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CANADIAN

PHARMACEUTICAL JOURNAL

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Original and Selected Papers.

NOTE ON GUAIACOL.*

BY JOHN WILLIAMS, F.C.S.

In a recent number of the *Pharmaceutical Journal* (No. 92, third series, page 788) attention was drawn to the statement that creasote consisted mainly of a body called "Guaiacol" and which was a product of the destructive distillation of gum guaiacum. As this appeared to be a fact of some interest I determined to prepare a little of the substance and compare its properties with those of the ordinary creasote of commerce.

The process of preparing it is as follows:—Gum guaiacum reduced to powder is exposed in a shallow iron pan to a considerable heat, sufficient to cause the commencement of charring, and until every trace of water is driven off. We thus avoid the frothing, which otherwise renders the distillation of the gum a very difficult matter. When the mass has been thus heated for some time it is transferred to an iron retort, furnished with a long iron tube, to

* Read before the British Pharmaceutical Conference, 1872, and published in the Pharmaceutical Journal and Transactions.

act as a condenser. The heat must be increased gradually to low redness, and continue as long as any tarry matter continues to distil. In this way a product is obtained amounting to about one-third the weight of the gum employed.

This tar is again placed in an iron retort and distilled, when it yields about one-third of its bulk of a light brown oily liquid. This brown oil is treated with a solution of caustic soda, which dissolves a part of the oil, but leaves a considerable quantity which must be separated and rejected. The alkaline solution of the oil is now placed in a retort and subjected to prolonged distillation, water being added from time to time, to make up for that which distils over. In this way a quantity of light oily matter passes over, having a very offensive smell, and floating on water. This is to be rejected, and when no more oil is observed to pass over, the alkaline solution in the retort is diluted, and a slight excess of sulphuric acid added, by which means a dark colored heavy oil is separated. This is distilled, and the oily product again treated with caustic soda and distilled as before, by which means a further small quantity of the light oil is separated. This alkaline solution on exposure to air soon turns of a very dark brown, almost black color, and when an acid is added after a few days a very dark purple colored oil is deposited. This oil distilled gives a light yellowish oily liquid, which after several distillations yields a colorless heavy oily liquid, which is the pure or nearly pure guaiacol.

Guaiacol is an oily liquid, considerably heavier than water; it is quite white when first distilled, but soon assumes a pale straw color. Its smell is characteristic of creasote, but not so disagreeable as some of the samples of that body found in commerce. The sample I have made begins to boil at 200° C, and soon rises to 210°, at which point eight-tenths distil over, and the remainder comes over at 215°. Pure creasote is stated in the books to boil at 210°. Guaiacol refracts light strongly, and has the taste as well as the general physical properties of creasote. It is soluble in glacial acetic acid, but insoluble in pure glycerine.

It appeared interesting to compare this body with creasote as found in commerce, more especially as some attention has lately been drawn to the fact, that creasote is sometimes sold consisting mainly of carbolic or crysylic acid, or other products of the distillation of *coal* instead of, as it ought to be, of *wood*.

In commerce we find two kinds of creasote, said to be derived from wood, one well known in England, manufactured by Messrs Morson and Son,—which I shall call "English" creasote—is said to be made from Stockholm tar, and if so, is the product of pine-wood probably. The other, of German manufacture, is said to be the product of beech-wood, Of the common German coal-tar creasote, I have made no especial note, but have employed pure

carbolic acid in all cases to represent the coal tar or phenylic product.

English creasote commences to boil at 200°, but almost immediately rises to 213°, at which about six per cent. passes over; the temperature then rising to 216°, at which about 34 per cent. passes over; then to 222°, when about 34 per cent. again distils, and then rises to 231°, when 16 per cent. is obtained, the remainder distilling at a still higher temperature. We thus find that this is a hydrated product, and that its boiling point is considerably higher than the proper boiling-point of creasote as represented by Guaiacol.

German creasote commences to boil at 200°, gradually rising to 220°, 40 per cent. comes over under 203°, 34 per cent. at 210°, and 16 per cent under 220°, thus boiling rather lower than it should for pure creasote, but apparently not containing much of the higher homologues.

Carbolic acid boils at 180°, and, when pure, its boiling-point is quite constant.

English creasote is insoluble in pure glycerine, as stated by Mr. Morson, in the PHARMACEUTCIAL JOURNAL, No. 99, page 921.

German creasote is soluble in glycerine.

Carbolic acid dissolves in glycerine in all proportions.

As I have before stated, guaiacol is not soluble in glycerine; it therefore became of great interest to find out, if possible, why the German creasote should be soluble, and thus differ from the guaiacol and English creasote, more especially as I found that the addition of, say 50 per cent. of carbolic acid to either guaiacol or English creasote, causes them to become perfectly soluble in glycerine. It thus became very important that we should, if possible, devise a mode of detecting the presence of carbolic acid in pure creasote.

For this purpose recourse was had to Professor Fluckiger's process as described in PHARMACEUTICAL JOURNAL, No. 103, page 1008. It consists in adding creasote (or carbolic acid) to a very small quantity of perchloride of iron in solution, and then adding alcohol and afterwards diluting considerably with water. If carbolic acid alone is employed a beautiful blue color is produced, but if creasote, a dingy brownish liquid is the result. Now this test distinguishes between pure creasote and carbolic acid perfectly, but when I attempted to use it as a means of detecting the presence of carbolic acid in creasote it quite failed, the brown creasote reaction quite masking the blue produced by the carbolic acid. I tried various proportions, and in no instance could I obtain a reaction I could depend upon, 50 per cent. and even 100 per cent. of carbolic acid mixed with English creasote or guaiacol being quite undistinguishable. Professor Fluckiger distinctly states that his test enables to detect the presence of carbolic acid in creasote, but I cannot agree with that statement; in my hands at least, it does not answer.

In a recent number of the Chemical News, a test was given by means of bromine. When bromine water is added to an aqueous solution of carbolic acid, a white oil is speedily deposited, but when it is added to an aqueous solution of pure creasote or guaiacol a brown oil is the result. This test, however, fails, as might be expected, to distinguish carbolic acid when mixed with creasote in all cases a brown oil is deposited, which is useless for the purpose we have in view.

Strong solution of ammonia dissolves carbolic acid readily (the solution turning blue after a few hours' exposure to the air) while guaiacol and creasote (both English and German) are only partly soluble, or at any rate would require a very large quantity of ammonia to effect complete solution. I found German creasote to be much more soluble than either guaiacol or English creasote namely, one-half dissolving without much difficulty, when treated with about six times its bulk of strong liquor ammonia.

The English creasote so treated did not lose above one-fourth of its bulk.

The portion of creasote insoluble in the ammonia was separated; the ammoniacal solutions being diluted and neutralized with acid, also deposited the creasote which had been dissolved. These different samples were examined carefully.

The English, which had dissolved in ammonia when distilled, smelt better and more like guaiacol than the original sample of creasote before treatment; it also boiled nearer 210°, all distilling under 220°.

The portion which did not dissolve in ammonia when distilled, yielded a liquid which had a much more offensive smell, and appeared to contain more of the impurities of the original creasote than the soluble portion; its boiling-point was, however, lower and almost identical with the first portion. Both samples were insoluble in glycerine. The German creasote, which did not dissolve in ammonia, retained its old boiling-point, but no longer dissolved in glycerine. The portion soluble in ammonia was carefully examined; its boiling-point was found to be almost the same as the normal creasote. Its smell was good; almost identical with guaiacol, but it was soluble in glycerine. Attempts made to detect the presence of carbolic acid quite failed.

Other means were then tried to procure evidence of the presence of carbolic acid in creasote.

It is stated in the paper first referred to (*Ph. Jour.* No. 92, p. 789), that while the phenol series yields with nitric acid trinitrophenol or picric acid, guaiacol or creasote yields only oxalic acid. If this were true, we might hope to detect the presence of picric acid, and thus prove that carbolic acid had been contained in the creasote.

To determine this point, the creasote to be examined was first

dissolved in about twice its weight of glacial acetic acid, and then added to an equal bulk of strong nitric acid, sp. gr. 1500. (If the creasote to be examined is added direct to the nitric acid, the action is so violent and unmanageable that no definite result can be arrived at). The capsule containing the mixture must be placed on a sand bath, and evaporated almost to dryness. When pure carbolic acid has been used, the product is a bright yellow crystalline mass (pure picric acid), but in the case of guaiacol or creasote (both English and German), the product is a brown, sticky, semi-resinous mass. This product, treated with a little hot water, is transferred to a large test tube or small retort, and a gramme or so of ordinary bleaching powder added, and a gentle heat applied, the result being the production of chloropicrin if picric acid is present, which can be distinguished without doubt or difficulty by its most peculiar and repulsive smell, or can be separated by distillation if thought necessary; but if oxalic acid is the product of the reaction, no chloropicrin is produced, but simply a liberation of chlorine. I am sorry to say that in all my trials I obtained chloropicrin, and not a trace of chlorine, and all other attempts made to isolate oxalic acid from the product of the reaction of nitric acid upon guaiacol or creasote having quite failed, I have come to the conclusion that the statement respecting the different products obtained from creasote and carbolic acid by oxidation is incorrect. Picric acid, or some isomer of that body, is the product of the reaction in all cases, irrespective of the source of the creasote (or carbolic acid) being from coal tar or from wood.

Attempts were made to distinguish between carbolic acid and creasote by the production of sulpho-conjugated acids. But the acid produced by creasote appears to be too much like the sulphocarbolic acid for anything like a distinguishing test to be founded upon that reaction.

I regret that the results of my experiments are of a negative rather than of a positive nature, but I trust, unsatisfactorily as they confessedly are, they may prove of service to any one who may wish to follow up the examination of the true nature of creasote.

There is, I think, no doubt that the English creasote is a genuine product of wood tar. It is, however, not a homogeneous body, but probably consists of several isomeric substances; while the fact of the German (beech-wood) creasote dissolving in glycerine led me to suspect the presence of carbolic acid, but all my attempts to demonstrate its presence quite failed, and I can only conclude that beech-wood tar yields a creasote to a certain extent different to that yielded by either guaiacum or pine-wood tar. In some of its chemical properties German creasote much nearer approaches guaiacol than the English; its smell is almost identical, and its boiling-point very much nearer and more constant.

When English and German creasote are dissolved in strong

caustic soda, and then diluted, the English becomes milky, and yields, when distilled, an appreciable quantity of light oil; the German, on the contrary, remains bright and yields no oil, which would tend to prove the German to be in some respects a purer article than the English.

The fact of the German creasote dissolving in glycerine ought to be explained, either by proving that beech-wood creasote really possesses this property, or has obtained it from some peculiarity in the mode of manufacture.

It would be very interesting to examine some of Reichenbach's original creasote, if an authentic sample could now be obtained; perhaps some member of the Conference may be able to assist in this matter.

To Mr. Myles Smith, our chemical assistant, I must express my best thanks for many of the suggestions, and nearly the whole of the experiments here detailed have been performed by him with great care and accuracy.

The paper gave rise to the following remarks by members present:—

Mr. Morson:—Our attention has been naturally called to the extensive sale of carbolic acid under the name of creasote; and we are very well satisfied to find that by the mixture of glycerine we have had some chance of detecting it. We have examined some specimens from German sources, and we have invariably found them to dissolve in glycerine, and we have also found that there is a peculiar coloration in all the creasote so prepared—a tendency to red coloration, whilst in all pure creasote, or what we consider to be so, the tendency is to become brown. This is excessively remarkable; for some which is designated as pure white creasote, and which I obtained from an excellent source in Paris, though perfectly white, became perfectly red in the course of about three months, and is perfectly and entirely soluble in glycerine, even in a diluted form. In an American journal some observations are made on the short notice written by my son on the subject; and they state that no doubt our experiments are made with diluted glycerine. Such, however, is not the case. They were made with Price's glycerine, which, I think, can hardly be called diluted glycerine. You have only to add a few drops of this substance to find out that carbolic acid in all its forms is perfectly soluble in glycerine, and that most readily. Creasote we have prepared for 40 years. We take the heavy oil of tar, and separate the light oils by frequent saponification with oil of vitriol, and ebullition. We distil it in a concentrated form. We do not distil it in glass, for it breaks the retorts very readily, until you get rid of the whole of the water, and requires a very high temperature for the process. We have constantly pursued one process, and never had difficulty. Of course, the introduction of carbolic acid has interfered with it. It is

strange that Gerhardt was perfectly acquainted with it. He says, "Le substance qu' on vend dans le commerce sous le nom de créosote n'est souvent que l'acide phénique plus ou moins impure. Mais le véritable créosote, extrait de goudron de bois par M. Reichenbach, est un corps parfaitement distinct, et c'est à cette créosote que le vinaigre de bois, l'eau de goudron, la fumée de bois, doivent leurs propriétés antiseptiques." It is a curious thing that carbolic acid and creasote act very differently as preservative of animal matter. There are instances in which that will be found to be the case. Creasote preserves in a very different way from carbolic acid. There is another fact which should not be lost sight of, and that is, that if you mix carbolic acid with creasote, the mixed body is perfectly soluble in glycerine, and even in comparatively diluted glycerine. When it contains half its weight of water, it will still dissolve carbolic acid. Consequently, the observations made in the American journal as to diluted glycerine do not in the slightest degree apply. Professor Fluckiger speaks of anhydrous glycerine. That is a body I am not acquainted with; but I suspect —in fact, I know—that much that is described as beech-wood creasote is othing but carbolic acid, and is not derived from wood. I make this observation because some of the so-called beech-wood creasote becomes red, and that is quite a characteristic of carbolic acid.

Mr. Stoddart.—I should like to ask Mr. Morson a question which I have not been able to get solved. Some few years ago, a naturalist, who was going to Australia, went into a shop in London to get some creasote; and all the things that he put into the bottle and brought back from Australia were preserved admirably. You could dissect them, or do what you like with them, and they did not disintegrate. He then took them out, and put them into fresh creasote, and, to his utter astonishment, all the things disintegrated.

Mr. Morson.—He got pure creasote first, and carbolic acid afterwards.

The President.—The fact is, that pure creasote has a very different sort of antiseptic power from carbolic acid. That is very well known amongst zoologists and anatomists, who I find generally prefer pure creasote for preserving specimens of animal tissues.

Mr. Morson.—When creasote is distilled with water and so perfectly saturated, this solution is very efficient in preserving objects of natural history.

A CHEAP DISINFECTANT.*

BY E. C. C. STANFORD, F.C.S.

Some of the popular disinfectants have such an offensive odor of their own that an odorless substance will generally secure the preference for ordinary household purposes. We have several harmless, cheap, and odorless disinfectants amongst the alkaline and other chlorides. I have recently experimented on several of these to ascertain which is the most powerful, and, at the same time, the cheapest. That highly popular substance known as Chloralum was used also for the sake of comparison. The experiments lasted thirty days, and the times noted were those when mildew and offensive odor first appeared. The chlorides were each mixed in the proportion of 2 per cent. and 5 per cent. with urine. In the second experiments a mixture of equal parts of blood and water with the clot removed was used, and the chlorides added in the same proportions.

Mixtures with Urine, 2 per cent. Salts.

	First appearance of Mildew.	First appearance of offensive odor.
Chloralum	4 days	6 days.
Chloride Iron	none.	none.
" Calcium	15	none.
" Sodium	4	8
" Potassium	4	5
" Ammonium	4	23

Mixtures with Urine, 5 per cent. Salts.

Chloralum	4 days	6 days.
Chloride Iron	none.	none.
" Calcium	25	none.
" Sodium	5	6
" Potassium	12	none.
" Ammonium	none.	7

Mixtures with Blood and Water, 2 per cent. Salts.

Chloralum	11	none.
Chloride Iron	26	none.
" Calcium	18	none.
" Sodium	4	5
" Potassium	5	6
" Ammonium	none.	12

*Read before the British Pharmaceutical Conference, 1872, and published in the *Pharmaceutical Journal and Transactions.*

Mixtures with Blood and Water, 5 per cent. Salts.

Chloralum	11	none.
Chloride Iron	none.	none.
" Calcium	18	none.
" Sodium	4	5
Potassium	4	5
" Ammonium	none.	13

It will be seen that the most powerful of all is the Chloride of Iron, the simplest and least powerful is the Chloride of Sodium. The cheapest, in proportion to its power, is the Chloride of Calcium. This substance is a waste product in all alkali works, and the quantity at present thrown away is enormous; I now propose it for general household use as a convenient, colorless, harmless and cheap disinfectant. I propose to use it in the form of solution containing 25 per cent. of the solid salt, and acidified with 12 per cent. of Hydrochloric Acid. This increases its power and is a harmless addition. I found about the same proportion in liquid Chloralum. Compared with liquid Chloralum in deoderising sewage it was found to be about four times the strength, and it can certainly be produced for half the price.

The sample of powdered Chloralum used in the urine and blood experiments was found to contain about 3 per cent. of Chloride of Iron, which accounts for part of its deodorizing property. I was first led to notice the disinfecting power of Chloride of Calcium by using it in urinals. There is always great difficulty in keeping urinals in houses free from offensive odor; this is entirely obviated by putting a lump of Chloride of Calcium in the urinal; it lasts a long time, as it dissolves very gradually, and keeps the urinal perfectly free from odor.

For general household purposes, however, the liquid form is more convenient, and I propose to give the combination I have described the name of Chloricalcium, which is shortly and sufficiently descriptive of its composition.

OLEIC ACID AND SOME OF ITS COMBINATIONS.*

BY ALFRED W. GERARD.

Dispenser and Pharmacist, Guy's Hospital.

The introduction of the oleates of mercury and morphia as remedial agents by Mr. J. Marshall, F.R.S., suggested to me the following as capable of preparation, and as having some therapeutic value :—

Mr. Frank Clowes, to whom Mr. Marshall referred the chemical question of his paper (*Lancet*, May 25th, 1872) mentions that the scales of peroxide of mercury are with difficulty soluble in oleic acid. I find this is not so if the peroxide is previously well levigated. There is no necessity, therefore, for preparing the fresh oxide for solution in the oleic acid.

The oleic acid used in the following preparations is that made at the stearine candle factories, where it occurs as a secondary product. It is contaminated with a variety of impurities, the removal of which is a tedious process. It has the color of olive oil, but a thinner consistence, and a slight tallowy odor; is soluble in all the ordinary fats and oils, alcohol and ether, but insoluble in glycerin. It forms normal and acid salts; the normal salts of the alkalies potash and soda are the soluble soaps of the pharmacopœia.

Professor Miller, in his "Elements of Chemistry," part 3, page 363–4, says,—Pure oleic acid, at temperature above 57°, forms a colorless limpid oil without taste or smell; it does not redden litmus even when dissolved in alcohol; at 40° it concretes into a hard crystalline mass composed of fine needles. When solid it undergoes no change in the air, but when liquid it absorbs oxygen, rapidly acquiring a brown color, a rancid odor, and an acid reaction upon litmus, its points of solidification gradually becoming lowered until it falls below 0° Fahrenheit.

By reason of the impurities in commercial oleic acid, I find that it cannot be made to unite with the salts used in the following preparations in equivalent proportions; it will, however, form solutions of 20 per cent., and this I have chosen as a suitable strength :—

Oleate of Lead (20 per cent.)

Prepared by heating together oxide of lead one part, oleic acid four parts, until dissolved; on cooling, it forms a semi-transparent tenacious mass somewhat thinner than lead plaister. This is not well adapted for direct application, but requires diluting, and as it

*Pharm. Jour. and Trans., August, 1872.

mixes readily with ordinary fats and oils, I have adopted the following formula for its exhibition:

Ointment of Oleate of Lead.

Take of

Oleate of Lead (20 per cent.)	2 parts.
Oil of Almonds	1 part.
Prepared Lard	1 "

Mix with a gentle heat.

On cooling, this forms an elegant ointment resembling that of spermaceti.

Oleate of Zinc (20 per cent.)

Prepared by heating together oxide of zinc one part, oleic acid four parts, until dissolved. During the process of solution some bubbling takes place with disengagement of watery vapor. It is transparent when melted, on cooling it has the appearance of lead plaister, is hard and friable, and requires to be diluted in the same manner as oleate of lead.

Ointment of Oleate of Zinc.

Take of

Oleate of Zinc (20 per cent.)	2 parts.
Oil of Almonds	1 part.
Prepared Lard	1 "

Mix with heat.

This forms an ointment of the ordinary consistence.

Whilst experimenting with the above, I thought that if atropia and aconitina were soluble in oleic acid, they might prove useful preparations. I find they are readily so at ordinary temperatures, whilst the sulphate of atropia is soluble on the application of heat.

I have prepared solutions of the above, which nearly correspond to the ointments of the British Pharmacopœia.

Solution of Oleate of Atropia.

Take of

Atropia	2 grains.
Oleic Acid	98 grains.

Dissolve.

Solution of Oleate of Aconitina.

Take of

Aconitina	2 grains.
Oleic Acid	98 grains.

On economical grounds there can be no objection to the introduction of the oleates, as large quantities of oleic acid can be ob-

tained at a cheap rate, but the chief consideration is whether they possess any advantages as remedial agents beyond those of the same kind already in use. This is a question for the therapeutist, and must be left to the physician and surgeon to decide.

NOCTILUCINE.*

BY DR. T. L. PHIPSON, F. C. S.

I have given the name of noctilucine to a peculiar organic substance, first alluded to in my paper in the *Comptes Rendus* for 1860 (2e semestre, p. 541), and again in my work on "Phosphorescence" (London 1862, p. 103), as the substance which causes the production of light in phosphorescent fish. This remarkable compound, which might also be termed the *organic phosphorus*, is also the cause of the production of light by the glow-worm, and probably by all other phosphorescent animals; appears to be formed in a variety of circumstances at the expense of dead animal and vegetable tissue, and even by certain living plants (*Euphorbia*, *Agaricus*, etc.). My observations at present relate only to noctilucine as produced in the animal world.

At the ordinary summer temperature noctilucine is a semi-fluid, almost liquid, substance containing nitrogen; it is white, and in its natural state contains a considerable amount of water; it has a slight odor resembling that of caprylic acid; it is only slightly soluble in water, and is somewhat lighter than this liquid; it is insoluble in alcohol and ether, and is decomposed by acids and alkalies. Nitric acid easily dissolves and decomposes it; sulphuric acid also, and potash evolves ammonia from it. In fermenting in contact with water, it produces an odor of putrid cheese; as long as it is moist it absorbs oxygen and evolves carbonic acid in the air. When left to itself, it dries up, in the course of a few hours, to thin, shining, translucent films, quite devoid of structure, and resembling the *mucine* of the common garden snail.

When recently produced, noctilucine is highly phosphorescent, and this production of light is owing to oxidation in contact with the air. It also shines for a little time in water, as long as there is air in the water; it is rather more brilliant in oxygen gas, and still more brilliant in a south-west wind, which I find usually contains much ozone. This production of light ceases as soon as the oxidation is completely accomplished; but as long as the smallest amount of air adheres to it, it will shine, even in carbonic acid, for a short time.

*From The Chemical News.

Noctilucine is secreted in phosphorescent animals by a special organ, just as bile is secreted by the liver, and appears to be used in producing light nearly as fast as it is formed. It is also produced in certain conditions of temperature and moisture, in dead animal matter of various descriptions (pork-flesh, beef, blood, fish, etc.), and occasionally in urine. Whatsoever its source, it shows the same kind of light, nearly monochromatic ; the same spectrum, principally developed between the lines E and F ; and, as far as I have examined them, the same chemical properties.

In an impure state, noctilucine can be obtained from the surface of various fish when highly phosphorescent, also from the glow-worm by pressing the luminous matter collected by the scalpel through porous filtering paper. It is secreted in a pure form by the luminous centipede (*Scolopendra electrica*), and on the 15th of September, 1871, I procured some from this source. When a number of these *Scolopendræ* are caused to run about a large glass capsule, they leave a certain amount of noctilucine upon the surface of it sufficient to enable one to examine the principal properties of this curious substance.

The secretion of noctilucine in the higher phosphorescent animals, such as the glow-worm and the firefly, is to a certan extent dependent upon the nervous system of these insects ; hence they have the faculty, apparently, of shutting off their light at will. In this case the secretion is stopped for the time ; but a certain quantity of noctilucine exists in the eggs of the glow-worm, which also shine for some time after they are deposited.

There appears to be a special orgaan for the secretion of noctilucine, even in a minute *Noctiluca miliaris* of the English Channel and other lower types of phosphorescent animals ; and even here we find scarcely any rudiments of a nervous system, the secretion of the luminous substance appears to depend greatly upon external circumstances.

QUININE.*

Our knowledge of the physiological and therapeutical actions of this invaluable alkaloid have been recently much extended by the labors of Binz, Ranke, Kerner, Zuntz, Scharrenbroich, and Schulte. We propose to lay before our readers a *résumè* of the chief results obtained.

Binz finds that quinine has the power of arresting the process of putrefaction and fermentation in a high degree, and it is an active

*Medical Times and Gazette.

poison for all low organisms, animal and vegetable. According to Cohnheim's views, pus, being mainly a collection of white blood globules, which have passed through the walls of vessels—further, quinine having the power of arresting the motion of the white corpuscles, and hence preventing their exit from the vessels—the alkaloid arrests, at all events diminishes, the formation of pus during the course of inflammation. Moreover, it destroys the ozonizing power of certain substances; and as the red corpuscles have this power quinine in the blood probably diminishes oxidation of tissue, and lessens the production of heat. Ranke and Kerner, indeed, have found that quinine in large doses diminishes tissue changes, as is shown by the smaller quantities of urea and uric acid excreted; and there are many observations to show that in fevers it produces a decrement in temperature. Ranke and Kerner's experiments do not show, however, how far the lessening of tissue-waste is due to the direct action of quinine or oxidation, and how far to the indirect action of the alkaloid through the nervous system. Two methods have been employed for ascertaining the direct influence of quinine on oxidation. Harley added quinine to the blood, and found that this, when so treated, took up less oxygen, and gave off less carbonic acid, than blood which had not been so treated. This method is inconvenient of application, and liable to error. Zuntz employed the changes in the alkalinity of the blood for arriving at the same results. Schulte has extended these researches. If fresh blood be drawn, a development of acid begins in it, and continues at first rapidly, then more slowly, till putrefaction sets in. Of course this acidification depends on oxidation; and the diminished alkalinity of the blood, thereby produced, furnishes a test of the rapidity with which oxidation proceeds. Schulte has confirmed the observation first made by Zuntz and Scharrenbroich, that quinine and berberine lessen the production of acid. Harley's observation is thus confirmed. Cinchonine produces similar results to quinine, though in a very inferior degree. Picrate of sodium is nearly as powerful as quinine. Zuntz found, as Ranke and Kerner had previously done, that quinine, in ten-grain doses, lessens the daily excretion of urea by one-third or more. Unruh has found the same to occur when quinine is administered in fevers; but his observations are open to objections. Binz's experiments are curious, and show that when putrefying liquids are injected into the circulation the temperature of the body rises; but if the fluids be previously mixed with quinine, whereby the putrefactive processes are arrested or destroyed, the rise in temperature is either entirely arrested or considerably diminished.

We think that these experiments have an important bearing on practice, and that they are in accordance with the teachings of clinical observation. It has been much the fashion to assume that the therapeutical actions of quinine are entirely different in its effects when administered in health. We apprehend that the true method

of commencing the study of the actions of medicines is first to ascertain their effects in health, then to observe their results in disease.

Dr. Crace Calvert has also recently announced the discovery of the power of quinine in preventing the development of fungi. He appears, however, to have been unaware of Binz's previous publication of the fact.

ON A NEW APPLICATION OF TUBE HYDROMETERS.*

BY WILSON H. PILE, M. D.

In an article read before the American Pharmaceutical Association in Baltimore, 1870, I endeavored to render intelligible a new method by which the relation between the degrees of Beaume's hydrometer and specific gravity could be easily determined; and, as the method there pointed out is intimately connected with the present subject, I will briefly recapitulate the main points.

A plain cylindrical tube of thin glass, closed at its lower end, is to be immersed in pure water, at a temperature of 60° F., and then loaded by pouring in shot or mercury until it sinks about $\frac{2}{3}$ of its length in the water, the point to which the surface of the water rises being then marked on the tube. If now that part of the tube which was immersed in the water be divided into 145 parts, and these parts numbered from the top downwards, the tube will represent a Beaumé's hydrometer for liquids heavier than water, and by floating it in any liquid of greater density than water, its degrees will be seen on the tube at the surface of the liquid.

These degrees can be marked on paper, and the paper inserted in the tube and pushed down to the bottom, the upper mark or zero being exactly opposite the mark which had been previously made on the tube.

We will now proceed to show a new application of these tube hydrometers in determining densities.

Having immersed a tube, closed at the lower end as before, in water, we pour water into the tube until it sinks about $\frac{2}{3}$ of its length. It should float upright. We are now to mark the surface of the water in which the tube floats, and also the surface of the water within the tube. The tube below this latter mark must be divided into 145 parts, either by etching on the glass or, what is more practical, by drawing a scale on paper, numbering the degrees from the top (0°) downwards. In ascertaining the density of any liquid heav-

*From the American Journal of Pharmacy. November

ier than water the tube must be emptied and dried by rinsing with alcohol and drawing air through by means of a long tube, then immersed in water of 60° F., and the liquid to be tried poured in until the tube sinks to the upper mark. It can then be taken out, and the degree of density shown on the tube, if it be etched, or else by holding it on the paper scale in its proper position.

Our illustrations have been thus far for liquids heavier than water; for those lighter than water the tubes require a different division. Unfortunately, Beaume's method of dividing his hydrometers rendered the degrees for those of light liquids larger than those for heavy liquids, and by comparison we find there are in a ratio of 145 to 140. In order, therefore, to make a scale for light liquids, we divide the space below the surface of the water within the tube into 140 parts instead of 145 parts, as at first; the degrees are then continued upwards 70 or more parts. These divisions are numbered at the water point 10° (another peculiarity of Beaume's scale), and running upwards so high as desired. The scale below the water point need not be marked, as it can only be used for liquids lighter than water.

Tne tube is used for all liquids in the same manner, namely, by pouring into it the liquid to be tried until it sinks in the water down to the mark made at first on the tube; then by holding it against the paper scale marked as just described. The surface of the liquid will indicate its proper degree of density.

An advantage which the tube when used in this manner possesses, is the small quantity of liquid necessary, as the tube can be made quite small in diameter, and by increasing its length the degrees are rendered larger, and thus greater accuracy is obtained. It may also be employed in ascertaining the density of extremely heavy liquids, were no hydrometer could be found of service.

APOTHECARIES.*

The word "apothecary" formerly signified any kind of store, magazine, or warehouse, and the proprieters were termed "apothecaries." "It would be a great mistake," observes Beckman, "if in the writings of the thirteenth and fourteenth centuries, were these expressions occur, we should understand under the latter term, 'apothecaries,' such as ours are at present. At these periods, persons were often called apothecaries who, at court, and in the houses of great people, prepared for the table various preserves, particularly fruit encrusted with sugar, and who, on that account, may be considered confectioners." At the time when this description of people was

*From Good Health. in Am. Jour. Phar.

as apothecaries, physicians prepared all their own prescriptions, purchasing the herbs from which they were compounded from the apothecaries, who had procured many of them from remote countries. After a time, however, these herb-dealers began to encroach on the business of their patrons, having, by study and vigilance, acquired a knowledge of the healing virtue of many of their commodities; but at what time the preparation of medicine was entirely resigned into their hands, or when they acquired, by a suitable course of study, the right to an exclusive practice in that business is not known. It is probable that physicians gradually became accustomed to employ such assistance for the sake of their own convenience when they found in the neighborhood a druggist in whose skill they could confide, and whose interest they wished to promote by resigning that occupation in his favor.

The first apothecaries, who were by law acknowledged as compounders of medicine, lived at Naples; and the well known edict of Frederick, the second, granting them many privileges and perquisites, was the foundation of the position which those of our own day occupy. By that edict it was required "that the confectionarii should take an oath to keep by them fresh and sufficient drugs, and to make up medicine exactly according to the prescriptions of the physician; and a price was fixed at which they might vend the medicine so prepared, and keep them a year or two for sale in a public shop." These shops were open only in certain places; and at first they were fitted up at the public expense, and each had a large garden where the apothecary was expected to rear all British medicinal plants. The preparation of drugs was becoming always more difficult and expensive. After the invention of distillation, sublimation, and other chemical processes, laboratories, furnaces, and costly apparatus were to be constructed; and it was thought proper that men who had regularly studied chemistry should alone follow pharmacy, and that they should be indemnified for their expense by an exclusive trade. It would appear that no suspicions were entertained that apothecaries could amass riches by their employment so good and easily as they do at present; (?) for they were allowed many other advantages, and particularly that of dealing in sweetmeats and confectionery, which were then very expensive delicacies. In many places they were obliged on certain festivals to give presents of such dainties to magistrates, by way of acknowledgment.

The first mention made of an English apothecary occurs in the reign of Edward the Third, who, it is said, bestowed, in the year 1345, a pension of sixpence a day on Coursus de Gange, an apothecary in London, for taking care of, and attending his majesty during his illness in Scotland.

About the same time that they were established in England, or somewhat later, they were also established in France and Germany, and of the regulations connected with them in many of the duchies

and principalities of the latter country there are some curious records. We shall transcribe one from Beckman:

"In Halle there was no apothecary's shop till the year 1493. Before that period medicines were sold only by grocers and barbers. In the above year, however, the council, with the approbation of the archbishop, permitted one Simon Puster to establish an apothecary's shop, in order, as stated in the patent, that the citizens might be supplied with confections, cooling liquors, and such like common things, at a cheap rate; and that in cases of sickness they might be able procure readily fresh and well prepared medicines. Puster was exempted from all taxes for ten years, but was obliged to furnish two collations in the time of yearly festivals of eight pounds of good sugar confections, fit and proper to be used at such entertainments.

At the Byzantine court the keeper of the wardrobe had the care in the sixteenth century, of the portable apothecary's shop whenever the emperor took the field. "It was called 'pandectæ, and contained antidotes, oils, plasters, salves, and herbs proper for curing men and cattle." What a step have not apothecaries made! How greatly they are advanced in the scale of society and deservedly, for they owe it to their own earnest and honest endeavours after knowledge.

THE MEDICINAL PROPERTIES OF THE COW TREE OF SOUTH AMERICA.*

BY JOHN R. JACKSON, A.L.S

Curator of the Museums, Kew.

The presence of milky juices in plants is not uncommon; indeed, it is a character of many natural orders. In the numerous plants which yield caoutchouc, or india-rubber, the juice, as it flows from the tree, is milky white, becoming colored on exposure to the air, or in process of solidifying. The juices of some of the milk-yielding trees, however, do not solidify, and they are used as an article of food. Several of these trees, from the fact of their yielding wholesome milks are known as Cow-trees. In South America, which is the head-quarters of these Cow-trees, they are called Palo de vaca, or Arbol de leche. Perhaps the best known of these trees is that referred to *Brosimum galactodendron*, Don. It grows in large forests on the mountains of Cariaco, and in other parts of the sea-coast of Venezuela. It forms a tree frequently over 100 feet high, and

*From the Pharmaceutical Journal & Transactions, Oct 26th 1872.

often running to a height of 60 or 70 feet high before branching. The milk, which is obtained by making incisions in the trunk, is said to have a very agreeable taste, somewhat resembling that of sweet cream, and a slightly balsamic odor; the only unpleasent feature about it is that it is somewhat glutinous, but is very nourishing and perfectly wholesome. Humboldt says, "We drank considerable quantities of it in the evening before we went to bed, and very early in the morning without feeling the least injurious effect. The negroes and the free people who work in the plantations drink it, dipping it into it their bread of maize, or cassava. The majordomo of the farm told us that the negroes grow sensibly fatter during the season when the Palo de vaca furnishes them with most milk. This juice, exposed to the air, presents at its surface—perhaps in consequence of the absorption of the atmospheric oxygen—membranes of a strongly-animalized substance, yellowish, stringy, and resembling a cheesy snbstance. For several months of the year not a single shower moistens its foliage. Its branches appear dead and dried; but when the trunk is pierced there flows from it a sweet and nourishing milk. It is at the rising of the sun that this vegetable fountain is most abundant. The blacks and natives are then seen hastening from all quarters furnished with large bowls to recieve the milk, which grows yellow, and thickens on its surface. Some empty their bowls under the tree itself; others carry the juice home to their children. Like animal milk, it turns sour and putrefies after a few days' exposure to the atmosphere It has been found to contain more than 30 per cent. of galactin."

Tabernæmontana utilis. Arn., known as the Hya-Hya, or Cow-tree of British Guiana, likewise yields a milky juice, which is perfectly bland and wholesome, though the general characters of the order are poisonous and acrid. The tree is tapped to obtain the milk. The milk, or Cow-tree of Para, known as the Massaranduba, has been referred to *Mimusops elata*, Allem; but its determination is doubtful, though there is no question of its belonging to the natural order Sapotaceæ. The milk, which flows slowly from the wounded bark, resembles good cream in consistence, but it is said to be too viscid to be a safe article of food.

Certainly, the most important in a pharmaceutical point of view of all the Cow-trees is the *Clusia galactodendron* of Desvaux. The tree has a thick bark covered with rough tubercles, and bears leaves of an obovate form and about three inches long. It is a native of Venezuela, but is also found in the Cauca Valley, north of the State of Antioquia, on the banks of the Abraeto river and on the Pacific coast as far as Tumaco.

Many interesting accounts have been given of this tree, but the following notes from a letter on the subject, written by Mr. R. B White, of Medellin, are the most comprehensive. The tree it appears, has a decided partiality for certain localities, and there can

be no doubt that while it needs the warm damp climate of the Choco, it likes good drainage, as it is always found on the low ridges just rising off the plains ; mean temperature 27° to 30° Cent., and never exceeds 200 metres above the level of the sea. The general utility of the milk of this tree is well known, but its most valuable property has been quite overlooked, that of curing dysentery. It contains a resinous and an astringent principle, and an aromatic and tonic substance. The action of this combination is mechanical so far as relates to the resin, which no doubt coats the intestines with a film and allays irritation; and, secondly, it is astringent, tonic and antispasmodic. So far a knowledge of the constitueuts of this milk would lead one thus to judge theoretically of its action. With regard to practice, no other mecicine is used in the Choco and on the Pacific coast of New Granada for dysentery ; and this disease is thought little or nothing of as it is so easily cured. The milk is to be procured everywhere, and is generally sold at from one to two dollars per bottle. Mr. White says, "For upwards of two years I saw it constanly used amongst the workmen employed on the Buena Ventura Road, Pacific Coast, and in the most unhealthy climate. We ad at times from 500 to 700 men employed, and out of numberless cases of severe dysentery I never knew of a fatal case, and I have seen cures effected when the cases had gone so far as to seem hopeless. As a general illustration of its actions, and method adopted of using it, I will refer to my own case. I was attacked with diarrhœa, which in two days passed into dysentery, very severe. In a short space of twelve hours I was reduced to a state of utter prostration, suffering the most excruciating pains imaginable. The bloody discharge was so terrible that it seemed easy to predict death within a few hours; not a shadow of a medicine was to be had, as I was in a hut in the woods, and the violent phase of the desease was only developed at night-fall, and thus I passed the night in a helpless state. At day-break the wife of one of our inspectors was called in as nurse, and by 9 o'clock "leche de vaca" was procured. Up to this time I had been getting rapidly worse, and was then hardly conscious. The milk was given to me (a table-spoonful in a glass of water with a little sugar) every half-hour till 12 o'clock midday, and at this hour I was perfectly free from dysentery or the slightest sympton of it. Broths and light food were then given to me for a few days, and I was restored to perfect health without taking any more milk or other medicine, and without having the least recurrence of symptoms of dysentery. I have seen many severe cases successfuly treated in this way, but none more severe than my own, and am sure that no medicine or known system of treatment can be so efficacious as this leche de vaca treatment.

"Admitting the fact of its power to cure dysentery, a little reflection will convince one that the composition of this milk is wonderfully calculated to produce the results I have stated. The only ques-

tion is, can it be used otherwise than in a fresh state. Up to a certain period I can answer this question in the affirmative. The milk, even when corked in a bottle, soon turns sour and coagulates, but this for many months at least does not impair its efficacy. It is possible that if putrefaction ultimately ensues, the milk will lose its properties. It is also possible that in certain cases the sourness of the milk would be prejudicial, but I do not see why this should not be remedied by the addition of some inoffensive alkali.

Mr. White says he has some milk which he brought himself from the Choco, which been contained in a bottle for more than a year and a half, and is apparently as good as ever. One of the great advantages of the use of this milk in dysentery is the radical cure it effects. Its tonic and astringent properties appears to be brought into play as they are required, and as the resinous principle first serves as a palliative, the antispasmodic tonic and astringent properties work out the cure.

Mr. White's opinion of the medicinal properties of this milk is so favourable that he concludes his notes by saying that he cannot but think that, in combination with other medicines, it might serve as a base for successful treatment of cholera.

It has been said that a single tree will yield as much as a quart in an hour. These notes will, no doubt, prove interesting to the readers of this Journal. An examination and trial of the milk in this country would also prove of much interest.

JAPANESE WAX AND ITS EMPLOYMENT IN PHARMACY.

BY DR. C. ROUCHER.

The vegetable wax, known under the name of Japanese or Chinese wax, is produced by the *Rhus succedaneum*. It is harder than ordinary wax, but much more fusible; the point of fusion indicated by various authors varying from 40°C. to 42°C, It is white, with a slightly yellowish tint, has a feebly rancid smell, and is more friable than beeswax.

As this vegetable wax is now much used in pharmacy, the author has sought to determine the exact point of fusion, and for this purpose examined two specimens, which yielded exactly similar results. This he did by using very thin closed tubes, 15 millimetres wide, in the lower third of which the substance was spread in a uniform layer. The tubes were then plunged into water at various temperatures, and the points noted of opacity, semi-transparence, complete transparence, and running against the sides of the glass.

The results obtained with the Japanese wax were as follows:—

At from 40°C. to 45°C. the wax remained opaque, provided that the temperature was raised one degree at a time; from 45°C. to 50°C. it became more and more transparent, without becoming mobile; at 53°C. it was transparent and nearly melted; at 54°C. it was completely fused. If the wax be rapidly raised to a temperature sufficiently above its melting-point, and, after cooltng, be plunged into water at 42°C. it melts into a transparent liquid. So that this wax has two melting-points—42°C. and 54°C.—separated from each other by twelve degrees; the highest being attained when the temperature is slowly and progressively raised.

Japanese wax is not the only substance presenting such anomalies in fusion and solidification, since, according to M. Duffy, natural stearine under the influence of heat undergoes three distinct modifications, which are produced in a similar manner by heating it beyond the melting-point and then cooling it. The same phenomenon is noticed in monomargarine and the palmitines.

To ascertain whether the wax operated on was constituted by a mixture of two or more substances, the separation of which might influence the phenomenon of fusion, the author dissolved a portion of it in boiling 90° alcohol. Upon cooling, the greater part of the wax separated; this, dried for some days in the open air, still contained a considerable quantity of water, which could be driven off by heat. Deprived of its water it presented exactly the same points of fusion, 42°C. and 54°C., and comported itself between these two extremes in the same manner as that which had not been treated with alcohol. Beeswax offers nothing similar; two specimens, one white and the other yellow, melting at the single temperatures respectively of 62 5°C. and 64°C.

The introduction of Japanese wax into pharmacy, and its substitution for beeswax, suggested the following experiments as to the relations of the points of fusion of cerates prepared with these two substances, both being used in the proportion of ten parts of wax to thirty-five parts of olive oil.

(1) *Japanese Wax and Olive Oil.*—At 30°C. it commenced to melt, but quickly stopped and became opaque and solid on the sides of the tube. From 32°C. to 45°C. the cerate, semi-transparent, ran slowly and sluggishly. At 46°C. it melted easily into a transparent mobile liquid. In this state if heated to 50°C., and after allowing it to spread in a thin layer and cooled, it was plunged into water at 32°C., it melted into a transparent syrupy liquid, accumulating at the bottom of the tube. Raised again to 50°C. and placed in water at 30°C. it became transparent, but only ran slowly. Upon repeating the operation with water at 28°C. it became transparent, but did not run, and gradually resumed its opacity. This showed that by the addition of the above proportion of olive oil to Japanese wax, its highest melting-point was lowered eight degrees—from 54°C. to 46°C.—and its lowest ten degrees—42°C. to 32°C.—the cerate, like

the wax contained in it, having two melting-points which are separated by fourteen degrees.

(2) *White Beeswax and Olive Oil.*—At 39°C. it commences to lose a little of its opacity; from 42°C. to 52°C. it becomes more and more translucent; at 54°C. transparent; at 46°C. runs slowly; at 57°C. it runs easily. So that a mixture of olive oil with beeswax in the proportions indicated, lowers the melting-point seven degrees. Just as there is a difference of ten degrees between one of the melting-points of Japanese wax and that of beeswax, there is a difference of ten degrees between those of the two cerates.

The observation of the melting-point alone would not be sufficient to distinguish between cerate made from vegetable wax and that from beeswax, as the melting-point might depend upon the proportion of olive oil present. But the existence of only a single point of fusion in beeswax might be a useful indication as to the presence or absence of Japanese wax, or probably of margarine or stearine. A cerate made with beeswax may also be distinguished from one made with Japanese wax, by the action of strong alcoholic solution of caustic potash, which dissolves entirely, even in the cold, a cerate made from the vegetable wax, but only dissolves very incompletely one made from beeswax.

It will thus be seen that from a pharmaceutical point of view the effect of substituting Japanese for beeswax, in medicaments having wax for their base, is a notable lowering of their melting-point; and a cerate made of the proportions indicated above would melt at the temperature of the human body, the mean of its two melting-points being about 37°C. or 38°C. It will therefore be evident that such a substitution should not be made without the greatest care.—*Journal de Pharmacie et de Chimie.*

EXPERIMENTS ON SPONTANEOUS COMBUSTION.

At the recent meeting of the British Association, Mr. J. Gallettly detailed the results of a number of experiments of which the following are the most important:

"The first of my experiments, was made at a temperature of about 170° Fahr., but I have made some at a heat a little over 130°, or about the temperature a body acquires by lying perpendicular to the sun's rays; the former temperature might represent the heat attained in the neighborhood of a steam pipe, or in front of an open fire.

"Boiled linseed oil with chamber kept about 170° Fahr.—A handful of cotton waste, after being soaked in boiled linseed oil, and removing the excess of this by wringing, was placed among dry

waste in a box 17 in. long by 7 in. square in the ends, Through a hole in the corner of this box, a thermometer was passed with its bulb resting amongst the oily cotton. Shortly after reaching the temperature of the warm chamber the mercury began to rise rapidly, namely, from 5° to 10° every few minutes, and in 75 minutes from the time the box was placed in the chamber the heat indicated was 350° Fahr. At this point smoke issuing from the box revealed that the cotton was now in a state of active combustion, and on removing it to the free access of air it burst into flame. In another similar experiment, temperature rose more slowly, but reached 280° Fahr. in 105 minutes, when, from the appearance of smoke, it was plain that the cotton was burning, and the whole mass was soon in a flame, on being placed in a current of air. On a smaller scale, I tried a quantity of the oiled cotton that just filled a common lucifer match box; within an hour it was on fire, the temperature of the chamber being 166° Fahr.

"Raw linseed oil, as generally supposed, does not so readily set fire to cotton as the boiled oil; but in two experiments, where the size of the box employed was 6½ in. by 4½ in. square in the ends, active combustion was going on, in the one case in five and the other in four hours.

"Rape oil, put up as in first experiment on boiled linseed, resulted, in two trials, in the box and cotton being found in ashes within ten hours. The box being put up at night, the result was only observed in the morning. In one trial I did not get the cotton to ignite in six hours; the chamber, in the cases of this oil and raw linseed, was kept about 170° Fahr. With the following oils at a little over 132° Fahr. the quantity of waste used was loosely packed in a paper box holding about the sixteenth of a cubic foot.

"Gallipoli olive oil.—The two trials made with this oil gave closely similar results; in one case rapid combustion was going on in a little more than five, and in the other within six hours.

"Castor oil.—I found the oxidation of this oil to proceed so slowly that only on the second day I found the interior of the box to be a mass of charred cotton. Its sp. gr. (963) is remarkably high, and its chemical nature very distinct from the other vegetable oils I have tried, which, no doubt, has some intimate connection with its slow oxidation.

"I have tried three oils of animal origin with effects very distinct and instructive.

"Lard oil, an oil of any ordinary specific gravity, namely, 916, produces rapid combustion in four hours.

"Sperm oil, which has a specific gravity of only 882, and is not a glyceride, showed its unusual chemical character by refusal to char the waste.

"Seal oil, which has a strong fish oil odor, not unlike the sperm,

but a specific gravity of 928, produced rapid ignition in one hundred minutes. Comparing raw linseed with lard and seal oils, it would appear that the statement is not altogether correct that drying oils are more liable to spontaneous combustion than non-drying oils. I have also some reason to believe that the rate at which oxidation takes place does not chiefly depend on the presence of small quantities of oxyotized or other easily putrefiable matters, but rather on the particular olein. However, further inquiry on this point is necessary. I have made at least two experiments with each oil, and have got remarkably uniform results. The ignition of the cotton can be calculated on for any oil, with about the same certainty as the point at which sulphur or other combustible material takes fire when heated in the air. So that the term 'spontaneous combustion' may be objected to for the same reason that Gerhard objects to 'spontaneous decomposition' produced by oxidation. The heavy oils from coal and shale, being chiefly the higher olefines, have a remarkable effect in preventing this oxidation, undoubtedly by giving a certain protection from the air. Mixtures of these oils with 20 per cent rape gave no indication of heat whatever at 170° Fahr.; and even seal oil, with its own bulk of mineral oil added to it, did not, at 135°, reach a temperature sufficient to char the cotton."

Editorial.

LADY PHARMACISTS.

By a decision of the British Pharmaceutical Council it was lately resolved that the regulations of that body should be so far modified as to allow of the attendance of ladies at the lectures in Bloomsbury Square. These lectures are given by Professor Bentley, of King's College, and Professor Redwood, and are considered as thorough and complete as any delivered in London. This gallantry and consideration on the part of the Council have been, in some measure, appreciated by those for whom it was intended, inasmuch as one entry has been made for the present session.

Whatever may be our convictions in regard to the admission of lady pharmacists, we have too much good sense, if not experience, not to know that, in cases of this kind, discretion is the better part of valor, and we would, therefore, beg to forego any discussion of the subject. It is not so with some of those who ventillate their views in some of the English publications. The editor of the *Pharmaceutical Journal* alludes to one of his correspondents who characterizes the recent change as "one of the most *disgusting* acts the Board of Examiners has allowed since *he* joined the society in 1844." Who this disgusted individual is we are not told, but it is certain that he bears no very amiable feelings towards the gentler sex. One might safely lay a wager that he is a bachelor—confirmed, ill-humored, surly, coarse, and cross-grained. He may be old—indeed the fact of his joining the Society in 1844 would strongly favor the supposition of his having advanced considerably into the sere and yellow. If so, we will let his gray hairs be his protection, and let him pass.

If we are to have lady doctors, we do not see how any one can offer any consistent opposition to lady pharmacists. If their qualications to practice either of these callings or professions be guaranteed by their submitting to the same educational tests as men, we may consent to leave the consideration of sex out of the question. It is, however, necessary that these conditions be as rigidly car-

ried out in one case as the other, and to this end it is only right that equal educational facilities should be allowed.

The *Pall Mall Gazette* takes a similar view of this subject, insisting upon the qualification of lady pharmacists, and alluding to the time, prior to the passing of the Pharmacy Act, when the widows of chemists engaged in pharmaceutical pursuits; not always to the benefit of the community. A recent case is instanced, wherein it was proved that a self-educated female pharmacist had been the means of causing death, by confounding *pulv. opii Turc.* with *pulv. rhei Turc.*, thinking probably that geographical implied also therapeutical identity. Blunders as inexcusable have often been made by male pharmacists, and it remains to be proved whether, with adequate qualification, ladies would not be as reliable dispensers as men.

We do not think that lady pharmacists will ever be a very numerous class. Our churlish bachelors may rest perfectly easy on that score. No department of labor, or sphere in life, seems so adapted to females as the domestic, and generally speaking, ladies, themselves, are not slow in finding this out. It has almost invariably been found, by those who have had experience in these matters, that however proficient a female may become in any avocation, she seldom becomes attached to it to such a degree that she will not desert it for the charms of the domestic hearth. It may be that the designer of all things implanted this desire in the female, and that in seeking and assuming household cares she is merely acting in obedience to the promptness of instinct. But we are getting upon dangerous ground and had better confine ourselves to the remark that if the great Napoleon's reply to Madam de Stael was a correct one, the mothers of our children, will, at least, be none the worse for their knowledge of the virtues of the *elixir paregoricum*, or the regulating qualities of *pulvis Gregorii*.

Adulteration of Food and Drugs.—A new law respecting adulteration has been past, recently, in England. It provides for the appointment of "persons possessing competent chemical, medical, and microscopical knowledge, as analysts of all articles of food, drink and drugs." Certain local authorities have the power of appointing these analysts, and we learn that in some districts and cities

appointments have been made, and that, already several parties have been proceeded against. It was, at first, thought that only duly qualified medical practitioners could hold these positions, but in answer to a question submitted to the Attorney General, by the Pharmaceutical Council of Great Britain, it has been aseertained that any qualified person may be appointed. The field is, consequently, open to pharmaceutical chemists, and will, no doubt, be largely taken advantage of by that body.

EFFECT OF ARSENIOUS ACID ON THE TEETH.—It is stated by M. Magitot that this acid, when internally administered, possesses the curious property of causing the renewal of certain parts of the teeth.

The English pharmaceutical journals contain a list of names comprising about one thousand pharmaceutical chemists and associates, who, it may be assumed, have failed to respond to the pecuniary demands of the Registrar, and who are by this means notified that unless they come to time by the 30th of December next, they will suffer excommunication, and their names will be erased from the official register. We commend to our Registrar in Ontario, a similar course to that taken in England. We understand that there are still a few who have neglected the gentle reminders which have, from time to time, been forwarded to them, and it might be that a conditional "Index Expurgatorius" might afford a means of escape from the registerial anathemas which, sooner or later, must be pronounced.

THE GLYCERINE TEST FOR CREASOTE.—We have received the following notice from Mr. T. M. Morson, of London:—"Mr. Enno Sander, of St. Louis, reported to a meeting of the American Pharmaceutical Association that he had tested several specimens of creasote, and had found only one to reply to the glycerine test. This confirms my statement made at the British Pharmaceutical Conference, and published in the PHARM. JOUR. of the 21st September.

Since these observations were made, we have examined numerous imported specimens, and have found only one, that produced by Mr. Trommsdorff, to be the genuine creasote of Reichenbach. All the others were phenic acid, or a mixture of that acid in large proportion.

I have no doubt that creasote may be obtained by the distillation of various resins. The interesting remarks on Guaiacol made by Mr. Williams at the Brighton meeting prove, at all events, that it may be prepared from Gum Guaiacum."

Editorial Summary.

SOLUBLE SULPHATE OF QUININE.—J. Donde, *(Am. Jour. Phar.)* alludes to the method of making this preparation given by Soubeiran and others. As the exact quantities of the ingredients are not stated, he gives the following formula as having produced a satisfactory preparation :—

Quinia sulphate, basic...	150 grm.
Rain water...	2 litres.
Sulphuric acid, 66°.....	22 grm.

The acid is mixed with the water in a porcelain capsule, the sulphate is then added, and the mixture occasionally agitated until dissolution has taken place, which required about an hour at a temperature of 29° C. After filtering, the evaporation is continued till the liquor is reduced to 600 grm.; 24 hours afterwards the crystals are taken out, and the mother liquor remaining is evaporated a second time in order to obtain more crystals. The mother liquor finally remaining is used for precipitating the quinia.

FUSION OF ARSENIC.—The generally received opinion that arsenic cannot be fussed, but passes directly from the solid to the vaporous state, has been questioned by Dr. J. W. Mallet of the University of Virginia, *(Chem. News*, August, 1872), who instituted

several experiments in order to settle the point. Metallic arsenic was enclosed in a strong barometer tube of glass, which was further strengthened by being placed within a closed iron tube, and packed tightly with sand. The whole was heated to redness by a charcoal fire, and when the heat was withdrawn it was found that the arsenic had fused into a perfectly compact, crystalline mass, moulded to the shape of the tube. It possessed a steel grey color, and brilliant lustre; was of Sp. gr. 5.709 at 19° C.; possessed a considerable degree of cohesive strength, as compared with common sublimed arsenic, and seemed to be slightly malleable. It tarnished gradually by exposure to air and in other respects resembled the sublimed metal. The temperature required for fusion lies between the melting points of of antimony and silver.

Purification of Bismuth.—Mr. Edward Smith, F. C. S., *(Phar. Jour. and Trans.)* recommends the process of Hugo Tamm, *(Chem. News*, Vol. xxv, p. 100), has having proved very efficient and satisfactory as regards the separation of copper. Compared with the *British Pharmacopœia* process of fusion with nitre, it affords much better results, both as to the purity of the resulting metal, and the loss entailed by the process. Tamm says "The sulphocyanide which I use is prepared by mixing eight parts of cyanide of potassium and three parts of sulphur, one part of this mixture is thrown over sixteen parts of the metal, melted at a low temperature." A bright red heat is sufficient, such as may easily be obtained by the use of a good lamp. Mr. Smith tested bismuth treated after this method and found the separation of copper complete. The loss of bismuth, in small operations, may easily be kept under five per cent. while by the nitre process, as stated by Mr. Schacht, *(Phar. Jour. April*, 1868) it ranges between seven and seventeen per cent. The proportion of cyanide laid down by Tamm refers to the pure salt. If commercial fused cyanide be employed, a larger quantity must be used. Prractically, fifty parts of impure metal require from three and a half to four of fused cyanide to one part of sulphur. If a deficiency of cyanide be used, sulphide of bismuth is formed, thus envolving a second fusion, or entailing a great loss of metal.

CULTIVATION OF CINCHONA IN INDIA.—From the annual report made by Mr. George King, M.B., Superintendent of Botanical Gardens, and in charge of Cinchona cultivation in Bengal, we glean the following particulars regarding the year's operations. During that period 166,285 plants of *Cinchona succirubra*, and 44,500 of *Cinchona calisaya* have been added to the permanent plantation. Propagation has been carried on vigorously, the seed and nursery beds containing, at least, 600,000 young plants of the former, and 147,500 of the latter species. The plantations of young trees have been thoroughly inspected, and weakly trees cut out. The bark from these, together with that obtained from the prunings of other trees, amounted to 116,000 pounds (equal to about 39,000 pounds of dry bark). Of this some 7,000 pounds was sold at auction in London, realizing an average of one shilling and fivepence per pound. The total number of plants, cuttings and seedlings at present growing on the plantations is 2,394,799. Of these two millions belong to *C. succirubra*, and the remainder to five other species. Regarding the cultivation of cinchona in India, Dr. King thinks its production as a crop cannot fairly be considered, as yet, beyond the condition of an experiment. "It has indeed been demonstrated that cinchona trees can be grown successfully up to the age of about ten years, and that their bark is quite as rich in alkaloids as that obtained from the South American forests; but whether they will reach maturity remains to be seen. It has still to be settled how the bark crop can most advantageously be taken, and the respective merits of the systems of mossing as invented and practiced by Mr. McIvor, of systematic coppicing, and of working forest-fashion by selection and thinning, cannot be determined without much additional experience. Connected with the commercial aspect of the matter, there are as unsettled problems, the probable extent to which the price of the drug will be affected by the introduction into the European market of the large quantities of bark which must soon begin to be turned out by the various Indian and colonial plantations that have been established, the amount by which the demand for preparations of cinchona will be increased by the fall in their price, which is almost certain to take place, and finally, the advantages or disadvantages of the manufacture of an amorphous preparation at the plantation as opposed to the complete separation of each alkaloid in a pure form, or to the more primitive plan of exporting all the bark to England, and of taking prepared alkaloids in exchange as part payment.,'

TEST FOR PUS.—A new test-fluid has been proposed by Dr. Day, of Australia, a saturated alcoholic solution of guaiac resin is exposed to the action of the air until it possesses the property of turning green when placed in contact with iodide of potassium. A drop or two of this liquid poured upon the most minute quantity of pus, previously moistened with water, strikes a clear blue color.

ADULTERATION OF PALM OIL.—Of five samples of palm oil examined by Professor Cameron, Analyst of the City of Dublin, three contained, respectively, 57, 60 and 68 per cent. of water. It may be noted that these adulterated oils were principally used for lubricating purposes, by railway companies, and that the two remaining samples, which were passably pure, were obtained from wholesale druggists.

THE ODOROUS PRINCIPLE OF ORRIS.—A paper on "Florentine Orris," read by Mr. Henry Groves, before the British Pharmaceutical Conference, gave rise to some little discussion as to the particular principle upon which the odor of orris depends. Mr. Haselden was of opinion that it was an essential oil. He alluded to an oil which had been introduced from Germany, and sold at a very high price, as the oil of orris, but he was of opinion that it was not the pure essential oil. He had tried to obtain the oil by distillation with water, but had not been successful, the main difficulty arising from the tendency of the watery mixture to boil over; or of the bruised orris to stick to the bottom of the still before the boiling point is reached, or during the operation. By making a tincture, and distilling it, much of the perfume remains with the resin; the distillate being but faintly odorous. The best method appeared to be that of distilling the root with some volatile oil, and in this way it was asserted that most of the odor might be brought over in combination with that of the oil employed. The orris root should be first soaked in water, sliced, and then mixed with the oil with which it is to be distilled, oil of geranium had been found to answer a good purpose. Mr. Umney said that he had had considerable experience in regard to orris, and had no doubts in regard to the existence of an essential

oil, reprssenting the odor of the root. He had distilled many tons of the latter and found the yield to be about one part from one thousand. The oil obtained resembled cacoa butter, and communicated an exceedingly powerful odor to alcohol. It was very expensive, more so, perhaps, than otto of rose. It was suggested by one of the members present that this oil might be the orris camphor described by Gmelin. Prof. Wayne thought the odorous principle depended more upon the soft resin than upon the oil, but this does not appear to have been the case with the oil described by Mr. Umney.

A DISPENSING DIFFICULTY.—A correspondent of the *Pharmaceutical Journal* of London asks advice regarding the following prescription, which he had been unable to dispense satisfactorily. The pills were required small, hard, and, of course, containing the full amount of creasote :—

R. Creasote ..... 20 minims.
Pot. Chlor.....
Pulv. Rhei *aa*..... ½ drachm.
Ft. pil. xx in fol. arg. involv.

The editor tenders the following advice :—The addition of one grain of oil of theobroma will have the desired effect, and form a hard, compact mass. In all cases where creasote is ordered in pills along with dry powders, it will be found useful, as creasote and it are miscible. The above will require careful manipulation; on trituration, the oil of theobroma will soon become plastic, but the mass should not come in contact with the warm hand, or the pills be kept in a warm place. The silvering should be done by means of a little thin mucilage, in which the pills should be rolled in a gallipot, so as to get them well moistened and partially dried before placing them upon the silver leaf.

IMPROVED METHOD OF PREPARING CLEAR SHELLAC VARNISH.—The *Journal of Applied Chemistry* contains a translation from Polytechnisches Notizblatt, in which is given the details of an examination made by Dr. N. Grager, as to the composition and man-

ner of preparation of the eelebrated "Paris Lac," a varnish of unrivalled clearness and durability. This was proved to be a solution of shellac in alcohol, in the proportion of one-third of the former to two thirds of the latter. Although solution is easily effected, it is exceedingly difficult to obtain a varnish at all approaching the "Paris Lac" in clearness, or smoothness in drying, as the solution is too thick to clear by subsidence or filtration. Dr. Grager at last succeeding in overcoming these difficulties by employing the following method:—One part of good shellac is dissolved in three to four parts of 92 per cent. alcohol in a large flask on the water-bath. To the solution is gradually added enough distilled water to produce a caseous precipitate, with a clear, supernatant liquid; generally about one part of water to three parts of alcohol is required. The whole is passed through linen, the cake pressed out, and the liquid filtered through paper, which operation requires but little time. The expressed cake may be stirred up again with 67 per cent. alcohol, the liquid pressed out and put with that first obtained. The clear solutions are put in a retort and all the alcohol distilled off, the resin taken out and dried on a water bath to constant weight. The perfectly dry resin is dissolved in double its weight of absolute (or at least 96 to 98 per cent.) alcohol, and the solution perfumed with some oil of lavender. It is generally stated that the substance which separates from the shellac is of a waxy nature, but this is incorrect. On the contrary, it is a peculiarly fatty acid, soluble in warm ether, alcohol, benzine, &c., and separates again on cooling. It forms with carbonated alkalies soapy compounds, and, if a person had much of it, could be mixed with other fats and used for soap making.

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Transactions of Pharmaceutical Colleges and Societies.

MONTREAL COLLEGE OF PHARMACY.

The regular monthly meeting of this college was held at the rooms of the Pharmaceutical Association, on Thursday evening, Nov. 5th. Being the occasion of the Annual commencement, Mr. J. Gardner, President of the college, delivered the opening address, in which the present state of the retail drug business was made the especial subject of remark. The main substance of the address is contained in the following summary:

"At the opening of this, the present session of the college of Pharmacy of Montreal, and from the honorable position in which I am placed in by the members and Council, as President of this College, and as a representative of the Retail Drug Trade, I have thought it proper and appropriate to the best of my ability, to give a few outlines of the status of the Retail Drug trade as it is at present in this province, and more particularly so in this our city. Firstly—The morale of our trade is such that any member of it cannot but feel proud that he is a Druggist, for I imagine that our enemies, if we have any, would fail to find a charge of unfair dealing amongst us and moreover, I think I can safely affirm that a more honorable class of citzens are not to be found in Her Majesty's dominions. Their prospects, as far as I can gather, are favorable, and the chances of the Chemist and Druggist in both the provinces of Ontario and Quebec are fair, as far as regards their securing a proportionate remuneration for their acquired ability and close attention to their calling; but by no menas such as will lead to their securing a rapid fortune in these days of close competition and multiplicity of stores. In this city, in my opinion, the expensive way of carrying on the Retail Drug Business by renting a store for the business at a high rate, in the first place, and then doubling the expenses by living away from the place of business, will ere long be found impractible, and and those who wish to make both ends meet must secure first of all, a fair locality, and at the same time secure a dwelling above their place of business.—Another, and a considerable drawback to the chances of success in carrying on the Drug Business, exists in the fact that some of our Wholesale Houses have, to all appearances, a Retail Department wherein the legitimate business of the retail druggist is largely interfered with. Of late so much has been both said and written on the subject of Prescription, that I deem it unwise, at this moment, to dwell at any length upon

this most important feature relative to a succesful reward for the labors we have performed, and we as a body corporate, intend fully to carry out, while most of the prominent medical men, after the efforts put forth by some of our craft in trying to have this abuse of power quashed, seem determined still to pursue this, the greatest barrier to the just and expected reward of faithful and persistent study. I learn with gratitude that young members of the profession, commencing practice for themselves, scout the injustice of building up one pet establishment at the expense of the well-earned-reputation of others equally deserving of their patronage; and, therefore, we do hope that this marked interference with the mutual welfare of the members of this and kindred societies will die out with the generation that promulgated its existence, and that from this fact a stimulus will take hold of the junior members of our college that shall urge them to pursue their studies in the different branches now so happily within their reach. Another feature to the well-being of ourselves and of others in the different branches of the retail trade, and one which I think I can not lay to much stress upon, is the shortening of the hours of counter service. I will ask any one that has studied the powers of mind and of body which man possesses, that after one has given close application say from 8 a m. to 8 p m., in filling his office as dispenser of medicines, or attending to other counter duties is he then in a fit state to attend lectures with profit, and must he not deprive himself of a serious amount of repose, which these powers demand, to read and study the lectures he has heard unless he steals that time from his alloted employment, by thinking over these matters, instead of his employer's business. I would say, gentlemen, if we wish to have an intelligent staff of men surrounding us, let us curtail the hours of shop service, and give more time to ourselves and to our young men to attend the literary and scientific institutions which are at present crying out for support. Doubtless we are entering upon an era when so much valuable time, which at present is wasted by the customs of the age, will be used for a better purpose. Next, so far as we the members and associates of this College are concerned, we have courses of lectures on Materia Medica, Botany and Chemistry provided for this Session, and we are pleased to find that a good number have given in their names as students for the course. I may here remark that it is more than probable that before long the Pharmaceutical Association of the Province of Quebec will secure the passing of an act of Parliament, that will make it compulsory upon every one, who desires to establish himself as a Chemist and Druggist in this Province, to show that he has attended such a number of courses of lectures; and also that he will have to pass such an examination before a board of apothecaries provided by the aforesaid acts, ere he can lawfully commence business in this Province as a Chemist and Druggist. We hope that employers in those business houses where

the young men have enrolled their names as students will give them every facility their business will admit of to attend upon the study necessary to successfully carry out the objects this College has in view, viz:—that of having a class of men as chemists and druggists, whose qualifications cannot be disputed. Before closing it appears to me worthy of note that the physician may have some reasonable ground in directing his patient to an apothecary in whom he has implicit confidence, from the fact that instances have occured where that careful attention has not been given which would warrant an indiscriminate plan of carelessly giving out prescriptions. In such cases the old adage is brought out—the dishonest make the honest suffer; or in this case, the incompetent and careless brings unmerited loss and reproach upon his more competent and careful confreres.

The remarks of the President led to some interesting discussion.

At the close of the meeting a vote of thanks was moved by H. R. Gray, Esq., and seconded by R. Bolton and John Kerry, Esqs., and carried unanimously.

Practical Formulæ.

Essence of Moss Rose.—

R	Otto Rose.....	one and a-half drachms.
	Ess. Ambergris.....	two and-half ounces.
	Ess. Musk.....	one ounce.
	Alcohol.....	fifteen ounces.
	Aq. Rosæ Conc.....	ten ounces.

Silicated Cements.—If a silicate of soda of 33° B, is intimately mixed with precipitated chalk, so as to form a thick plastic mass, with the addition of the following substances, cements of different colors and extraordinary solidity are produced, mostly drying in from six to eight hours and allowing of an extended application for chemical as well as industrial purposes. Using first finely powdered sulphuret of antimony, a black cement is formed, which, after solidifying, may be polished by means of an agate. 2. With limatura ferri in impalpable powder, a grayish-black cement is produced. 3. Zinc-dust (so-called zinc-gray) forms a gray cement, which becomes very hard, and after solidifying assumes the shining white color of metallic zinc when polished with an agate. 4. Carbonate of copper forms a light green. 5. Oxide of chromium, a dark green. 6. Cobalt-blue, a blue. 7. Litharge, an orange-colored. 8. Vermillion, a light red.

9. Carmine, a violet-red cement. Solution of silicate of soda mixed with carbonate of lime alone forms a cement of great solidity; equal parts, by measure, of sulphuret of antimony and limatura ferri mixed with solution of silicate of soda to a stiff paste forms a black cement of extraordinary hardness; zinc-dust and limatura ferri in the same proportions as the preceding forms a cement of a dark gray color.—*Jour. f. prakt. Chemie.*

Gold Varnish.—Turmeric, 1 drachm; gamboge, 1 drachm; oil of turpentine, 2 pints; shellac, 5 ounces; sandarac, 5 ounces; dragon' blood, 7 drachms; thin mastic varnish, 8 ounces. Digest, with occasional agitation, for fourteen days, in a warm place, then set aside to fine, and pour off the clear.

Varieties.

THE ACTIVE PRINCIPLE OF THE AQUEOUS DISTILLATE OF CANTHARIDES.—E. Rennard proved, from the blistering effects, the presence of cantharidin in a cat poisoned with the distillate obtained from cantharides, and proved its presence also in the distillate in the same manner. The author altered Bluhm and Dragendorff's method for preparing cantharidin somewhat; the mixture of powdered cantharides, magnesia and water is exsiccated, the residue saturated with chloroform, supersaturated with sulphuric acid and exhausted with ether. He obtained from four samples 0.38, 0.431, 0.439, and 0.57 per cent. of cantharides. Boiling water dissolves between 0.290 and 0.297, cold water, 0.2, boiling alcohol, 2.03 to 2.168, cold alcohol, 0.127, boiling benzol, 3.38, cold benzol, 0.51, boiling muriatic acid of 1.17 sp. gr., 0.3, and the cold acid, 0.137 per cent. cantharidin. Cantharidin volatalizes with the vapors of chloroform at 60°C. Distilled with water, the first portions contain the largest proportion of cantharidin. The aqueous distillate of cantharides contains besides cantharidin an animal oil of low boiling point, which decreases with the age of the insects.—*N. Jahr. f. Pharm. in Am. Jour. Pharm.*

HYGIENIC VALUE OF FLOWERS.—The old notion that odorous flowers are injurious to the health seems to have been overturned by some recent experiments of Professor Mantegazza. He found that flowers with powerful perfumes, such as the hyacinth, heliotrope, mignonette, etc., develop large quantities of ozone, and hence he attributes to them great hygienic value in the purification of the air in marshy districts. It also appeared that flowers with fainter perfume produce less ozone, and those which are odorless none at all.—*Phila. Med. and Surg. Reporter.*

ANTIDOTE AGAINST CARBOLIC ACID.—Th. Husemann recommends sugar lime, prepared by dissolving 16 parts of white sugar in 40 parts of water, digesting with lime for three days, filtering and evaporating.—*Ibid.*

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DRUGS, MEDICINES, &c.	$ c.	$ c.
Acid, Acetic, fort	0 12 @	0 14
Benzoic, pure	0 25	0 35
Citric	1 40	1 50
Muriatic	0 5	0 06
Nitric	0 7½	0 15
Oxalic	0 35	0 40
Sulphuric	0 03¾	0 07
Tartaric, pulv	0 50	0 50
Ammon, carb. casks	0 22	0 22
" jars	0 22	0 22
Liquor, 880	0 25	0 28
Muriate	0 12½	0 15
Nitrate	0 45	0 60
Æther, Acetic	0 45	0 50
Nitrous	0 35	0 37
Sulphuric	0 50	0 50
Antim. Crude, pulv	0 13	0 17
Tart "	0 65	0 70
Alcohol, 95 per ct.....Cash	1 60	1 72
Arrowroot, Jamaica	0 16	0 22
Bermuda	0 45	0 65
Alum	0 02¾	0 03½
Balsam, Canada	0 40	0 42
Copaiba	0 80	0 85
Peru	3 80	4 00
Tolu	0 90	1 00
Bark, Bayberry, pulv	0 20	0 22
Canella	0 17	0 20
Peruvian, yel. pulv	0 42	0 50
" red "	2 10	2 20
Slippery Elm, g. b	0 15	0 20
" flour, packets	0 28	0 32
Sassafras	0 15	0 15
Berries, Cubebs, ground	0 20	0 25
Juniper	0 06	0 10
Beans, Tonquin	0 62	1 10
Vanilla	28 00	28 00
Bismuth Alb	3 60	4 00
Carb.	3 65	4 00
Camphor, Crude	0 38	0 40
Refined	0 50	0 55
Cantharides	2 80	3 00
Powdered	2 85	3 10
Charcoal, Animal	0 04	0 06
Wood, powdered	0 10	0 15
Chiretta	0 20	0 30
Chloroform	1 25	1 65
Cochineal, S. G	0 80	0 95
Black	1 10	1 20
Colocynth, pulv	0 50	0 60
Clolodion	0 70	0 75
Elaterium.....oz	5 80	5 90
Ergot	0 65	0 75
Extract Belladonna	2 20	2 50
Colocynth, Co	1 25	1 75
Gentian	0 50	0 60
Hemlock, Ang	0 85	0 95
Hen. bane, "	1 80	2 00
Jalap	5 00	5 50
Mandrake	1 75	2 00
Nux Vomic.....oz	0 40	0 50
Opium.....oz	—	—
Rhubarb	5 00	5 50
Sarsap. Hon. Co	1 00	1 20
" Jam. Co	4 80	5 00
Taraxicum, Ang	0 70	0 80
Flowers, Arnica	0 25	0 35
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 95	1 35
" " pulv	1 00	0 00
Arabic, White	0 70	0 75
" powdered	0 60	0 75
" sorts	0 28	0 30
" " powdered	0 42	0 50
" com. Gedda	0 13	0 16
Assafœtida	0 40	0 42½
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 25	1 35
Guaiacum	0 35	1 00
Myrrh	0 50	0 70

DRUGS, MEDICINES, &c.—*Contd.*	$ c.	$ c.
Sang Dracon	0 60	0 70
Scammony, powdered	6 50	6 75
" Virg. "	14 50	—
Shellac, Orange	0 55	0 60
Gum, Shellac, liver	0 50	0 52
Storax	0 40	0 45
Tragacanth, flake	1 10	1 40
" common	0 53	0 65
Galls	0 28	0 32
Gelatine, Cox's 6d	1 15	1 20
Glycerine, common	0 30	0 35
Vienna	0 32	0 40
Prices	0 60	0 75
Honey, Canada, best	0 15	0 17
Lower Canada	0 14	0 16
Iron, Carb. Precip	0 17	0 20
" Sacchar	0 40	0 55
Citrate Ammon	1 50	1 50
" & Quinine, oz	0 55	0 60
" & Strychine "	0 17	0 25
Sulphate, pure	0 08	0 10
Iodine, good	12 50	—
Resubiimed	15 00	—
Jalapin	1 25	1 50
Kreosote	2 00	2 10
Leaves, Buchu	0 22	0 30
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 06	0 07
Sulphate	0 08	0 12½
Lead, Acetate	0 14	0 15
Leptandrin.....oz.	0 60	—
Liq. Bismuth	0 50	0 75
Lye, Concentrated	1 75	2 00
Liquorice, Solazzi	0 5	0 55
Cassano	0 25	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 45	0 50
Mercury	1 30	1 35
Bichlor	1 15	1 0
Chloride	1 55	—
C. Chalk	0 65	—
Nit. Oxyd	1 50	—
Morphia Acet	4 00	4 25
Mur.	4 00	4 25
Sulph	4 25	4 50
Musk, pure grain.....oz	22 00	—
Canton	0 90	1 20
Oil, Amonds, sweet	0 45	0 52
" bitter	14 00	15 00
Aniseed	4 25	4 50
Bergamot, super	5 50	6 00
Carraway	4 00	4 20
Cassia	2 40	2 50
Castor, E. I	0 15	0 15
Crystal	0 22	0 25
Italian	0 26	0 28
Citronella	1 35	1 50
Cloves, Ang	1 75	2 00
Cod Liver	1 45	1 50
Croton	1 75	2 00
Juniper Wood	0 80	1 00
Berries	6 00	7 00
Lavand, Ang.....oz.	0 90	1 00
Exotic	1 40	1 60
Lemon, super	5 00	5 50
ord	3 20	3 40
Orange	5 25	5 50
Origanum	0 65	0 75
Peppermint Ang	13 00	14 40
" Amer	3 25	3 50
Rose, Virgin	8 00	8 25
" good	5 75	6 00
Sassafras	1 15	1 40
Wintergreen	6 00	6 50
Wormwood, pure	4 00	6 50
Ointment, blue	0 90	1 00
Opium, Turkey	8 50	8 75
pulv	10 25	10 50

DRUGS, MEDICINES, &c.—*Cont'd*	$ c.	$ c
Orange Peel, opt.	0 30	0 36
" good	0 12½	0 20
Pill, Blue, Mass	1 00	1 00
Potash, Bichrom	0 23	0 27
Bi-tart	0 30	0 32
Carbonate	0 14	0 20
Chlorate	0 65	0 70
Nitrate	10 50	11 00
Potassium, Bromide	1 40	1 60
Cyanide	0 75	0 80
Iodide	11 50	11 75
Sulphuret	0 25	0 35
Pepsin, Boudault's oz	1 50	—
Houghton's doz.	8 00	9 00
Morson's oz.	0 85	1 10
Phosphorus	0 75	0 85
Podophyllin	0 50	0 60
Quinine, Pelletier's	—	2 45
Howard's	2 50	—
" 100 oz. case.	2 45	—
" 25 oz. tin.	2 40	—
Root, Colombo	0 13	0 20
Curcuma, grd	0 12½	0 17
Dandelion	0 17	0 20
Elecampane	0 16	0 17
Gentian	0 10	0 12½
" pulv	0 15	0 20
Hellebore, pulv	0 17	0 20
Ipecac, "	2 20	2 30
Jalap, Vera Cruz	1 00	1 25
" Tampico	0 70	1 00
Liquorice, select	0 12	0 13
" powdered	0 15	0 20
Mandrake "	0 20	0 25
Orris, "	0 20	0 25
Rhubarb, Turkey	2 50	2 75
" E. I	1 10	1 20
" " pulv	1 20	1 30
" " 2nd	0 90	1 00
" French	0 75	—
Sarsap., Hond	0 40	0 45
" Jam	0 88	0 90
Squills	0 10	0 15½
Senega	1 35	1 50
Spigelia	0 40	0 45
Salts, Epsom	2 25	3 00
Rochelle	0 32	0 35
Soda	0 02½	0 03
Seed, Anise	0 13	0 16
Canary	0 05	0 06
Cardamon	2 85	2 95
Fenugreek, g'd	0 09	0 10
Hemp	0 06½	—
Mustard, white	0 14	0 16
Saffron, American	1 15	1 50
Spanish	15 00	17 00
Santonine	9 00	10 00
Sago	0 08	0 09
Silver, Nitrate Cash	14 85	16 50
Soap Castile, mottled	0 11	0 14
Soda Ash	0 04	0 05
Bicarb. Newcastle	6 25	6 50
" Howard's	0 14	0 16
Caustic	0 06½	0 06½
Spirits Ammon., arom	0 25	0 35
Strychnine, Crystals	2 20	2 50
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 75	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
Analine, Magenta, cryst	3 00	4 00
" liquid	2 00	—
Argols, ground	0 15	0 25
Blue Vitrol, pure	0 10	0 10
Camwood	0 06	0 09
Copperas, Green	0 01½	0 02½
Cudbear	0 16	0 25
Fustic, Cuban	0 02½	0 04
Indigo, Bengal	2 40	2 50
Madras	0 95	1 10
Extract	0 30	0 35

DYESTUFFS—*Continued.*		
Japonica	0 06¼	0 06½
Lacdye, powdered	0 33	0 38
Logwood	0 02	0 03
Logwood, Camp	0 02	0 3½
Extract	0 10	0 14
" 1 lb. bxs	0 14	—
" ½ lb. "	0 15	—
Madder, best Dutch	0 15	0 17
2nd quality	0 14	0 16
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 39	0 40
Cloves	0 18	0 18
Cayenne	0 18	0 25
Ginger, E. I	0 12	0 14
Jam	0 20	0 30
Mace	1 75	1 75
Mustard, com	0 20	0 25
Nutmegs	1 15	1 20
Pepper, Black	0 22½	0 23
White	0 40	0 42
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 07	0 08
Venetian	0 02½	0 03½
Sienna, B. & G	0 10	0 15
Umber	0 07	0 10
Vermillion, English	1 30	1 35
American	0 25	0 35
Whiting	0 85	0 90
White Lead, dry, gen	0 08	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 25	—
" No. 1	2 05	—
" No. 2	1 85	—
" No. 3	1 65	—
" com	1 30	—
White Zinc, Snow	2 75	3 25
NAVAL STORES.		
Black Pitch	5 00 @	5 25
Rosin, Strained	5 50	—
Clear, pale	7 80	—
Spirits Turpentine	0 80	0 85
Tar Wood	5 00	5 25
OILS.		
Cod	0 63 @	0 65
Lard, extra	0 95	—
No. 1	0 90	0 95
No 2	0 85	0 90
Linseed Raw	0 80	0 85
Boiled	0 85	0 90
Olive, Common	1 15	1 35
Salad	1 80	2 30
" Pints, cases	4 20	4 40
" Quarts	3 25	3 50
Seal Oil, Pale	0 80	0 85
Straw	0 70	0 75
Sesame Salad	1 30	1 35
Sperm, genuine	2 15	2 40
Whale, refined	0 90	0 95