilage of acacia and tragacanth? In my opinion it preserves them by its action on the fermentable substance held in solution, and this is strengthened by the property it possesses of preventing alcoholic fermentation. About three weeks ago I mixed two fluid drachms of yeast with three separate sixteen ounces of fresh infusion of malt, which had cooled; they were marked Nos. 1, 2, and 3. To No. 1 were added *twenty* minims, and to No. 2 *ten* minims of chloroform; no chloroform was added to No. 3. They were set aside in a warm place; after a while fermentation set up in No. 2 and 3, with the formation of alcohol, but No. 1 remains to this day unfermented.

Not only is the alcoholic fermentation prevented by chloroform, but when added in sufficient quantity to fresh milk, the lactic fermentation is also prevented. To two eight fluid ounces of fresh milk were added respectively *ten* and *twenty* minims of chloroform; they were kept in a warm place, and occasionally agitated; after five days had elapsed that containing *ten* minims had developed lactic acid in quantity sufficient to separate the caseine, whilst that containing *twenty* remained fresh and good. It might be found convenient to preserve milk in this manner, always taking care to boil it just before using, in order to drive off the chloroform.

It is very probable that solutions of acetate and citrate of ammonia, citric acid, lemon juice, and many other organic substances may be preserved by chloroform.

About seven years ago Dr. Pritchard informed me that he was then using chloroform water in his mixtures, much to his own satisfaction and that of his patients.

ON THE LOCAL USE OF TANNIN.*

Mr. Thomas writes to the *British Medical Journal*, on concentrated solution of tannin as a styptic. I have used it for some years, as a topical application, in various diseases, though rather as an astringent than a styptic. To prepare it of full strength, an ounce of perfectly fresh tannin must be mixed with six drachms of water, in which it readily dissolves. The solution is a thick fluid, of the color and consistence of treacle, which keeps much better than tannin itself.

Most of the tannic acid found in shops contains a large proportion of gallic acid, and will not yield a very strong solution. But, if an ounce of old tannic acid be mixed with two ounces of water, a tolerably strong solution, which answers for many purposes, may be decanted off after subsidence.

The strong solution of tannin is a most powerful astringent, almost free from irritating properties. It is one of the best dressings for wounds, far superior to collodion, and even less irritating than the styptic colloid, which it somewhat resembles. If applied by a brush and allowed to dry, it soon forms a pellicle which excludes the air, and gives ease to pain. It may be applied to almost any form of ulcer, and to wounds after amputations or other operations, especially when not very deep. It answers well, for instance, after the operation for hare-lip, painted over the pins and threads, in the same way as collodion is sometimes used.

In a female, aged twenty-six, the hair was caught between rollers and the whole scalp removed to within an inch of the left eyebrow, and two inches from the right, round on a level with the tips of the ears to about the external occipital proturbeance, the periosteum being extensively removed at the vertex. There was much suppuration, followed by erysipelas. After three months, exfoliation of bone occurred, and skin-grafting was performed, first with eleven grafts, and, six weeks subsequently, with twenty-one. After varied treatment, antiseptic and other, little progress was made, till nine months after the accident, strong tannin solution was applied. Discharge and fœtor diminished at once, and the healing process went on more quickly than before. Tenderness diminished, and the general health improved rapidly for the first time since the accident.

* Philadelphia Med. and Surg. Jour.

The wound, eighteen months after the accident, was about half its original size, and the discharge trifling. The patient does household work, wears only a thin cap, and is little worse for the accident, generally or locally.

Strong tannin solution applied to the ulcerated skin of ingrowing toe-nail at once removes pain. After one application, the offending corner of the nail may be readily raised, a little lint inserted underneath, and the nail allowed to grow up. Among many cases, I have in this way cured one in which evulsion, twice performed, had proved only a temporary remedy, the disease being reproduced each time the nail grew. For cracked nipples, this solution, diluted with an equal quantity of water, is the best application, and corresponds to the tannin solution commonly used for this purpose.

Enlarged tonsils may be reduced by daily brushing with this solution. This treatment, though vastly inferior to extirpation, or even to the application of potassa cum calce, is painless, and therefore, in some cases, useful.

Bleeding warts may be readily removed by this application, as also by the perchloride of iron. I have found the former to readily reduce the granulations from an unhealed umbilicus in an infant.

CHLOROFORM AS A PRESERVATIVE AGENT IN INFUSIONS.*

BY F. J. BARRETT,

Dispenser at the Wolverhampton and Staffordshire General Hospital.

Nearly four years ago, on commencing my duties at this hospital, I found that the cost of rectified spirit for the preservation of concentrated infusions formed a very serious item of drug expenditure, and at twenty-five per cent, of rectified spirit could scarcely be considered (apart from its preservative action) a necessary or even desirable adjunct to a concentrated infusion, I endeavoured to discover some more economical preservative. After several experiments I hit upon *chloroform*, and found it to answer the required purpose. As I cannot place my hands upon the notes I made at the time, relative to the length of time various infusions kept good with different proportions of chloroform, compared with the same infusions treated with rectified spirit, these remarks will, I fear, be comparatively worthless.

I found subsequently, on exchanging notes with a friend, a

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, December 2, 1874, published in the Pharm. Jour. & Trans.

brother hospital pharmaceutist, that there was one trifling drawback to the importance of this discovery—namely, it had been found out many years before, and was in constant use in more than one hospital. I believe, however, that no record has been published of its use for this purpose, and Mr. J. B. Barnes will doubtless do good service in calling the general attention of chemists to its important preservative properties.

The following is the *modus operandi* adopted in this hospital laboratory :—We prepare a three weeks' supply at once (generally about four gallons of concentrated infusions of quassia, calumba, and gentian, and smaller quanties of others). A Winchester quart (four pints) is first half filled with infusion, then two drachms of chloroform is poured in and well shaken for two or three minutes, then another pint of infusion is added, and again well shaken, and lastly the bottle is filled, stoppered, tied over with leather, and stored in a cool place. In this way we have kept for two months a concentrated infusion, which, upon dilution with water, will remain unchanged as long as an infusion prepared in the ordinary manner. Certainly, there can be no possible objection to chloroform thus used, as one ounce of diluted infusion would only contain one-sixth of chloroform.

In making concentrated infusions containing volatile aromatics, we evaporate a simple infusion of the active ingredient by a steam bath to an eighth part of its bulk, and then infuse the aromatic substances in this till cold.

Besides using chloroform as a preservative in infusions, I have more recently used it combined with glycerine in place of rectified spirit, in the preparation of such fluid extracts as ergot, bael, liquorice, cinchona, greater periwinkle (*Vinca major*), and others. Very satisfactory preparations may be made in this way, which if not quite as elegant in appearance as the Pharmacopœia extracts, are at least much more economical and certainly as active, which, after all, in hospital work are the main points to be considered. We have some ergot extract now in use, which was made in July, and it appears to be quite as good as when first manufactured. I hope shortly to be able to send to the Journal full particulars of the way in which we prepare our liquid extracts.

Doubtless chloroform could be used most advantageously in many preparations in the place of rectified spirit, and it has the advantage when greatly diluted of being exceedingly palatable, so that it would not be objected to by the patient.

Editorial.

THE PROPOSED AMENDMENTS TO THE PHARMACY ACT.

DURING the time which has elapsed since the publication of our last issue we have had an opportunity of learning something of the general feeling regarding the proposed amendments to the Pharmacy Act, and, so far, the measure appears to have met with the unqualified approval of the entire community. Only one alteration has been suggested, and that relates to a typographical error which had crept into the Act as officially printed. With this solitary exception, all the communications we have received have been of the most commendatory character.

While this result must be gratifying to all lovers of progress —and to none more than to the editor of this journal—we must confess that to find so general and so pleasing an unanimity of feeling was more than we had anticipated. The College has still some open enemies, who have strenuously and continuously resisted the present law, and we had thought would have as energetically opposed any further attempt at legislation. This class is, however, represented by a very small number of persons, of still less considerable influence and respectability. Slightly more numerous are those who, while grudgingly complying with the requirements of the law, though enjoying the advantages derived from its protection, have a manifest dislike to its restrictions as applied to themselves, and have little sympathy with any movement which does not give promise of pecuniary and personal gain. These, with the usual proportion of jealous and discontented persons to be found in all communities, make up the class from which a direct opposition was to be expected. None of these parties have so far put in an appearance, but for the satisfaction of any who may be in doubt as to the meaning of, or necessity for any of the proposed amendments we give a short summary of the leading clauses.

The first section of the proposed Act is one which demanded the closest attention of the Legislative Committee, and for its nice adjustment required much consideration and judgment. The ad-

mission of Apprentices and Assistants is not definitely provided for by the present Act, but the necessity of such provision must be apparent to all. If boys who can barely read and write, are permitted to go behind the counter as apprentices, what hope can we have of their ever becoming educated druggists; and of what use are our efforts to improve the *status* of the trade? The same remark applies to assistants, who, if they do not intend to become principals, are not required to have any education beyond that of an ordinary grocer's clerk. Another inconsistency which exists in regard to this matter is, that of allowing unqualified assistants to dispense poisons, while their masters, who from several reasons, are less liable to make mistakes, are obliged to give evidence of adequate qualfication. These difficulties are met by the section in question, and though the proposed conditions of admission may appear stringent when compared with our present loose system, they are not so much so as to be considered "high-flown" or impracticable. There will, however, be time for a reconsideration of this subject which may result in advantageous modifications of this portion of the Act.

The second section defines those persons who are eligible for election for Council. By the present Act any person may be nominated and elected. By the proposed alteration the selection would be confined to members of the College.

The third section provides that the old Council hold office until their successors are elected and this supplies an omission in the old Act which has been the cause of some considerable uncertainty.

Section fourth amends the thirteenth of the existing Act. At present, any person may present himself for examination without showing evidence of having served at all as apprentice or assistant. Candidates have been examined who have only served for a few months, and they were entitled by law to demand such examination. The proposed amendment required three years apprenticeship, and two year's service as assistant. This section would of course only apply to strangers and not to apprentices or assistants registered as such.

Heretofore, a great deal of inconvenience has resulted from the antiquated and utmost unprecedented mode in which examinations have been conducted. This has at length been abolished by By-law, and the necessary changes are made in the fifth section of the Act. The present term of office for examiners has, by custom, been coin-

cident with that of the Council. This period is two years, and, as may well be imagined, is scarcely sufficient for the initiation of an examiner, much less for that experience which is so necessary to an adequate discharge of a difficult duty. At the time of the passing of the Pharmacy Act in Great Britain, this subject was thoroughly discussed in all its bearings, and the conclusion was arrived at that, though an examiner might work too much in one groove, the evil would be immeasurbly less than that incident to frequent changes and inexperienced and inefficient examiners. The period was therefore laid down at six years by the Act of 1868. The proposed amendment would fix the term at five years, or through three Council elections.

The Registrar's duties are more clearly defined by the fifth section, and by this he would be required to recover, if necessary, by course of law, any fees in arrears.

The next section would in effect limit to qualified persons the dispensing of physicians' prescriptions. The necessity of this alteration is apparent, not only on behalf of the public safety, but in the interests of common right and justice.

The eighth section was virtually the cause of the withdrawal of the Act. We have before alluded to this subject, and need not, at this time, do more than point out that the section relates to the repeal of the proviso by which physicians are enabled to keep regular drug stores without being obliged to register. The opposition to the repeal of this clause arose in great part from a misunderstanding, or rather to ignorance of the real state of the case. We have no doubt that when the Act is again brought forward that matters can be amicably arranged with the Council of the College of Physicians and Surgeons.

The ninth section provides for the recognition of the diplomas of several foreign colleges, and persons holding these diplomas would thus be exempted from examination.

In our opinion the tenth section requires a little modification in phraseology, so that it may only be held to apply to persons actually engaged behind the counter.

The three remaining sections relate to the period at which the Act was to come into force; the penalties for contradiction of any of the clauses, and to certain technicalities of purely legal interest.

QUEBEC PHARMACY ACT.

Just at the time of going to press we have received from our Montreal correspondent a hasty note informing us of the passing of a Pharmacy Act for the Province of Quebec. We announce the fact with no small degree of pleasure, for our eastern friends had a hard battle to fight, and one which has required the steady persevering effort of years to win.

The Bill was hastily drafted, and as quickly passed through the House, so that we had not an opportunity of seeing it. We understand, however, that in intent it is similar to our Pharmacy Act taken with the proposed amendments. Apprentices are obliged to pass a preliminary examination before the regular term of their indentures commences. When they have served for *at least* three years they go up for the minor examination, and, if successful, obtain certificates as Certified Clerks. Before commencing business as principals, the ordeal of the major examination must be gone through and a license must be obtained, as is at present the case in Ontario. Pharmaceutical chemists are styled Licentiates in Pharmacy. Druggists in business at the time of the passing of the Act, must submit evidence of the fact and will then be entered on the Register. Druggists are not allowed to employ clerks or assistants who have not been certified, or apprentices who have not passed the "Preliminary." A heavy penalty is attached to this clause. Next month we shall give the complete text of the Bill.

Editorial Summary.

PHARMACY IN DENMARK.—Mr. Hans M. Wilder contributes to the *American Journal of Pharmacy* a most interesting account of the past and present state of Pharmacy in Denmark. From this it appears that even so far back as two hundred years ago, Pharmacists were very severely restricted, though very carefully protected by the law; Pharmacies were regularly inspected at least once a year, and quality as well as price were inquired into. Poisons had to be kept under lock and key, in a separate compartment. None but qualified persons might keep Pharmacies, and every apothecary had

to keep one qualified assistant. The proper training of apprentices was enjoined, and a regular time was allotted for this purpose by employers. Counter prescribing was directly forbidden, and, on the other hand, Physicians were not allowed to keep, or have part in a pharmacy. All preparations were required to be of the pharmacists' own manufacture. The due qualification of assistants and principals is, at present, very carefully looked after. The progress of the student is thus traced out.

The apprentice must be at least fifteen years of age, and have left high-school from one of the two upper forms. If the latter be not the case, he has to pass a preliminary examination to show that he possesses a fair school education, and is proficient in Latin. He has to serve four years before he is permitted to take his first degree. At this examination he is required to translate portions of the Pharmacopœia, recognize drugs, read abbreviated prescriptions, put up prescriptions, make one of the easier preparations, and show a fair knowledge of practical chemistry, poison laws and doses, and of indigenous medical botany. If successful, he is declared *assistant*, and as such has a right to put up prescriptions on his own responsibility, but is not allowed to take charge of a store for a longer period than twenty-four hours. After further serving for a couple of years, or after attending two courses of lectures at the University, he may take his last degree, which makes him a *graduate*, and gives him equal standing with the apothecary (minus the ownership of a store). This last examination requires him to make an official chemical preparation, one or more tests, and a qualitative analysis (of any mechanical mixture), on each of which he has to write a report. Said preparations and analysis are made, and reports written on three consecutive days within twelve hours each day, during which time he is not allowed to talk to anybody, or leave the room before his task is finished, nor are text-books allowed. Then comes the theorectical part, which is conducted orally, and consists of questions in practical pharmacy, theoretical and practical chemistry, natural philosophy, botany, pharmacology. There are three degrees of qualification according to the number of points made: *Laudabilis*, *haud-illaudabilis* and *non contemnendus* (praiseworthy, not unpraiseworthy, not to be despised); graduates with the last degree generally try to make the examination over again. For exceptional proficiency in all branches there exists a fourth degree: *Laudabilis præ ceteris* (praiseworthy above all others). There is one peculiarity, which obtains in putting up prescriptions, viz., that every prescriptionist must put his name on the label every time a prescription is put up; in case of mistakes, it is at once traced to the guilty party.

KOUMIS.—In the *Pharmaceutical Journal and Transactions* is reproduced the letter of a *Daily News* correspondent, who, writing from Samara, gives a most interesting account of Koumis and its manner of preparation. The letter is too long for the space at our disposal, so we must be content with a summary of the main points of interest. Koumis, as our readers are doubtless aware, is a beverage which has for a long time been used by certain Tartar tribes. It has been reported as combining the nourishing properties of milk, with the invigorating qualities of alcohol, and it has been observed that consumption, and its cognate disorders, were unknown among the tribes who habitually drank Koumis. Starting from this observation, several Russian physicians—notably Dr. Portnikoff, of Samara,—conceived the idea that this barbaric compound might possess valuable medical properties, which might be turned to good account. Experiments were made on consumptive patients, and the result was highly satisfactory. So much so, that the doctor above named, decided upon establishing a hospital at Samara, where the afflicted might resort, and Koumis of the first water might be enjoyed to an unlimited extent. Samara is about three hundred miles nearer civilization than Orenburg, the chief centre of the Koumis country, and is therefore comparatively approachable. Dr. Portnikoff's hospital has grown into a small colony, and the success attending the experiment has induced other persons to engage in similar undertakings. A Koumis establishment is now to be found in the neighbourhood of Moscow; another near St. Petersburg; and a third at Wiesbaden. Koumis is prepared from the milk of Tartar mares, fermented by a peculiar process. In most cases the fermentation is set up by the addition of a portion of milk which has undergone this stage, but yeast is sometimes used. The mixture is allowed to stand for some time, and is then subjected to churning, but this operation is not continued until butter or curds are formed. A portion of the contents of the churn is drawn off and constitutes a weak variety of Koumis. The balance is subjected to further fermentation and churning, and the result is a liquor containing much carbonic acid gas, and some alcohol. The Koumis is secured in strong quart bottles, tied over after the manner of champagne. Of this liquid some patients consume six or eight bottles a day, while others subsist entirely on it. In the early stages of consumption a beneficial change often results: in the advanced stage little benefit is derived. Lingering cases of recovery from wasting illness appear to be most benefitted. About one point there appears to be considerable uncertainty; that is as to what constitutes the peculiar virtues of Koumis. Some affirm that *Tartar* mares are an essential; some insist on the peculiar pasturage—covil, *Stipa pennata*—upon which the animals feed; while others say that the method of preparation is the main part. Of the latter class is Dr. Yagielski, an authority on Koumis, who not only goes so far as to deny the indis-

pensableness of Tartar mares, but ignores mare's milk altogether, giving the preference to that of the domestic cow. This is by far the most accomodating view of the case, and is at least as reasonable as any of the others.

PHOSPHORATED OIL.—At a meeting of the British Pharmaceutical Society (reported in the *Pharm. Jour. & Trans.*) a paper on the Pharmacy of Amorphous Phosphorus was read by one of the members present, and gave rise to an interesting discussion, which ultimately turned on the new officinal preparations of phosphorus. Professor Redwood gave his experience of these compounds, and had found the phosphorated oil a very satisfactory article. He had kept the solution for many months, and if not exposed to the light it kept perfectly well. It was luminous in the dark, it smelt strongly of phosphorus, and it had the ordinary disagreeable taste. A few drops formed a dose, and the only question was how it should be administered. He recommended it as an emulsion, and a most perfect, elegant, and agreeable emulsion it formed; a tablespoonful of it could be taken without disgust, it would keep for any reasonable length of time, and it perfectly fulfilled all the requirements of a medicine It was made by taking a drachm of the phosphorated oil, two drachms of yolk of egg, six drachms of syrup of tolu, a drachm of Liquor potassæ, and sufficient chloroform water to make up to six ounces. There was no doubt a little art in mixing it, because if the yolk of egg and phosphorated oil were mixed together, and the Liquor potassæ put in, it formed a magma, to which the chloroform water and syrup could not be afterwards added with advantange; but if the phosphorated oil, the yolk of egg, the syrup of tolu, and the chloroform water were well rubbed together, and then the Liquor pottassæ added and well shaken up, a good emulsion would be produced which would keep for several months. It had an agreeable taste, the odour was nothing offensive, and no decomposition took place. Of course, if ordinary water were used, the yolk of egg would undergo decomposition and become offensive; but the chloroform water had the remarkable property of preventing such decomposition, and he did not think that they yet knew half the extent of its applicability in pharmacy. He had kept an emulsion of this kind for three or four months in a vessel occasionally open, and it was as sweet and good at the end of the time as at the beginning. In fact, he considered chloroform water one of the best vehicles they had for many medicines, and the emulsion thus made with it was an elegant and not disagreeable form for the administration of phosphorus.

ANNUAL SALES OF AMERICAN MEDICAL SPECIALTIES.—A correspondent of the *Chemist & Druggist* gives the following estimate of the value of the annual sales of prominent Patent Medicines. The figures represent pounds, sterling:

Hostetter's Bitters	200,000	Boudault's Pepsine	10,000
Drakes' do.	140,000	Dutcher's Fly Paper	10,000
Hoofland's do.	20,000	Brandreth's Pills	30,000
Brown's Ginger	50,000	Herrick's Pills	20,000
Hall's Hair Renewer	80,000	Schenck's Pills	20,000
Ayers' Pills	40,000	Radway's Pills	40,000
Ayers' Pectoral	30,000	Wright's Pills	30,000
Ayers' Auge Cure	20,000	Smith's Tonic	40,000
Ayers' Sarsaparilla	30,000	Tarrant's Aperient	20,000
Winslow's Syrup	100,000	Osgood's Chlogoge	20,000
Brown's Troches	50,000	Jayne's Expectorant	20,000
Lanman's Florida Water	50,000	Pain Killer	30,000
Helmbold's Buchu	100,000	Sozodont	20,000
Kennedy's Discovery	20,000		

FLUID EXTRACT OF GUARANA.—The *American Journal of Pharmacy* for November contains a long paper on some of the preparations of guarana. The author, Mr. J. B. Moore, recommends the following formula for the preparation of the fluid extract:—Pulv. Paullinia; sixteen troy ounces; Alcohol fort,; water, q. s. Mix three measures of stronger alcohol with one of water, moisten the powder with the menstruum, pack in a glass funnel and gradually pour the menstruum upon it until one pint of the tincture is obtained. Set this aside, in a shallow vessel, to evaporate spontaneously to twelve fluid ounces. Continue the percolation until two pints more of the tincture are obtained, or until the powder is exhausted. Evaporate this, by means of a water-bath, at a temperature not exceeding 140° F., to four fluid ounces. Mix with the reserved tincture and filter through paper. This preparation is of a deep reddish-brown color, resembling fluid extract of gentian, and has a bitter, astringent, not unpleasant taste. The dose of the extract may be from fifteen to thirty minims. Syrup is a convenient and suitable vehicle for the administration of this medicine.

SOLID EXTRACT OF GUARANA.—In the paper alluded to in the preceding paragraph, a method for preparing a solid extract is also suggested. The mode of procedure is precisely similar to that for the fluid preparation, except that half a fluid ounce of glycerin is added to each sixteen ounces of guarana. The evaporation of the last portion of the percolate is conducted at 140°, that of the mixed percolates at 120°. During evaporation, the extract should be continually stirred. The yield of finished extract is about thirty three per cent. The dose may be from five to ten grains.

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. 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.

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.

Parrish's Pharmacy.
Garrod's Materia Medica.
Gray's Manual of Botany.
Fownes' Chemistry.

SECOND PRIZES.

Gray's First Lessons in Botany.
U. S. Pharmacopœia, 1873.
Wittstein's Practical Pharmaceutical Chemistry.
Roscoe's Chemistry.

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

QUESTIONS.

1. *Chemistry.*—15 grams of acetic acid are neutralized by 90 *c. c.* of the volumetric solution of soda; what is the percentage of $HC^2H_3O_2$ present? State the method by which the answer is obtained.

2. *Pharmacy.*—What is the excess of iron in the formula for *Syr. Ferri Iodidi* B. P? What is the object of this excess? What decomposition is liable to take place in the syrup?

3. *Materia Medica.*—Name the species, orders and classes from which are derived the substances of animal origin which are officinal in the Pharmacopœia.

4. *Botany.*—(1) What is the difference between a root and a rhizome? (2) a corm and a bulb? (3) a corymb and an umbel? (4) a peduncle and a pedicel? (5) a sepal and a petal?

5.—*Dispensing.*—Define in as few words as possible a liniment

or lotion, and a collyrium; a mixture and an emulsion; a bolus and a pill; a gargle and a linctus, marking the differences between them.

6. *Prescriptions.*—In the following prescription which is the *basis?* the *corrigens?* the *excipiens?* and what are the meaning of these terms.

Recipe. Podophylli Resinæ, granum.
Hydrargyri Subchloridi, grana quatuor.
Pulveris Capsici, granum.
Confectionis Rosæ granum.

Fiat massa.

LAST MONTH'S QUESTIONS.

Dispensing.—The best method of dispensing this preparation would be to put each ingredient in a separate paper, or if thought necessary to follow the directions of the prescriber to the letter, put the two together without mixing or pulverizing. If Zinci Sulph and Plumbi Acet. are triturated together, or even allowed to remain in contact, they form a soft magma in consequence of a mutual reaction, which liberates eight proportions of water of crystallization, the result being a semi-fluid mass, consisting of Plumbi Sulph., Zinci Acet., Zinci Sulph. and water. The reactions are as follows:—

$ZnSO_4\ 7\ (H_2O) + Pb\ (C_2H_3O_2)_2\ 3(H_2O) = Zn\ (C_2H_3O_2)_2\ 2(H_2O) + Pb\ SO_4 + 8\ (H_2O)$.

In the above equation the new notation is used; and some Zinc Sulphate which does not undergo decomposition is left out of view.

Prescriptions.—Recipe. Spiritus Ætheris Nitrici, guttas viginti.
Liquor Ammoniæ Acetatis, drachmas duas.
Tincturæ Aconiti, unciam cum semisse.
Aquæ Menthæ Piperitæ, ad uncias duas.

Fiat mistura salinam, cujus capiat cochleare parvum nocte maneque.

Take—

Of Spirits of Nitirus Ether, twenty drops,
Of Solution of Acetate of Ammonia, two drachms,
Of Tincture of Aconite, one ounce and a half,
Of Peppermint Water, sufficient to make two ounces.

Make a saline mixture, of which a teaspoonful may be taken night and morniug.

The dose of Tincture of Aconite is much too large, being forty five mimims, whilst it should not exceed fifteen.

ORDER OF MERIT.

Maximum Number of Marks = 70.

No	NAME.	Chemistry.	Pharmacy.	Materia Medica.	Botany.	Dispensing.	Prescriptions.	Extra.	Total.
1	W. M. Robinson, Cobourg..	10	10	8	7	6.0	9.0	10	60.0
2	R. McCormick, Ottawa ..	10	*c*	10	9	9.0	10.0	10	58.0
3	G. Maclagan, Lindsay	10	*p c*	9	8	10.0	10.0	10	57.0
4	R. Armstrong, Strathroy ..	10	8	9	10	8.0	4.0	6	55.0
5	D. B. Mills, St. Catharines	6	9	9	5	4.0	9.0	7	49.0
6	R. M. Thurtell, Guelph....	5	10	9	7	3.0	4.0	10	48.0
7	"Mercurious," Simcoe....	10	*p c*	9	6	4.0	5.0	10	44.0
8	W. W. Stephen, Meaford..	10	*c*	9	8	8.0	4.0	5	44.0
9	"Radix," Owen Sound....	6	9	7	5	2.0	3.0	8	40.0
10	C. N. Sliter, Strathroy....	2	8	7	6	2.0	6.0	6	37.0
11	F. G. Hay, Stratford.....	5	0	9	9	4.0	4.0	5	36.0
12	J. C. Cook, Kincardine....	6	9	6	5	3.0	4.0	6	33.0
13	F. E. Simson, Halifax, N.S.	3	1	6	3	4.0	8.0	7	32.0
14	R. E. Scott, Sarnia	0	10	3	2	6.0	5.0	5	31.0
15	A. J. Thompson, Strathroy	8	1	7	4	2.0	4.0	5	31.0
16	A. J. Greenwood, St. Cath.	1	10	5	4	2.0	8.0	0	30.0
17	"Lithium," Ottawa	0	1	7	9	2.0	7.0	2	28.0
18	G. Graydon, St. Catharines	1	4	8	1	2.0	4.0	4	24.0
19	F. E. Buchu, Kingston....	0	0	4	5	2.0	3.0	4	18.0

The First Prize is awarded to W. M. ROBINSON, Cobourg; the Second Prize to R. McCORMICK, Ottawa.

In the above enumeration, *c.* or *p. c.* indicates that the answer was copied or partly copied from some published work. For the future we shall pursue this method of marking, and rigidly adhere to it. The ratings of the first three on the list will be given. We request that competitors read the advice given a few months ago, and especially remember that *no notice will be taken* of any communications which have not the competitors name and address written at the foot of *each page*, and also that answers on dispensing and prescriptions be written on sheets folded separate from the rest.

IN THE PHRENOLOGICAL JOURNAL AND LIFE ILLUSTRATED for February the reader finds an unusual combination of timely and edifying topics. Among those which must please are: Jean Ingelow; Some Thoughts about the Clergy; Signs of Character; Thomas Whittaker, the English Reformer; The Key to Womanhood; Jane Hadley, a story of woman's courage; Husbands and Wives; Ezra Cornell; Greeley, Colorado; Prevention of Insanity; The Emotions of Savage and Civilized Man; The Worth of Knowledge; Uncle Dave; Legs and what they Mean; Mental Development and Religious Character; Treatment of Wounds and Blisters; etc. The report of the Closing Exercises of the late Course of Lectures on Phrenology and Physiology will receive consideration. The subscription price is $3 per annum; the publisher, S. R. Wells, Broadway, New York.

Varieties.

STAINS OF WOOD.—*A Green Stain.*—Take 3 pts. strong vinegar, 4 oz. best verdigris, ground fine, ½ oz. sap green, thoroughly mix these ingredients. *A Purple Stain.*—Take 1 lb. of chipped logwood, 3 qts. water, 4 oz. pearlash, and 2 oz. powdered indigo. Boil the logwood in the water for half an hour; then add the pearlash and indigo. *A Cherry Stain.*—Take 3 qts. rain-water, 4 oz. annatto; boil in a copper kettle till the annatto is dissolved, then put in a piece of potash of the size of a walnut. Keep the mixture over the fire half an hour longer, and then it may be bottled for use. *A Mahogany Stain.*—Wash the wood with diluted nitric acid (ten parts of water to one of nitric acid). For rosewood, glaze the same with carmine or Munich Lake. Asphaltum, thinned with turpentine, forms an excellent mahogany-color for new work. *A Blue Stain.*—Dissolve copper filings in aquafortis; brush the wood with it, and then go over the work with a hot solution of pearlash (2 oz. to 1 pt. of water), till it assumes a perfectly blue color.

INCOMBUSTIBLE PAPER AND INK.—An English inventor has secured letters.patent for an incombustible paper and fireproof ink. Though the paper is not regarded as absolutely indestructible by fire of any degree of fierceness, it is yet claimed that under such circumstances as fires in houses, factories, or other buildings, it is "ordinarily incombustible." The pulp, which is manufactured in the usual way, is composed of vegetable fibre, one part; asbestos, two parts; borax, one-tenth part; and alum, two-tenths part. Not only can writing-paper be thus manufactured, but a coarser substance for the bindings of books, or the enclosing of manuscripts. The fireproof ink can be used either in writing or printing, and is made according to the following receipt:—Graphite (finely ground), 22 drachms; copal, 12 grains: sulphate of iron, 2 drachms; tincture of nut-galls, 2 drachms; sulphate of indigo, 8 drachms. When any other color but black is desired, the graphite is replaced by an earthy mineral pigment of the desired color.

KAOLIN FOR CLARIFYING WINE.—The experiments of B. Hoff with Austrian and Hungarian wines show that kaolin can be employed for clarifying wines. A quantity of kaolin equal to ½ of one per cent. of the weight of the wine to be clarified is triturated with a little wine to a thin paste, and then added to the wine to be clarified and well mixed. If ½ of one per cent. does not produce the desired effect, as much more is added. If the wine clears slowly it is well to stir up the kaolin in the barrel. The kaolin employed must not contain a trace of iron, otherwise it colors the wine a little. The iron is easily removed by treating with dilute hydrochloric acid, which must afterward be entirely washed out with water. The action of the kaolin is principally this, that it unites with certain protein substances that are suspended in the wine and forms with them insoluble compounds that settle quickly. The kaolin occupies but little space after it has settled, and the clear wine can be drown off to the last drop. If kaolin be added to wine while fermenting it, it immediately becomes clear. Kaolin also renders filtration entirely superfluous, for in settling it carries all the impurities along with it.—*Jour. of App. Chem.*

DRUGS, MEDICINES, &c.	$ c.		$ c.
Acid, Acetic, fort	0 14	@	0 15
Benzoic, pure	0 22		0 27
Citric	1 40		1 50
Muriatic	0 05		0 06
Nitric	0 11½		0 15
Oxalic	0 22		0 23
Sulphuric	0 03¾		0 07
Tartaric, pulv	0 50		0 50
Ammon, carb. casks	0 22		0 24
" jars	0 23		0 24
Liquor, 880	0 25		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 55		0 65
Alcohol, 95 per ct.....Cash	2 02		2 05
Arrowroot, Jamaica	0 18		0 22
Bermuda	0 50		0 65
Alum	0 02¾		0 03½
Balsam, Canada	0 33		0 38
Copaiba	1 10		1 15
Peru	3 40		3 75
Tolu	1 40		1 50
Bark, Bayberry, pulv	0 20		0 22
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	30 00		30 00
Bismuth, Alb	2 90		3 00
Carb.	3 10		3 25
Camphor, Crude	0 38		0 40
Refined	0 45		0 50
Cantharides	2 20		2 30
Powdered	2 30		2 40
Charcoal, Animal	0 04		0 06
Wood, powdered	0 10		0 15
Chiretta	0 23		0 30
Chloroform	1 10		1 55
Cochineal, S. G.	0 65		0 70
Black	85		90
Colocynth, pulv.	0 60		0 65
Collodion	0 70		0 80
Elaterium oz	3 20		4 00
Ergot	0 35		0 45
Extract Belladonna	1 50		1 60
Colocynth, Co	1 25		1 75
Gentian	0 50		0 60
Hemlock, Ang	0 00		0 95
Henbane, "	1 70		1 80
Jalap	5 00		5 50
Mandrake	1 75		2 00
Nux Vomic oz	0 40		0 50
Opium oz	1 80		
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 32		0 40
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 50		0 60
" powdered	0 60		0 75
" sorts	0 24		0 30
" " 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 40		1 50
Guaiacum	0 45		1 00
Myrrh	0 50		0 85

DRUGS, MEDICINES, &c.—*Contd.*	$ c.		$ c.
Sang Dracon	0 60		
Scammony, powdered	6 00		6 50
" Virg. "	14 50		—
Shellac, Orange	0 80		0 85
Gum, Shellac, liver	0 60		0 70
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 21		0 30
Vienna	0 29		0 30
Prices	0 60		0 75
Honey, Canada, best	0 15		0 16
Lower Canada	0 14		0 16
Iron, Carb. Precip	0 20		0 25
" Sacchar	0 40		0 55
Citrate Ammon	1 75		1 80
" & Quinine, oz	0 57		0 58
" & Strychine	0 20		0 25
Sulphate, pure	0 08		0 10
Iodine, good	5 00		5 50
Resublimed	6 50		7 00
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 06
Sulphate	0 08		0 12½
Lead, Acetate	0 15		0 16½
Leptandrin oz.	0 60		—
Liq. Bismuth	0 50		0 75
Lye, Concentrated	1 50		1 60
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 17		0 20
Calcined	0 65		0 75
Citrate gran.	0 60		0 75
Mercury	2 20		2 30
Bichlor	2 00		2 10
Chloride	2 35		2 45
C. Chalk	0 95		1 00
Nit. Oxyd	2 50		2 50
Morphia Acet	4 50		4 60
Mur.	4 50		4 60
Sulph	4 65		4 75
Musk, pure grain oz	25 00		—
Canton	0 60		1 20
Oil, Amonds, sweet	0 40		0 45
" bitter	14 00		15 00
Aniseed	4 00		4 25
Bergamot, super	7 50		7 75
Caraway	3 20		3 50
Cassia	2 00		2 25
Castor, E. I	0 15		0 17
Crystal	0 22		0 25
Italian	0 26		0 28
Citronella	1 05		1 15
Cloves, Ang	3 50		3 75
Cod Liver	1 25		1 50
Croton	1 75		2 00
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 50		7 00
Rose, Virgin	8 50		8 75
" good	7 00		7 25
Sassafras	0 75		1 90
Wintergreen	6 00		6 50
Wormwood, pure	4 00		6 00
Ointment, blue	1 60		1 70
Opium, Turkey	9 75		10 00
pulv	00 00		12 00

DRUGS, MEDICINES, &c.—*Cont'd*	$ c.	$ c
Orange Peel, opt.	0 30	0 36
" good	0 12½	0 20
Pill, Blue, Mass.	1 60	1 65
Potash, Bichrom	0 18	0 20
Bi-tart	0 33	0 35
Carbonate	0 14	0 20
Chlorate	0 40	0 45
Nitrate	8 00	9 00
Potassium, Bromide	70	0 80
Cyanide	0 75	0 80
Iodide	3 50	3 70
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 20	—
" 100 oz. case.	2 17	—
" 25 oz. tin..	2 17	—
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	1 75	2 00
" E. I.	0 75	0 90
" " pulv	1 60	1 10
" " 2nd	0 60	0 70
" French	0 75	—
Sarsap., Hond	0 53	0 60
" Jam	0 88	0 90
Squills	0 10	0 15½
Senega	1 10	1 10
Spigelia	0 25	0 30
Salts, Epsom	2 25	3 00
Rochelle	0 31	0 35
Soda	0 02½	0 03
Seed, Anise	0 13	0 16
Canary	0 05	0 06
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	12 00	13 00
Santonine	7 50	8 00
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	5 75	6 25
" 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 50	2 80
" liquid	2 00	—
Argols, ground	0 15	0 25
Blue Vitrol, pure	0 09¼	0 10
Camwood	0 06	0 09
Copperas, Green	0 01½	0 02½
Cudbear	0 16	0 25
Fustic, Cuban	0 02¼	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 01⅞	0 03
Logwood, Camp	0 01⅝	0 03
Extract	0 9½	0 12
" 1 lb. bxs	0 13	—
" 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 60	0 65
Cayenne	0 22	0 28
Ginger, E. I.	0 19	0 20
Jam	0 30	0 30
Mace	1 50	1 60
Mustard, com	0 20	0 25
Nutmegs	1 15	1 25
Pepper, Black	0 22½	0 23
White	0 31	0 32
PAINTS, DRY.		
Black, Lamp, com	0 07 @	0 08
" 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 07¼	0 08
Venetian	0 02½	0 03½
Sienna, B. & G	0 07	0 08
Umber	0 07	0 10
Vermillion, English	2 10	2 20
American	0 25	0 35
Whiting	0 1¼	0 02
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 03¾	0 04½
Yellow Ochre	0 08	0 12
White Lead, gen. 25 lb. tins	2 35	—
" No. 1	2 10	—
" No. 2	1 85	—
" No. 3	1 60	—
" com	1 30	—
White Zinc, Snow	2 75	3 25
NAVAL STORES.		
Black Pitch	4 10 @	4 50
Rosin, Strained	3 80	4 25
Clear, pale	5 75	7 25
Spirits Turpentine	0 50	0 52
Tar Wood	4 40	4 50
OILS.		
Cod	0 63 @	0 70
Lard, extra	1 10	1 20
No. 1	1 05	1 10
No. 2	0 85	0 90
Linseed, Raw	0 67½	0 70
Boiled	0 72½	0 75
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 75	0 75
Straw	0 68	0 70
Sesame Salad	1 30	1 35
Sperm, genuine	2 55	2 60
Whale refined	0 70	0 75