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CANADIAN

# PHARMACEUTICAL JOURNAL

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## ON VARIOUS METHODS FOR THE PREPARATION OF BINIODIDE OF MERCURY.

BY E. B. SHUTTLEWORTH.

In devising or selecting a formula for the preparation of any compound there are three considerations which are essential to a correct and satisfactory conclusion. These are, that the contemplated product be obtained (*a*) of the best quality; (*b*) at the lowest cost; (*c*) with the least trouble. As a general rule, the relative importance of these conditions is indicated by the order in which they are given; quality is, or should be, the great essential, while cost and convenience are of secondary consequence. Too often, however, this order is reversed, and all considerations are made subordinate to that of cost; but, in no case, can this be justifiable; it is only when the matter of quality is satisfactorily settled that we are at liberty to decide in favor of that process which promises to be the most economical. The question of economy is, however, to the pharmacist, a most important one, and in cases of scarcity of material, or high prices, merits his best attention.

A case in point is that of the red iodide of mercury—a compound which is almost invariably prepared by the pharmacist. The

recent inflation in the price of iodide of potassium, and the high figure which it at present maintains, demand the utmost economy in its use. In view of this it may be opportune to review the various processes which have been devised for the preparation of the biniodide of mercury, so that we may be able to obtain the best results with the least possible expenditure of materials.

The first process which might be noticed is that in which the biniodide is formed by a direct union of the elements composing it. Mercury and iodide are triturated, or agitated together, a little alcohol being added to control the reaction. In inexperienced hands this process yields an imperfect product; is exceedingly wasteful and troublesome, and may be so dismissed.

A better process is that of the *British Pharmacopœia*, 4 parts of perchloride of mercury, dissolved in 60 parts of boiling water, are mixed with 5 parts of iodide of potassium, in 20 parts of boiling water. The iodide is, theoretically and practically, one-tenth of one part in excess of that actually required for the decomposition. Its object is to prevent contamination of the product with the mercuric salt. This excess appears useless, first, because, with any ordinary care, the operator can ascertain the moment the decomposition is complete; and again if any slight excess of mercuric salt happened to be present it would certainly be removed in the subsequent copious washings to which the biniodide is subjected. This excess is not only wasteful as far as the iodide of potassium is concerned, but of the biniodide also, as the latter salt is soluble in the former. The use of boiling water is unnecessary, as the quantity ordered would, if cold, dissolve the salts readily. The precipitate from a hot solution is more granular than that from one which is cold, and for the preparation of ointments, it will be conceded that the finer and softer salt is to be preferred.

In the process of the *U. S. Pharmacopœia*, the excess of iodide is the same as that of the *B. P.*, but cold water is employed for solution.

The most satisfactory and economical results I have obtained from the decomposition of the salts alluded to, have been by employing 4 parts of the mercuric salt, in powder, dissolved in 64 parts of cold water, adding a sufficient quantity of solution of iodide of potassium, (4.9 parts in 10 parts of water). The yield will be 6.7 parts, of a salt sufficiently dry to be pulverulent. This

is very little short of the theoretical yield ; 271 parts  $\text{HgCl}_2$  require for decomposition 332 parts KI, and should produce 454 parts (6.701)  $\text{HgI}_2$ .

Another method which may be easily and economically pursued is that in which iodide of iron is used instead of iodide of potassium. The relative prices of iodine and iodide of potassium are generally as 21 to 19, and 254 parts iodine are equal to 332 of iodide of potassium. If, therefore, we mix 3.75 parts of iodine with 4 parts of cold water and sufficient iron wire to saturate, allowing the mixture to stand for several hours, heating towards the close of the reaction, we shall obtain a solution of iodide of iron equivalent in iodine strength to the quantity of iodide of potassium required to decompose 4 parts of perchloride of mercury. The yield will be about 6.7 parts, and the quality of the product is equal to that produced in any other way, but the precautions of using the iron solution as soon as possible, and of washing the precipitate as soon as deposited, must be observed ; otherwise the product might be contaminated with a basic ferric chloride, which in time, is thrown down. It will be seen that this method is as economical as could well be devised ; the operator getting the profits of the manufacturer of iodide of potassium, minus the labor of the former in making the iodide of iron.

The last process which we shall notice is that devised by Mr. Williams, described in the *Chicago Pharmacist*, and also published in this Journal (Vol. vii., No. 1). In this, the use of a large quantity of water, for the solution of the mercuric salt, is obviated by employing a concentrated solution of chloride of ammonium, in which the mercuric salt dissolves readily. Four parts of perchloride of mercury are dissolved in four parts of water to which 2 parts of chloride of ammonium have been added, 5 parts of iodide of potassium are dissolved in 5 parts of water, and the solutions are mixed. It will be seen that, in this way, 9 parts of water suffice for solution, while, otherwise, at least 70 would be required. This is a great convenience, especially when large quantities are operated upon ; but, according to trials which I have made, the method is not economical, on account of the biniodide being soluble in the solution of chloride of ammonium. By draining the newly formed salt, as soon as deposited, the loss may be rendered smaller than if water were at once added to the mixture ; but the product will not exceed 6.150

parts, against 6.701, the theoretical yield, or 6.700 the yield by the method with simple water. In large operations, some of this dissolved biniodide may be recovered by evaporating to dryness the drainings and first washings, washing away the deposited chloride of ammonium, and thus leaving the more insoluble biniodide. The operation must be performed quickly or the biniodide will also dissolve. Williams' method cannot be recommended except where expedition and convenience are paramount considerations to that of cost. The product is of a darker color, and more granular than by other methods, and somewhat resembles that prepared by the old Edinburgh process, in which the compound formed by a direct union of mercury and iodine is dissolved and crystallized from a solution of chloride of sodium.

A word in regard to Williams' method for purifying the green iodide of mercury. I have lately tried this plan and found it to work very satisfactorily, being equally efficient, quite as convenient, more expeditious, and much more economical than the process with alcohol. The washing may be best performed by repeated agitation and decantation, using fresh solution of chloride of sodium.

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## ADULTERATION OF TARTARIC ACID.

BY H. MACLAGAN.

In the account of the proceedings of the Am. Pharm. Association, in the November number of the JOURNAL, I noticed a reference to the presence of sulphuric acid in commercial tartaric acid. That it is sometimes present, and in considerable quantity, I can fully attest, having once suffered considerable annoyance therefrom. Complaint was made by a customer of our seidlitz powders—that there was something wrong with them, as a quantity of white powder remained in the tumbler after drinking. I found, on mixing one, that such was indeed the case—that when the effervescence was about ended, the mixture became cloudy, and in a very short time a considerable white deposit had accumulated in the bottom of the glass. This was collected and examined, and proved to be bitartrate of potassa. Suspecting the tartaric acid, I examined it, and found it to contain sulphuric acid, which sufficiently explained the

mystery. The sulphuric acid decomposed the rochelle salt, producing cream of tartar and sulphate of soda, thus:—

$2\text{K Na C}_4\text{H}_4\text{O}_6 + \text{H}_2\text{SO}_4 = 2\text{K H C}_4\text{H}_4\text{O}_6 + \text{Na}_2\text{SO}_4$ . This makes a considerable difference in the character of the medicine. The patient, instead of taking Rochelle salt and neutral tartrate of soda, is swallowing a mixture of cream of tartar and glauber salt, which, in some cases, might not be desirable.

I did not estimate the percentage of impurity present, but, to judge from the quantity of bitartrate produced, it must have been very considerable.

Lindsay, Ont.

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## REPORT OF THE PURITY OF COMMERCIAL SPECIMENS OF OFFICIAL ACIDS.\*

BY LOUIS SIEBOLD.

The title of this paper shows that I wish to deal, not with the crude acids of commerce, but with those products which are sold as *pure* for dispensing and analytical purposes. That these so-called pure acids are in many cases far from pure is a fact well known to every chemist who takes the trouble of testing the chemicals supplied to him. To dwell upon the impurities contained in such acids, the means of detecting and removing the same, and the best methods of preparing acids of perfect purity, is the object of this paper.

*Hydrochloric Acid.*—If this acid is prepared in strict accordance with the pharmacopœia process, and from perfectly pure materials, it will always be obtained free from sulphuric acid, sulphurous acid, arsenic, iron, and free chlorine, which are the main impurities found in the commercial article. If the sulphuric acid used contains arsenic, the hydrochloric acid made from it will, of course, contain the same impurity; if oxides of nitrogen are present in the former, free chlorine will inevitably occur in the latter, whilst organic matter either in the  $\text{H}_2\text{SO}_4$  or in the  $\text{NaCl}$  generally cause the formation of a little sulphurous acid. I need hardly remind you that free chlorine and sulphurous acid destroy one another, and that for this reason they can never occur together. There appears to be hardly any difficulty in obtaining from wholesale dealers and manufacturers, hydrochloric acid quite free from 'sulph-

\* Read at the Meeting of the British Pharmaceutical Conference, and published in the *Pharm. Jour. and Trans.*

uric acid, from sulphurous acid, and also from appreciable quantities of iron (very small traces of iron can be detected in nearly every sample), but arsenic and free chlorine are very frequently found in acids sold as pure; and as arsenic is undoubtedly a most objectionable impurity, however small its quantity may be, it should be carefully searched for, and if found, the acid containing it should be rejected as unfit for dispensing, and even more so for analytical operations, where its use might lead to very serious mistakes. Boiling a little of the acid with a piece of pure copper foil is a very convenient test, and is therefore generally resorted to, but it is not delicate enough for the detection of very small traces of arsenic. I have often been unable to detect it in hydrochloric acid by the copper test, when a careful examination with sulphuretted hydrogen proved its presence most unmistakably.

It does not, however, suffice to add a solution of  $H_2S$ , but the gas must be conducted through the acid until the latter is completely saturated with it. After twelve hours' standing, the precipitate, which will, in any case, be formed, must be filtered, washed, dried, and fused with carbonate and nitrate of sodium; the fused mass dissolved in water, filtered, mixed with pure nitric acid in excess, boiled, and then tested with ammonia and nitrate of silver, or with sulphuretted hydrogen. It is impossible to judge of the absence of arsenic from the light color of the precipitate. By the method just described, arsenic will be found in many samples of hydrochloric acid which, if tested according to the directions of the pharmacopœia, would seem to be quite pure.

Sulphurous acid is readily detected by the pharmacopœia test, or by iodized starch, the color of which would be destroyed by the least trace of  $H_2SO_3$ . For detecting free chlorine, solution of indigo appears to me preferable to a mixture of iodide of potassium and starch, as the formation of blue iodide of starch might be caused by perchloride of iron, which is often present in hydrochloric acid, and which might thus be mistaken for chlorine.

On the strength of numerous experiments which I have made, I can recommend the two following methods as the best for preparing perfectly pure hydrochloric acid from the crude commercial article. The first of the two methods yields an acid of low specific gravity (1.120 to 1.125), which, though very suitable for analytical purposes, does not come up to the pharmacopœia standard of strength. By the second method, which was proposed by A. Bettiendorff about two years ago, and which I cannot recommend too strongly, a pure acid of 1.16 sp. gr. can be produced with very little trouble indeed.

*1st. method.*—Dilute the crude acid with sufficient water to reduce the specific gravity to about 1.12; saturate it with sulphuretted hydrogen gas, allow to stand for fully twelve hours, decant

the clear liquid from the precipitate, drive off the sulphuretted hydrogen by heat, and distil, after adding a little chloride of sodium.

The sulphuretted hydrogen removes not only the arsenic, but likewise the free chlorine or the sulphurous acid, whichever of the two may be present.

*2nd method.*—Mix the crude acid, whose specific gravity should be between 1.16 and 1.18 (not lower than 1.16), with a small quantity of a solution of stannous chloride in hydrochloric acid of the same strength; and allow to stand for twenty-four hours. Any arsenic present will thus be precipitated in the shape of a brown powder (which consists of metallic arsenic with a variable amount of tin). Sulphurous acid, if present, produces a precipitate of stannous sulphide, and is therefore removed along with the arsenic. The filtered acid now only requires to be distilled from a little chloride of sodium, as in the previous process. But as hydrochloric acid of so high a specific gravity parts with a great deal of hydrochloric acid gas on boiling, it is necessary to place a little water into the receiver for its absorption. This method also removes free chlorine if present.

About four years ago a new method of making pure hydrochloric acid from the commercial was published by A. W. Hofmann. According to this, one volume of crude hydrochloric acid is to be mixed gradually with  $3\frac{1}{2}$  volumes of strong sulphuric acid in a tubulated retort, and the HCl gas disengaged by the heat produced by the addition of each successive quantity of  $H_2SO_4$  is to be conducted through distilled water in the usual way. Fresenius has proved this method to be quite useless, as neither arsenic nor chlorine can be removed by the same.

In reference to the above method of purifying with stannous chloride, I wish to add that I only recommend it for removing, but not so much for detecting arsenic, as the presence of  $H_2SO_3$  in the hydrochloric acid might lead an inexperienced worker into errors.

*Sulphuric Acid.*—The chief impurities for which this substance must be tested before it should be used for medicinal or analytical purposes are arsenic, lead, and oxides of nitrogen. Arsenic is best detected by Marsh's test, lead by sulphuretted hydrogen, and oxides of nitrogen by ferrous sulphate. An acid free from arsenic and nitrogen oxides, but containing lead, calcium, iron, etc., may be easily purified by distillation, but if the first-named impurities are present mere distillation will not suffice. In that case it is necessary to mix one volume of the acid with six or seven volumes of water, and to saturate the mixture with  $H_2S$ . After forty-eight hours the clear acid is decanted from the precipitated sulphides of lead and arsenic, evaporated in a retort until fumes of  $H_2SO_4$  escape, and then distilled. What passes over first is too weak, and is rejected until an acid of 1.84 sp. gr. distils, when the receiver is changed. To assure a quiet boiling of the acid, and thus to pre-

vent the cracking of the retort, it is extremely useful to conduct a slow current of air, by means of an aspirator, through the acid during distillation. Though sulphuric acid purchased as pure from the most respectable houses is sometimes found to contain impurities, this is by no means the case to the same extent as it is with hydrochloric acid, which it is almost impossible to purchase in a state of absolute purity, whilst there is not much difficulty in obtaining a supply of perfectly pure sulphuric acid.

*Nitric Acid.*—This preparation can be obtained in a state of the utmost attainable purity by distilling commercial acid of 1.42 sp. gr., and of good quality, with a little absolutely pure nitrate of potassium, from a glass retort. What passes over first must be rejected, until an acid distils, which, if diluted with water, forms a perfectly clear mixture with solution of nitrate of silver, remaining clear, too, after standing for ten minutes. Not less than two drachms of the acid should be subjected to this test. When thus quite free from every trace of HCl, the receiver is changed, and the distillation carried on until only about one-eighth of the original bulk remains in the retort. If carried on still further the purity of the product would be endangered, as traces of sulphuric acid might pass over with the nitric. Another method of purifying nitric acid consists in removing the HCl by the addition of solution of nitrate of silver to the somewhat diluted acid, decanting from the precipitate and distilling the clear acid with a little perfectly pure nitrate of potassium, until about seven-eighths have passed over. The method is good, but is only applicable for preparing an acid of low specific gravity (1.25).

The first method, I feel sure, is the best of all that can be recommended for preparing pure nitric acid of the pharmacopœia strength, and as it presents no difficulties whatever, it is, I believe, the one generally applied. The fact, therefore, that it is almost impossible to obtain perfectly pure nitric acid by purchase, seems all the more surprising. It is easy enough to get it free from solid impurities, as mere distillation is sure to remove these; nor is there any great difficulty in procuring it free from HCl, but  $H_2SO_4$  is always present, no matter from whom it has been obtained. Many samples of nitric acid sold as perfectly pure may be quite good enough for medicinal use, but the trace of  $H_2SO_4$  present is always a source of annoyance in medical laboratories, where the acid is required for accurate scientific investigations. Whoever requires this preparation absolutely free from  $H_2SO_4$  is obliged to make it for his own use. To detect very small quantities of this impurity in nitric acid, the application of the pharmacopœia test, consisting in the addition of a solution of barium chloride to the diluted acid, is altogether insufficient. About four ounces of the acid to be tested must be evaporated on a water bath until a few drops only are left; the residue is then mixed with a little distilled

water and a few drops of solution of chloride of barium. A precipitate will thus be obtained from any commercial specimen of pure acid. If nitric acid containing small traces of  $H_2SO_4$  which do not show on the mere addition of a solution of  $BaCl_2$ , is neutralized or nearly neutralized with pure carbonate of sodium (quite free from sulphate), the mixture will then turn cloudy on the addition of a solution of a barium salt. It is on this account that the presence of even very small traces of  $H_2SO_4$  is often very annoying to the analyst. The reason that manufacturers do not succeed in producing nitric acid of perfect purity by the method described, is that they do not reject enough of the acid passing over at the beginning, and that they carry on the distillation too far towards the end, and, finally, that they use impure nitrate of potassium. Howard's pure nitrate of potassium, generally considered as a very pure preparation, still contains appreciable quantities of chloride, which must be removed by recrystallization (stirring the solution well during crystallization, so as to prevent the formation of large crystals) before it can be used for the manufacture of pure nitric acid.

*Hydrocyanic Acid.*—In a preparation like this, the strength must, of course, be a far more important feature than the purity. The traces of sulphuric acid frequently present seem to me very little, if at all, objectionable in a preparation, the medicinal dose of which is so very small, and which, moreover, is not required in a perfect state of purity for scientific purposes. But the great disparity in the strength of different specimens of this acid is most objectionable and serious, considering its powerful nature. The pharmacopœia requires it to contain 2 per cent. of the anhydrous acid  $HCN$ , but my experience tells me that the hydrocyanic acid used for dispensing in druggists' shops varies from two to about a quarter of a per cent., and even less. I know of cases in which two drachms and half an ounce of the acid labelled *Acidum hydrocyanicum P.B.* have been given to dogs without bringing on the least indisposition. The reason of this is, that the preparation is kept in bottles, the stoppers of which do not fit tightly, so that  $HCN$  is continually escaping, and can be distinctly noticed by smell without moving the stopper. This is the case with nearly all the common 1 and 2 oz. stoppered blue glass bottles in which the acid is generally kept by retail chemists. How very necessary it is to keep it in bottles with well-fitting ground stoppers, and tied over with bladder or gutta percha tissue, and how very great a change it undergoes even in a short time, may be seen from the following:—I purchased a two oz. bottle of the pharmacopœia acid, freshly made, from a very respectable wholesale house, and at once estimated its strength by volumetric analysis. It contained 1.6 instead of 2 per cent. It was kept in the same bottle without being tied over, and the escape between stopper and neck was noticeable at some distance. After twenty-four hours it contained 1.2, after two

days hardly one per cent., and after a month it contained only traces of HCN. This explains the great disparity in the effect upon animals produced by samples of the acid procured from different retail establishments. Chemists should, therefore, either prepare their own hydrocyanic acid, or, at any rate, they ought to test its strength by volumetric analysis or by ponderal analysis with nitrate of silver (taking the specific gravity is altogether insufficient); they should keep it carefully closed, and examine its strength again from time to time, as this preparation may lose in strength however well it is kept.

In performing the volumetric test, it is important that not more solution of caustic soda should be used than is necessary to produce a distinct alkaline reaction, as any large excess would lead to an inaccurate result, too much of the solution of  $\text{AgNO}_3$  being then required for the formation of a permanent precipitate.

Not desiring to give this report any undue length, I reserve the consideration of phosphoric acid, sulphurous acid, and acetic acid for a future occasion.

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## MANUFACTURE OF FERROCYANIDE OF POTASSIUM.\*

In preparing ferrocyanide of potassium from leather scraps, the scraps are mixed with carbonate of potash and iron filings, and placed in a reverberatory furnace arranged with a shallow cast-iron pan from 40 to 72 inches in diameter, with a rim about 4 inches high. This pan reaches nearly from the bridge to the flue. Sometimes the hot air is applied to the heating of evaporating pans, being carried under them before entering the chimney. Scraps of metal, smith's scales, old nails, &c., may be employed instead of filings; 100 lbs leather require 45 to 48 lbs potash and 2 to 4 lbs iron. If the leather were charred first in a retort the ammonia given off could be collected and sold.

About 200 lbs of potash are melted, and when the whole is red hot the fire is slackened, as the addition of the animal matters develops sufficient heat for the chemical action. The animal matter is thrown in from time to time in small quantities, and mixed by means of a rake suspended by a chain, forcing the leather beneath the melted potash. When all the animal matter has been added the fire is again set away, while the workman continues to work the contents of the pan for two hours, and when the operation is finished the charge is withdrawn into iron barrows. Up to a certain point, the higher the temperature the more rapid is the reaction and the larger the product. The metal, as the fused mass is called, is broken up

\*From the Journal of Applied Chemistry.

when cold, and covered with weak liquors from previous operations, or with fresh water. The whole is gradually raised to boiling, with constant agitation, until all the pieces have disappeared. After being allowed to settle, the liquor, which stands at  $20^{\circ}$  to  $24^{\circ}$  B., is drawn off by a leaden syphon, and run into an evaporating pan, where it is concentrated up to  $30^{\circ}$  B., and then run into large wooden coolers, where it remains for eight days. It is then drawn off and concentrated to  $40^{\circ}$  B., and allowed to crystallize. Different persons use different methods of lixiviation, some allowing it to digest a day in cold water before they apply heat.

## ON THE PREPARATION AND COATING OF IODIDE OF IRON PILLS.\*

BY M. MAGNES-LAHENS.

The conditions which assure the best preparation and conservation of the iodide of iron pills, are as follows:

1. For the preparation of iodide of iron, to be used for pills, employ very little water, so that a pill mass of good consistence may be obtained with very little evaporation.

2. Avoid the filtration of the solution of iodide of iron; it alters the salt, and a portion of it is lost by being retained in the filter.

3. Take a sufficient quantity of iron, so that a small quantity of it will remain in excess after the complete saturation of the iodine; this excess of iron prevents the alteration of the iodide, during the preparation as well as while keeping the pills.

4. Substitute a mixture of gum and sugar for the honey, which presents the triple inconvenience of being acid, of rendering the exact formation of the pill mass rather difficult owing to the water, which it contains in great abundance, and of being very hygrometric when concentrated.

5. Use gum arabic in preference to gum tragacanth, because it gives a mass less elastic, more homogeneous and dissolving better and quicker in the stomach.

6. Use an iron dish instead of glass or porcelain vessels.

7. Operate at a temperature of  $50^{\circ}$  to  $60^{\circ}$  C. ( $122^{\circ}$  to  $140^{\circ}$  F.) These rules form the basis of the formula, and of the mode of operation, which is as follows:

Take of—

\*Translated from Journ. de Pharm. et de Chim., 1873, Oct., p. 328—330, in the American Journal of Pharmacy.

*Coating of Iodide of Iron Pills.*

Pure iodine...	.....	.410	grams.
Powdered iron.....	.....	1.90	"
Powdered sugar.....	.....	2.50	"
Powdered gum arabic .....	.....	2.50	"
Distilled water. ....	.....	2.50	"

Put in an iron dish the water and the powdered iron, add the iodine gradually, and facilitate the reaction by stirring with a spatula of iron and by warming a little; when the reaction is complete, add the gum and the sugar, then heat to about 50° C., stirring continually, and until the mass will cease to drop, when a little is taken up with the end of the spatula. When that has been reached, the operation offers no further difficulties; the pills may be readily rolled out and coated.

To obtain the pills, incorporate into the mass 5 grams of powdered liquorice root, if necessary; heat it for some minutes, divide the mass into one hundred pills, roll them in the powdered gum and, if desired, coat with mastic and tolu.

For sugar-coated pills (*dragées*), incorporate with the mass 7.50 grams of powdered gum arabic, then heat it slightly to soften it. The hundred pills obtained are rolled in powdered gum arabic, then placed in a suitable vessel, heated and agitated with a circular motion until of the proper hardness, after which they may be sugar-coated.

Each pill and each *degré* contains about 5 centigrams of iodide of iron and one centigram of powdered iron.

The iodide of iron is in a state of perfect purity, and may be dosed with great precision. Put in cold water some months after their preparation, they will dissolve, save the excess of iron, without coloring it.

The following is the mode of coating as proposed by Mr. Magnes-Lahens: Roll the pills quickly, about fifty at a time, with the hand in a clear mucilage of gum arabic spread thinly in a saucer; when they are completely moistened throw them into a basin containing a mixture of sugar, 9 parts, with gum arabic one part; agitate them until they are covered with a layer of the powder, heat them for about eight or ten minutes, at first very slightly, and afterwards increase the heat, rotating the pills continually. After cooling coat them a second and then a third time, following the process just described. These pills may thus be prepared in small or large quantities; in the latter case they should be put in the drying closet after each coating. Made with this precaution they will keep a long time in a good condition.

C. J. M.

## COAL TAR PITCH, OR ASPHALT.\*

BY DR. E. A. BEHRENS.

When coal tar is subjected to fractional distillation, various light and heavy oils are separated, as already described in the June number of this journal. The heaviest of these, and one containing the anthracene, has a specific gravity of 1.12. After this oil has all been distilled off there remains in the retort a residue resembling pitch, to which the name of asphalt is incorrectly given. In large works, where time is an important factor, it would be impracticable to leave this asphalt in the retort until so cool that there would be no danger of fire on taking it out, and until it would no longer give off too much vapor on being emptied into open ditches. In ordinary kettles, which hold 20,000 or 25,000 kilos. of tar, of which about 55 per cent., or 11,000 to 14,000 kilos., is pitch, it would be at least thirty-six hours before it would get so cool that the kettle could be used again, and the work would be delayed for that length of time. It is, therefore, allowed to flow at first, about nine hours after the distillation is stopped, into an iron receiver, situated lower than the outlet cock on the bottom of the retort, and provided on top with a small opening. Here it is left to cool until near the point of solidification, but yet fluid. Then it is allowed to flow into a cemented trench, only one foot to twenty inches deep, where it becomes solid almost immediately.

In this condition it is a black, shining solid, with an average specific gravity of 1.3, and almost tasteless to the tongue. If the oils are removed to a specific gravity of 1.12 it possesses but little elasticity, and can be rubbed to a powder between the teeth. If six or seven per cent. of oil be left in the pitch, the distillation being stopped as soon as the specific gravity of the oil flowing from the worm has risen to 1.09, the pitch is much softer, is not rubbed to powder, but can be kneaded between the teeth like chewing gum. This practical method of determining the hardness of asphalt is a very delicate one, and with a little practice a person may safely judge of its quality. This softer pitch is blacker and more shiny than the hard pitch, which has more of a dead surface and gray color. The latter is also more porous.

The melting point of the asphalt depends, of course, on the hardness. It is difficult to determine it accurately. On being warmed it first gets soft, then gradually becomes viscous, in which condition it will take any desired form. At 150° C. it is a thick fluid, and at a higher temperature becomes thin, like oil, and gives off vapors very irritating to the eyes and skin. The inflammation thus produced is often so great as to cause great pain. The pitch, in a finely-divided

\*From the Journal of Applied Chemistry.

state, acts in a similar manner, especially in warm air. The workmen who dig out the pitch from the trenches are often troubled with inflammation of the eyes. The best protection is glasses set in fine wire gauze which entirely covers the eye; besides, the work should be done as much as possible at night. Instead of letting it flow into trenches, and then transporting it in loose pieces, the softer kinds are run into barrels, where it hardens.

If asphalt or pitch is subjected to dry distillation, oils containing anthracene are first given off. In most manufactories only the oil that goes over first is caught for making the anthracene used for artificial alizarin. The distillation is conducted over a direct fire in a cast iron retort, and, to aid in carrying off the oil vapor, superheated steam is passed over the surface of the pitch. After the anthracene oil has gone over, the mass remaining in the retort is too brittle and lean to be used for ordinary technical purposes. In order to restore to this residue its previous properties, it is treated with a sufficient quantity of the naphthalin obtained in distilling off the tar. If the distillation of the pitch is complete, coke is left behind. The properties of the coke depend upon the temperature to which it has been heated and the time the heat was kept up. If these are insufficient, the coke consists of a dull, black, compact mass, broken by few cracks. On opening the retort, this carbon takes fire, burning with a luminous flame, which issues from the cracks. By burning it out in this way it is more perfectly coked, and this can be hastened by increasing the cracks with a crowbar, but the quality of the product would be very poor. Pitch coke, when it has not been previously hard burned, possesses the property of crumbling almost to powder when put into the fire. In consequence of this, coke burned in the above injurious manner possesses very little cohesion, and has, beside, the disadvantage of adhering tightly to the bottom and sides of the retort, so that great difficulty is experienced in breaking it off and hauling it out. The imperfectly ignited coke, after it is first extinguished, must have water poured over it from time to time, until perfectly cold, since it reignites very readily and burns with a flame. In order to prepare hard coke, after the red fumes evolved at the close of the distillation have ceased the retort must be heated to a bright red heat, and kept so at least eight hours. A complete operation lasts about twenty-four hours. A hard-burned coke adheres but slightly to the sides of the retort, possesses great cohesion, and occurs in long prismatic spinters, which can be removed from the retort almost without the use of a crowbar. Such coke does not reignite after it is once extinguished. It has a light gray color, is very dense, and does not crumble in the fire.

The author has tried various experiments with this coke in English iron work, to test its value for metallurgical purposes. The results were as follows: In cupola furnaces for smelting cast iron, and for refining wrought iron, where wood charcoal is generally used, the

results were unfavorable, and in the latter case it was hard to separate the slag from the iron. On the contrary, hard-burned pitch coke is very useful for refining pig iron by the English method, where gas coke is mostly employed. Cast iron, refined with this coke, slag and air in a puddling furnace, produced beautiful, pure bar iron. This coke can also be employed for fusing in crucibles.

Although the distillation of pure coal-tar pitch for oil and coke is profitable from an industrial stand point, still it has been as yet little practiced, owing to the difficulty of finding a suitable material for the retort. Cast iron is quite easily destroyed under the influence of the heat and the pitch. Clay retorts, large enough for the purpose, require too much fuel for the quantity of pitch used. Furnaces built of refractory stone are not tight enough, for pitch at a high temperature is as thin as oil. Beside, these furnaces produce far less oil and more gas than cast iron retorts. In some parts of England the pitch is mixed with fine coal and worked in ordinary furnaces merely for the coke.

If the pitch is passed through red hot tubes it is decomposed, and from one kilo. of pitch 250 liters of gas were generated. In these experiments the pitch was first melted, and then passed through an S shaped iron tube, heated to redness. At a lower temperature no decomposition took place, or only a very imperfect one. The gas was passed through a Laming's purifier, and then collected in a graduated gas holder. A photometric test showed that the illuminating power of this gas was nearly equal to zero. It contains some sulphur, but consists principally of hydrogen.

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## NOTE ON THE HYDRATION OF EXTRACTS.\*

BY CHARLES EKIN, F.C.S.

It has occurred to me that Wanklyn's method of limited oxidation by means of an alkaline solution of potassium permanganate might be applied with good results to the assay of such medicinal extracts as are dependent for their activity entirely, or for the most part, on certain alkaloids—all alkaloids yielding a certain portion of their nitrogen as ammonia. Also that it might be made available for the determination of the relative values of the first year's and second year's plant of *hyoscyamus*, about which a good deal has been taken for granted but nothing yet really proved. And again in the case of *conium*, to determine which has the greater activity, a tincture made from the fruit or from the leaves. Of course the diffi-

\* Read before the British Pharmaceutical Conference, and published in the *Pharm. Journ. and Trans.*, Oct., 1873.

culty lies in the complete and easy separation of the vegetable proteids of the plant juices, but I am by no means sure that this is not a difficulty that can be overcome, although I regret I have not yet had time to go sufficiently into the subject so as to be able to lay results of any value before this meeting of the Conference. I have had, however, incidentally to determine the amount of water in various extracts, and have thus so far answered question 66 on the blue paper circulated by the Conference, viz., "Is it possible to assign a definite degree of hydration to medicinal extracts with a view to uniformity of strength?"

I believe it is quite possible to do so, certainly with some if not with all extracts.

I find that extracts of fair average consistence for pill-making, when subjected to the heat of a water-bath, in the cases of belladonna and hyoscyamus lose 20 per cent. of their weight, and in the case of conium, 25 per cent.

The plan I adopted was to spread the extracts very thinly on a thin platinum capsule, and dry at a temperature of  $212^{\circ}$  until it ceased to lose weight. Various experiments with the same extract gave in this way very constant results. At first I operated on quantities of 10 grains at a time, but I found that several hours were then required for complete desiccation, whereas if only one or two grains were used the time required was little more than half an hour.

The consistence of extracts varies so much that it would seem advisable to define in the Pharmacopœia the amount of water each should contain, the amount to be determined as I have recommended. When once a standard has been set up there would be practically little difficulty to manufacturers, for I find after a few trials the eye can determine from the consistence of the extract, to less than 1 per cent., the amount of water present.

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## A REVOLUTION IN THE MANUFACTURE OF CARBONATE OF SODA.\*

BY DR. RUDOLPH WAGNER.

Six years ago, when the international jury at the Paris Exposition expressed their opinion upon the state of the soda industry at that time, all the judges, whether practical or theoretical men, believed that Leblanc's process would hold the field for a long time yet. This seemed still more probable since a process had just been introduced for recovering the sulphur from the soda residues. At that time all

\*From the Journal of Applied Chemistry.

the soda in use was prepared by this process, excepting a comparatively small amount obtained from Chili saltpetre and cryolite, although there were already tangible indications that soda could be made on a large scale by another method which would be cheaper than Leblanc's process.

The chemical section of the international jury at the Vienna Exposition, under the presidency of Prof. A. W. Hofmann, constituted a congress of chemical technology. By its labors during the course of the summer this congress of scientific men was able to authenticate the very important fact that although Leblanc's process might in the future possess some importance for certain branches of the industry, yet in most places another soda process would be introduced in the immediate future, and entirely supersede that of Leblanc. Since the time of the Paris Exposition this new process has grown from a small germ to a strong tree.

The process in question, and which is called by Prof. A. W. Hofmann the ammonia process, is not new from either a chemical or scientific point of view. It belongs to the same class of methods as those in which oxide of lead, bicarbonate of magnesia, quick lime, alumina, silicate of alumina, oxide of chromium or fluosilic acid are employed to decompose chloride of sodium and convert it directly into soda or its carbonate. None of these attempts met with a success deserving of notice, although for a century past efforts have been made to render them practically operative. The new process is founded upon a reaction noticed over thirty years ago—that of bicarbonate of ammonia upon a strong solution of common salt. The greater part of the sodium is precipitated as a bicarbonate, while chloride of ammonium remains in solution, from which the ammonia for a second operation is expelled by quick lime. The carbonic acid necessary to convert the ammonia into bicarbonate of ammonia, and thus make the process a continuous one, is obtained by heating the bicarbonate of soda to convert it into the simple carbonate.

The sensation which the ammonia process has created in industrial circles will render a brief history of its development not uninteresting.

So far as I know, Harrison, Dyer, Grey and Hemming were the first to patent the ammonia process in Great Britain in 1838.\* "Great expectations" were excited by it but it soon sank into oblivion. Thirty or forty years ago the manufacture of soda was by no means at the head of the great branches of industry; at that time, too, ammonia was not to be had cheaply and in immense quantities, and that branch of machine building which has furnished the necessary apparatus for chemical industries did not exist. Besides this, Anthon, of Prague, in 1840, claimed to have proved that in the ammonia process a very considerable portion of the common salt remained undecomposed.

After a sleep of sixteen years the ammonia process again enter-

ed the field. On the 26th of May, 1854, Turck took out a patent in France, and on the 21st of June, the same year, Schløesing, chemist of the Imperial tobacco factory at Paris, took out a patent for France and Great Britain. The mechanical portion and machinery for Schløesing's process were designed by Engineer E. Rolland, director of the tobacco factory. In 1855 a company was organized to work this process. An experimental manufactory was started at Puteaux, near Paris, but owing to its situation and arrangements as well as to the salt monopoly, it could not produce soda cheap enough to compete with the other process, and hence, in 1858, the experiment was abandoned. Schløesing and Rolland were of the opinion that sooner or later the new process must come into use in making soda.

It must here be noticed that in 1858 Prof. Heeren, of Hanover, subjected the ammonia process to a very careful test in his laboratory. From his experiments and calculations it was ascertained that this process was better adapted to the manufacture of bicarbonate than of the simple protocarbonate of soda.

To render this sketch more complete and historically true, it must be mentioned that T. Bell, of England, took out a patent Oct. 13, 1857, for a new soda process, which in principle and practice was almost literally the same as that of Dyer.

It was known when the jury was working at Paris in 1867 that essential improvements had been introduced into the ammonia process by the efforts of Margueritte and de Sourdeval, of Paris, and Jas. Young, of Glasgow. A more important fact, however, is that Solvay & Co., of Conillet, in Belgium, actually exhibited at the Paris Exposition carbonate of soda prepared by this new process.

Since that time the ammonia process has been developed and perfected to such an extent, especially by Solvay, Honigmann and Gerstenhœfer, that as early as February, 1873, Prof. A. W. Hofmann, in his introduction to the third group of the catalogue of the Exhibition of the German Empire, was able to make this remark: "At all events the ammonia process is the only one which threatens to become an important competitor of the now almost exclusively employed process of Leblanc" The Vienna Exposition has since proved the truth of his assertion.

There are now large soda works in England, Hungary, Switzerland, Westphalia, Thuringia and Baden which employ the improved ammonia process, and some of them make fifteen tons of soda per day.

The advantages of the new process over that of Leblanc are very evident, although the details of the process have not yet been made public. The chief advantage consists in the direct conversion of salt brine only the sodium is precipitated, with none of the other metals of the mother liquor. Beside this, the product is absolutely free from all sulphur compounds, the soda is of a high grade, the apparatus and

utensils are very simple, there is a great saving of labor and fuel, and no noxious gases and waste products are produced, which is of importance from a sanitary point of view. The only weak point of the ammonia process is the loss of the chlorine, which is converted into worthless chloride of calcium.

The effect which the general introduction of the new soda process will exert upon large chemical industries in general, and especially upon the consumption of sulphur, the manufacture of sulphuric acid, and the price of muriatic acid and chloride of lime, cannot be over-looked.

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## AN IMPROVED PREPARATION OF KINO.

BY GEORGE ELLINOR.

The tincture of kino of the Pharmacopœia is so unstable that it is very little used.

Kino possessing advantages over most of the astringents, having a peculiar action on the mucous membrane of the intestinal canal, it is desirable to have a solution of the drug in a stable form, and miscible with water in any proportion.

In the liquor kino concent, or fortier, I now exhibit, this is fully accomplished.

This liquor kino fortier, diluted with water to form the relative strength of the tincture, will be found most efficacious and reliable.

Liquor kino concent. or fortier is prepared in the following manner, viz. :

Kino . . . . .	· 3 j
Glycerine . . . . .	· 3 ij
Water to . . . . .	· 3 iv

Rub together in a mortar the kino, glycerine, and 3 j of the water, until dissolved, then make up to f 3 iv by the addition of water.

To the liquor kino fort. one volume by measure mixed with four volumes of water will thus form the liq. kino corresponding with the strength of the tincture relatively, but really stronger, the whole of the kino being dissolved, and this is entirely soluble in water.

I prefer making the liquor kino in the concentrated form because from it can be so readily prepared the representative of the Pharmacopœia.

\* Read before the British Pharmaceutical Conference; reported in the Pharm. Journ. & Trans. Oct. 25, 1872.

The whole of the kino is dissolved ; the sand and other earthy matter is thrown down after standing a week or so.

I believe this preparation to be very efficacious, and adapted to mixture of chalk, and all diarrhœa mixtures, and with a great amount of saving in the expense of rectified spirit, the cost being less than 6d per Oj. of the preparation as compared with the price of the tincture.

I think it may take a place with the glycerates of the Pharmacopœia.

As far as I have been able to determine, it is far preferable to the tincture in its action and stability.

The reading of the paper gave rise to the following discussion :

The PRESIDENT : It was suggested long ago in America that a glycerine solution of kino might be used advantageously, but there are very strong objections to using glycerine with astringents.

Mr. WILLIAMS : Is the specimen of the solution produced liable to pectize by keeping ?

Mr. GREENISH : We ought to be very careful before we venture to suggest any alteration in the method of making tinctures laid down in the Pharmacopœia. I make tincture of kino by percolation which never gelatinizes, even though kept for a considerable time.

Mr. GROVES : The pectization of kino depends greatly upon the age of the substance ; fresh kino does not pectize, whilst that which is two or three years old probably will do so.

The PRESIDENT : Just to bear out what I stated a moment ago, I may say that I know of one case in which three hundred grains of perchloride of iron dissolved in pure glycerine were swallowed by mistake without any ill effect, whilst a very much smaller quantity dissolved in water must have caused serious results. Again, I know several instances in which medical men have been disappointed in obtaining the full astringent effect they expected from glycerinum acidi tannici, when a strong aqueous solution has answered admirably. Glycerine, I am certain, has a powerful action in weakening the effect of astringents, and its indiscriminate use in pharmacy is much to be deprecated.

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## NOTE ON LIATRIS ODORATISSIMA.\*

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

*Curator of the Kew Museums.*

Under the name of wild vanilla the leaves of *Liatris Odoratissima*, Willd., are sometimes used in North America as a substitute for true vanilla. The plant belongs to the Compositæ and grows to height of three to four feet with an erect annual stem, terminated by a corymb of beautiful purple flowers; the odour of the leaves is very perceptible when bruised, and this odour has been referred to the presence of the principle coumarin. It is said that many of the flavouring fruit essences, perfumes, etc., are produced in America from the leaves of this plant, and they have also been occasionally employed to give a pleasant fragrance to tobacco and cigars. This application has been largely extended of late, and the leaves are brought to market in small bales. They are mostly selected from the lower part of the plant, and are about six inches long by three broad. The smaller and less perfect leaves are used for fillers of cigars, while the large and sound ones are used for wrappers.

The plant is said to be very abundant in Florida, and it has been suggested that if it were submitted to cultivation and the stock cut back so as to induce the development of large leaves it might be improved in quality and value. The flavor that these leaves impart to tobacco is approved of by many persons and it has the advantage of having no deleterious properties. Another use to which the leaves are put is for the purpose of protecting woollen cloths from the attacks of moths. Other species of *Liatris*, such as *L. scariosa*, *L. squarrosa*, and *L. spicata* are considered to have medicinal properties: the former is employed in making a gargle for sore throats, also in gonorrhœa, and it has a reputation for the cure of snake bites. The root of *L. squarrosa* is acrid and pungent, and yields a balsamic substance in alcohol. *L. spicata* is called button snake root and has some reputation as a stimulant, diuretic and expectorant. It is used in the form of a tincture or decoction made from the root.

\* From the Pharm. Journ. &amp; Trans., Oct., 1873.

## COPPER AMONG THE ANCIENTS.

The copper operations of the ancients in the Lake Superior regions still remain a mystery, though there seems every reason to believe that they were conducted by the Aztecs, who left their haunts in Mexico and the Ohio Valley, and made summer pilgrimages to the copper region. There has not been found either bones or implements or any means of identification whatever, except the tools which are occasionally picked up in the ancient pits. And some of these pits and workings are so completely covered with drift and formation, that it is impossible to form any estimate in regard to the time when they were operated. The presence of bismuth, lead, mercury, and arsenic in this copper enabled these ancient miners to mould it into cutting tools, which possessed a finer and tougher edge than pure metal, and answered to some extent the place of iron and steel—though the tools found, after being cleaned of their oxidation, do not appear materially harder than the copper itself. Along the courses of some of the veins, old shafts or surface gougings have been found, which, when freed of débris, show plainly the methods pursued by their former workers in extracting the ore. So far as can be judged, the rock was softened and cracked by means of fire built against it, and kept going for days, then the loosened masses are pried out by poles. Remains are found of huge stone hammers, and copper chisels and other cutting tools, and in several cases large masses of metal have been found that have been dug around on all sides and partly underneath, and then left as if the miners had given up all hopes of detaching and raising them to the surface.

The only reason for inferring that this was the work of the Aztecs is the fact that specimens of this copper, with native silver adhering, have been found in the mounds of the Ohio Valley, having evidently been used as ornaments by the mound builders, and buried with them. Similar specimens have been handed down for many generations in Mexico, as having been possessed by the Aztecs, who were said to be cognizant of valuable mineral lands far to the north. It has been doubted by many that the copper tools of the ancients really possessed the density and cutting power usually ascribed to them. Sir Gardiner Wilkinson, however, remarks that some of the bronze daggers, found by him in Egyptian tombs, were so beautifully tempered, that after having lain buried for 3,000 years they possessed when dug up, an elasticity almost equal to that of steel. It is thus definitely proven that the Egyptians really did possess an art, which has been lost, of making bronze of a particularly fine temper, capable of taking and keeping a sharp edge.—*Marquette Mining Journal*.

## Editorial.

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### THE TRAFFIC IN PERCENTAGES.

This subject has, at one time or another, been fully discussed in this journal, and as often have we taken the opportunity of expressing an opinion, which, we are well assured, represents not only the true state of the case, but the *disinterested* belief of the majority of our readers. So long as an evil continues, it becomes our duty to aid in its extermination, nor should our efforts relax until this result be attained.

It is said that every evil will, in time, eradicate itself, and we are pleased to learn that the percentage system forms no exception to this rule, but is progressing favorably in the operation of starving itself out. This result is being accelerated by the well-directed efforts of those who oppose the system. The improved status of pharmacists, generally, has also brought with it an independence of feeling which is directly hostile and repugnant to the debasing truckling which characterises the trade in percentages. The severance of this self-imposed bond of servility will obliterate the sole remaining sign of medical domination, erase a most dishonorable blot from the pharmaceutical escutcheon, and remove a cause of ill-feeling, which, of all others, has been a most prolific source of contention.

Some time ago this subject was taken up by the medical and pharmaceutical press of Great Britain. The general opinion held there is well expressed by the following extract taken from the *Pharmaceutical Journal* of London:--

“In this country, as well as in America, it is a violation of medical etiquette and respectability for a physician to participate directly or indirectly in the profit arising out of the dispensing of his prescriptions. It would be a libel to accuse either a medical man of receiving, or a chemist of paying, a share of the spoil as an equivalent for patronage.

“A man who professes only to prescribe, and clandestinely takes a profit on the medicine, is deceiving his patients and robbing

the druggist. The deception on the patient is two-fold, for he is strictly charged to go to one particular druggist, on the ground that no other is to be depended on; whereas the actual reason is, because the party recommended is the accomplice, and the prescriber is a participator in the profit.

This collusion is a deception on the public. A physician or prescribing surgeon receives his usual fee, or he prescribes gratis, taking credit for benevolence. When he takes his percentage or bonus, in the first case he is paid twice, in the second case he receives money for that which he has already given away. He has a direct interest in drenching his patients with medicine, and prescribing it in its most expensive form, although he must be aware that they consult him in the full belief that he is disinterested in this respect.

"We are convinced that no respectable member of the medical profession is guilty of this degrading practice, but in all classes of society there are shades of character ranging from white to black."

In the cities and larger towns of Canada, the percentage system has been largely and openly practiced, but, as we have said, is rapidly falling into disuse. A Montreal correspondent, writing of the state of affairs in that city, says, "With, perhaps, two or three exceptions, the leading physicians are pretty well frightened out of the business, and if they accept any pecuniary consideration, it is in the shape of a present at Christmas." Considering that Montreal might have been considered the headquarters of this disgraceful practice, our correspondent's report is very encouraging, and should stimulate to renewed exertions those, who, for the past two years, have waged an indefatigable and ceaseless warfare, which is now so near a successful termination.

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APPALLING CASE OF POISONING AT MONTREAL.—Just at the time of going to press we have received a few particulars relating to a most shocking case of poisoning which occurred on Thursday, Nov. 27th, at Montreal, and by which six persons have already lost their lives. As represented to us, the particulars are substantially as follows: A few days previous to the date above mentioned, Messrs. Evans, Mercer & Co., wholesale druggists, sent, to a customer, a

bottle containing a half gallon of *Vinum Colchici*—whether of the seed, or root, we cannot say. The customer, finding that he had already a sufficient quantity on hand, decided on returning that last received. This was accordingly done, but the carter in whose charge it was placed, reported to his employers, next morning, that the bottle was missing, and that, as it could not have dropped off the sleigh, it must have been stolen. This appears to have been the case, as it has been ascertained that a man named Flaherty and a little boy, both residents of one of the lowest localities in the city, extracted the bottle from the sleigh and took it home to their residence in Tubb's Yard, where it was examined, and the contents pronounced to be sherry. Acting on this supposition, some of the denizens of the place helped themselves pretty plentifully; nor were they undeceived until a little boy, to whom a mugful had been given, was suddenly taken ill, and, in a short time, died. Consternation spread rapidly amongst those who had partaken of the death-dealing liquid, and the feeling was ten-fold increased when it was discovered that six more persons were evidently under the influence of the fatal draught. Medical men were promptly in attendance, but the poison had too surely done its work, and ere long five more persons were numbered among its victims. These included the man Flaherty, another man, and three women. At that time the husband of one of the women was evidently at the point of death, and, as a considerable number of persons partook of the wine, it is probable that several more deaths may result. The symptoms of poisoning were those of colchicum—constant vomiting and purging, accompanied with violent abdominal pains. The pulse was weak but rapid, running as high as 120 and 130. Consciousness was, in general, retained almost up to the time of death. As we have said, we are not aware whether the wine was of the root or seeds of colchicum. It will be remembered that the maximum dose of the former preparation is half a drachm, and a case of poisoning has been reported in which only two and a half drachms were taken. A case, however, came under our own observation in which a fluid ounce was unattended with fatal results to a boy who took it under the supposition that it was wine. The *Vinum Colchici seminis*, U.S.P., is frequently ordered in this country. Of this the maximum dose is two drachms; two fluid ounces have proved fatal.

## Editorial Summary.

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**Ext. Aurantii Cort. Fluid.**—Mr. M. Bond contributes to the *American Journal of Pharmacy* a formula for the preparation of a fluid extract of sweet orange peel, to be used for flavouring purposes. The preparation is permanent and possesses all the aroma of the peel, but it is, of course, necessary to use fresh and good rind. The method recommended is as follows: Mix fourteen fluid-ounces of alcohol with two fluid-ounces of glycerine, moisten sixteen ounces of peel, in moderately fine powder, with twelve fluid-ounces of the mixture in a large wedgewood mortar, or any convenient vessel, and having covered it carefully, let it stand for twelve hours; then pack moderately firm in a suitable percolator, and proceed as directed in the officinal directions for preparing fluid extracts. Finish the percolation with a mixture of two parts of alcohol and one part of water; reserving the first fourteen fluid-ounces, add one fluid-ounce of glycerine to the remainder, carefully evaporate to two fluid-ounces and mix with the reserved portion. One fluid-ounce added to fifteen fluid-ounces of simple syrup makes a stronger and better "Syrupus Aurantii Corticis" than the officinal. The resulting syrup is entirely destitute of any opaqueness, and its mode of preparation less troublesome than by the present formula, which is somewhat tedious. Four fluidrachms of the fluid extract and a few drops of solution of citric acid, mixed with one pint of syrup, make a syrup unsurpassed in delicacy of flavor, and unfermentable for use at the mineral water counter.

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**Artificial Butter.**—At the American Institute Fair, lately held at New York, there was exhibited a sample of artificial butter, together with other products made by the Oleo-Margarin Manufacturing Co., of New York. It is not generally known that a palatable butter can be made out of other materials than milk, but this appears to be the case. We learn the following particulars from the *Journal of Applied Chemistry*. The process employed is that of M. Mouriez, of France. The principle material employed is fresh beef suet, which is first hashed in a machine similar to a small sausage grinder, with a fine sieve at one end. The fat is forced through the sieve and comes out in the form of a whitish jelly. It is next placed in steam vats and heated for two hours, nearly to the temperature of boiling water, whereby the olein and stearin are separated from the animal matter. The real fat is then placed in bags containing about two pounds each, and pressed between sheets of

galvanized iron in an oil press. The yellow oil which oozes from the pores of the cotton consists of olein containing more or less stearin in solution. This oil has neither taste nor smell. The residuum left in the bags is solid stearin, and is used in making candles. The oil is finally mixed with one-fifth its weight of sour milk, and churned for 20 minutes in a cool chamber. The butter thus formed is colored yellow with annatto, salted, and worked like other butter, when it is ready for the table. One hundred pounds of suet will make seventy pounds of butter, twenty pounds of stearin, and ten pounds of scraps.

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**Action of Sulphate of Iron on Vegetation.**—In the *Druggists' Circular* for November is a paper translated from the *Moniteur Scientifique*. Its author, M. Eusebe Gris, has made a number of experiments on the influence of sulphate of iron on vegetation, and comes to the conclusions (a) that the salt is a stimulating manure; (b) it presents no danger when intelligently applied; (c) its action is evident upon the coloring principle of leaves; (d) it is so cheap that a few cents' worth is sufficient to treat hundreds of plants (e) it might be applied to cultivation on a large scale, and, especially, to the cultivation of fruit. The manner of applying the sulphate is as follows: A solution of two drachms to one quart of water is made, and with this the plants, previously placed in the shade, are watered. It is presumed that the earth surrounding the plant is moist; if this is not the case, a more dilute solution must be used. The solution may be applied daily, for five or six days; about two and a half ounces are sufficient for each watering of an ordinary sized plant, as a calceolaria. Plants which have become sickly, colorless, and etiolated, will, under this treatment, quickly recover a full green color, give finer flowers, send forth more vigorous shoots, and generally show the good effects of the tonic.

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**New Test for Morphia.**—At the meeting of the British Pharmaceutical Conference Mr. L. Siebold read a short paper on a new test for morphine, which he had discovered, and which, in point of delicacy, exceeds any test hitherto known. In its application to the detection of morphia, or opium, in food, the contents of the stomach, etc., are treated in the usual way for the separation of alkaloids, and the matter collected is heated, gently, with a few drops of pure sulphuric acid. A very small quantity of pure perchlorate of potassium is then added. The liquid immediately surrounding the perchlorate will at once assume a deep brown colour, which will soon spread and extend over the greater part of the acid. Warming increases the delicacy of the test. 0.0001 gramme of

morphia can be distinctly recognized in this way, and no other alkalioid is acted upon in a similar way by the substances named. It is indispensable however for the success of the experiment that the perchlorate of potassium is absolutely free from chlorate; if it is not, it must be heated with successive portions of pure hydrochloric acid until the latter remains colorless and ceases to give off chlorine. After removing the HCl completely by washing with water, the perchlorate must be dried at  $212^{\circ}$ , and it is then ready for use.

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**Examination of Sea Water.**—In a paper read before the British Pharmaceutical Conference, Mr. G. A. Keyworth detailed the results of a series of experiments made for the purpose of determining the presence of silver, bromine, and iodine in sea water. Silver was first sought for, as it is commonly believed to exist in solution as a chloride. A weak continuous current of electricity was passed through the water, but, though the experiment was continued during four months, no silver was obtained. Sulphuretted hydrogen passed through several gallons of water, also gave negative results. Iodine was obtained in small quantity, or rather its presence was shown by the starch test. Bromine was more abundant, as it could be detected in as small a quantity as one ounce of water.

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## Transactions of Pharmaceutical Colleges and Societies.

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### MONTREAL COLLEGE OF PHARMACY.

A monthly meeting of the College of Pharmacy was held on Thursday evening, Nov. 13th, in the Lecture Room of the Pharmaceutical Association, Lagauchetiere st., Mr. H. R. Gray, the president, in the chair, and Mr. Harper, in the absence of Mr. Mattinson, acting as Secretary. After the transaction of the usual routine business, the president announced a donation to the College of a complete set of mineralogical specimens from Dr. Perrigo. Many of these specimens are very rare and valuable, and were collected by the doctor himself.

Dr. Shaw, Lecturer on Chemistry, Medical Faculty of Bishop's College, Montreal, then delivered a most interesting and instructive lecture on oxygen. After stating briefly the properties and leading

characteristics of the gas, the lecturer alluded to the almost unlimited extent of the diffusion of oxygen throughout the wide domain of nature. It forms one-fifth of the volume of the atmosphere; between one half and one third of the crust of the globe, and the bodies of its inhabitants; no less than eight-ninths of all water; three-fourths of our own bodies, two-fifths of every plant, and at least, one-half of the solid rocks. The immense force which was required to retain the greater part of this quantity of gas in combination was commented on, and the lecturer then passed on to treat at considerable length, the constitution of the principal rocks of which the crust of the earth is composed, and in which oxygen enters so largely as a constituent. In this respect oxygen might be termed the great world-builder. It has been, as it were, the universal cement by which the other elements have been joined together.

The gas, as existing in the atmosphere, was then taken up, and its three leading manifestations were considered: 1st. Its passive state, as in the great bulk of the air. 2nd. Partially or slowly active, as in the processes of decay and respiration. 3rd. Highly active as in the phenomena of combustion. We should have been pleased to have given in full, this most interesting part of the paper, but the amount of space at disposal forbids our attempting more than the concluding remarks regarding the important part which oxygen plays in the animal economy.

“By far the greater part of our daily food consists of varieties of starch or sugar. These two substances are almost identical in composition, and starch may be converted into sugar, with the greatest ease. Leaving out of view the large amount of water which all our food contains, we find that of wheaten bread, no less than 39 per cent consists of starch or sugar; of potatoes fully 92 per cent is made up of the same materials and in general they form over 4-5ths of the solid part of all our food. These substances when taken into the stomach are almost instantaneously converted by the saliva and gastric juice into a variety of sugar known as grape sugar, so called because it is the sweet principle of ripe grapes. The sweet principle of honey and molasses and the incrustation which is so frequently seen on figs and raisins are essentially the same substance. Grape sugar being very soluble, dissolves in the water present and is taken up (absorbed) by the veins, which ramify on the surface of the intestines. The blood now containing sugar in solution, returns through the liver, to the right side of the heart and by the organ which consists of two ingeniously contrived force pumps, arranged side by side, it is forced through the lungs, where the sugar is brought in contact with the air. Let us examine for a moment this remarkable structure. The lungs as is well known, consist of two large organs, on either side of the chest, called the left and right lung. The right is divided into 3 lobes and the left into two. On examining one of these lobes, it will be found to be made up of an immense

number of small bags or cells, all closely packed together. These cells connect by means of the bronchial tubes and windpipe with the air, through the nose and mouth. They vary in size, but on an average are about 1-100 of an inch in diameter and the total number of the cells in the lungs has been estimated at 600 millions. Their walls are exceedingly thin and the cells may therefore, be easily compressed. The whole mass of the lungs is also exceedingly elastic and by the action of a system of muscles, their volume is alternately increased and diminished in the process of respiration. The amount of air which is thus drawn into the cells and again expelled at each inspiration, differs in different individuals. The average quantity in ordinary tranquil respiration of an adult is a pint; but in a full respiration, it may be as much as  $2\frac{1}{2}$  pints, and by an effort, the lungs may be made to inhale from 5 to 7 pints. As the average, in health, is about 18 respirations per minute, which corresponds to about 18 pints of air inhaled and exhaled, it follows that about 3,000 gallons of air pass through the lungs of an adult man every day. Some estimate it as high as 4,000 gallons a day for an average in ordinary circumstances and as high as 5,700 gallons a day for an athletic man undergoing severe exertion. In order that you may form an idea of this quantity, I will add that 4,000 gallons would fill a room measuring  $8\frac{1}{2}$  feet in every dimension.

Let us now turn to the blood and examine the apparatus by which it is exposed to the air in the lungs. As we have already seen, the blood charged with sugar is received into the heart, from whence it is pumped through a tube called the pulmonary artery into the lungs. This artery divides again and again until it is reduced to very small capillary tubes, which ramify on the surfaces of the air cells. The walls of these capillaries are formed of the thinnest conceivable membrane, so as to bring the blood into as close a contact as possible with the air. Here oxygen gas is absorbed in large quantities and carbonic anhydride given off. The blood now holds in solution, at the same time, oxygen gas and sugar and thus charged it returns by a series of veins to the left side of the heart, when by the second of the two force-pumps, it is again forced through the general circulation of the body, and whilst this is being accomplished the oxygen burns up the sugar. Sugar like wood consists of carbon, hydrogen and oxygen. The last two are present in the proportion to form water, so that sugar may be said to be composed of carbon and water. Of these two substances the carbon only is combustible. This during the circulation of the blood, is slowly burnt up by the oxygen and converted into  $\text{CO}_2$ , carbonic anhydride, which remains in solution until it is discharged, when the blood returns again to the lungs or else escapes through the skin. Thus it appears that respiration is a process of combustion, in which the fuel is sugar and the smoke carbonic anhydride and aqueous vapour. I need not dwell upon the fact so universally known as the presence of carbonic anhy-

dride in the breath. All may not know, however, how large is the volume of this gas which they daily exhale. It varies with age, sex, food, health and a variety of other circumstances. In a full grown man the weight of carbonic anhydride evolved from the lungs varies from 1 to 3 lbs in 24 hours, which is equivalent to from 9 to 27 cubic feet. From the quantity of carbonic anhydride exhaled, we can readily calculate the amount of carbon burnt which will in a full grown man vary from 5 to 15 ounces in 24 hours. Moreover it has been proved, that the quantity of heat evolved by a given amount of charcoal in burning is absolutely the same, whether the combustion be rapid or slow, so that the same amount of heat has been generated in our bodies, during the last 24 hours by the slow process of respiration, as would have been set by the burning of 12 oz. of carbon or charcoal for each man. It is no wonder then, that the temperature of the body is always so much above that of the air, and that even in the coldest climate, the heat of the blood is maintained as high as 96° F. In regulating the temperature of his body, man follows instinctively the same rules of common sense, which he applies to warming his dwellings. In proportion as the climate is cold, he supplies the loss of heat by burning more fuel in his body and hence the statements of arctic voyagers, that 12 lbs. of tallow candles make only an average meal for an Esquimaux, are not inconsistent with the deductions of science.

Respiration then, like decay, is a process of slow combustion, in which the oxygen of the air attacks and consumes even at ordinary temperatures, the sugar in the blood. Let us now compare with it the rapid combustion of the same substance. In this crucible I have mixed two ounces of sugar and two ounces and a quarter of solidified oxygen, solidified by the force of chemical affinity and bound up in a white salt called potassic chlorate. The oxygen and sugar are here lying side by side as in the blood, but the condition of slow combustion which exists in the body, not being present in the crucible, they will remain in contact indefinitely until some external agency is applied. The oxygen is now in its passive condition, but one single drop of sulphuric acid will arouse its dormant energies and you have instantly one of the most dazzling displays of combustive energy, which can be produced by art. The only difference between this brilliant deflagration and the combustion which has gone on in each of our bodies is simply this: That the heat which in the blood has been imperceptibly evolved during the last hour, was here concentrated in a few seconds and therefore produced the phenomena of intense ignition. All the other conditions, the material burnt the quantity of material employed, the products generated and the amount of heat evolved are in both cases essentially the same. On comparing these two phenomena together, reflect for a moment on the false estimate, which we are apt to make of the phenomena of nature. The splendid displays of

combustion arrest our attention by their very brilliancy, while we overlook the silent yet ceaseless processes of respiration and decay, before which in importance and magnitude the grandest conflagrations sink into insignificance. These are but the spasmodic efforts of nature; there are appointed means by which the harmony and order of creation are preserved. It has been calculated that 3,571,428 tons of oxygen are consumed in 24 hours for the purposes of respiration in man and the lower animals, for fires, furnaces, &c., and the processes of decay and fermentation. If such be the daily requisition of this gas, will not the oxygen of the atmosphere be in time exhausted? The whole amount of oxygen in the atmosphere has been calculated to be about 1,178,158 thousand millions of tons: a supply which at the present rate of consumption would last about 900,000 years. We need not therefore, fear that the amount of oxygen in the atmosphere will be sensibly diminished in our day and generation, but then this period great as it is, is not to be compared with the ages of geological time. The time which has elapsed since the coal we are now burning was deposited in its beds, is to be counted by many millions of years, so that since the coal epoch, the oxygen of the atmosphere must have been all consumed again and again. Why then has it not all been removed from the atmosphere? Simply because in the beautiful balance of creation, there is always some recuperative process for every such loss. In the case before us it is as you all know, the vegetation. As fast as our breath, our fires and the process of decay around us, are removing the life-giving oxygen, just so fast is it restored by every green leaf, which wanes in the sunshine, and by every blade of grass, which sprouts under our feet. What the animal removes the plant restores. The sun's rays acting upon the green surface of the leaf, decompose in some mysterious way the carbonic anhydride, overcoming the intense affinities of its elements, fixing the carbon and setting free the oxygen to be restored to the air. It is the special office of plants to elaborate all the materials of organized beings. The animal receives these materials and builds with them its various tissues, but no sooner are the cell walls finished and the structure ready to discharge its vital functions, than it is consumed by almost the very act which gave it life. The carbonic anhydride, water and ammonia are restored to the atmosphere and the cycle is complete.

Of the Divine economy the sun's rays are the great moving cause, and it is their mysterious power which is constantly reappearing in all the varied phases of organic life. And not in these alone, for it is easy to prove that this same gentle influence keeps in motion the aerial currents which blow our ships across the ocean. It raises the water which turns the wheels of our factories. It drives the locomotive over the iron roads and impels the steamer through the waves. It roars at the cannon's mouth and charges the grander

artillery of the skies. There is no motion on the globe which cannot be traced directly or indirectly to the sun, and were his rays to lose their mysterious power, all nature would become silent, motionless and dead. But in tracing to the sun all these varied phenomena let us not forget that we have not yet found the first great cause. Who made the sun? or how did it come into existence? and how is it maintained in its proper position? Who regulates its forces and tempers its influences to the required ends? And what is the sun? It is but a small star in the infinitude of space, where shine Sirius and Arcturus, Regulus and Aldebaran, Procyon and Capella with innumerable others, all shedding forth a far mightier effluence than our feeble star. Yet the grand total of all the powers streaming from all the suns which human eye has seen or which still lie undiscovered in the depth of space, alone represents the active energy of the universe. Gentlemen, there are two theories of creation. One regards this energy as an unintelligent power. The other sees in it simply the will of the Eternal Jehovah. They are both theories. We cannot substantiate either, but which do you think the most probable.

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#### PHILADELPHIA COLLEGE OF PHARMACY.

A pharmaceutical meeting was held on the afternoon of October 21st, 1873, in the hall of the College. Present, twenty members. Dillwyn Parrish, President, in the chair.

Owing to the lateness of the hour at which the meeting was convened, on account of a preceding meeting occupying so much of the time, the number of members remaining was small.

Prof. Maisch read a letter from Clemmons Parrish, tendering his resignation as Registrar, his present engagements preventing his attending to the duties of the office. On motion, his resignation was accepted.

This being the regular time for electing a Registrar, as provided in the by-laws, Joseph P. Remington was elected to fill the office.

Richard V. Mattison read a paper on Fluid Extracts of Ipecac, in which he suggests an improvement in the present officinal formula, by depriving the percolate of the peculiar substance which causes turbidity, and decreasing the proportion of glycerin  $12\frac{1}{2}$  per cent.

Dr. W. H. Pile called attention to a sample of adulterated oil of gaultheria, which seems now to be pressing on the market. The adulterating substance he found to be chloroform, and the means adopted for detecting the fraud were, first, by taking the specific gravity, and, secondly, noting the boiling-point. The specific gravity of true oil of gaultheria is 1.18, whilst that of the sample in

question was 1.24. The boiling-point of the true oil is 400° F., whilst the adulterated oil boiled actively at 200° F. By shaking the adulterated oil in a test-tube, after slightly warming, the odor of chloroform is distinctly apparent. He ascertained that this impurity existed in the oil in the proportion of 1 part of chloroform to 4 parts of oil, and his mode of arriving at the quantitative estimation consisted in mixing certain proportions of chloroform and oil together until he obtained the same specific gravity as the adulterated sample had.

Charles Bullock stated that he had met with two cans of the oil, which he thought probably belonged to the same lot as that mentioned by Dr. Pile, and he exhibited a very neat and convenient little apparatus for detecting and separating the mixed liquids by fractional distillation. It consisted of a small glass flask, into which the oil was poured; a bulb-like stopper, having a tubulure at the top, which had a rather long tube leading from it at a similar angle to that usually seen in alembics, and a thermometer, which passed through the tubulure and into the bulb of the stopper. If heat is now applied to the flask, the temperature of the vapor which fills the bulb and is being condensed can easily be read off. By this method he was able to separate the chloroform from the oil, and he also found that it contained a very large portion of oil of sassafras. The manner in which the oil had been made seemed to have been: Take 4 or 5 lbs. oil of sassafras, 1 lb. oil of gaultheria, and chloroform sufficient quantity to bring up the specific gravity to the right point.

Prof. Maisch, speaking of oil of gaultheria adulterated with oil of sassafras, said that when the adulterated oil is treated in the cold with commercial nitric acid a deep red resinous mass separates, whilst the pure oil of gaultheria is not colored by it.

Charles Bullock reported that, having some suspicions that the heavy lubricating coal oils were used for the purposes of adulteration, he took the specific gravity of one of the most dense in the market, and found it to be only .883; he regarded them on this account unfit for the purpose.

Prof. Maisch exhibited three samples of Pareira brava, two of which differed from the kind usually seen in commerce of late years, and a sample of the real Pareira, which has been proved by Mr. Daniel Hunbury to be produced by *Chondodendron tomentosum*. The three spurious pareiras, all of which were mentioned in Mr. Hanbury's paper, were the usual commercial variety, with the layers of wood in more or less eccentric layers; a sample of a bright yellow color internally and with the wood developed almost altogether in one direction, and a sample nearly tasteless, the wood of which is in more concentric layers; the sources of these three kinds are unknown, but all are derived from plants of the order Menispermaceæ.

Mr. Gaillard spoke of having received a sample of what purported to be French quinine, from a friend in the South, who had been offered the article at a very low price, and had sent him a portion to ascertain why it could be sold so low. It proved to be the old fraud—muriate of cinchonia.

Prof. Maisch read an extract from the "Circular of the Philadelphia Drug Exchange" in relation to this subject, as follows:

*Cinchonia Muriate*. From the "Druggists' Circular," New York, October, 1873, we extract the following statement reported in the Transactions of the American Pharmaceutical Association at Richmond:

"Prof. Maisch drew attention to the fact that very large quantities of muriate of cinchonia had been put up in the style of French quinine, and having an imitation of Pelletier's label upon it, and that it had been extensively introduced in the Southern States.

"Dr. Squibb said that some of the manufacturers of quinine were in part responsible for this attempt to defraud the people, as they in the course of their manufacture accumulated large quantities of the cinchonia salts, and they disposed of them indiscriminately to any who applied for them."

We take occasion to say that, so far as American manufacturers of sulphate of quinia are concerned (1), they do not dispose of the cinchonia salts indiscriminately to any who apply for them, but only to regular customers who pay for them; and (2), so far from being responsible for this attempt to defraud the people, they purposely avoid handling *muriate of cinchonia*—they do not make the article.

We consider that this statement is eminently due to our friends who make sulph. quinia here, for they have not only declined making, but refuse to deal in, the article of *muriate of cinchonia*, on account of its close resemblance to *sulphate of quinia*,

*Muriate of cinchonia* is largely sold in *Europe*, but not in this country, so far as sulph. quinia manufacturers are interested.

It was suggested that advantage might be taken of the condition of affairs to ascertain what virtues *muriate of cinchonia* possesses as an antiperiodic.

Jos. P. Remington introduced the subject of Diluted Phosphoric Acid, and gave the results of an experiment based on a fact mentioned to him by Prof. Maisch, in which it was shown that diluted phosphoric acid, made from the phosphorus direct, according to the U. S. Pharmacopœia, would make a clear solution when mixed with an equal quantity of tincture of chloride of iron, whilst that made from the glacial phosphoric acid produced a precipitate when similarly mixed.

Prof. Maisch stated that it required repeated treatment with nitric acid in the manner laid down in the second formula of the Pharmacopœia in order to thoroughly convert the monobasic into the tribasic variety.

The meeting then adjourned.

JOSEPH P. REMINGTON, Registrar.

—*American Journal of Pharmacy.*

## Practical Formulæ

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*Red Ink.*—Prof. R. Boettger recommends a red ink which is not affected by powerful chemical agents. The ink is prepared as follows: Carmine is triturated, in a porcelain mortar, with a little solution of soluble glass; afterwards more of this solution is added, until the desired shade and fluidity has been attained. The ink when used dries rapidly, with a gloss, and when not in use should be protected from contact with the atmosphere by closing the vial with an oiled cork.—*Chem. Centralbl.*, 1873, No 30, in *Am. Jour. Pharm.*

*Red Brown Wash for Wood.*—1 lb. of sulphate of copper is dissolved in 8 lbs. of water, and the solution applied to the wood with an ordinary brush; this is to be followed by a solution of  $\frac{1}{2}$  lb. ferrocyanide of potassium in 8 lbs. of water. The ferrocyanide of copper thus deposited upon the wood fibre is not only not altered by atmospheric influences, but it tends also to preserve the wood from the growth upon it of moss, lichens, fungi, and from the attacks of insects. The color may be darkened or lightened by increasing or decreasing the strength of the solutions, and the wash will be more permanent if the wood afterwards receives a coat of boiled linseed oil or varnish.—*Pharm. Centralh.*, in *Am. Jour. Pharm.*

*Erasmus Wilson's Hair Wash.*—

Aqua Mellis.....	$\frac{1}{2}$ oz.
Liq. Ammoniaë .....	$\frac{1}{2}$ oz.
Spirit. Rosmarini .....	1 oz.
Ol. Olive .....	1 oz.

—*Phar. Jour. & Trans.*

*Hop Beer.*—

Take of Malt.....	14 quarts.
Hops.....	1 $\frac{1}{2}$ pounds.
Crushed sugar.....	16 “
Caramel.....	$\frac{1}{2}$ pint.
Potato-yeast .....	1 quart.

Scald the malt in boiling water and let stand twelve hours; repeat the process, drawing the wort each time. Make an infusion of the hops in a covered vessel, add it as well as the sugar to the malt wort, heat until it is milkwarm, and after placing in a vat or barrel, add the yeast and let stand 24 hours. Then, draw off into a clean barrel and bung tight. This comes as near to XXX ale as anything except the article itself.—*Druggists' Circular.*

*Cologne Water*.—A correspondent of the *Druggists' Circular* is responsible for the following peculiar formula :

- R Lavender flowers, choice.....9 ounces.  
 Rosemary leaves.....3 “  
 Nutmegs, crushed .....No. 4.  
 Mace, bruised .....6 drachms.

Mix, and percolate rapidly with the following menstruum :

- Alcohol, deodorized.....7 pints.  
 Orange-flower water .....1 pint.

To the percolate add :

- Oil of Lemon.....9 drachms.  
 “ Orange.....6 “  
 “ Bergamot .....3 “  
 “ Neroli .....3 “  
 “ Rose .....50 drops.  
 “ Cloves .....24 “

Mix, and add lastly :

- Pure grape brandy.....12 fluid ounces.

The brandy imparts the cœnanthic-ether odor which is necessary to cologne. I am aware, in giving the above recipe, that I have deviated slightly from the gamut of odors given by scientific smellers, but the result of the combination, if properly manipulated, will be superior to most orthodox formulæ published when corn-spirit has to be used. The above should be allowed to stand several weeks before being offered for sale.

## Varieties.

**COLORATION OF CHLORALHYDRATE BY OIL OF PEPPERMINT**.—On bringing the two substances in contact, a reddish color is soon developed, which gradually darkens to cherry-red. The color is readily soluble in ether, alcohol, and chloroform; boiling does not destroy it; sulphuric acid heightens its intensity, and, if now chloroform be added, a dark, violet tint is produced. The oils of lemon, bergamot, juniper, crisped mint, rosemary, cloves, anise and fennel do not produce any coloration with chloralhydrate.—*Archiv. d. Pharm.*, 1873, July 29, in *Am Journ. Pharm.*

**ANTIDOTE TO MUSHROOM POISONING**.—Experiments lately made with the active principle of mushroom (muscarine), from *agaricus muscarius*, show that its effect on the system is the reverse of that of atropine. It causes a great sensibility to light and increase of the pulse, and seems in its action to promise the best remedy for belladonna poisoning, and *vice versa*. Its subcutaneous injection was used.—*Phila. Med. & Surg. Reporter*.

**HOW TO SWALLOW A PILL**.—The *Chicago Medical Times* is responsible for the following : “ Put the pills under the tongue and behind the teeth, and let the patient immediately take a large swallow of water, and he will

neither feel the pill nor taste it. In fact, he cannot tell where it has gone, and I have seen them look about the floor to see if they had not dropped it."

**DETECTION OF ADULTERATION IN COFFEE.**—J. Muller.—In order to ascertain whether ground coffee has been mixed with either roasted corn or amylaceous substances generally, it is only necessary to treat the powder, first with dilute caustic potassa, and, after filtration and addition of a large quantity of pure water, a solution of iodine is added, whereby the starch is detected.—*Chem. News, from Dingl. Polyt. Journ.*

**CHILBLAINS.**—Mr. Fergus recommends sulphurous acid in this affection. It should be applied with a camel's-hair brush, or by means of a spray-producer. One application of this usually effects a cure. The acid should be used pure. A good wash for hands or feet affected with chilblains is sulphurous acid, 3 parts; glycerine, 1 part; and water, 1 part. The acid will be found particularly useful in the irritating, tormenting stage of chilblains.

**PAULLINIA OR GUARANA** is a new medicine introduced into Europe from Brazil. It is prepared by the natives from the seeds of the *Paullinia Sorbilis* and *P. Cupana*, climbing shrubs growing on the banks of the river Orinoco. The drug, as found in the market, is in cylindrical or globular masses, of a reddish-brown color, rugose on the surface, very hard, and of a marbled appearance when broken. To use a plain comparison, these cylinders look just like dried-up Bologna sausages. Paullinia contains a large percentage of caffeine, more than twice as much as tea, and five times as much as coffee. Tannin also enters into its composition in no small amount. From the presence of these two active principles the medicinal properties and uses of Paullinia are readily anticipated. Its effects upon the system are those of a tonic and nervous stimulant. It is used with advantage in the diarrhoea of phthisis, sick-headache, paralysis, tedious convalescence, and sometimes in irritation of the urinary passages. It is administered in the shape of a powder, mixed with sweetened water, or more conveniently in the form of an alcoholic extract. The dose of the powder is from one to two drachms, that of the extract eight or ten grains during the day. Paullinia is a regular article of trade, obtainable of nearly all wholesale druggists.—*Druggists Circular.*

## Registrar's Notices.

LIST OF CHEMISTS WHO HAVE RENEWED THEIR REGISTRATION DURING THE PAST MONTH.

Ault, Edward, Iroquois.	Lawrence, J. A. R., Hamilton.
Barker, Robt., Brighton.	Lewis, J. T., Toronto.
Cooke, Fred., Orillia.	Maclagan, Henry, Lindsay.
Cummines, Thomas, Welland.	Nelles, R. A., Duart.
Deyell, Robt., Port Hope.	Perrin, S., Lindsay.
Gayfer, John, Ingersoll.	Roberts, C. W., Paris.
Hobart, G. S., Kingston.	Roper, John, Caledonia.
Lang, G. J. B., Owen Sound.	

NEW REGISTRATIONS,

Higginbotham, J. W., Bowmanville. Lowry, Martin, Tyrone.  
Hunter, John, Orillia.

DRUGS, MEDICINES, &c.		\$ c.	\$ c.	DRUGS, MEDICINES, &c.—Contd.		\$ c.	\$ c.
Acid, Acetic, fort.		0 14	0 15	Sang Dracon		0 60	0 70
Benzoic, pure		0 23	0 30	Scammony, powdered		6 00	6 50
Citric		1 40	1 50	" Virg.		14 50	—
Muriatic		0 05	0 06	Shellac, Orange		0 65	0 70
Nitric		0 11	0 15	Gum, Shellac, liver		0 60	0 65
Oxalic		0 23	0 27	Storax		0 40	0 45
Sulphuric		0 03	0 07	Tragacanth, flake		1 10	1 40
Tartaric, pulv		0 50	0 50	common		0 53	0 65
Ammon, carb. casks		0 23	0 24	Galls		0 28	0 32
" jars		0 23	0 24	Gelatine, Cox's 6d.		1 15	1 20
Liquor, 880.		0 25	0 28	Glycerine, common		0 25	0 30
Muriate		0 14	0 15	Vienna		0 55	0 30
Nitrate		0 45	0 60	Prices		0 60	0 75
Æther, Acetic		0 45	0 50	Honey, Canada, best		0 15	0 17
Nitrous		0 35	0 37	Lower Canada		0 14	0 16
Sulphuric		0 50	0 50	Iron, Carb. Precip.		0 20	0 25
" Crude, pulv		0 15	0 17	" Sacchar		0 40	0 55
Tart		0 55	0 65	Citrate Ammon.		1 65	1 70
Alcohol, 95 per ct.	Cash	1 60	1 72	" & Quinine, oz		0 53	0 58
Arrowroot, Jamaica		0 16	0 22	" & Strychine		0 20	0 25
Bermuda		0 50	0 65	Sulphate, pure		0 08	0 10
Alum		0 02	0 03	Iodine, good		7 50	8 00
Balsam, Canada		0 50	0 50	Resublimed		8 50	9 00
Copaiba		0 90	0 95	Jalapin		1 25	1 50
Peru		3 75	4 00	Kreosote		2 40	2 50
Tolu		0 10	1 00	Leaves, Buchu		0 22	0 30
Bark, Bayberry, pulv		0 20	0 22	Foxglove		0 25	0 30
Canella		0 17	0 20	Henbane		0 35	0 40
Peruvian, yel. pulv		0 42	0 50	Senna, Alex		0 27	0 60
red		2 10	2 20	" E. I.		0 14	0 20
Slippery Elm, g. b.		0 15	0 20	" Tinneville		0 20	0 30
flour, packets		0 28	0 32	Uva Ursi		0 15	0 17
Sassafras		0 15	0 20	Lime, Carbolate	brl	5 50	—
Berries, Cubebs, ground		0 20	0 25	Chloride		0 06	0 07
Juniper		0 06	0 10	Sulphate		0 08	0 12
Beans, Tonquin		0 62	1 10	Lead, Acetate		0 15	0 16
Vanilla		30 00	30 00	Leptandrin	oz.	0 60	—
Bismuth, Alb		3 40	4 00	Liq. Bismuth		0 50	0 75
Carb.		3 65	4 00	Lye, Concentrated		1 75	2 00
Camphor, Crude		0 38	0 41	Liquorice, Solazzi		0 51	0 55
Refined		0 45	0 50	Cassano		0 23	0 40
Cantharides		2 80	3 00	Other brands		0 14	0 25
Powdered		2 85	3 10	Liquorice, Refined		0 35	0 45
Charcoal, Animal		0 04	0 06	Magnesia, Carb.	1 oz.	0 20	0 25
Wood, powdered		0 10	0 15	" 4 oz.		0 17	0 20
Chiretta		0 20	0 30	Calcined		0 65	0 75
Chloroform		1 10	1 65	Citrate	gran.	0 63	0 75
Cochineal, S. G.		0 75	0 90	Mercury		1 70	1 75
Black		1 10	1 20	Bichlor		1 50	1 60
Colocynth, pulv		0 50	0 60	Chloride		1 75	1 80
Collodion		0 90	1 00	C. Chalk		0 75	80
Elatarium	oz	3 20	4 00	Nit. Oxyd		1 90	2 00
Ergot		0 35	0 45	Morphia Acet		4 45	4 60
Extract		1 50	1 60	Mur.		4 45	4 60
Belladonna		1 25	1 75	Sulph.		4 60	4 75
Colocynth, Co.		0 50	0 60	Musk, pure grain	oz	25 00	—
Gentian		0 85	0 95	(Anton		0 90	1 20
Hemlock, Ang		1 50	1 60	Oil, Amonds, sweet		0 40	0 45
Henbane, "		5 00	5 50	" bitter		14 00	15 00
Jalap		1 75	2 00	Anisced.		4 00	4 25
Mandrake		0 40	0 50	Bergamot, super		6 25	6 50
Nux Vom.	oz	1 50	1 50	Caraway		3 20	3 50
Opium	oz	5 00	5 50	Cassia		2 50	2 60
Rhubarb		1 00	1 20	Castor, E. I		0 14	0 15
Sarsap. Hon. Co.		3 50	4 00	Crystal		0 22	0 25
" Jam. Co.		0 70	0 80	Italian		0 26	0 28
Taraxacum, Ang		0 17	0 25	Citronella		1 25	1 35
Flowers, Arnica		0 32	0 40	Cloves, Ang.		2 40	2 50
Chamomile		0 70	0 80	Cod Liver		1 25	1 50
Gum, Aloes, Barb. extra.		0 40	0 50	Croton		0 80	1 00
" good		0 16	0 20	Juniper Wood		6 00	7 00
" Cape		0 20	0 30	Berries		0 90	1 00
" powdered		0 50	1 35	Lavand, Ang.	oz.	1 40	1 60
" Socot		0 70	0 75	Exotic		5 00	5 50
" pulv		0 60	0 75	Lemon, super		3 20	3 40
Arabic, White		0 24	0 30	ord.		4 00	4 25
" powdered		0 42	0 50	Orange		0 65	0 75
" sorts		0 13	0 16	Origanum		13 00	14 40
" powdered		0 40	0 42	Peppermint Ang.		3 80	4 00
" com. Gedda		0 13	0 15	" Amer.		8 50	8 75
Assafoetida		0 35	0 75	Rose, Virgin		6 80	7 00
British or Dextrine		0 12	0 15	" good		0 90	1 00
Benzoin		0 25	0 30	Sassafras		6 00	6 50
Catechu		0 12	0 15	Wintergreen		4 00	6 50
" powdered		0 25	0 30	Wormwood, pure		1 30	1 40
Euphorb, pulv		1 40	1 50	Ointment, blue		8 50	8 75
Gamboge		0 90	1 00	Opium, Turkey		10 50	10 75
Guaiacum		0 50	0 70	pulv.			
Myrrh							

DRUGS, MEDICINES, &c.—Cont'd

Orange Peel, opt.	0 30	0 36
"    good	0 12½	0 20
Pill, Blue, Mass.	1 30	1 40
Potash, Bi.chrom	0 23	0 27
Bi-tart	0 33	0 35
Carbonate	0 14	0 20
Chlorate	0 55	0 60
Nitrate	10 50	11 00
Potassium, Bromide	1 10	1 25
Cyanide	0 75	0 80
Iodide	6 75	7 00
Sulphuret	0 25	0 35
Pepsin, Boudault's	1 40	—
Houghton's	8 00	9 00
Morson's	0 85	1 10
Phosphorus	0 95	1 00
Podophyllin	0 50	0 60
Quinine, Pelletier's	—	2 45
Howard's	2 70	—
"    100 oz. case	2 70	—
"    25 oz. tin	2 65	—
Root, Colombo	0 13	0 20
Curcuma, grd	0 12½	0 17
Dandelion	0 17	0 20
Elecampane	0 16	0 17
Gentian	0 08	0 10
"    pulp	0 15	0 20
Hellebore, pulp	0 17	0 20
Ipecac	1 50	1 60
Jalap, Vera Cruz	90	1 15
"    Tampico	0 70	1 00
Liquorice, select	0 12	0 13
"    powdered	0 15	0 20
Mandrake	0 20	0 25
Orris	0 20	0 25
Rhubarb, Turkey	2 50	2 75
"    E. I.	1 10	1 20
"    "    pulp	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 00	1 10
Spigelia	0 25	0 30
Sal., 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 25	2 50
Fenugreek, g'd	0 09	0 10
Hemp	0 06½	—
Mustard, white	0 14	0 16
Saffron, American	1 00	1 10
"    Spanish	12 00	13 00
Santonine	8 25	9 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 5½
"    Howard's	0 14	0 16
Caustic	0 06½	0 06½
Spirits Ammon., arom	0 35	0 35
Strychnine, Crystals	2 60	2 70
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	0 10	0 15
"    Sulphate, pure	0 10	0 15
"    common	0 06	0 10
DYESTUFFS.		
Annatto	0 35 @	0 60
Aniline, Magenta, cryst	2 50	2 80
"    liquid	2 00	—
Argols, ground	0 15	0 25
Blue Vitrol, pure	0 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 60	0 95
Extract	0 30	0 35

DYESTUFFS—Continued.

Japonica	0 07½	0 08
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 13	—
"    ½ lb.	0 14	—
Madder, best Dutch	0 13	0 15
2nd quality	0 12	0 11
Quercitron	0 03	0 05
Sumac	0 06	0 08
Tin, Muriate	0 10½	0 12½
Redwood	0 05	0 06
SPICES.		
Allspice	0 11½ @	0 12
Cassia	0 39	0 40
Cloves	0 30	0 32
Cayenne	0 30	0 35
Ginger, E. I.	0 19	0 20
Jam	0 20	0 30
Mace	1 65	1 75
Mustard, com	0 20	0 25
Nutmegs	1 15	1 20
Pepper, Black	0 22½	0 23
White	0 48	0 50
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 07½	0 08
Venetian	0 02½	0 03½
Sienna, B. & G.	0 07	0 10
Umber	0 07	1 80
Vermillion, English	1 60	1 80
American	0 25	0 35
Whiting	0 85	0 90
White Lead, dry, gen	0 08½	0 09
"    No. 1	0 07	0 07
"    No. 2	0 05	0 05
Yellow Chrome	0 12½	0 15
"    Ochre	0 02½	0 03½
Zinc White, Star	0 10	0 12
COLORS, IN OIL.		
Blue Paint	0 12 @	0 15
Fire Proof Paint	0 06	0 08
Green, Paris	0 30	0 37½
Red, Venetian	0 07	0 10
Patent Dryers, 1 lb tins.	0 11	0 12
Putty	0 03½	0 04½
Yellow Ochre	0 08	—
White Lead, gen. 25 lb. tins.	2 50	—
"    No. 1	2 25	—
"    No. 2	2 00	—
"    No. 3	1 75	—
"    com	1 30	—
White Zinc, Snow	2 75	3 25
NAVAL STORES.		
Black Pitch	5 00 @	5 25
Rosin, Strained	4 50	—
Clear, pale	7 80	0 60
Spirits Turpentine	0 58	0 75
Tar Wood	5 50	—
OILS.		
Cod	0 63 @	0 70
Lard, extra	0 85	0 80
No. 1	0 75	0 90
No. 2	0 75	0 80
Linseed, Raw	0 75	0 85
Boiled	0 80	1 20
Olive, Common	1 10	1 30
Salad	1 80	2 40
"    Pints, cases	4 20	3 50
"    Quarts	3 25	0 70
Seal Oil, Pale	0 68	0 70
Straw	0 68	1 35
Sesame Salad	1 30	2 40
Sperm, genuine	2 20	0 50
Whale refined	0 90	—