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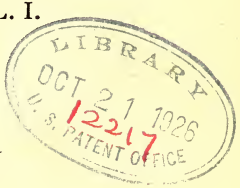

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PHARMACY.

APRIL, 1835.

Original Communications.

ART. I.—ON EGYPTIAN OPIUM. By Jonathan Evans, Jr.

(Extract from Thesis. Phil. Col. Pharm.)

During the course of the year 1833, a parcel of opium was imported into this city direct from Leghorn, and by its favourable appearance found at first a ready market; it being a fact however, that opium taken to France mixed with impurities and manufactured into flat cylindrical cakes is occasionally received into this country, suspicions were excited, that the article now offered as Egyptian opium was a sophistication.

This idea being held out, a portion was submitted to analysis, and found to contain an unusually small per centage of morphia; the account of which was published in the fifth volume of the Journal of the Philadelphia College of Pharmacy, by J. Scattergood.

Subsequently, a quantity of opium has been thrown into the market, similar in form and appearance to the importation of 1833, and sold under the same name.

As regards the merits of the last mentioned article, a difference of opinion prevails; by some it is considered superior

to the first; by others, very little or no better. These opinions may be considered as founded on supposition, no trial that I am aware of having been made to ascertain its proportion of morphia.

Viewing the subject as one of importance, I commenced a course of experiments, the results of which, together with some observations on the comparative value of the article, I now submit.

Its form is that of roundish flat masses, varying in weight from one to eight ounces, having been covered with a greenish leaf, while moist, on many of the pieces fragments of the midrib only remaining; the brown capsules with which Turkey opium is mostly surrounded are entirely absent. Its general appearance is attractive; upon breaking several pieces, however, I was struck with a difference of colour, some being darker than others, and than common opium. Its fracture is dull and uneven, and when freshly broken the surface has a slightly unctuous feel; taste not so strongly bitter, but acrid and astringent, and its odour more nauseous. When cold, it is hard and friable, easily reduced to powder which is of a light brown colour.

It approaches nearer to the form of an extract than common opium, but less so than a specimen of pure Turkey opium which I had an opportunity of examining; the fracture of which was smooth and shining.

Before reciting the analysis, it may be right to remark that but little attention has been paid to those principles occurring in minute quantities, and which are of little import, except as matters of curiosity; the principal object has been to isolate those of practical importance.

In performing the first experiment, I followed, with but little variation, the formula of Dr. Staples, recognized by our national Pharmacopœia as being the best for obtaining morphia, and by which the most accurate conclusions may be made of the comparative strength of the opium.

Experiment 1*st.* Two thousand grains were submitted to the action of twelve fluid ounces distilled water, for six days, the temperature varying from 80° to 90°. The dregs were sepa-

rated by a filter of unsized paper, which was previously moistened with water. The resulting solution was of a dark colour, of a very bitter, and somewhat acrid taste, with the usual heavy, narcotic smell of opium, and having a specific gravity of 1.069. The dregs were again digested in eight fluid ounces distilled water, four days, and a solution produced much less coloured than the first, of specific gravity 1.031. Finally, the dregs were washed with four ounces of water, passed and repassed until they ceased to yield colour to that menstruum.

The several solutions were mixed and evaporated by means of a water bath to the consistence of a soft extract.

Upon redissolving the extract in distilled water, a slight turbidness was observable through the solution; this was removed by filtration, and treated with boiling alcohol; as it cooled there were deposited crystals free from colour, which dissolved slowly in nitric acid, giving it a yellow tinge, proving it to be narcotine.

To the solution of the watery extract, twelve fluid ounces of alcohol were now added, causing considerable turbidness; five fluid drachms of water of ammonia, specific gravity .952, previously mixed with two fluid ounces of alcohol, were next added, and the whole agitated; a brown precipitate, together with a small quantity of minute crystals gradually subsided, the mixture was allowed to remain undisturbed fifteen hours, when six drachms more ammonia were added, mixed with alcohol as before, and the mixture again agitated. Allowing sufficient time to elapse for the formation of crystals, the liquor was decanted, the precipitate collected on a filter and carefully dried by a heat of about 65°; it weighed 135 grains, a part of which was the colouring matter thrown down by the first addition of ammonia. The ammoniacal waters, upon standing a few days, deposited a fresh portion of crystals, weighing, when dried 22 grains.

To free the morphia from colouring matter and other impurities, the two precipitates were dissolved in dilute sulphuric acid; animal charcoal, purified with hydrochloric acid, being added, the whole was submitted to ebullition; the filtered

solution was allowed to stand till it became cold, and then neutralized with magnesia; the precipitate was thrown on a filter, washed with cold distilled water, and dried; it was next boiled in three ounces of alcohol 35°, and the solution filtered while hot; as it cooled, crystals were deposited, which when dried, weighed 41 grains; by testing they proved to be morphia, producing, with nitric acid, a deep orange red solution.

The mother liquor, by evaporation, yielded a crystalline mass, weighing 29 grains, of a dirty nankeen colour; by a second solution in alcohol, and crystallizing, they yielded 23 grains, much less coloured; they proved to be morphia. The magnesian precipitate was again boiled in half an ounce of alcohol; the filtered solution yielded 4 grains of morphia.

In order to be satisfied whether any morphia remained in the ammoniacal liquor, it was evaporated to one-half, and one drachm of water of ammonia added; after standing some time, a thin crust formed on the bottom of the vessel; this was removed and purified with alcohol; it yielded 7 grains, making in all, 75 grains of morphia. This was twice washed with sulphuric ether, in order to free it from narcotine; it then weighed, when dried, 69 grains.

The mass which remained after exhaustion with water, was submitted to the action of alcohol, the maceration being assisted by the heat of a water bath, kept at the temperature of from 130° to 150°; the first portion of alcohol was decanted, and another added; finally, the marc was washed with alcohol until it ceased to yield colour; the several tinctures were mixed and evaporated; at first an oily substance was deposited; after that a resinous extract. The first was insoluble in water, soluble in ether, having an unctuous, sticky feel; the second portion, partly soluble in alcohol 39°; the rest insoluble in ether, but soluble in boiling water; nothing of a crystalline nature was procured from the alcoholic extract.

The marc was next digested in ether; the solution when filtered and evaporated, deposited, first, a slightly coloured unctuous matter, resembling caoutchouc; secondly, crystals nearly free from colour, producing a yellow solution with ni-

tric acid, indicating narcotine, and lastly, a reddish brown mass of a viscid consistence, analagous to wax associated with a fixed oil.

Experiment 2*d.* Two hundred and fifty grains, reduced to powder were digested in three ounces of distilled vinegar, specific gravity 1.011, eight days; the result was a highly coloured solution, having a specific gravity 1.059; the dregs were a second time digested in distilled vinegar, and the two filtered solutions mixed, the acid of the vinegar was neutralized with water of ammonia, and one and a half drachms more diluted with half an ounce of alcohol, were thrown into the solution which was well agitated; upon standing, a copious precipitate, of a light brown colour, fell down. This precipitate was collected, washed with cold water, dried and boiled in alcohol, 35°; the hot filtered solution, by evaporation, yielded 14 grains of morphia, somewhat coloured; after being reduced to powder and washed with ether, they weighed 11 grains.

Oil of turpentine, by standing on the dregs a few days, occasionally assisted by the heat of a sand bath, acquired a brown colour; by evaporation, it yielded a matter similar to the etherial deposit mentioned in the last; it was inflammable, producing much smoke.

Experiment 3*d.* Three hundred grains, coarsely powdered, were acted on by one ounce distilled water, until completely divided; six ounces diluted alcohol were added, the maceration continued ten days, the tincture filtered, and the dregs washed with two ounces diluted alcohol, passed and repassed; the two tinctures were mixed and evaporated. The extract, dissolved in alcohol diluted with twice its weight of water, formed a clear solution; after standing a short time, however, it deposited a number of crystals; these were collected on a filter and dried; they weighed 5 grains, and proved to be narcotine.

The solution of the extract was boiled a few minutes with thirty grains of recently calcined magnesia, allowed to cool, and then filtered. By purification, first with alcohol and afterward with ether, but 10 grains of morphia were obtained.

Experiment 4th. One hundred grains, finely pulverized, were digested in ether for several days; the solution, unlike the one produced by the action of the same solvent on the dregs in Experiment, No. 1, was scarcely coloured; it yielded, by evaporation, about 4 grains narcotine, and a peculiar substance of an oily consistence, quite fluid, without odour, and nearly colourless, but possessing a very acrid, biting taste, comparable to that of tincture of capsicum, insoluble in water, soluble in alcohol, weighed 13 grains. The piece upon which the two last experiments were performed was of a very dark colour, the surface having a more decidedly greasy feel, though that characteristic was observable in all that I examined.

To satisfy myself more fully of the value of the article, I experimented on 300 grains of the Turkey opium of the shops, and obtained by the same process as Experiment No. 2, 26 grains of tolerably pure morphia, and 9 grains more coloured.

The residuum of the opium, Experiment No. 3, when boiled in water and dried, weighed 80 grains, showing a loss of seventy-three and a third per cent., and the dregs of 4922 grains of Turkey opium, from which laudanum had been made, after similar treatment, weighed 1312 grains, being a loss precisely in the same proportion, proving the assertion made by the dealers in Egyptian opium, that it dissolves more perfectly in diluted alcohol, and consequently leaving less sediment, is incorrect.

One hundred parts yielded to water 55 of a friable extract, and to alcohol 20 parts soft extract.

The amount of morphia usually obtained from opium is stated in the books to be from nine to fourteen per cent. Guibourt got from Egyptian opium 14.5 impure morphia, and the article mentioned as having been analyzed by J. Scattergood, yielded about five per cent. Now, the amount obtained from the article under consideration, containing impurities, such as colouring matter, narcotine &c. was a little over seven per cent., and the average amount of the first three experiments, after purification with alcohol and ether, 3.55 per cent.

By the preceding comparison, it is evident that the drug now vended as Egyptian opium, contains less morphia by more than one-half, than the Egyptian opium of Guibourt and other varieties. Therefore, should the parcels hereafter imported be of the same quality with that now for sale here, it is important that the comparative virtues of the article should be generally known, both for the sake of certainty in medical practice, and because it is said it is likely to be brought into more general use.

ART. II—ADULTERATION OF PROTO-CHLORIDE OF MERCURY.

By James H. Hart, M. D.

Extract from thesis. New York Coll. Pharm.

This important chemical is most frequently contaminated with the accidental admixture of corrosive sublimate; and as calomel is one of the medicines perhaps as frequently prescribed by the physician as any article in the materia medica, I think it may claim our notice with great propriety.

I have frequently heard of the injurious consequences which have arisen from the exhibition of calomel carelessly prepared, and Dr. Francis in his learned dissertation on mercury, asserts that "a small dose of calomel, given in the infantile state, has been followed by convulsions and sanguineous discharges from the alimentary canal," which, as calomel when pure is a perfectly mild powder, may be safely attributable to the *impurity* of the medicine, and I am informed by a respectable physician, Dr. S. C. Roe, of this city, that he recently witnessed a most violent case of gastro-enteritis, caused by the exhibition of this medicine sophisticated with corrosive sublimate, and he is so well convinced that the calomel uniformly sold, is not sufficiently pure for internal use, that he is in the constant habit of rewashing all that he

uses in his own practice. It is, however, to be hoped that the doctor's sweeping suspicions are for the most part incorrect. I have myself subjected several parcels to the ordinary chemical tests, and have discovered minute portions of corrosive sublimate in the proportion of one in four specimens.

The difficulty of divesting calomel entirely of corrosive sublimate, I attribute to the impossibility of reducing calomel, made in the ordinary way, to a sufficiently fine powder, and consequently corrosive sublimate adheres to it with great tenacity.

I have recently made, in conjunction with Professor Ellet, of Columbia College, a most excellent article, by a process similar to that of Messrs. Howard and Jewel, and somewhat varied from the usual method, which possesses the important advantage of reducing the calomel to the minutest possible division. It consists in subliming calomel into an atmosphere of steam. The ingredients are put into a short necked earthen retort, which is attached to a receiver, having an aperture at opposite sides and one at the top.* A retort containing water is fitted to the opposite opening, and heat is applied simultaneously to both retorts, when the vapour of calomel and the steam come in contact before they are condensed, which prevents the mass from becoming solid. Calomel made by this process is perfectly pulverulent, of a pearly whiteness, and very pure.

To determine the presence of corrosive sublimate in calomel, digest in ten times its weight of boiling water, and filter; of the filtered solution, a drop or two may be placed on a gold coin, and its upper surface touched with one extremity of an iron or zinc wire, whose other extremity is in contact with some other part of the gold, so as to form a galvanic circle. If the solution contain mercury, its presence will be determined by its deposition on the surface of the gold, which it whitens. As no other soluble preparation of mercury is likely to be present in calomel, the above experiment may be generally considered as indicating corrosive sublimate. To insure *absolute certainty* another portion of the liquid may be

* The opening at the top is for vent.

mixed with nitrate of silver, which, in solutions of corrosive sublimate, will produce a white precipitate, insoluble in nitric acid, but soluble in aqua ammonia. Or "a drop of nitrate of tin, when added to a solution of corrosive sublimate, will precipitate of a dark brown colour, the three millionth part of a grain."

ADULTERATIONS OF SULPHATE OF MAGNESIA.

Sulphate of magnesia is most frequently adulterated with fine crystals of sulphate of soda, sometimes with muriate of magnesia, and occasionally with sulphate of iron.

To detect sulphate of soda, dissolve one hundred grains of the suspected salt in distilled water, and add an equal weight of sub-carbonate of soda; boil this and wash and dry the precipitate obtained, which, if the salt be genuine, will weigh exactly thirty-four grains; if less than this it is impure; or the solution of the pure salt will give no precipitate with carbonate of potass. The presence of muriate of magnesia may be known by the disengagement of chlorine when sulphuric acid is added to the salt; or by its deliquescence, when exposed to the atmosphere. On the contrary, if epsom salts be pure, on being exposed to the air they will effloresce.

I have seen some specimens of the article contain sulphate of iron, which I detected with tincture of galls and also with ferrocyanate of potass. Epsom salts, adulterated with sulphate of iron, may be completely purified by adding carbonate of magnesia to the solution; a double decomposition takes place, the sulphuric acid of the sulphate of iron unites with the magnesia and forms sulphate of magnesia, and the carbonic acid of the carbonate of magnesia combines with the iron and forms carbonate of iron, which is precipitated.

I am informed that some experiments have been made by the New York Chemical Manufacturing Company with the magnesian earth called serpentine, which is very abundant at Hoboken, with the view of making epsom salts, but which

failed, on account of the difficulty of separating the iron with which it is impregnated. If they had been acquainted with the simple process just mentioned, I have no hesitation in saying that they would have succeeded.

ADULTERATIONS OF CALCINED MAGNESIA.

Magnesia is commonly adulterated with *flour*, *chalk*, *lime* and *gypsum*.

Flour may be detected by its burning when thrown upon red hot iron or coals; or its presence may be proved by adding to the specimen an aqueous solution of iodine, when if it contain flour a blue compound will be formed.

Chalk, by dissolving it in nitric acid, and precipitating with sub-carbonate of ammonia.

Lime may be detected by dissolving it in dilute sulphuric acid, and precipitating with oxalate of ammonia.

Gypsum may be discovered by boiling the suspected magnesia in distilled water, and adding oxalate of ammonia, which will precipitate oxalate of lime; or by adding muriate of barytes, we will have a precipitate of sulphate of barytes.

I have ascertained by experiments that mixtures containing magnesia, adulterated with calcined sulphate of lime, after standing short time, will become solid. The circumstance which led to these experiments was an article by an apothecary, in the twelfth number of the Journal of the Philadelphia College of Pharmacy, vol. iii. p. 290.

At the time this communication appeared, it gave rise to some speculations amongst some of the members of this College, and we, with the Philadelphia apothecary, were unable to account for the "singular change," and a number of experiments were instituted by Professor Rogers, Mr. Geo. D. Coggeshall and myself, with the view of ascertaining the cause of the phenomenon. We prepared the mixture according to the above formula, and also varied the ingredients in every variety of proportion, but a permanently thin mixture was uniformly the result.

Recollecting that anhydrous sulphate of lime becomes solid when mixed with water, I suspected that the magnesia employed by the apothecary was adulterated with it, and my suspicions have been confirmed by subsequent experiments. I made several mixtures according to the above recipe and added to each a quantity of calcined sulphate of lime in various proportions, and in two or three days the mixture at the bottom became quite hard.

By these experiments I have arrived at the conclusion that the magnesia employed by the apothecary must have been adulterated with a large quantity of sulphate of lime.

We would probably have the same result by mixing pure lime with the magnesia and adding to the mixture a small quantity of sulphuric acid. It is probable, therefore, that if the magnesia of the apothecary was *not* adulterated with sulphate of lime, it contained *pure lime*, and the vinegar employed in making his syrup of squills must have been largely contaminated with sulphuric acid.

ART. III.—ON ADULTERATIONS OF CERTAIN MEDICINES.

By Oliver Hull.

Read before the Board of Trustees of the College of Pharmacy, of the city of New York, Feb. 6th, 1835.

The sophistication of the materials used in medicine is a species of fraud of the most culpable kind. The purchaser is not only deprived of a portion of his property unjustly, but the health and life of the patient is endangered or destroyed. This evil however exists to a very alarming extent. Among a number of instances which have recently come to my knowledge are the following:—Equal parts of alum and tartaric acid have been ground together, and sold as powdered tartaric acid. Equal parts of rhubarb and American colombo root, with a little gamboge, have been powdered to-

gether, and sold as powdered rhubarb. A very extensive drug dealer in this city, as I am credibly informed, has for several years past, sold as powdered ipecac, about equal parts of ipecac and sarsaparilla powdered and mixed together. Cream of tartar and a little tartaric acid have been mixed, and sold as pure tartaric acid. Rhubarb and common Peruvian bark have been mixed, and sold as powdered rhubarb. All the valuable essential oils afford easy and too tempting opportunities to a base spirit of cupidity, not to have been adulterated to a very great extent. They have consequently been mixed with other essential oils of cheaper price, with alcohol, with spirits of turpentine, and with fixed oils. Castor oil when previously mixed with an essential oil, will dissolve in alcohol of the ordinary strength. A sample of oil of peppermint, offered for sale, and which dissolved in alcohol, I found on evaporation to contain one third part of castor oil. A sample of oil of winter green consisted of seven-eighths of castor oil to one-eighth of winter green oil. Castor oil or any other fixed oil may be easily detected by moistening paper with the suspected oil and drying it by a moderate heat. The fixed oils will not evaporate except by a strong heat, and will consequently leave the paper greasy, when applied only to a moderate heat. On mixing a suspected lot of very thin oil of caraway with water, I found it to diminish 45 per cent.; showing that it contained that proportion of alcohol, which was abstracted and mixed with the water. A specimen of oil of peppermint I found to contain one-fifth per cent. of alcohol. I have been informed that castor oil has been mixed with purified whale oil, and sold as castor oil. Foreign oils, as well as those of domestic manufacture, are frequently very largely adulterated with spirits of turpentine. Several lots of oil of garden lavender and oil of thyme, which I examined, contained 50 and even 75 per cent. of spirits of turpentine, which appeared only to diminish the perfume without communicating any smell of the turpentine. Specimens of oil of penny royal and oil of peppermint, I found to contain 50 per cent. of spirits of turpentine, without communicating its smell. Spirits of turpentine being easily soluble in alcohol is difficult of detection; but

the circumstance of its being less soluble in alcohol of a moderate proof than most of the essential oils, furnishes a means of detection, if the experiment is conducted with care. Two samples of oil of peppermint were submitted for examination and resulted in both cases alike. I put 20 minims of the suspected oil into a tall drop measure, with 20 minims of alcohol of 30 per cent. proof. They mixed freely, making a transparent solution, I then added two drops of water and shook up the mixtures, it subsided into two parts, showing ten minims of a transparent fluid in the bottom of the glass, and 32 minums of another transparent fluid, occupying the upper part of the glass; I then added 8 minims of water and shook up the mixture, which separated into 30 minims of a transparent fluid floating at top. My conclusion from this experiment is that the specimen of oil consisted of equal parts of spirits of turpentine and oil of peppermint, and that in the first instance the alcohol was of sufficient strength to dissolve this mixture; but on mixing it with two drops of water it dissolved only the oil of peppermint, rejecting the turpentine which subsided to the bottom, by its greater specific gravity. After being further diluted with 10 minims of water the alcohol was too weak to dissolve the oil of peppermint, which again mixed with the turpentine, having greater affinity for it than for the diluted alcohol. This conclusion I have strengthened by mixing various proportions of pure essential oil and spirits of turpentine, and by treating them as above detailed, have separated them again into their actual proportions.

ART. IV.—ON ACETATE OF ZINC. By Ambrose Smith.

(Extract from thesis. Phil. Coll. Phar.)

Acetate of Zinc, in crystals, was first described by Glauber. A solution of this salt, obtained by the mutual decomposition of acetate of lead and sulphate of zinc, has long been used medicinally, and is officinal in the Edinburgh College of Pharmacy. In the crystalline state it was first made officinal, in the U. S. Pharmacopœia of 1830. It is prepared according to this pharmacopœia, by mixing solutions of acetate of lead and sulphate of zinc, filtering and evaporating the clear liquid. The formula is as follows:

"Take of sulphate of zinc 6 oz.
acetate of lead 8 oz.
distilled water, a gallon.

Dissolve the sulphate of zinc and acetate of lead severally, in four pints of the distilled water; then mix the solutions and filter through paper; lastly evaporate the filtered liquor so that upon cooling it may crystallize." Acetate of lead is composed of one equivalent of acetic acid, 51, one of protoxide of lead, 112, and three of water, 27=190. Sulphate of zinc of one equivalent of sulphuric acid, 40, one of oxide of zinc, 42, and seven of water, 63=145. In this process one equivalent of acetic acid, 51, from the acetate of lead unites with one equivalent of oxide of zinc, 42, and seven of water, 63, forming one equivalent of crystallized acetate of zinc, 156; and one equivalent of sulphuric acid, 40, from the sulphate of zinc unites with the equivalent of oxide of lead, 112, liberated by the decomposition of the acetate, forming one equivalent of sulphate of lead, 152, which is separated by filtration. Three of the ten equivalents of water of crystallization, contained in the salts employed, are of course lost in the process. The equivalent proportion of acetate of lead for the six ounces sulphate of zinc employed is 7 oz. 6 drs. 53.8 grs., so that a slight excess of the acetate is directed by the Pharmacopœia.

The quantity of acetate of zinc yielded ought to be to the sulphate employed in the proportion of 156 to 145, which gives for the 6 oz., 6 oz. 3 dr. 38.48 grs.

While evaporating a solution of acetate of zinc obtained according to the above process, at a boiling heat, a considerable quantity of a white powder was found to precipitate. This powder when heated before a blow pipe assumed a yellow colour, which it lost on cooling. It dissolved in acids without effervescence and without giving off any odour of acetic acid, and the solution gave a white precipitate with hydrosulphate of ammonia and with the alkalies. The caustic alkalies when in excess redissolved the precipitate. The alkaline carbonates gave precipitates which were insoluble in an excess of the precipitant. When its solution in dilute sulphuric acid was evaporated, small crystals formed, which were four sided prisms, having all the properties of sulphate of zinc. The powder then was simply oxide of zinc, from which the acetic acid had been driven off by the too great heat employed in evaporating. The solution ought therefore to be evaporated with a moderate heat; when it becomes concentrated a water bath should be employed. A boiling heat does not decompose the salt when the solution is weak.

The quantity of water directed for dissolving the sulphate of zinc and acetate of lead appearing larger than necessary, in order to shorten the subsequent evaporation one half was used, and acetate of zinc prepared (with this exception) according to the proportions directed in the Pharmacopœia, as follows:

Sulphate of zinc,	600 parts,
Acetate of lead,	800 parts,
Distilled water,	6400 parts.

The salts were dissolved separately in the water, and the solutions mixed. Six hundred and twenty-eight parts of sulphate of lead (when dried) were separated by a filter; six hundred and forty-two parts of crystallized acetate of zinc were obtained after evaporation. During the evaporation, minute yellow crystalline grains formed in the liquid. These small crystals were separated by a filter, and treated with

nitric acid, which dissolved the yellow colour, leaving a white powder unacted on. The acid solution gave a deep blue colour when tested with ferrocyanate of potassa. The white powder unacted on by the acid, was mixed with charcoal and heated before a blowpipe; vapours of sulphuric acid were given off, and small globules of metallic lead formed. These crystals are therefore sulphate of lead, coloured by adhering oxide of iron. If their weight (five parts) be added to the sulphate of lead, separated by the filter, it will give 633 parts as the whole of this salt formed.

Another mode of procuring the salt is by decomposing acetate of lead in solution by metallic zinc. Lead precipitates in crystals, and the zinc uniting with acetic acid and oxygen, occupies its place in solution. The equivalent proportions are, one equivalent of zinc 34, and one equivalent of acetate of lead 190. If 8 ounces of acetate of lead are used, the quantity of zinc required, according to theory, would be 1 ounce, 3 drams, 27 grains.

The stronger the solution of acetate of lead, the more rapid, of course, would be its action on the zinc. Acetate of lead dissolves in about four times its weight of water to form a saturated solution. This would then be the proper proportion of water.

In order to ascertain the most eligible proportions of the acetate of lead and of zinc, the following experiments were made, the temperature in each instance being the same, above 60°;

1st.	Acetate of lead	800 parts,
	Mossy* zinc	400 parts,
	Distilled water	3200 parts.

After standing a week, the liquid still showed traces of lead when tested with sulphuretted hydrogen.

2d.	Acetate of lead	800 parts,
	Granulated zinc	200 parts,
	Distilled water	3200 parts.

Four or five days were required for the complete decomposition of the acetate of lead.

* Made by pouring melted zinc into water.

3d.	Acetate of lead	800 parts,
	Mossy zinc	600 parts,
	Distilled water	3200 parts.

About twelve hours required.

4th.	Acetate of lead	800 parts,
	Granulated zinc	300 parts,
	Distilled water	3200 parts.

About eight hours required.

5th.	Acetate of lead	800 parts,
	Mossy zinc	800 parts,
	Distilled water	3200 parts.

In six hours no trace discoverable.

6th.	Acetate of lead	800 parts,
	Granulated zinc	400 parts,
	Distilled water	3200 parts,

In six hours no trace discoverable.

In all these experiments, a larger proportion of zinc is employed than that indicated by the atomic weights. Less would no doubt answer, but the time required in the process would be proportionally increased. Granulated zinc acts with rather greater rapidity than twice its weight of mossy zinc. Although a greater quantity is required, it is best to use mossy zinc, as it is much more easily made, and is less apt to contain impurities than the granulated. It will be generally most convenient to use a large proportion of zinc, in order that it may not require much time to decompose the acetate of lead. The proportions probably preferable are those used in Experiment 5; or if given in definite quantities as follows:

Acetate of lead	8 oz.
Mossy zinc	8 oz.
Distilled water	2 pints.*

Dissolve the acetate of lead in the water, and add the zinc; allow it to stand until the solution gives a pure white precipitate when tested with sulphuretted hydrogen; then pour off

* This quantity of water, though it is rather less than four times the weight of the acetate of lead, is sufficient to dissolve it.

the clear liquor and evaporate, so that upon cooling it may crystallize.

This process is certainly preferable to that by double decomposition. The product is purer, the materials also are cheaper, and the manipulation easier. The quantity of acetate of zinc, which according to the equivalent proportions these quantities should yield is 6.5 oz. 32.84 grs.; but I have not been able to obtain from 8 oz. of the acetate of lead of commerce more than 5 oz. This deficiency is probably because the acetate of lead did not contain its full complement of acetic acid, owing in part to a small quantity of carbonate which the commercial salt usually contains, but chiefly to its having been partially changed into a basic sesqui-acetate by exposure.

Acetate of zinc may also be formed by direct combination between acetic acid and zinc, or its oxide, or by decomposing the carbonate by acetic acid. Neither of these modes however, is available in procuring the salt for commercial purposes.

Acetate of zinc, when recently crystallized from a solution which has not been too far evaporated, is in colourless transparent plates, usually hexagonal, sometimes though rarely, rhombic, which are slightly efflorescent in dry air. As found in the shops, it is in opaque white scales of a micaceous or rather talcose appearance, having an astringent, metallic, very disagreeable taste. One ounce of water at the temperature of 60° dissolved 190 grains. One ounce of alcohol of sp. gr. .835, dissolved twelve grains. It is much more soluble with the aid of heat, boiling water dissolving more than sixteen times its weight, boiling alcohol more than four times. Its specific gravity was found by weighing it in a saturated solution, to be 1.6975, by weighing it in ether, 1.696. Acetate of zinc is decomposed by the stronger acids, which unite with the oxide of zinc, liberating the acetic acid. Its solution is precipitated by the alkalies and their carbonates. The precipitates with the caustic alkalies redissolve in an excess of the precipitant. It also forms precipitates with lime and baryta waters, and with infusion of galls. When exposed to heat, decomposition

commences before all its water of crystallization is given off, and the vapour which rises takes fire on the approach of a lighted taper, and burns with a beautiful flame, the interior of which is red, the exterior blue, green and white.

When a portion of it was submitted to destructive distillation, a liquid of a slight yellowish colour condensed in the receiver, which was found to consist of water, acetic acid and pyro-acetic spirit. Oxide of zinc, together with a little charcoal, remained in the retort.

ART. V—ON AMERICAN SENNA. By James J. Martin.

Extract from thesis. Phil. Coll. Pharm.

This is the Cassia *Marilandica*, of Willdenow, belonging to the *class* decandira, *order* monogynia, *natural order* Leguminosæ. Tournefort and Gœrtner separated those with cylindrical and pulpy pods, reserving to them the name of *cassia*; whilst the others were designated by that of *senna*. Persoon was dissatisfied with this arrangement, and gave the name of *cathartocarpus*, to the *first set*, and allowed the *others* to remain, under the appellation of *cassia*. This deviation was deemed superfluous; and as the plants so nearly resemble each other in most respects, it would prevent confusion by allowing them to remain under the old title of *cassia*. This preference appears to be given by our national pharmacopœia, to those species therein noticed.

The Cassia *Marilandica* is an indigenous plant, and grows abundantly in most parts of the United States, from Massachusetts to Missouri and Georgia, and is very common in the western states. It grows most plentifully and luxuriantly in the vicinity of rivers and ponds, preferring a low moist soil.

It is cultivated to some extent for medical purposes to the northward by the Shakers; and it is from them the market is chiefly supplied. The leaves are the officinal portion; and these should be collected about the beginning of September,

that being the time at which the pods are ripe; they contain a portion of the active principle as well as the leaves; it appearing at this period to be most widely disseminated over the plant. It is mentioned by Rafinesque that American senna is more efficacious than that of Egypt; it is however much inferior to the Alexandrian, requiring a larger quantity to produce similar effects. As most plants growing in dry and exposed situations, are more active than those growing in rich, moist soils, it is probable that the inferiority of the American senna to the imported, is owing to this cause; and it might, under similar circumstances of growth, be equal to that in strength. It has been introduced into Europe: the first that reached there was sent from the state of Maryland, and hence its specific name. The leaves, as they occur in the shops, are packed in oblong cakes, as is usual with most plants derived from the Shakers. They are from one to two inches in length, and near half an inch in breadth, thin and pliable, of a pale green colour; the odour is slightly analogous to that of imported senna, though by no means so nauseous. Its effects on the system are similar to those produced by the imported.

Its medical virtues are imparted to water by decoction or infusion, and to alcohol. A tincture may be formed with diluted alcohol, which is, like the infusion, of a reddish brown colour. Alcohol and ether, digested on the powdered leaves, become of a deep olive green colour. The infusion and decoction become turbid on exposure to the air, owing to the conversion of the extractive matter into apotheme.

The medicine is best administered in the form of infusion; the following formula will give a preparation equal in strength to that directed by the U. S. Pharmacopœia, from the imported, and it may, under all circumstances, be substituted for that. Take of

American senna,	1½ oz.
Coriander seeds, bruised,	1 drachm.
Boiling water,	1 pint,

Macerate in a covered vessel for one hour, and strain.

With a view of demonstrating the analogy existing be-

tween the two kinds of senna, I performed the following experiments:

1. To a filtered decoction of the leaves, a solution of acetate of lead was added, so long as a precipitate fell; this was separated by filtration: the excess of acetate of lead, by hydro-sulphuric acid; sulphuret of lead by another filtration: this solution was evaporated to dryness, and treated with pure alcohol, the alcoholic solution evaporated, and then treated with sulphuric acid, to decompose the acetate of potassa which it contains: the sulphate of potassa is separated by filtration: the excess of sulphuric acid by acetate of lead: the excess of acetate of lead by hydrosulphuric acid: sulphuret of lead by filtration; the alcoholic solution now evaporated, yielded the active matter of the plant.

2. Macerated the leaves for several hours in cold water; the liquid was separated by means of a sieve, and filtered. On being heated to ebullition it becomes turbid: another portion yielded a grayish precipitate, with a solution of corrosive sublimate.

3. The leaves were digested in alcohol until every thing soluble was taken up, expressed and dried; they were then treated with cold water. The solution thus obtained, gave a flocculent precipitate with acetate of lead; and a brownish precipitate with permuriate of iron. On concentrating a portion of the solution, it yielded a precipitate on the addition of alcohol.

4. The residue of the leaves from last experiment, were treated with boiling water; this solution yielded a blue precipitate with tincture of iodine; subacetate of lead threw down a whitish precipitate.

5. Macerated the leaves in cold water until every thing soluble in that menstruum was taken up; expressed and dried them. They were now treated with alcohol; the alcoholic solution filtered and evaporated; the substance left was treated with boiling water, which took up a small quantity of soluble matter. The residue was of a deep green colour, soluble in alcohol and ether, slightly soluble in boiling water; insoluble in cold water.

On adding to the solution a metallic salt, and then a solution of a fixed alkali, the oxide of the metal was thrown down with the green matter, in the form of a lake.

6. The solution obtained in last experiment, with boiling water, on being evaporated, yielded a *yellow colouring matter.*

7. A portion of the leaves were introduced into a retort, heated by means of an oil bath, and water added to them; this was distilled until it came away inodorous; the exhausted leaves were replaced by others; and the liquid redistilled from them; this operation was repeated till numerous fine particles of *oil* came over with the water.

8. Digested the residue of the leaves obtained in experiment 5th, in sulphuric ether; evaporated the etherial solution, and obtained a yellow substance, which left a greasy stain on paper, and was insoluble in alcohol.

9. A tincture made with diluted alcohol, became turbid on the addition of water; the precipitate was separated by filtration; the filter was digested in alcohol, which dissolved the precipitate; on the addition of water, the *resin* was again thrown down.

10. Having digested the leaves severally, in a solution of caustic potassa and dilute muriatic acid, a substance was obtained possessing the properties of *lignin.*

11. Incinerated the leaves, and treated the residue with water; a solution was obtained which effervesced with acids; on concentrating it, it gave a white precipitate with a solution of tartaric acid, which was dissolved by heating the water to ebullition, and again precipitated on cooling.

A portion of the liquid yielded a precipitate with a solution of chloride of platinum.

12. The insoluble residue of last experiment was treated with diluted muriatic acid, which occasioned considerable effervescence. The solution obtained gave a precipitate with oxalate of ammonia and sulphuric acid; the last did not occur till several hours afterwards.

From the foregoing experiments we may infer that American senna contains, 1, Active principle of the plant; 2, Albumen; 3, Mucilage; 4, Starch; 5, Chlorophylle; 6, Yellow

colouring matter; 7, Volatile oil; 8, Fatty matter; 9, Resin; 10, Lignin; 11, Potassa; 12, Lime.

By comparing these constituents with those found in imported senna, it will be seen that the composition is very similar. Several experiments were made to ascertain the presence of other substances, supposed to exist in the plant, but without avail. The pods were found to contain the active, and most probably the other principles of the plant; but the quantity of them was too small to operate on to advantage.

One thousand parts of the leaves give 396 parts of watery and 160 parts of alcoholic extract: inversely, 300 of alcoholic, and 256 of watery extract; making 140 parts of extractive matter.

The extractive matter may be obtained by acting on the watery extract, (dried,) with pure alcohol; it is of a dark reddish brown colour, and possesses the virtues of the plant.

In solution it is affected by the atmospheric air, when exposed to its influence; but does not become turbid in a vial that is closely stopped.

The *active constituent* is of a yellowish red colour, having the taste and *medicinal properties* of the plant, in a concentrated degree. Its colour is rather lighter than that of *cathartin*, and its taste but slightly similar; its odour is entirely different. Forty grains produced similar effects on the system with an equal quantity of *cathartin*. It is, like that substance, deliquescent; its watery solution is not affected by exposure to the air, tartrate of antimony, or acetate of lead; but is precipitated by an infusion of galls, and subacetate of lead. It is, in all probability, a modification of the substance, the active principle of imported senna, and as such can hardly be ranked as a distinct proximate principle. When taken into the system, it produces a griping effect, which is obviated by combining with it a saline substance; this acts by qualifying the system, and produces no effect on the principle, as this was obtained pure from a decoction of the leaves, formed with the addition of a salt.

On macerating the leaves for several days in water, in a warm room, they were found to have undergone putrefactive fermentation, owing to the decomposition of the albumen which they contain.

The manner in which experiment 4th was conducted appears necessary, as in several attempts the existence of starch was not shown by the addition of tincture of iodine to the decoction, decolourized by animal charcoal; the quantity existing is very minute.

The yellow colouring matter may be most readily obtained by acting on the extractive matter with sulphuric ether, and evaporating the solution; it has the following properties: it is soluble in alcohol, ether, boiling water and the acids; precipitated from its solutions by alkalies of a brick red colour, and restored to its solution unchanged by the addition of an acid.

Water distilled from the leaves has a nauseous taste; the volatile oil is colourless, and possesses the peculiar odour of the plant, and this odour depends entirely on the volatile oil, as it is not possessed by the active principle.

On treating the powdered leaves with sulphuric ether, and evaporating the solution, there was formed a solid substance; also, floating on the surface of this, a peculiar oily substance, of an exceedingly acrid taste; it very soon united with the mass. The experiment was repeated several times for the purpose of obtaining this supposed fixed oil, but without success. By taking away every thing soluble in alcohol from the green mass, there remained the yellow fatty substance before noticed; this, of course, is insoluble in alcohol, and appears to be the union of wax with fixed oil.

The residuary leaves from the preceding process yielded nothing to boiling ether.

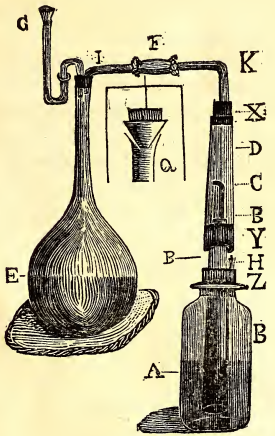
Cathartin, the term applied to the active principle of senna, is indefinite; other cathartic principles being equally entitled to it. It is most probable this principle exists, more or less modified, in all the cathartic species of cassia. On this supposition I would propose the term *cassin*, (changing the last letter of the generic name) as a substitute.

ART. VI.—A SUBSTITUTE FOR WOLFE'S APPARATUS.

By P. T Tyson, Baltimore.

Most persons who have had frequent occasion for Wolfe's Apparatus, and the substitutes proposed for it, complain of the trouble and inconvenience attending the use of them. The annexed sketch represents a contrivance which seems better adapted to the use of the chemist and pharmaceutist in most cases, than those generally used.

The apothecary will find it well adapted to the manufacture of hydrocyanic acid, when this is made by treating the bicyanide of mercury with hydro-sulphuric acid.



The vessel A may be a bottle of any convenient size. B is the beak of a broken retort, the large end of which should be of such dimensions as merely to permit it to be introduced through the mouth of the bottle A; it should reach nearly to the

bottom: at Z it is passed through a cork well fitted into the mouth of the bottle. The smaller end of the beak B, has a cork fitted into it, through which a small tube C (bent in an angle at its upper extremity) is passed. D is another retort beak, or a bottle with its bottom cut off, the larger end of which, Y, is fitted by means of a cork to the smaller end of B. At X a small bent tube K is passed through a cork fitted into D. The cork in the mouth of the flask E, has the end of the safety tube G passed through it, and also a bent tube I which is connected by a tube of caoutchouc with the bent tube K. At H is a valve to prevent any explosion when the extrication of gas is too rapid to be absorbed; this valve is represented at Q, enlarged.

The gas being generated in the flask E, passes through the bent tubes into D, where the aqueous vapour is condensed; the resulting water is prevented from passing into B by the tube D. The gas passes through C and B, the latter containing the liquid to be subjected to the action of the gas.

The tubes I, F, and K may be replaced by a single glass tube, if a very corrosive gas be used.

If a series of bottles be desirable, the condensing vessel D may be dispensed with, in all after the first; a tube may proceed from H to be connected to the tube C of the succeeding bottle.

ART. VII.—ON ADULTERATION OF HYDRIODATE OF POTASH &c. By F. & N. G. Carnes, New York.

In reply to Art. LXIV, Vol. VI, page 287.

Observing that our names have been used in the last number of the Journal, in a paper on Hydriodate of Potash, by Dr. Adamson, and that it may be inferred from what is there stated, that we sell adulterated chemicals, we feel it due to ourselves to say a few words on the subject.

That the article referred to was impure, we do not deny; but the fault is not with us, but with the druggists of this and other cities, who will have *cheap* hydriodate of potash, without regard to purity. We were among the first of those who imported this article from Paris, years ago, when we sold it in its pure state, at from seventy-five to eighty-seven and a half cents per ounce; a price sufficient to pay a fair profit; but since that time, such has been the competition of trade, the influx of Frenchmen with adventures of inferior articles, and above all, the desire of our druggists throughout the country, to have cheap chemicals, that they might undersell each other, that we have been obliged in self defence, to import them of an inferior quality, or lose custom.

But this is not the only article which is wanted cheap. Morphine, strychnine, iodine, and various other valuable substances, which under *no* circumstances ought to be sold but in a pure state. It is not fair that we should be found fault with for selling impure articles, when *purchasers themselves* know that these articles cost more in Paris than they are willing to pay for them here.

To conclude, if we could be supported in importing none but pure articles, we most certainly would never sell any other: but until then, we must continue to import *two* qualities; one for those who want them cheap, the other for the fair dealer, who wants them good, and is willing to pay for them.

It is a fact, that we shall not import any iodine or hydriodate of potash this spring, merely because these articles are worth forty-two cents per ounce in Paris, and we are well aware that we cannot obtain more than that price here, let the quality be what it may.

ART. VIII.—ON GILLENIA TRIFOLIATA.

By Charles S. Shreeve.

Extract from thesis. Phil. Coll. Pharm.

In making the following experiments, the cortical portion of superior specimens of the dried root was used. The ligneous part was rejected as being comparatively inert.

1. The decoction strikes a blue colour with the tincture of iodine, and is precipitated of a dirty white colour by subacetate of lead.

2. Upon the addition of alcohol to a cold infusion, it threw down a precipitate, indicating the presence of gum.

3. The decoction is of a beautiful red wine colour, having an intensely bitter taste, the odour while boiling resembling that of senega. Alcohol throws down a precipitate of a dirty white colour. This does not agree with the statement of Dr. Bigelow, who asserts that alcohol occasions no change when added to the decoction.

4. Three hundred and eighty grains of the powdered root were digested in f. ʒiv of sulphuric ether, for three days; the etherial tincture was then filtered, and upon evaporation yielded a considerable quantity of a yellowish brown substance, which, upon examination, was found to consist principally of wax and fatty matter.

5. Digested a quantity of the root previously submitted to the action of ether, as in the preceding experiment, in f. ℥viij of alcohol, with a moderate heat for two days; the tincture was then filtered and evaporated; the residue was of a reddish brown colour, having an intensely bitter and somewhat

nauseous taste. This was treated with water, filtered and digested with half a drachm of carbonate of magnesia, (the colour of the solution was rendered considerably deeper by this process,) and was then evaporated to dryness. The extract obtained, having a reddish brown colour and an intensely bitter taste.

6. Digested 240 grains of the powdered root in f. ℥iv of boiling water, acidulated with thirty drops of sulphuric acid; decanted, and treated the residue with a fresh portion of acidulated water, filtered and mixed the liquors: then added solution of subacetate of lead as long as any precipitate was afforded; filtered, and passed hydrosulphuric acid through the solution to get rid of the excess of acetate of lead, then filtered again to separate the sulphuret of lead; and the clear solution evaporated to dryness, the resulting extract was of a reddish brown colour, soluble in alcohol, insoluble in water and ether.

7. The tincture is of a beautiful red wine colour, and has a bitter, somewhat nauseous taste; it is rendered turbid by the addition of water, indicating the presence of resin.

8. Four ounces of the recently powdered root were submitted to the process recommended by M. Tilloy of Dijon, for obtaining the sulphate of quina. The substance thus obtained was of a light gray colour, and bitter, nauseous taste. It was soluble, except a small residue, in water acidulated with sulphuric acid; the solution, when evaporated yielded an extract of a somewhat granular appearance, and having more bitterness than before its solution. The quantity obtained was so small as to deprive me of the opportunity of examining further into its properties.

9. As a final experiment, I submitted a portion of the root to distillation with water; the product was slightly coloured, and had a peculiar and very disagreeable odor, with little or no taste. The root evidently contains a volatile colouring principle; this was perceptible on the sides of the beak and upper parts of the retort.

From the foregoing experiments it is probable the following are the principal constituents of Gillenia, viz.

1, Starch; 2, Gum: 3, Resin; 4, Wax; 5, Fatty matter; 6, Red colouring matter; 7, Volatile colouring matter; 8, A peculiar principle soluble in alcohol and the dilute acids, but insoluble in water and ether.

ART. IX—EXTRACT FROM A COMMUNICATION READ BEFORE THE COLLEGE OF PHARMACY OF THE CITY OF NEW YORK, ON THE ADULTERATION OF MEDICINES.

By William L. Rushton.

ADULTERATION OF ACETATE OF MORPHIA.

I recently purchased of a drug house in Philadelphia an article purporting to be acetate of morphia, which was represented to be of their own preparing, and warranted perfectly pure; upon opening a vial of it, I perceived an unusual odour, which led me to suspect that it was adulterated. I submitted it to the usual tests, and could not discover that it contained a particle of morphia. I then gave a small quantity of the same article to a chemist to analyze, and received the following note:

"Dear Sir—The substance which you left with me for analysis, purporting to be acetate of morphia, does not contain either morphia or acetic acid; it is entirely composed of sulphate of lime, with a slight excess of sulphuric acid.

"Yours, &c. C."

Adulterated and damaged articles are also daily sold at auction, which require attention. Damaged rhubarb, within a few days, has been sold at five dollars a case, which will no doubt be powdered, and perhaps mixed with a little gamboge, turmeric, or some deleterious substance and find its way into some of our stores, the proprietors of which are go-

verned more by the low price of medicines than by a regard to their quality.

It is a fact well known to many of us, that the adulteration of chemicals, essential oils &c., is carried on to a great extent, the perpetration of which is not confined to New York, but extends to some of our neighbouring cities, as well as to foreign sources, which practice is so reprehensible and has become so common, that it demands our serious attention and most rigid scrutiny.

Note.—We are requested by Messrs. W. & L. Krumbhaar, the druggists alluded to in the above communication, to state that they have submitted some of the same parcel of acetate of morphia to the inspection of a distinguished chemist of this city, who, after "a careful, experimental investigation, has declared that it was of the best quality, and entitled to the confidence of the public and the profession." Mr. Cance, the manufacturer of the article in question, is also confident that the portion furnished to Mr. Rushton was identical with that examined by Dr. Mitchell. In order, however, to settle this point, Messrs. Krumbhaar have written to New York for some of the acetate sold to Mr. Rushton, which will be placed in the hands of competent persons for examination, and the results, whatever they may be, communicated in our next number.—Ed.

ART. X.—ON SANGUINARIA CANADENSIS. By Clement J. Lee.

(Extract from thesis. Phil. Coll. Phar.)

According to Dr. Dana the active principle may be obtained, by digesting the finely powdered root in absolute alcohol, and adding to the tincture a solution of ammonia so long as it occasions any precipitate; a gray powder falls down which is to be collected and boiled in water, with some pure animal charcoal—the liquid is then filtered, and alcohol is to be digested on the matter remaining on the filter and afterwards evaporated to dryness. A white substance remains having an acid taste: this substance is the sanguinarena of Dr. Dana.

I followed up the above experiment, and obtained the active principle of the root, although in a very small quantity.

Experiment 2d. A tincture was formed by digesting ℥iv of the finely powdered root, in ℥viij of absolute alcohol, for six days, filtering off the tincture and adding ℥viij more of absolute alcohol to the dregs, and digesting as before; a second time filtering off and mixing the tinctures together. To which was added a solution of acetate of lead, so long as any precipitate was afforded. The liquid was then filtered and the excess of lead precipitated by passing a stream of hydro-sulphuric acid through the solution. It was then filtered and slightly heated to drive off the excess of hydro-sulphuric acid. The solution was then evaporated away to about one-fourth, which united with the acetic acid, and precipitated the sanguinarena with a portion of uncombined magnesia. The precipitate was dried and treated with boiling alcohol, which dissolved out the sanguinarena, and yielded it by spontaneous evaporation. The product obtained by the above process was not entirely white, no doubt owing to some impurities. Its taste was extremely acrid; in alcohol it was very soluble, but sparingly so in water. Its alcoholic solution afforded a slight precipitate with tincture of galls, which was soluble in alcohol, but insoluble in water and ammonia. Sanguinarena is soluble in sulphuric acid, forming a beautiful red

solution. I was unable to crystallize the sulphate, owing to the small quantity upon which I operated.

Experiment 2d. ℥vi of the finely powdered root were digested in ℥xii of alcohol: the tincture at the expiration of ten days was filtered off, to which were added f. ℥iiss. of aq. ammon., the mixture was then poured into a vessel containing two pints of distilled water, when a brown matter subsided, which was collected upon a filter and carefully washed with a small quantity of distilled water, and the colouring matter removed by means of purified charcoal. It was then treated with boiling alcohol, which dissolved the sanguinarina and by cautious vaporization, the latter was obtained in a state approaching to whiteness. By exposure to atmospheric air it changed to a light yellow colour.

Experiment 4th. ℥iv of the bruised root was digested in ℥viij of water, for the space of two weeks, the whole was then transferred to a retort by means of a sand bath. The liquid which passed over had the odour and to a slight degree the peculiar taste of the root.

With ammonia it afforded a precipitate which was re-dissolved by the alkali in excess.

I was unable to procure any of the sanguinarina from the precipitate, but with sulphuric acid it formed a red solution, proving the presence of that salt.

Of the several processes which I have pursued for the extraction of sanguinarina from the blood root, that of experiment 3d I found to answer the best, being the most simple, easy of management, and yielding the largest quantity of the vegetable alkali.

Selected Articles.

ART. XI.—ON THE CYANURET OF POTASSIUM AS A REMEDIAL AGENT. By Felix Boudet.

The cyanuret of potassium has for some years past been considered as a specific in neuralgia. Whether it be applied externally or administered internally, the dose is very small, and it is of the highest importance that its composition, and of course its strength, should always be identical, as the least variation might be attended with unpleasant consequences.

From the observations of Dr. Trouvé of Caen, published in the *Journal de Chimie Medicale*, (x. 23,) it appears that there is a great difference in the action of moist and long prepared cyanuret of potassium, and that which is dry and recent, and that this difference may occasion dangerous results.

If to this be added all the causes which may, during or after the preparation, modify the composition of the cyanuret and always at the expense of its efficacy, it will be seen how much the preparation and use of this remedy merits the most serious attention.

It appears from the experiments of M. M. Pelouse and Geiger, that a concentrated solution of cyanuret of potassium subjected to ebullition *in vacuo*, is decomposed by the mere elevation of temperature; so that one proportion of cyanuret acting on four proportions of water, gives rise to one proportion of ammonia which is disengaged, and to one proportion of formiate of potash.

The same solution evaporated in the air, gives rise to a slow but continued disengagement of hydrocyanic acid, and

produces carbonates of potash and ammonia, formiate of potash, a small quantity of hydrocyanate of ammonia &c., products which have no relation as to properties, with the cyanuret.

Moreover, the same cyanuret in a solid state, kept in a badly closed bottle, or one which is often opened, is transformed into hydrocyanic acid, which is disengaged, and into carbonate of potash, which is formed at the expense of the carbonic acid of the air. This transformation takes place very rapidly, when the salt is moist.

This being admitted, when we refer to the usual method of preparing the cyanuret of potassium used in medicine, which consists of dissolving and evaporating to dryness the product of a calcination of the yellow cyanuret of potassium and iron, it must be evident, that during this operation, a certain proportion of the cyanuret will be completely decomposed, and that this proportion will vary with the rapidity of the evaporation, the temperature employed, the quantity operated upon, in short, that a pure product can never be obtained, nor one which is identical with the results of other operations. Hence, in making use of a cyanuret thus prepared, a physician is always exposed to unpleasant consequences.

Suppose for instance, a physician after having prescribed a grain of the cyanuret of potassium, without obtaining the desired result, gradually increases the dose to two, three, or even four grains; if the cyanuret be moist, and has undergone a change, these four grains may be only equivalent to two grains of the pure cyanuret, and may produce a beneficial effect; but if, after having thus made use of the preparation in this state, the same patient should employ the same dose of a pure and dry cyanuret, this change doubles the strength of the remedy, and may cause the most fatal results.

There exists, however, a mode of avoiding this danger, which is by never employing for medicinal purposes, any other than the fused cyanuret.

When the retort is broken, in which the cyanuret of potas-

sium and iron have been calcined, a mass is found, formed of the cyanuret of potassium and the quadri-carburet of iron. If this mass be broken with care, we may, as is observed by M. Robiquet, separate a certain quantity of fused cyanuret, in white, compact fragments, perfectly pure, and fit for medicinal use. The cyanuret thus obtained, presents but a small surface to the action of the air, and should be the only one used in medicine, for it is the only one which can be administered with safety; but even in this form, the energy of its properties requires the most scrupulous attention on the part of the physician who prescribes it.

ART. XII.—ON THE ACTIVE PRINCIPLE OF SARSAPARILLA.

By M. Poggiale.

M. Palotta first made known the active principle of sarsaparilla, in 1824, and gave it the name of *Parigline*. About the same time, another Italian physician, M. Folchi, discovered what he thought a new principle, which he named *Smilacine*. Few persons in France, I believe, repeated the experiments of M. Palotta, and no one took notice of those of M. Folchi. It was not until 1831 that M. Thubeuf again called the attention of chemists to this subject. He announced that he had extracted a new substance from sarsaparilla, and which he denominated *salseparine*. The number of these pretended active principles of sarsaparilla was further increased by a German chemist, M. Batka, who published, towards the close of 1833, an account of the discovery of an acid which he termed *Parillinic acid*.

Are these four substances really four new bodies, or are they only the same principles obtained by different processes? This question I shall endeavor to answer in the succeeding pages.

Before undertaking my researches, I procured sufficient

quantities of parigline, smilacine, salseparine, and parillinic acid.

I prepared the parigline according to the process of M. Palotta, by adding milk of lime to an aqueous infusion of sarsaparilla, treating the precipitate when dry with alcohol, and then distilling. By this means I obtained a very fine product.

I did not find it as easy to prepare the smilacine of M. Folchi; this physician I think deceived himself, when he announced that he had obtained appreciable quantities of this substance, by macerating one ounce of the medullary part of sarsaparilla in water, treating this infusion with animal charcoal, and evaporating it. I would state that it is impossible to extract the smallest quantity of smilacine, from an ounce of this meditullium by means of water. I separated with the greatest care the cortical substance from the medullary part, and although I operated on five kilogrammes, I obtained very little smilacine. The colour of the substance thus prepared is acted on with great difficulty by animal charcoal; but if it is treated with alcohol and charcoal, it acquires all the properties of parigline; when we reflect that water is a bad solvent of parigline, and that the meditullium furnishes very little of it, it will be readily conceived why we always obtain this substance in small quantities and in an impure state by the method of M. Folchi. But, if an infusion, or what is better, a decoction of the medullary portion of sarsaparilla, be treated with lime and alcohol, a substance is obtained identical with parigline. This same part, well bruised, and macerated in alcohol at 35°, also affords the same body.

These researches led me to examine whether the active properties of sarsaparilla resided in the cortical or medullary part of the root. Mr. Pope has asserted that the active principle was wholly confined to the cortical portion, and that the medullary was inert. This assertion I esteem erroneous. All the world may satisfy themselves that both parts contain parigline. I have treated these two portions of the root by the methods of Palotta, Folchi, Thubuef and Batka, and have

obtained the same principle from both. I must, however, allow that the medullary part furnishes the smallest quantity.

Although M. Thubeuf has not yet published an account of the method he employs to prepare salseparine, I am aware that he commences by obtaining an alcoholic tincture of the root; that he treats this tincture with animal charcoal, filters and crystallizes the salseparine. At all events, I followed this plan, and the substance I obtained possessed properties which did not differ from those of parigline. And I must also add, that this is by far the best mode of operating, as it requires less time, is less expensive, and affords a larger and more beautiful product than any other.

I also prepared the pretended parallinic acid of M. Batka, following the method of that author. This plan is very complicated, and might certainly be rendered more simple if required. I have prepared it by merely adding hydrochloric acid to a concentrated decoction of sarsaparilla. I shall, hereafter, notice the reasons which induced M. Batka to regard this substance as an acid, and will prove that they are founded in error.

I have stated that salseparine or parigline might be obtained bv several different modes of operating. I have prepared tnem by means of potash, magnesia, sulphuric acid &c. By boiling sarsaparilla for half an hour with calcined magnesia, drying the precipitate and treating it with alcohol, much parigline is obtained. This parigline is granulated and looks like potatoe starch. It does not present the physical properties of salseparine, but it nevertheless is identical with this substance, for by dissolving it in alcohol and carefully evaporating the solution, crystals are obtained precisely similar to those of salseparine. I mention this fact, to give an idea of the influence exercised by the manner of operating, on the physical properties of this substance.

It is owing to this circumstance that M. M. Thubeuf, Folchi and Batka were led to suppose that they had discovered a new principle in sarsaparilla.

I will now proceed to the comparative examination of the four substances spoken of above, and I think that I can satis-

factorily prove that they are one and the same principle in somewhat different forms.

They are all white, scentless and tasteless when in an anhydrous state. They have a very austere and nauseous bitter taste, when they are dissolved in alcohol or water. They have a greater specific gravity than this latter fluid. They are insoluble in cold water, but little soluble in boiling water, very soluble in boiling alcohol, but less so in this fluid when cold. Boiling ether readily dissolves them, as do the volatile oils, but the fat oils take up a less quantity. They slightly redden turmeric paper; they have no action on litmus, but change syrup of violets to a green. If they are exposed to the action of heat in a small glass tube, they first become of a yellowish colour, which gradually becomes darker; then are fused, and finally are decomposed, furnishing the usual products of a dry distillation of vegetable substances. The coal left, is extremely light, and is remarkable for its metallic brilliancy. Their aqueous and alcoholic solutions furnish much froth on rapidly stirring or shaking them.

If these substances are mixed with sulphur, they enter into fusion with this body when heated, and are decomposed, giving rise to a disengagement of sulphurous and hydrosulphuric acids; there is also a formation of sulphuric acid. These substances are decomposed by chlorine. Potash aud soda dissolve them when aided by heat. Ammonia also dissolves them; hence, in precipitating them by this alkali, it must not be used in excess.

They all crystallize in small radiated prisms when their alcoholic solution is carefully evaporated. As generally obtained, they are pulverulent.

The substance described by M. Batka is not an acid, as I before observed. It is true, it reddens litmus, but this arises from the presence of a small quantity of hydrochloric acid. It is well known with what tenacity many vegetable substances retain this acid. But, if the pretended acid of M. Batka be washed with water seven or eight times, it loses all its acid properties. Moreover, by dissolving it in sulphuric

acid and precipitating it by ammonia, salseparine is obtained, which may be crystallized.

It is therefore erroneous to bestow four names on the same substance; smilacine, salseparine and parillinic acid, are identical with the parilline of M. Palotta, to whom the credit of the discovery of this substance is due; the others have merely given new processes, of which that of M. Thubeuf is the best.

M. Poggiale then gives the results of a great number of analyses of these substances, showing that the elementary composition of the whole of them is the same, namely, $C^8\ H^{18}\ O^3 + (H^2\ O.)$ He adopts the name of salseparine as being the best.

The action of acids on this substance is interesting. The author goes on to say: We are as yet not acquainted with any unazotized body which saturates acids and forms salts with them. Notwithstanding this, I at one time thought that salseparine formed an exception, as very diluted acids dissolve it completely: if this substance be crystallized in an acid fluid, the form of the crystals will differ according to the acid made use of. Hydrochloric acid affords them in silky tufts, sulphuric in small prisms. Potash, soda, ammonia &c. cause an abundant precipitate when added to a concentrated acid solution of salseparine. It might be supposed that in this case the alkali removed the acid which was combined with the salseparine; but there is evidently no chemical combination of these bodies; if the salseparine be precipitated when an alkali is added, it is because this latter combines with the acid, without whose aid the salseparine is not soluble. If the salseparine, treated with sulphuric acid, be washed two or three times with water, the last washings do not redden litmus paper, whilst the salseparine which remains on the filter, on being dissolved in alcohol, is precipitated by barytes water. This character led me to think that the acid was really combined with the sulphuric acid. A closer investigation completely changed my views. If salseparine crystallized from very diluted sulphuric acid, be washed for a long time, it will become obvious that the acid

is not combined, but is merely retained by it. M. Soubeiran who was much interested in these investigations, suggested the following method of proving that salseparine does not combine with acids; he crystallized it in alcohol containing an excess of sulphuric acid, placed the crystals in a tube closed at one end, and covered with cotton; he then poured sulphuric ether on the cotton, this, in traversing the salseparine, carried off all the sulphuric acid with it. This experiment succeeded perfectly.

Sulphuric acid exercises a peculiar action on salseparine. If it be added in a concentrated state to salseparine, drop by drop, this substance becomes of a dark red colour, which gradually changes to a violet, and finally to a pale yellow. A solution is obtained, from which, on the addition of cold water, the salseparine is precipitated, and the yellowish colour disappears. Hence it is evident the salseparine is unaltered by the acid, notwithstanding the change of colour. Cold water does not precipitate it from its solution in diluted sulphuric acid.

The action of nitric acid on this substance, differs from that of sulphuric. When concentrated, it dissolves it at the ordinary temperature, but it alters a small portion of it; this altered part becomes yellow. The nitric solution gives a white precipitate on the addition of water, formed almost entirely of unaltered salseparine.

Hydrochloric acid also dissolves salseparine, and on evaporating the solution affords fine crystals, in fact all the acids act alike in this respect, to a greater or less degree.

Jour. de Pharm.

ART. XIII.—APPLICATION OF TANNIN AS AN ALKALOIMETER.

By O. Henry.

By *Alkaloimetry* is meant, processes calculated to show in an exact manner, the quantities of alkaloids contained in certain vegetables. This, which in general has only been accomplished by long and complicated processes, which are attended with many inconveniences, from the tediousness of the operation, and the repeated decompositions and evaporations they require, hence always exposing the operator, particularly when experimenting on a small scale, to a loss of a certain quantity of the product. Having been several times called upon to determine the richness of different parcels of cinchona in alkaloids, I have been forcibly impressed with the difficulties above alluded to, and have made many experiments to ascertain a more expeditious method of obtaining the desired ends. Thus, wishing to proceed as in *alkalimetry*, I thought of precipitating the quinine and cinchonine by a liquid of known strength, and the quantity of which would be appreciable by the divisions of a graduated measure. Taking advantage, with this view, of the property pointed out by Serullas, possessed by iodic acid of forming insoluble precipitates with almost all the alkaloids dissolved in alcohol, I thought I should obtain my end, by adopting a solution of pure iodic acid, supposing that an alcoholic solution of quinine &c. would require certain proportion of this test to produce its entire precipitation; but this method did not succeed, because on the one hand, if the alkaloid solution was made with alcohol at 32°, a part of the iodic acid was itself precipitated in an uncombined state, and if made with that fluid at 22°, a portion of the organic acid iodate remained in solution.

Since the discovery of the vegetable alkalies and the happy application of many of them in medical practice, their extraction has become a branch of commercial industry. This, which is of French creation, and for a long time peculiar to our laboratories, is now of sufficient importance to require some means by which the value of the raw materials em-

ployed can be readily ascertained. I was therefore led to return to the ideas above alluded to, and was endeavouring to make them practically useful, when the excellent memoir on tannin by M. Pelouze made its appearance. In this essay it was stated that tannin formed white precipitates with quinine, cinchonine, morphine, narcotine, strychnine and brucine, and which were almost insoluble in water.

It had been for a long time known that tincture of galls formed a flocculent, white precipitate with different organic substances, especially with the vegetable alkalies. M. Dublanc had also stated that very small quantities of morphine might be detected by this reagent, and my father, in examining the action of red wines on cinchona, had shown that quinine and cinchonine were precipitated by the colouring matter of these wines, which acted on them like tannin; he also very judiciously deduced that in the preparation of cinchona wine, the white or sweet wines were preferable to those which contained much red colouring matter. Berzelius, in the fifth volume of his Treatise on Chemistry, also notices the action of tannin on the vegetable alkalies, and he thinks that certain organic bases might perhaps be isolated, by forming salts of double decomposition, with their insoluble tannates, by means of acetate of lead.

To these facts, I will add, that by means of tannin we can detect very minute proportions of the organic alkalies in a solution, as the tannates which result are very voluminous, of a white colour, and rapidly precipitate themselves.

Taking these observations as a basis, I have endeavoured to use pure tannin as a test of the richness of certain substances in alkaloids, and have more especially applied it to the different kinds of cinchona.

I therefore prepared, with care, a certain quantity of pure tannin, according to the simple and easy process described by M. Pelouze, which I shall briefly notice. It consists in taking a glass adapter, the smaller end of which is to be partly closed by a dossil of cotton, and the larger provided with a good cork; a certain quantity of powdered galls, sufficient to fill about one half of the adapter, is to be introduced

into it, and the remaining space to be filled with sulphuric ether, and the cork closely fitted in, the ether slowly filtrates through the powder and falls into the receiver. This fluid is to be several times passed through the galls; it becomes of a greenish colour; on standing, it deposits a brownish syrupy crust, which collected in a funnel by decantation, washed with sulphuric ether, and again decanted, holds the pure tannin in solution. It suffices to evaporate this etherial liquid in vacuo, or in a water bath, to dryness; in the first place a voluminous, whitish, yellow foliated product is obtained, which is very light and readily pulverizable; in the latter, the product is in the form of a greenish mass, which is soft when hot, and dry and brittle when cold, and readily reducible into a white powder.

Having thus at my command very pure and dry tannin, I commenced by dissolving a certain quantity in a vessel filled with cold water, protecting it from the action of the air. The solution, at first, took place slowly, the fluid then became more viscous, forming a brownish layer, which covered the bottom of the vessel, and was readily mixed with the remainder of the fluid by stirring; the solution was then complete, and after filtration it had a light greenish brown colour.

To ascertain how much pure tannin it contained, I took two equal portions, namely, fifteen grains, and poured into one a solution of tartar emetic, and into the other, neutral acetate of lead; the precipitates were washed and dried. I obtained—

1. Tannate of antimony $Sb^2O^3\overline{T}^3$ = 0.69 gr. 0.68 gr.; 0.685 gr.
2. Tannate of lead $\dot{P}i\overline{T}$ = 0.82 gr. 0.84 gr.; 0.84 gr.

which gave of pure tannin with the salt of antimony, 0.5576 grains, and with the salt of lead, 0.5398 grains, for one atom of tannate of antimon. contains,

Protox. antimon.	1912.90, or 19.18.
Tannin	8064.59, or 80.12.

One atom of tartrate of lead contains—

Protox. lead	1394.498, or 34.16.
Tannin	2688.198, or 65.84.

Fifteen grammes of the solution of tannin being introduced into the graduated measure of Decroizille's alkalimeter, marked 33.07, showing that each division represented 0.0168 grains by the salt of antimony, or for 100 grammes = 220 divisions, 3.71 grains, (this solution is what I shall call the *alkaloimetric liquid.*) Afterwards having taken one grain of very pure quinine, and one grain of equally pure crystallized cinchonine, well dried, I dissolved them in a certain proportion of distilled water, acidulated with three or four drops of sulphuric acid.

To these limpid solutions, the *alkaloimetric liquid* was carefully added, carefully noting the number of divisions required to produce precipitation. The tannate which was formed, was white, curdy and almost insoluble in water; when the precipitate was so large as to lead me to suppose that it was almost complete, I saturated the acid in the fluid by means of a few drops of ammonia, and added more of the test, till a precipitate no longer took place. On observing the number of divisions on the scale, and multiplying them by 0.168, I ascertained the quantity of tannin used. With the quinine, the divisions indicated, of pure tannin, 2.5 grains, and with the cinchonine, 2.71 grains, consequently, by calculation, we find that these numbers give for the tannates formed:

Two atoms of tannin and one atom of alkaloid, or

Quinine	1 atom	2142	= per 100	28.19.
Tannin	2 atoms	5376		71.10.
Cinchonine	1 atom	2005	= per 100	27.17.
Tannin	2 atoms	5376		72.83.

These salts may be considered as *bitannates;* they are acid. I shall make a more detailed examination of them, as well as of the neutral tannate of the organic alkalies, but at present shall confine myself to the practical conclusions I have attained, and which I propose as a new method of alkaloimetry.

QUINOMETRY.

Test liquor. This is prepared by dissolving ten grammes of very pure powdered tannin in 190 grammes of cold distilled water, and filtering the solution. There ought to be scarcely any residue. This solution contains one-twentieth of pure tannin; it is colourless, or of a very light greenish brown. It should be kept in a well closed bottle, and be prepared but a short time before it is used.

Each division of Decroizville's alkalimeter contains 0.47 grains of the solution, and consequently 0.0235 grains of tannin, which corresponds to 0.0095 of quinine. Hence we have have only to multiply the number of divisions employed by this number, to ascertain the quantity of the alkaloid present. Suppose, for instance, that for a quantity n of cinchona, it requires 100 measures of the test liquor to produce a complete precipitation, it is merely requisite to multiply 100 by 0.0095 grains to have the quantity of quinine contained in the cinchona, or $100 + 0.0095$ of quinine in n of bark.

TRIAL OF CINCHONA BY THE TEST LIQUOR.

About ten pounds of the bark to be tried, is to be taken as a sample, which is to be reduced to a fine powder. One pound of this is to be separated and treated three times with boiling alcohol at 32°, acidulated each time with eight grammes of sulphuric acid; the tincture is to be carefully pressed out, and an excess of hydrate of lead added to it, till it becomes colourless. It is then to be filtered, and a small quantity of oxalate of soda or ammonia added to it, to precipitate any lime or lead in solution in the alcohol; the alkaline liquid is then to be saturated with sulphuric acid, added drop by drop, and the whole evaporated. The residue, slightly acidulated, is to be dissolved in pure water and filtered, to separate the chlorophylline or greenish resin, and weighed. A tenth of it then to be treated by the test liquor, as above described, operating with great caution, and carefully filtering towards the close of the operation, adding the solution of tannin as long as there is any precipitate, then examining how many divisions of the alkalimeter are occupied.

If, for example, in acting on a tenth of the solution, from a pound of cinchona, 123 divisions of the alkalimeter are used, they represent 1.2 grain, consequently the pound of bark contains 12 gr. 3 drachms.*

I believe that this property of tannin may also be made use of to ascertain the richness of opium, nux vomica, &c. &c. in alkaloids, and also to isolate certain known or unknown organic bases in analysis.

Jour. de Pharm.

ART. XIV.—ON COBALT BLUE.

By M. Gaudin.

Montami, in the preparation of his blue, used a solution of arseniate of cobalt in nitric acid, mixed with chloride of sodium. He evaporated this solution almost to dryness, but not carried so far as to drive off all the acid; he obtained in this way a blue, which he exposed to the air, where it attracted moisture, became red, and soluble in water. In a few days he subjected the moist mass to the action of heat, to expel the excess of acid, again exposed it to the air, and repeated these processes, till the substance was no longer susceptible of becoming red, or of tinging water of a rose colour. In this preparation, the arsenic acid attacked the oxide of sodium, as it gradually became separated from the nitro-muriatic acid; and the oxide of cobalt thus set free was transformed into cobaltic acid and combined with the soda; to enable it to become fully developed, the substance must be heated to redness after having washed it. The same result is obtained if the black oxide of cobalt be combined with the

* As each division of the graduated measure, represents but a very small portion of quinine, no great error can arise if two or three divisions more are filled; for 0,0037 gr. multiplied by 3 = quinine 0,0219 gr. or in the pound, multiplied by 10 = quinine 0,219 gr.

arseniate of soda, or the arseniate of cobalt with the oxide of sodium.

Whatever may be the plan adopted to make this blue, it attracts moisture and loses its colour, which may be restored however, by subjecting it to the action of heat. A small quantity of iron does not prevent the appearance of a blue colour.

When M. Thenard was experimenting on the blue colour which bears his name, he found that the union of phosphate of cobalt and oxide of potassium or sodium, produced a bright blue. The proof of the change that took place in the base was, that when he used too much alkali, he obtained a black; when he used phosphate of cobalt and alumine, decomposition likewise took place, and the alumine, instead of acting the part of an acid, as had hitherto been supposed, really played the part of a base.

When oxide of cobalt is combined with glass, to obtain smaltz, it often happens that with the same materials, different shades of colour are produced. It is of importance to ascertain the best plan for obtaining them of a uniform tint. The difference is by some attributed to the presence of iron, but this is an error; it is more likely that it arises from the heat being urged beyond the point at which the blue colour manifests itself, when other chemical reactions take place. It should be borne in mind, that the cobaltic acid is developed in greatest intensity under circumstances which must be closely studied by the operator. I believe that when the oxide of cobalt is pure, that the intensity of the heat sometimes drives off a part of the oxygen and reduces a small portion of the base to a metallic state.

Preparation of some blues. Take the precipitate of borate of cobalt, which is formed by pouring a neutral solution of salt of cobalt into one of borate of soda, or *vice versa*; wash the precipitate slightly and calcine it for a short time. Mix one part of this borate of cobalt with one or two parts of melted phosphate of soda, and heat the mixture to redness in a crucible. The borate of cobalt may be replaced by a phosphate of the same base, which also affords a fine blue. The

The phosphate of soda may be replaced by an arseniate of the same base.

Borate of cobalt may also be prepared as follows; pour an excess of borate of soda into a solution of a salt of cobalt, and add a solution of sub-carbonate of potash or soda as long as there is any precipitation. Wash, filter, and calcine slightly.

Another Blue. Take twelve parts of slightly calcined phosphate of cobalt, twelve parts of melted phosphate of soda, two parts of melted borax, four parts of calcined alumine, and three parts of calcined subcarbonate of soda. Rub the whole well together in a wedgewood mortar, and afterwards heat it to redness in a crucible.

If instead of cobalt, copper be used, I am of opinion that beautiful green colours will be the result.

Jour. de Pharm.

ART. XV.—ON THE PURIFICATION OF GUM RESINS &c.

By E. Mouchong, Jr., of Lyons.

Although the gum resins in general are not now of the same importance as they were during the reign of polypharmacy, still they demand our attention to a certain degree, and hence I have been led to make some remarks on the modes of purifying them.

To decide with any certainty on this subject, I subjected some of those gum resins most generally used to different comparative treatments, with water, vinegar and alcohol.

Although all the gum resins which come to us in impure masses, require to be purified, I confined myself to those which are most frequently subjected to this operation, namely, ammoniac, galbanum and sagapenum, and it should be noticed that a great analogy exists between the relative pro-

portions of the two principles which constitute almost the whole mass of these concrete juices.

Lemery, Baumé &c. were right in thinking that the action of heat, however regulated, will always cause a volatilization of a portion of the essential oil they contain. Hence this agent should never be had recourse to when the crude gums can be used, and preference should always be given to the formula which requires the least possible quantity of excipient, to avoid the inconvenience resulting from a prolonged evaporation; great attention must also be paid to the regulation of the heat, and above all to the uninterrupted stirring or agitation of the ingredients, as a neglect in this particular will inevitably cause disappointment, as regards the expected results.

In my experiments the proportions of excipients I have employed for 250 grammes of the resin to be purified, are:

When the fragments or tears are separate, or but slightly coherent, as in gum ammoniac:

	Alcohol at 22°,	1000 grammes,
or	White vinegar at 3°,	500 "
or	Water,	375 "

When the fragments are coherent or agglutinated, as galbanum and sagapenum:

	Alcohol at 22°,	1000 grammes,	
or	Acetic acid at 3°,	500 "	
or	Water for a 1st treatment,	500	625.
	Alcohol at 22° for a 2d "	125	

In each operation, I endeavoured as much as possible to give the gum resins their original consistence. Those which were treated with alcohol, were dissolved as is usual, by the assistance of a gentle heat, and in carefully closed vessels. As to the treatments with acetic acid and water, they were limited to a solution of the substance to be purified, in one or other of these fluids, by the aid of moderate heat and continued stirring, and the subsequent separation of the impurities, by straining through a coarse cloth, and finally a concentration of the product.

TREATMENT WITH ALCOHOL.

Names.	*Quality of Gum Resin.*	*Quantity obtained.*	*Loss.*	*Smell compared to unpurified.*	*Appearance &c.*	*Quantity of residue*	*Character of Residue.*
Ammoniac	Tears.	235 gr.	15 gr.	Not so strong.	Compact mass, brittle, of a gray approaching to yellow.	25 gr.	Almost entirely composed of small, reddish, ovoid flattened seeds, with longitudinal striæ; of an aromatic flavour, like those of the umbelliferæ.
Galbanum	Tearlike mass, somewhat soft.	210 gr.	40 gr.	do.	Compact mass, of a somewhat yellowish colour.	70 gr.	Remains of stalks and other impurities; of a reddish colour; not completely dissolved.
Sagapenum	Soft brownish red masses.	230 gr.	40 gr.	do.	Somewhat soft, not compact, readily pulled apart, pale yellow.	34 gr.	Remains of stalks, &c. and of earthy matter, mixed with some fragments of bassorine.

TREATMENT WITH VINEGAR.

Names.	*Quality of Gum Resin.*	*Quantity obtained.*	*Loss.*	*Smell compared to unpurified.*	*Appearance &c.*	*Quantity of residue.*	*Character of Residue.*
Ammoniac	Tears.	210 gr.	40 gr.	Less strong, but having a marked smell of the vinegar.	Compact, brittle, smooth of a yellow colour.	22 gr.	Vegetable fragments, and the seeds above described; no remains of gum resin.
Galbanum	Somewhat soft, aggregated mass.	172 gr.	78 gr.	idem.	Very compact, smooth somewhat soft mass of a reddish colour.	80 gr.	Reddish, gum resin, not completely dissolved.
Sagapenum	Somewhat soft mass.	200 gr.	50 gr.	idem	Tenacious mass of a colour resembling diachylon.	37 gr.	Earthy impurities, mixed with much vegetable matter, no trace of bassorine.

TREATMENT WITH WATER.

Names.	*Quantity of Gum Resin.*	*Quantity obtained.*	*Loss.*	*Smell compared to unpurified.*	*Appearance &c.*	*Quantity of residue*	*Character of Residue.*
Ammonia	Tears.	225 gr.	25 gr.	Not so strong.	Brittle mass of a gray colour, verging on yellow.	27 gr.	Impurities as before mentioned.
Galbanum treated by water alone.	Tearlike mass somewhat soft.	125 gr.	125 gr.	idem.	Grayish coloured compact mass, somewhat soft.	98 gr.	Resinous mass, of a straw yellow colour, mixed with vegetable fragments.
Galb. treated, 1st with 500 gr. water, and 2d, with 125 gr. alcoh. at 22°.	Somewhat soft masses mixed with tears.	224 gr.	36 gr.	idem.	Mass resembling in consistence, &c. white pitch.	42 gr.	Vegetable fragments, only a trace of gum resin.
Sagapenum treated as preceding.	Somewhat soft masses.	222 gr.	38 gr.	idem.	Resembling except in taste and smell, the preceding.	22 gr.	Vegetable fragments, and earthy impurities mixed with one-sixth of bassorine.

With the exception of the gum ammoniac, which retained in a great measure its natural appearance, these gum resins gradually assumed a brownish colour, so that in a month they were very different from what they were immediately after their purification.

From these experiments, it appears to me that some of the earlier authors were right in advising the use of water, and that the best way is to use a sufficient quantity of this fluid alone when the gum resin is in tears; but when it is in masses

that water should first be employed and afterwards the residue left on the cloth subjected to the action of alcohol at 22°. By this method results are obtained quite as satisfactory as if vinegar or alcohol be used, and it has the advantage of being more economical.

But I repeat, no purification should be practised if it can be avoided, as this process is also prejudicial to the gum resin, however carefully it may be conducted.

Jour. de Chim. Med.

ART. XVI—NEW METHOD OF LABELLING GLASS BOTTLES, &c.

By F. Boudet.

This method of labelling bottles which was at first only used for those containing corrosive liquids, has been so much improved, and is so readily executed at a trifling expense, that many apothecaries have adopted it in their shops.

Convinced that our readers would be desirous of knowing the mode in which it is done, I requested M. Golfier Besseyre, who is perfectly acquainted with all the details, to communicate them to me, which he has done as follows:

White enamel is to be pulverized, carefully triturated and the finest portions separated by means of water, the residue again triturated, till the whole is reduced into an impalpable powder, which is to be dried. This powder is to be ground with a small quantity of essence of lavender, and may be then used to paint on such glass as will not change its form, when exposed to the degree of heat required to melt the enamel; but for labelling bottles, it is necessary that the enamel should be mixed with one-fifth, one-quarter, or even one-third of the following flux:

Powdered rock crystal,	1 part,
Red lead,	3 parts,
Calcined borax,	½ part.

These substances are to be mixed with the enamel, the whole melted and rubbed down with a certain quantity of essence of lavender and essence of turpentine, which have become thick by long exposure to the air; the proportions generally used are two-thirds of the former to one-third of the latter. This composition is to be applied by means of flat camels' hair brushes. For example; to a portion of the prepared enamel of the size of a hazel-nut, is to be added one drop of the turpentine and two drops of the lavender, and the whole well mixed on a glass pallet; with this mixture a portion of the surface of the bottle, rather larger than the intended label, is to be covered. When it is almost dry, the surface is to be smoothed by a short, thick, but very soft camel's hair brush; when it is perfectly dry, it may be readily ascertained if the proper proportions have been used; too much turpentine renders it difficult to remove the enamel where the letters are intended to be, while too much lavender renders it so soft, that the least touch detaches it.

To write or design on this enamel, all that is requisite is to remove this substance from the spots the letters occupy, which is readily done by a quill cut like a pen but without a slit, the letters or design may be formed by the hand alone, or with the aid of a stencil plate.

The fusion of the enamel, is the last but the most difficult part of the operation. However, with a little practice, a person will always succeed in fusing it by means of an enamelling lamp; when a number of articles are to be thus labelled, a furnace must be used, and the pieces placed in muffles. After the temperature has been raised to the requisite height, that is to a red heat, the fire is to be extinguished, and the furnace closed, so as to anneal the articles properly.

Journ. de Pharm.

ART. XVII.—ON THE EXISTENCE OF THE BI-MALATE OF LIME IN THE BERRIES OF THE SUMACH; AND THE MODE OF PROCURING IT FROM THEM IN THE CRYSTALLINE FORM.

By William B. Rogers, Prof. of Chemistry and Natural Philosophy in William and Mary College.

The berries of the Rhus *glabrum* and Rhus *copallinum*, the two species of sumach common in Virginia, have long been remarked for their acidity and are still used in some places as a substitute for lemons in different forms of beverage as well as for various other purposes in domestic economy and medicine. In some experiments made more than two years ago upon the acid liquor obtained by macerating the berries in warm water, I have found it to contain a large quantity of an acid salt of lime which I have since determined to be the *bi-malate*. At the same time too a microscopic examination of the berries of the R. *glabrum* enabled me to discover the pure crystals of this salt on the outside of the berries mingled with the down. To observe the form of the crystal distinctly, the berries should be slightly moistened and then allowed to dry. The crystals may then be readily seen by the naked eye, and when viewed through the microscope they appear as beautiful hexagonal prisms of the most perfect symmetry.

The existence of this salt in the berries of the Rhus is a fact which appears to have hitherto escaped attention. The only experiments relating to the acid of these plants which I have met with, are those of Mr. I. Cozzens of New York, published in the first volume of the Annals of the Lyceum of that city; and that chemist seems to have regarded the infusion of the berries of the Rhus *glabrum* as containing malic acid uncombined with any base but "merely contaminated with a small portion of gallic acid which probably proceeds from the pulp of the berries." In his paper on the subject he does not mention having tested the acid liquor for lime, which he would have discovered at once either by evaporating a

few drops in a platinum capsule and then igniting, or by adding to the liquor a little oxalate of ammonia.

So abundant is the bi-malate of lime in the infusion of the berries both of the R. *glabrum* and *copallinum* that when reduced by evaporation the whole liquid has the appearance of a thick light varnish and is almost *insoluble* in alcohol, two characteristic properties of the bi-malate. The process of Mr. Cozzens for preparing a pure malic acid from these berries is therefore liable to the objection that by using alcohol as the solvent, the operator will lose all the malic acid which exists in the bi-malate, and this I am inclined to think is nearly all the malic acid of the infusion. From the very small portion of acid matter which alcohol imbibes by standing for some time over the inspissated infusion, it is obvious that little uncombined malic acid can be present. In fact, nearly all the acid kind in the Rhus exists as a bi-malate in combination with lime. In procuring malic acid from the juice of the Sorbus in which it exists in an uncombined state, the alcohol acts as a solvent of the acid, and is therefore employed with advantage to separate it from mucilage and the other substances with which it is mingled. But it is entirely inadmissible when the acid is to be procured from the bi-malate of lime.

The Bi-malate of Lime is readily procured from the berries in considerable quantity and *perfectly pure* by the following process:

A quantity of hot rain water or distilled water is poured over the berries in a clean earthen or wooden vessel. After allowing the berries to macerate for a day or two, the liquid is poured off and evaporated carefully in an earthen or porcelain dish until it becomes intensely acid. It is now filtered through animal charcoal or bone black, repeatedly washed with muriatic acid. The liquid passes through almost colourless having only a slight amber tint. If the evaporation has been carried sufficiently far, a large deposit of crystals will form in a few hours. The liquid being poured off and further reduced by evaporation an additional crop of crys-

tals may be obtained and is this way nearly all the bi-malate may be separated. The salt thus procured will often be slightly tinged with colouring matter, in which case it should be re-dissolved in hot water and crystallized anew. It is then perfectly pure.

When the crystallization of the bi-malate has been rapid the mass presents the pure and shining white of the sulphate of quinine. When more slowly conducted, hexagonal prisms of the most beautiful proportions are obtained. The largest of these have generally two of their parallel faces much broader than the rest, so that when placed upon any smooth surface they have the appearance of rectangles, slightly bevelled at the edges. In the salt suddenly crystallized, the crystals are much more slender, and are perfectly regular hexagonal prisms with bevelled extremities. They are frequently in pairs crossing at right angles, and in groups formed of several of these pairs. The variety of proportions among the different crystals and the exact symmetry which each presents are matters of very pleasing observation through the microscope. The great facility with which this salt crystallizes from the infusion of the berries, led me at first to doubt whether the acid contained in it was really the malic, for it would appear from the remarks of Berzelius and Thompson on the bi-malate, that hitherto it had not been procured in the crystalline form from the juices or infusions of plants. The former chemist in the fourth volume of the Traité de Chimie, speaking of this salt under the title of Sur-malate Calcique observes, "Il resemble à la gomme par son aspect;" and again, "Ce qui vient d'être dit ne se rapporte qu'au sel tireé des plantes; d'après Braconnot celui qu'on prépare à l'aide de l'acide, cristallise en prismes hexagones." Dr. Thomson does not speak of it as crystalline, and states that "when the supermalate of lime is evaporated to dryness it assumes exactly the appearance of gum arabic."

A very careful examination of the crystalline salt shows it to be a true bimalate, and I am therefore disposed to think that the uncrystallizable character of the bimalate procured

from the Sorbus, Sempervivum &c. arises from the admixture of mucilage and other impurities.

The salt procured as above is intensely but agreeably acid. It dissolves abundantly in water, but in very small proportion in alcohol. At a low heat it fuses and parts with its water of crystallization, assuming at the same time a gummy aspect. A little below redness the acid is decomposed, the mass swells very much, and if the heat be increased, every thing is driven off but the lime which remains in a bulky form, but perfectly pure and white. A single crystal placed on a slip of platinum foil and held over a spirit lamp, presents a very curious appearance, first melting, and in a moment after shooting up in a white column of pure lime. This phenomenon is quite characteristic of the salt.

In investigating the nature of this salt, of which as already stated, I at first entertained some doubts, I made the following experiments:

1. A portion of the salt was heated to bright redness in a platinum capsule, so as to drive off all the water and acid. The white spongy mass remaining was strongly alkaline. It was dissolved in dilute muriatic acid. The solution was divided into two portions, of which one was tested for potash, the other for lime. None of the former base could be detected, but an abundant precipitate of oxalate of lime indicated the presence of the latter.

2. A portion of the salt was dissolved in distilled water in a test tube. Upon adding a few drops of liquid oxalic or citric acids, a white precipitate was formed. Liquid tartaric acid being added to a similar solution produced, after some time, brilliant octahedral crystals of tartrate of lime, which adhered to the sides of the tube. It appeared therefore, that the base of the salt was *lime.*

3. To a solution of the salt in distilled water, a few drops of the solution of acetate of lead were added. A beautifully white flocculent precipitate was abundantly produced. This precipitate was insoluble in ammonia, and therefore could not be a citrate of lead. Indeed, neither citric, tartaric, or

oxalic acid could be suspected in the salt, inasmuch as neither of these acids are known to form acid salts with lime.

4. The precipitate procured by the acetate of lead was well washed with distilled water, and then heated in the same, to the boiling point. It almost entirely disappeared. But upon allowing the liquid to cool, the salt of lead separated and formed upon the surface and around the edges of the liquid, groups of the most brilliant satin like crystals. The crystals in these groups were extremely slender, diverging from the common centre of the group with the most perfect regularity. Solubility in hot, and insolubility in cold water are characteristic of the malate of lead. But the novel and very peculiar crystallization just described made me hesitate at first in pronouncing this precipitate a malate. Berzelius describes it as collecting "Sous la forme d'écailles blanches ayant l'éclat de l'argent." Afterwards however meeting with Wöhler's process for obtaining malic acid, I found that pure malate of lead crystallizes as I have described. It is not necessary for the production of this peculiar form of crystallization, that the precipitate should be washed and re-dissolved, for I have since found that the usual flocculent precipitate if heated in the supernatant liquid, and then left for some time undisturbed, is transformed into an assemblage of radiating groups such as have been described.

5. Ten grains of the salt obtained from the berries were exposed to a white heat, in a platinum capsule, until the water and acid were entirely expelled. The lime remaining weighed 1.25 grains. This result accords very closely with the composition of bi-malate, as determined by Braconnot.* According to that chemist, as quoted by Thomson, the constituents of the bi-malate are

2 atoms	malic acid,	17.00
1 "	lime,	3.50
6 "	water,	6.75
		27.25

*Vide Thomson's Organic Chemistry, Vol. II.

This would give in 10 grains of the salt 1.28, differing by three hundredths of a grain from my determination.

6. With the view of repeating some of the experiments of Lassaigne upon the acids produced by the destructive distillation of malic acid, I introduced several grains of the bimalate into a glass tube, about one third of an inch in diameter and ten inches long. One end of the tube being hermetically closed and the salt all collected in that extremity, the tube was bent at two points, in a zigzag form. The closed end was then held in the flame of a spirit lamp, to expel and decompose the acid. In the angle of the tube remote from the flame, an acid liquid mingled with empyreumatic tar collected, and near the flame adjacent to the salt, needle formed crystals of an amber colour collected on the surface of the tube. The liquid being removed from the tube was evaporated gently, and then suffered to cool. Numerous scaly crystals formed, resembling the flat figures which snow sometimes assumes. These crystals were intensely acid, and soluble in alcohol and in water. Heated in a test tube, they were partially decomposed, and needle shaped crystals sublimed, resembling those deposited near the closed end of the tube in the first operation. Thrown upon burning charcoal, they exhaled a white smoke, of a suffocating odor. A solution of this pyromalic acid in water, added to a solution of lead, produced a precipitate, at first flocculent, but afterwards becoming gelatinous. The sublimate was much less soluble than the acid just described. These substances agreed in properties with the pyromalic acids described by Lassaigne, and thus another proof was furnished of the true nature of the acid existing in the salt of the sumach. As but a small quantity of the sublimate was procured, I was prevented from examining its properties extensively. Little is yet known concerning it and I am at present preparing to give it a more complete examination.

The attention of the French and German chemists having lately been much directed to the constitution of the vegetable acids, various improved methods of obtaining the malic acid in a pure form, have been devised and published. In all

these however, the acid is extracted either from the Sorbus or Sempervivum. As in the former of these plants it exists almost entirely uncombined, while in the latter it is united with lime as a malate, a separate process is necessary for each. In procuring the acid from the Sempervivum the malate is converted into a bi-malate by the addition of so much sulphuric acid as will remove one half the lime, and then other operations upon the crystallized bi-malate, are necessary to separate the malic acid. From the comparative ease with which the bi-malate may be obtained from the berries of the Rhus, and the purity of the salt when procured in this way, there is no doubt that this fruit may be very advantageously employed in preparing malic acid for chemical purposes. I have as yet made no experiments to ascertain the amount of bi-malate which a given weight of the ripe berries of each of our species of Rhus will furnish, but I have no doubt that it would be found very considerable. Of the medicinal properties of the salt, I believe little or nothing is known. Should it have any value in this respect, or should its pleasant acidity bring it into general favour as an ingredient in our summer beverage, the great abundance of the plants in which it exists, would no doubt make it an object extensive manufacture. *Amer. Jour.Sci. and Arts.*

ART. XVIII.—ON PECTIC ACID AND THE PECTATES.

By M. Simonin.

Hitherto the use of pectic acid and the pectates, in the extemporaneous preparation of jellies, &c. has not been as general as it ought to be; this may have arisen from the difficulty of preparing them; in fact the operation is tedious, intricate, and often attended with failure, especially with persons not accustomed to the manipulations requisite for success. The intention of the following remarks is to simplify the process by the employment of means hitherto considered as inadequate.

I have employed the following method for several years, profiting by the observations of M. Braconnot on the conversion of pectine into pectic acid by the fixed alkalies.

The pectine, or abundant jelly which forms in currant juice, after the juice of sour cherries has been mixed with it, is to be separated from the fluid, and washed, to get rid of as much as possible of the colouring matter; it is then to be boiled with a very weak solution of caustic potash; afterwards, to separate any fragments of the fruit that may be present, it is to be filtered through a coarse cloth. This pectate is to be decomposed by gradually adding and stirring a sufficient quantity of liquid chloride of lime; the fluid rapidly loses its colour, and there is a formation of pectate of lime, in whitish flakes; this is to be collected on a cloth, and then mixed with water slightly acidulated with hydrochloric acid, which decomposes the pectate and dissolves the lime. The pectic acid is now to be drained on a cloth, and well washed with distilled or rain water, to dissolve any excess of the hydrochlorate of lime or of acid which may be present, it is then to be subjected to a slight pressure to separate the water.

In this state the pectic acid is almost colourless and transparent, in the form of a compact jelly; it combines with the alkalies with great facility, a few drops of ammonia being sufficient to liquify it, giving it at the same time a brown colour. If it is wished to prepare the pectate of ammonia, a

sufficient quantity of this alkali is added to give it the consistence of a syrup, which is to be filtered, and exposed in thin layers in porcelain plates to the heat of the sun or a stove; it soon dries, and separates from the plate, in brown, transparent, vitreous scales; this pectate is completely soluble in distilled water, from which alcohol and sugar will separate the pectic acid in the form of a jelly.

If, instead of ammonia, caustic potash or soda be employed, there will be a formation of pectates of these bases.

It is of the utmost importance to use water for the washings which contains neither lime nor calcareous salts, as a very small quantity of these will cause the formation of pectate of lime, and hence a failure of the operation.

From two hundred pounds of red currants, I obtained near eight ounces of pectate of ammonia, which would give a gelatinous consistence to five hundred times its weight of water.

When a large quantity of pectic acid is to be made, there might be some difficulty in procuring a sufficiency of distilled, or rain water; I have in such case successfully used river and well water, deprived of its calcareous salts by means of a little potash, but care must be taken not to render it alkaline, or it will dissolve the pectic acid and thus diminish the product. *Journ. de Pharm.*

ART. XIX.—EXTRACTS FROM THE JOURNAL DE CHIMIE MEDICALE.

Translated for the American Journal of Pharmacy, by AUGUSTINE DUMAHEL.

THE subjoined memoir of Dumas and Peligot is one possessed of the highest interest, from the advantage conferred upon chemistry, by the important discoveries made by them of three new gases. These resulted from the labours of the indefatigable authors upon a substance known by the names of *Pyroligneous spirit*, *Pyroxalic spirit*, *Pyroligneous ether*, *Pyroxalic ether* and *spirit of wood*. They have discovered in this substance the characters of a true alcohol isomorphous with common alcohol.

Pyroligneous spirit, as well as the many other products formed in the distillation of wood, have occupied the attention of chemists for a number of years past; but it is only of late that their experiments have been rewarded by the most signal discoveries. Berzelius, speaking of pyroligneous spirit, says, "Ph. Taylor was the first to remark its existence, and who noticed it to consist of a particular liquor analogous to alcohol, but not identical with it; Colin confounded it with pyroacetic spirit; and Macaire and F. Marcet, finally described the properties and composition of this body."

It would appear from the incongruity in descriptions and want of similitude in their experimental results, that there was great confusion among writers upon this subject. Berzelius making mention of this says, "The contradictions which these present, given upon experiments so simple, appear to indicate the existence of several kinds of pyroligneous spirits, which have some analogy under certain relations, but different the one from the other, in some of their properties." After stating the manner in which it is obtained, and giving some of its physical characters, together with the action of the acids upon it, Berzelius concludes thus:

"In the actual state of our knowledge, it is not easy to say what is the true nature of pyroligneous spirit. The hypothesis of its being an impure alcohol, is not exact.

It is much more probable that it consists of a species of ether of which we do not know the acid."

The uncertainty which hung over this substance, from the want of knowledge as to its exact atomic composition, is now happily cleared away by the following memoir.

TRANSLATOR.

MEMOIR,

Upon a new Alcohol, and upon the etherial products which proceed from it. Read at the Royal Academy of Sciences, Nov. 3d, 1834, by DUMAS & PELIGOT.

Spirit of wood exists in solution in the aqueous part of the products of the distillation of wood. This last being decanted in order to separate it from the undissolved tar, it is submitted finally to distillation in manufactories, to extract from it, at least in part, the tar which it held in solution. It is in the first products of this distillation that you must seek the spirit of wood.

Collect, then, the first ten quarts proceeding from each hundred quarts of liquid subjected to distillation, and submit this impure product to repeated rectifications, in the manner you would concentrate alcohol. As the boiling point of spirit of wood is very low, these rectifications may be made in a water bath, and you can in this way deprive it of nearly all foreign substances.

Pure spirit of wood is a very fluid, colourless liquid, having a peculiar odour, which is at the same time alcoholic, aromatic, and resembling that of acetic ether; it burns with a flame similar to that of common alcohol; it boils at 66° C. under the pressure of 0.701. Its specific gravity 0.798 at the temperature of 20° C.; that of its vapour is 1.120. Its composition is represented by C^4H^4,H^4O^2.

Thus each volume of spirit of wood comprehends one volume of carbon, two of hydrogen, and one-half of oxygen.

METHYLENE.

It is thus Messrs. Dumas and Peligot name carburetted

hydrogen C^4H^4, which forms the radical of all the combinations of which we are about to speak. So, according to them, spirit of wood is a *bihidrate of methylene*, consisting of one volume of vapour of water, and one volume of methylene, condensed into one volume.

Spirit of wood, exposed to the contact of air and black platinum is converted into formic acid, whilst common alcohol, submitted to the same action gives acetic acid. The acids exert a special action upon spirit of wood; it is, however, worthy of remark, that the action of the oxygenated acids, such as nitric acid, is much weaker than that which the acids exert upon alcohol.

When a solution of potash, in spirit of wood, is put in contact with sulphuret of carbon, it forms a product analogous to that which M. Zeise described under the name of *hydroxanthate de potasse*. Spirit of wood dissolves the resins perfectly, and as it is more volatile than alcohol, it is very convenient for making varnish.

HYDRATE OF METHYLENE.

Thus the authors name the gas obtained in distilling a mixture of one part of spirit of wood and four parts of concentrated sulphuric acid. This gas is to spirit of wood what common sulphuric ether is to alcohol; that is to say that the *bihydrate of methylene*, (spirit of wood,) has lost half of its water to form ordinary ether. This gas presents indeed to the eudiometric analysis the following composition, $C^4H^4H^2O$.

Hydrate of methylene is a colourless gas, has an etherial odour, and burns with a pale flame. Water at 18° C. dissolves thirty-seven times its volume. When the *bihydrate of methylene* is made to act on the hydracids, new compounds are obtained, perfectly analogous to hydrochloric, hydriodic, and other ethers of alcohol. In these compounds there always enters a volume of acid for a volume of methylene.

HYDROCHLORATE OF METHYLENE.

This is easily obtained by heating a mixture of two parts of sea-salt, one of spirit of wood, and three of concentrated

sulphuric acid. With the assistance of a slight heat, a gas is obtained which may be collected under water, and which is the pure hydrochlorate of methylene.

This gas has an etherial odour; burns with a fine green flame; water dissolves of it 2.8 of its volume at 16 C.; its formula is represented by $C^4H^4H^2CH^2$. It is decomposed in passing through a porcelain tube, heated to redness, producing hydrochloric acid and a carburetted gas, which is methylene that has not been obtained pure by this process.

HYDRIODATE OF METHYLENE.

This is prepared by distilling one part of iodine, eight of phosphorus and 12 of spirit of wood. It is in the form of a colourless liquid, the specific gravity of which at 22° C. is 2.237; it boils at 50°. According to the analysis that they have made, it is represented by $C^4H^4I^2H^2$.

Action of the Acids upon Spirit of Wood.

SULPHATE OF METHYLENE.

If one part of spirit of wood, and eight or ten of sulphuric acid at 66°, be distilled together, an oily liquid more dense than water is obtained. This ether properly rectified, is colourless, having an alliaceous odour, a specific gravity at 22° of 1.324; it boils at 188°. Its formula is $H^2O,C^4H^4IO^3$.

It is a true neutral sulphate of methylene, with an atom of water. With the acid of this compound, all the combinations of methylene may be produced; with cyanuret of potash it gives sulphate of potash and hydrochlorate of mythelene, or hydrocyanic ether.

NITRATE OF METHYLENE.

This is obtained in distilling together one part of nitrate of potash in powder, one part of spirit of wood, and two of sulphuric acid. Distil the product obtained in a water bath. Thus you have a colourless liquid, of the specific gravity 1.182, which burns readily with a yellow flame; heated in a tube, it detonates with violence. M. M. Dumas and Peligot were hurt by the result of this detonation.

Its formula is $H^2OC^4H^4A^2O^5$; heated with potash, spirit of wood, and nitrate of potash are obtained.

OXALATE OF METHYLENE.

Distil a mixture of equal parts of sulphuric and oxalic acids and spirit of wood, a liquid passes, which, exposed for some time to the air deposits voluminous crystals which are oxalate of methylene. This ether melts towards 51°, and distils at 161°. It crystallizes perfectly in rhomboidal plates of great brilliancy. Its formula is $H^2O,C^4H^4C^4O^3$; that is to say, one atom of oxalic acid, one atom of methylene, and one of water.

ACETATE OF METHYLENE.

This is obtained by the distillation of two parts of spirit of wood and one of crystallizable acetic acid. It is a colourless liquid, of an agreeable odor, boiling at 55° C.; its specific gravity is 0.919; its formula H^2O, $C^4H^4C^6$, H^6O^3.

SULPHO-METHYLATE OF BARYTA.

This is obtained by the same process as the sulpho-vinate of baryta, a salt with which it corresponds. It crystallizes in quadrangular plates, colourless and unalterable in the air. Its formula is C^4H^4, $H^2OSO^3+H^4O^2$. In treating the aqueous solution of this salt by a sufficient quantity of sulphuric acid to carry off the baryta, filtering and evaporating in vacuum, the bisulphate of methylene is obtained, which corresponds to the sulpo-vinic acid of alcohol; it crystallizes very well. The results of all these experiments of M. M. Dumas & Peligot, present the following facts:

1. Spirit of wood corresponds to alcohol.
2. In losing half of its water, it forms a gaseous ether.
3. Its radical unites volume to volume, with the hydracids, to form neutral anhydrous ethers.
4. It unites atom to atom with the oxacids to form salts, always hydrated.
5. It forms with phosphoric and sulphuric acids, bisalts, which dissolve the mineral bases to form double salts.
6. Finally chemistry is enriched with three new gases by

this labour—*methylene, hydrate* and *hydrochlorate of methylene.*

The history of methylene presents likewise very remarkable cases of *isomerie,** thus:

Hydrate of methylene is isometric with alcohol;

Carbonate of methylene with citric acid;

Formiate of methylene with acetic acid; and the citrate with sugar.

The authors propose to continue their researches upon this interesting subject.

ART. XX—POISONING BY MORRISON'S PILLS.

One Webb, proprietor of a tavern named the London Coffee house, was lately tried at the assizes of the city of York, accused of the crime of poisoning. Here are the facts. A young man employed at Webb's, having been attacked with the small pox, the latter, instead of calling a physician, administered to him Morrison's pills. This treatment commenced upon the 17th June; on the 20th Richardson was dead.

An inquest taking place, examination was made, and the intestinal tube was discovered to have been the seat of a serious inflammation, which was attributed by the physicians, not to the disease, but to the nature of the treatment used. M. W. West, was entrusted with the making of the analysis of the pills; he found them composed of cream of tartar, gamboge, tincture of aloes, and a small quantity of rhubarb; and several physicians, M. M. Allan, Mathiesson, Belcomb, and Walker, affirmed that in the state in which the patient was, they accelerated his death. The inventor being interrogated upon the nature of his processes, revealed the secret of his

* Not being able, in translating the above, to give the corresponding English term, I have taken the liberty to supply its place by that of the French. Isomerie is derived from two Greek words, ισος, *equal*, and μερις, *part*

preparation, and granted that in the case of small pox, his pills administered in strong doses, might cause death. The pills had been given to Richardson in the dose of ten, fifteen, and even twenty. The cause having been heard—Webb was declared guilty by the jury, and although it was shown that he had no interest in poisoning Richardson, he was condemned to death. It is hoped that the sentence will be commuted; the members of the court uniting to petition his majesty.

Journ. Chim. Medicale, for Dec. 1834.

XXI.—DETECTION OF ARSENIC WHEN MIXED WITH ORGANIC SUBSTANCES. By M. Taufflier.

The operations of legal chemistry are often directed to the detection of arsenic in organic substances; for instance, in the matters found in the digestive canal of persons supposed to have been poisoned. In this case it is essential, before having recourse to reagents, to destroy the organic substances mixed with the supposed poison. The various plans hitherto devised for this purpose, have been, to decompose these organic matters by fire, by acids, or by alkalies. These modes have given satisfactory results, but they present many difficulties.

I have succeeded in getting rid of these substances, by a simple method, which enables the operator to detect very small proportions of arsenious acid. The mucilaginous fluids, arising from a decoction of the contents of the stomach, are to be treated by a solution of oxide of zinc in potash; this oxide combines with the organic matters, and forms an insoluble compound, which rapidly precipitates. The supernatant fluid is clear and limpid, and may be filtered or decanted; it contains arsenite of potash and an excess of oxide of zinc dissolved in potash. This liquid being acidified with hydrochloric acid, hydrosulphuric acid is to be added, when a yellow colour will be developed, if there is the least trace of

arsenious acid present. The zinc remains in solution. By boiling, the sulphuret of arsenic collects in yellow flakes, which, having been collected and washed, are to be heated by the means proper to reduce it to a metallic state. By this method one-tenth of a grain of arsenious acid may be detected in half a pound of alimentary matters.*

To reduce the sulphuret of arsenic, I make use of a very simple process, which will give evidence of arsenic in the most minute portion of the sulphuret. This consists of introducing the sulphuret into a glass tube of three inches in length, and closed at one of its extremities, and placing directly above the sulphuret a piece of leaf silver rolled into a ball. The closed extremity of the tube is to be heated by means of a spirit lamp. A decomposition immediately takes place, the sulphuret is volatilized and decomposed, the sulphur entering into combination with the silver, whilst the arsenic condenses in a metallic state in the form of a brilliant blackish gray ring, a little above the heated portion of the tube.

If instead of reducing the sulphuret to a metallic state, it is wished to transform it into arsenious acid, instead of the leaf silver, the oxide of that metal is to be used. The decomposition takes place very rapidly at a somewhat elevated temperature, the arsenious acid which is produced condenses towards the upper part of the tube, in small, white, octahædral crystals, which may be readily detached. If the acid be in so small a quantity that it would be impossible to detach it, by reversing the tube, the sulphuret of silver, which has melted into a small solid mass, will fall out. Distilled water is then to be poured into the tube, and on the application of heat, the arsenious acid will be dissolved, when the solution can be tested by the proper reagents.

Journ. de Pharm.

* The operation also succeeds by using a solution of sulphate of zinc, and then adding potash or subcarbonate of soda in excess, instead of making use of the solution of oxide of zinc.

ART. XXII—ON THE USE OF INSOLUBLE SALTS AS A MEANS OF SEPARATION IN CHEMICAL ANALYSIS.

By Horace Demarcay.

[Extract.]

A class of metallic oxides is characterized by its not fully saturating acids, and of only being soluble in an excess of these agents. To this class belong the oxides of iron, chrome, tin, bismuth, antimony, as well as the oxides of the electro-negative metals. Except when there is a powerful play of affinities, it is possible to precipitate these oxides. In fact, the carbonates of lime, barytes, strontian, or magnesia, mixed with a cold solution of oxide of iron, separate this metal so completely that the most sensible tests indicate no trace of it. Oxide of iron may thus be separated from the oxidule of the same metal, from the oxides of manganese, cobalt and nickel, with greater ease and certainty than by any other method. The carbonates of barytes and strontian should be preferred from the ease with which they can be separated from the fluid, in which they are partly dissolved, or from the oxide of iron precipitated with them. This plan is the best to obtain the oxide of cerium, entirely free from iron.

The oxide of bismuth acts like the oxide of iron. Carbonate of barytes separates it from copper. In the same way it may be separated from lead, manganese and nickel. The carbonate of barytes likewise precipitates the oxides of antimony and tin from their solution in hydrochloric acid, and may serve to separate them from lead and copper, to which they are united in a variety of alloys.

The oxidule of tin is not separated like the oxide from its solution by the carbonate of barytes. This may be taken advantage of to separate tin from antimony. The oxide of chrome acts like the oxide of iron with carbonate of barytes. Hence this metal may be separated from the oxides of nickel, of cobalt, of manganese and those spoken of when noticing the oxide of iron. If the solution contains iron, it will be

precipitated with the oxide of chrome, and may be separated from it afterwards by calcining them with potash. To separate iron from chrome when they are both in solution in an acid, all that is required is to saturate the fluid with hydrosulphuric acid, to bring the iron to the state of a deutoxide, when the oxide of chrome alone will be precipitated by the carbonate of barytes.

The oxide and oxidule of mercury dissolved in nitric acid, are precipitated like the oxide of bismuth by carbonate of barytes. This means may be employed to separate this metal from those which, like it, are precipitated by hydrosulphuric acid.

It has heretofore been proposed to separate the different oxides by means of the carbonates of the alkaline earths, without this idea having received the attention it deserved; but the reason why this method obtained so little favour, is that the important point of the temperature at the time of precipitation had not been adverted to. The action of these salts differs with different temperatures; thus the chlorides or nitrates of cobalt, nickel, manganese, zinc and copper are completely decomposed by the carbonates of lime, barytes and magnesia, but only at a temperature above 60°. Copper and zinc are the first precipitated, cobalt and nickel next, and manganese the last; but this circumstance cannot be taken advantage of to separate these metals from each other.

Journ. de Pharm.

MINUTES

OF THE

Philadelphia College of Pharmacy.

Sept. 30, 1834. The Society went into an election for Trustees in place of those whose term of service was about to expire, and the tellers reported that the following were duly elected:

C. E. Pleasants, F. R. Smith, Jos. Scattergood, Jos. C. Turnpenny, Jacob Bigonet, P. Lehman, W. Hodgson, Jr. and S. F. Troth.

The resignation of Edward Townsend was received and read.

F. R. Smith presented a specimen of oil of camphor from India, which was ordered to be placed in the collection of the College.

Oct. 28. The committee on Latin labels made a report, when after discussion, the subject was referred back to them with power to act.

The committee on Patent Medicines was discharged and a new committee appointed, with instructions to inquire into the expediency of having new directions for patent medicines prepared, expunging such parts of the old English directions now in use, as may be exceptionable.

Nov. 25. The Board of Trustees reported the election of Thomas J. Husband and Stephen Proctor as resident members.

The committee on Latin labels made a report recommending the same, and stating that T. K. Collins & Co. have undertaken to print and publish them on their own account; to be executed with great neatness on coloured paper, there being three distinct sizes of labels, and not less than 1000 in each book. The committee also recommend the passage of the following resolution:

That the book of Latin labels about to be published by T. K. Collins & Co., being in accordance with the nomenclature of the revised edition of the U. S. Pharmacopœia of 1830, published in Philadelphia, and with other standard authorities, be recommended to the Druggists, Apothecaries and Physicians of the United States as correct.

A communication on the Fluid extract of Senna by Charles Ellis, was read and referred to the Publication Committee.

Dec. 30. The Board of Trustees reported the election of John Bringhurst as a resident member.

Dr. F. Bache, Dr. G. B. Wood and W. Hodgson Jr., were added to the committee on Latin labels, to assist in their revision and insure their correctness.

An improved minim measure was presented to the College by Robert Alsop of London, a foreign associate member, through W. Hodgson Jr. This measure, the invention of the donor, is a cylindrical tube five or six inches in length, and about one-fourth of an inch in diameter, tapering toward the lower end to a fine point. It is accurately graduated from one minim up, and fitted inside with a piston, by the elevation of which a certain quantity of air is displaced, and any number of minims of the fluid may be accurately measured, at

the same time that a volume of air, intervening between the piston and the fluid, prevents any contact of the two.

Dr. F. Bache read an extract of a letter from Dr. Turner of London, in which he stated that a prospect existed of the speedy adoption of a National Pharmacopœia in Great Britain and Ireland, to replace the three, of London, Edinburg, and Dublin, now in use.

Jan. 27, 1835. The resignation of W. Hodgson Jr. as a trustee was read and accepted, and an election held to supply the vacancy thus occasioned, when Charles Schæffer Jr. was duly chosen.

Feb. 24. The committee on Latin labels reported progress and were continued, and Warder Morris added to said committee.

March 31. The Board of Trustees reported that the degree of Graduate in Pharmacy had been conferred on the following candidates, they having complied with the requisitions of the College:—Isaac J. Martin, Richard Price, Ambrose Smith, William R. Kitchen, Charles S. Shreeve, C. J. Lee, Jonathan Evans Jr., James Hopkins, A. Olmstead and James Cockburn Jr.

The committee on Latin labels reported progress and are continued.

The Publication Committee made a report, which, after detailing their financial operations, went on to say:

Since the commencement of this publication, it will be perceived by a reference to the annual reports, that the number of subscribers has been much smaller than could have been expected, and the amount of money received has been barely sufficient to meet the necessary expenses. It must also be obvious, that with very few exceptions the original papers

have been furnished by individuals resident in Philadelphia, so that notwithstanding this is the only Journal in the United States exclusively devoted to pharmaceutic and chemical researches, such has been the apathy or unwillingness of members of our profession in other cities to contribute to its pages, that your committee are obliged to rely almost entirely on home materials.

This state of things, in the opinion of your committee, has in a great measure arisen from the following causes: The title of the publication is local, thus preventing many from contributing to its pages, and making it the record of their observations and experience, from a belief that they were reserved solely for members of the College. That this is the case is corroborated by the fact that with very few exceptions, no original paper has been obtained from foreign sources, or from individuals not members of the College, except at the personal solicitation of the committee. In support of the view your committee have taken of the subject, they would cite the example of the *Journal de Pharmacie;* this well known publication was originally placed in the same circumstances as our own Journal, being for some years, from 1809 to 1815, published under the title of the *Bulletin des Travaux de la Societé de Pharmacie de Paris,* but it was found that it could not be properly supported under so exclusive a designation, wherefore the name and plan of the work were changed and placed on a more liberal and extended footing, though it still remains under the guidance of the Society.

Your committee beg leave to propose the following resolutions:

1. That the title of the Journal of the Philadelphia College of Pharmacy, be changed to that of the American Journal of Pharmacy, published by authority of the Philadelphia College of Pharmacy &c.

2. That the number of the Publishing Committee be increased to ten.

3. That the Publishing Committee be authorised to appoint correspondents in different parts of the United States, whose names shall be published in conjunction with those of the Publishing Committee, on the cover of each number.

The report of the committee and the accompanying resolutions were adopted.

The committee on Patent Medicines made a report, highly disapproving of the printed directions which now accompany those patent medicines which have been recognized by the College, and for which scientific formulæ have been published, and recommending the adoption of more proper and suitable directions.

On which it was resolved, that the subject be referred to a committee who are requested to report such directions to accompany the patent medicines recognized by the College, as shall in their judgment be more proper and suitable than those now in use.

E. Durand presented a series of translations by A. Duhamel, from the *Journal de Chimie Medicale*, which were referred to the Publishing Committee.

The society then went into the annual election for officers, when the tellers reported the following as duly chosen:

President—D. B. Smith.

Vice Presidents—Henry Troth, S. Jackson, M. D.

Recording Secretary—Charles Ellis.

Corresponding Secretary—Elias Durand.

Treasurer—Edward B. Garrigues.

Trustees—Warder Morris, Edward Needles, Edward Roberts, John C. Allen, Charles Dingee, Stephen Proctor, Thomas H. Powers and Richard M. Reeve.

Publishing Committee—D. B. Smith, G. B. Wood, M. D., F. Bache, M. D., Charles Ellis, Joseph Scattergood, John C. Allen, William Hodgson, jr., Elias Durand, Dillwyn Parrish and R. E. Griffith, M. D.

Miscellany.

Sulphate of Quinine.—M. M. Pelletier and Desprez have patented the following improvements in manufacturing sulphate of quinine. Their principal object is the production of sulphate of quinine by means of distilled or expressed oils, whether derived from vegetable, animal, or mineral substances, and without the aid of alcohol. Where a distilled oil is intended to be used, the bark having been treated by acids, and having precipitated the quinine and the other soluble matter by means of lime, in the usual method, the calcareous precipitate is to be dried and reduced to a fine powder; it is then to be treated several times, say seven or eight, with the oil intended to be used; and from experience, oil of turpentine has been found to answer best. The oil is then to be separated by decantation or filtration. When expressed oil is used, care must be taken that the lime be all extracted, otherwise an insoluble soap of lime would be formed. The precipitate must then be dissolved in an acid, and the rough quinine precipitated by ammonia; when in this state it must be treated with oil several times, which will dissolve the quinine, and separate it from all foreign bodies. After thus obtaining the quinine in solution, the oil is to be treated with water acidulated with any acid capable of forming a soluble salt with the quinine, (hydrochloric is the best,) the acidulated water separates the quinine from the oil, the separation being easily effected by decantation, as the two liquids having different specific gravities, will not unite. The quinine thus dissolved is to be precipitated by an alkali, and afterwards formed into a sulphate by the addition of sulphuric acid, having been previously whitened by animal charcoal. *Repert. of Arts.*

Cyanide of Gold. M. O. Figuier, of Montpelier, has lately made some interesting remarks on the cyanide of gold. To obtain it, he decomposes the chloride of gold with the cyanide of potassium, as has been recommended by others; but he states that many precautions are necessary to procure it in a pure state. The chloride must be as neutral as possible, which can only be done by recrystallizing this salt several times. The cyanide must not be alkaline, or contain any formiate or carbonate of potash. This salt is to be added to the solution of the chloride of gold very cautiously, as long as there is any precipitate, taking care that there

is not the slightest excess of the cyanide, as this would cause a solution of part of the product, and the formation of soluble double cyanides. The cyanide thus made, is to be well washed with pure water, and dried in a dark place. M. Pourche, who has used it successfully in syphilis and scrofula, recommends its administration in the form of frictions on the ongue, mixed with powdered orris root, well washed in alcohol and dried :

Cyanide of gold,	gr. i.
Powdered orris root,	gr. iij.

In pills, he prescribes :

Cyanide of gold,	gr. i.
Ext. Mezereon	gr. iij.
Powdered Mallows,	q.s.

for pills of five grains.

In children, the dose at first should never exceed one-fifteenth of a grain. *Journ. de Pharm.*

Combinations and properties of Zinc. Besides the different metals that have been long since known to exist in the zinc of commerce, M. Schindler has recognized in it the presence of uranium, and of a combination of carbon with zinc. Both are found in the blackish residue obtained by the solution of zinc in sulphuric acid; uranium, however, in small quantity, one grain from two pounds of zinc. It is to the presence of the carburet that the odour always possessed by hydrogen obtained from commercial zinc, is to be attributed. M. Schindler attributes the yellow colour, which the oxide of zinc obtained by calcination almost always displays, not to iron, as is generally supposed, but to the presence of a new metal, which he has not been able to separate. Although oxide of zinc is readily soluble in a solution of potash, it is with difficulty, and only in small quantity, dissolved by aqua ammonia; the presence of an arseniate or a phosphate even in very small quantity, enables water of ammonia to dissolve it in considerable proportion. Ammonia cannot be said to precipitate oxide of zinc, as the oxide retains a quantity of the alkali, which cannot be separated without great difficulty, and which attracts carbonic acid.

He has obtained a hydrate of the oxide of zinc in small rhombohedral crystals, by plunging into water of ammonia, iron and zinc, connected together. A very abundant disengagement of hydrogen takes place, and the crystals are deposited on the sides of the vessel and on the zinc; they are very brilliant, and on the application of heat are converted into an anhydrous oxide; they are composed of one atom of oxide and one of water. The hydrated sulphuret of zinc can be obtained in small crystals, composed of one atom of sulphuret, + one atom of water; heat

separates but one-half of the water, the remainder cannot be disengaged until the sulphuret is decomposed. The common sulphate of zinc contains, according to M. Schindler, seven atoms of water, not five, as generally supposed.

Besides these different bodies, he has described three basic sulphates of zinc. The first, the *Sulphas bizincicus*, is soluble, uncrystallizable and very easily decomposed. The second, *Sulphas quadri-zincicus*, cannot be obtained in an anhydrous form; it is crystallizable, and scarcely soluble in water. Treated at a temperature of 80° or 100° R., it loses a portion of its water, and its composition corresponds then to a salt hitherto considered to contain three atoms of oxide. The third of these salts contains eight times as much base as the neutral salt, and is insoluble in water. Heated strongly, it is decomposed into pure oxide of zinc and neutral sulphate, in consequence of the loss of the water necessary to its composition. *Arcana of Science and Archiv. der Apot.*

Purification of Palm Oil. Take two parts of quick lime, and three parts of muriate of ammonia, the lime having been previously slacked with half its weight of water, and allowed to cool, and reduced to a fine powder, and then intimately blended with the powdered lime. The mixture is to be put into a still or cast iron pan, having a close cover, and a tube leading from the head of the pan or still, to near the bottom of the soap copper, which should contain equal quantities of water and palm oil. On fire being applied to the still, the ammoniacal gas will pass over into the soap copper; and as the water and oil combine, continue adding boiling water to the extent of treble the weight of the palm oil in all. By this process, the colour of the palm oil will be almost instantaneously changed to a pale yellow. The boiling palm oil and water should of course be rapidly stirred while the gas is passing through. The ammonia being an alkali, adds to the strength and detergency of the soap. *Journ. Frank. Inst. and Lond. Mech. Mag.*

New principle in Cloves. M. Bonastre has discovered a new crystalline substance in cloves, and which he calls *Eugenine*. This substance is formed in a certain time in water which has been distilled over cloves, and has become strongly impregnated with their soluble principles. It crystallizes in thin, white, pearly, transparent tables; by exposure to the air it becomes somewhat yellow. Alcohol and sulphuric ether dissolve this substance in all proportions. It has but little taste, and its smell is much weaker than that of cloves. It becomes of a vivid blood red colour on the addition of cold nitric acid, in this particular resembling the oil of cloves. From the analysis of M. Dumas, it appears to differ from oil of cloves only in the loss of an atom of water. It differs from caryophylline in its crystalline form, its solubility, &c. *Journ. de Pharm.*

New Sarsaparilla. M. Virey describes a new kind of sarsaparilla, which had been imported into France from the island of Bourbon. It consists of long, slender, root-like stems, of an ash gray colour, with the epidermis very slightly adherent. The wood or medullary portion is of the thickness of a quill; some stems, however, are as thick as the finger, the epidermis of these is brown externally, and reddish or orange coloured within. This substance has very little taste. M. Virey is of opinion that although it has many points of resemblance to the sarmentose smilax of the Philippine islands, that it is not identical with it, but seems inclined to believe that it may prove to be the product of the S. *borbonica*, which is used in many parts of the east as a remedy in syphilitic affections. *Journ. de Pharm.*

Syrup of Pomegranate Root. M. Dublanc, of Troyes, found that cold water took up a much larger proportion of the extractive principles of the bark of the pomegranate root than when this fluid was used in a boiling state, in which latter case the product was thick, turbid and partly insoluble; by means of a rapid evaporation of a cold infusion of pomegranate root, he obtained from two ounces of this substance, (the usual dose for an adult,) a dry extract, in translucent scales, this was somewhat bitter, and a little astringent, and generally weighed about 4 drachms, or $\frac{1}{4}$ of the weight of bark used. Wishing afterwards to concentrate the greatest quantity of extract in the least possible proportion of water, without heat, and by immediate concentration, he submitted five or six different portions of the root, each weighing as above, to the action of the same water, using the method of displacement proposed by M. M. Boullay. The liquid thus obtained, marked 15° of the areometer for syrups, it was perfectly transparent, and remained so for a long time; this furnished him in a few moments, by a rapid evaporation, fifty per cent. of dry extract. He therefore thought that this infusion at 15°, presented the active portions of the remedy in a concentrated and unaltered state. He prepared with it the following syrup:

Infusion of pomegranate root at 15°
White sugar, *aa*

The sugar is to be melted in the liquid by means of a water bath, strained and kept for use. This syrup contains a fourth of its weight of active principles, and four ounces, for example, correspond to two ounces of the root. *Journ. de Pharm.*

Amalgam of Platinum. Muschin Pushkin describes an easy method of forming this amalgam. It may be more conveniently and quickly formed, says Professor Mather, by heating the chloriodide of platinum with mercury in a tube. The iodine and chlorine combine with mercury

and sublime, while the platinum, in its nascent state, combines with mercury and remains at the bottom. The heat should be high enough to make the mercury boil. The amalgam, after having been pressed in soft leather, to remove the excess of mercury, is a soft solid, having the same kind of feel, and emitting the same sound when pressed between the fingers, as the amalgams of gold and silver. It is several times heavier than the platinum of which it was formed.

Amer. Journ. Sci. and Arts.

Creosote. M. Calderini of Milan, has given the following process for preparing creosote. The essential oil obtained by the destructive distillation of wood, is to be put into an iron vessel, and exposed to a gentle heat. The vessel is then to be taken from the fire, and slaked and sifted lime to be added gradually, and the mixture constantly stirred until the effervescence ceases, and the whole becomes a hard mass, which is to be allowed to cool, and then powdered. A cast iron retort is to be two-thirds filled with this powder and placed in a reverberatory furnace. A receiver is to be fitted to the retort at the moment when the white fumes which first come over, become yellowish. The distilled liquor is to be placed in a filter of paper moistened with water to permit only the aqueous part to pass, and the oil left is to be washed with pure water, which is to be allowed to filter. The oil, thus washed, is to be placed in an iron vessel, and aqua potassæ of specific gravity 1.125, is to be added in the proportion of three parts to two of the oil. The mixture is then to be boiled for a moment with a gentle heat, after which it is to be taken from the fire, allowed to cool, filtered, and mixed with dilute sulphuric acid, till it becomes slightly acid. The mixture is then to be left at rest, and an oily matter will be found floating on the top, which is impure creosote. This is to be collected, washed on a filter, put into a glass retort, placed in a sand bath, and distilled. The first portion is to be set aside, and what comes over afterwards, of a pale yellow colour, is creosote. The distillation is to be stopped when the drops become of a deeper colour. If the distilled creosote be not sufficiently pure, it is to be dissolved in acqua potassæ, and treated as before, always rejecting the first and last parts that come over, and this process is to be repeated until it becomes perfectly pure. When the creosote is obtained pure it is to be kept in well stopped bottles. It is known to be pure when it is colourless, transparent, and of a specific gravity of 1.037, and possessed of great refrangibility. *Edinburg Medical and Surgical Journal.*

Action of Potash on Organic Substances. From the experiments of Gay Lussac, it appears that a great variety of vegetable and animal substances treated with caustic potash or soda, at a temperature much below redness,

are transformed into oxalic acid, and at a higher heat, into carbonic acid. This is the case with sawdust, cotton, starch, gum, tartaric, citric and malic acids, silk &c. Some vegetable substances give out hydrogen and carbonic acid at the same time; and animal bodies, in addition to these two, afford ammonia and cyanogen. It is remarkable, that tartaric acid disengages scarcely any hydrogen, and does not become blackened. Tartar may be transformed into oxalate of potash by a very simple process; this consists in dissolving the tartar in water, with a suitable quantity of potash or soda, and forcing the solution by means of a pump, into a thick tube of iron or brass, heated to 400° F. The pressure would be but about twenty-five atmospheres, as no gas is disengaged.

Ann. de Chim.

Cause of Crystallization. M. Gaudin, in his investigations on the properties of atoms, has been led to some interesting conclusions. According to him, those bodies crystallizing in a cube have for their primitive molecule a point or right line; either an atom, as in metals; two dissimilar atoms, as in sulphuret of lead; three atoms, one of one kind, and two of another, as chloride of sodium; again, those molecules having for their form a double simple pyramid, or a prism of a number of sides, which are a multiple of forms, may be assimilated to points, when under different circumstances they form in groups around an accidental nucleus, and in this way sometimes crystallize in cubes. Those bodies whose cleavage gives a *right* prism, with any base whatever, have for their primitive molecule, either the polygon of the base, or a double simple pyramid, or a prism of a number of sides, equal or double. When the primitive prism is not cleavable perpendicularly at the axis, it is because the molecules are polarized, that is, retained together either by an electric force, or by the force of affinity. The tetrahædron, octahædron and rhomboihædron, have respectively for their primitive molecule, the first a square, or a rhomb, the second a double tetrahædral or octahædral pyramid, either simple or with an intervening prism, and the third a double hexahædral pyramid of the same nature. Finally, the absence of cleavage in these bodies is owing to want of continuity of the molecules. But in the tetrahædron, the want of continuity depends solely on the state of polarization, whilst in the octahædron and rhombohædron, it results from the aggregation of the molecules. *Journ. de Chim. Med.*

Citrate of Quinine. Dr. Galvani gives the following process as affording a pure article. One part of sulphate of quinine is to be dissolved in forty parts of pure boiling water, and acidulated citrate of soda, added gradually to the solution; at first litmus paper is not reddened by the liquor, but on the addition of more of the citrate, that paper is changed to

a red colour, which is a sign that the decomposition has been perfectly effected, and that citrate of quinine is formed. The liquor is to be filtered while near boiling, and on cooling, the salt crystallizes; at the end of six hours, the crystals are to be separated from the mother liquor, drained and washed with a little distilled water, and pressed. They may be dried between folds of bibulous paper, and pressed. On evaporating the mother water, more crystals are formed, and the whole of the salt thus obtained. *Annali Univer. di Med.*

White Agaric. M. Andral has found that the white agaric, (*Boletus laricis,*) is capable of checking the night sweats in consumptive patients. He uses it at first in doses of 8 grains, made into pills; then increasing to 48 or 60 grains a day, without any sensible derangement of the digestive functions being produced. *Journ. de Pharm.*

Mastich for carious teeth. Various articles have been used to fill the cavities of carious teeth, as resinous, balsamic or saline compositions, the fusible alloy of Darcet, and leaves of various metals, as gold, silver, lead &c. But all these are sometimes insufficient or impracticable, where the tooth is much decayed, or the nerve is exposed. In the first case, the filling employed is liable to fall out; in the second, proper force cannot be applied, on account of the pain. In such circumstances the following compound has been found useful:

Mastich,	4 parts,
Sulphuric ether,	1 part.

The solution of the resin is readily effected, without the assistance of heat, in a well closed vessel; the result is a liquid of a lemon yellow colour, of an oily consistence, which on exposure to the air becomes of the consistence of pitch, and at last quite friable, but softening by a moderate degree of heat. To employ it, a small dossil of cotton, of a size to fill the cavity of the tooth, is to be saturated with the liquid, and introduced into the decayed tooth. By the heat of the mouth, the ether is soon dissipated, and the remaining resin adheres firmly to the tooth; this resin remains sufficiently soft not to be detached in scales or fragments, and completely protects the interior of the tooth from the action of the air, and the introduction of fragments of food.

Journ. de Pharm.

Prussian blue. Mr. G. Lowe, of London, has taken out a patent for making Prussian blue from the refuse of coal gas works. To produce a pure blue, he directs one ounce of sulphate of iron in solution, to be well mixed with one gallon of the ammoniacal liquor of a specific gravity of 1.031. To the mixture is then to be added fourteen ounces of sulphuric

acid of a specific gravity of 1.850. A precipitate of Prussian blue will be formed of good quality.

Where an impure blue is wanted, an ounce and a half of a solution of sulphate of iron is to be mixed with a gallon of the lime water with which the gas has been purified. Fourteen ounces of sulphuric acid then to be added, a precipitate will form consisting of Prussian blue, combined with sulphate of lime. *Repert. of Arts.*

Colouring principle of Cornelian. From the observations of Dufay, and the experiments of M. de Claubray, it appears that the colouring matter of the cornelian is not an oxide of iron, but of an organic nature. The latter chemist found that when powdered cornelians were mixed with black oxide of copper, in a porcelain retort, and heated to redness, carbonic oxide and carbonic acid were disengaged, and hydro-acetic acid and a pyrogenous oil were formed. *Annal. de Chim.*

Crystallized Tin from Solution. Professor Mather states that having occasion to form a solution of muriate of tin, some muriatic acid was poured upon an excess of spongy grain tin. The solution was formed on the sand bath, and it was so concentrated as to be oily in its consistence. The solution being more concentrated than was desired, it was diluted and allowed to stand on the sand bath, exposed to the air. In a short time the undissolved tin was observed to be coated with crystals of metallic tin. Some of the crystals were small and granular, having many facets; some were long acicular prisms, and others were in foliated plates and plumose, like the precipitated lead of the *arbor saturni*. One of the acicular crystals, of the diameter of a horsehair, was mounted on the reflective goniometer. It had four brilliant planes, giving distinct reflected images, and each face inclined to the adjacent ones at angles of 90°. The experiment of crystallizing tin was repeated many times with the same result, using not only the spongy, but also the columnar grain tin. In the latter, the acid dissolved a crystalline structure, and probably it is owing to this crystalline structure that tin emits a peculiar crackling noise when bent.

If the solution containing the crystals of tin be set aside in a cool place, for twenty-four hours, they redissolve. The concentrated solution, when set aside until cool, and then diluted with water, will also vegetate, but the crystals form more slowly than when the *hot* solution is diluted. The crystallization can be shown before a class in the lecture room, and it is more beautiful than that of the *arbor Dianæ*.

Amer. Journ. Sci. and Arts.

THE

AMERICAN JOURNAL

OF

PHARMACY.

JULY, 1835.

Original Communications.

ART. XXIII.—ADDRESS DELIVERED BEFORE THE GRADUATES OF THE PHILADELPHIA COLLEGE OF PHARMACY, APRIL 27, 1835. By FRANKLIN BACHE, M. D., Professor of Chemistry in the College.

GENTLEMEN, GRADUATES ELECT OF THE COLLEGE OF PHARMACY—I have been invited by the Committee of Arrangement, to address you on this interesting occasion. I regret that their choice did not fall on one more competent than myself, and whose leisure might afford the necessary time to do ample justice to the topics which may be appropriately presented for your consideration.

You are now about to commence a most arduous and responsible profession, after regular studies and due preparation. The knowledge which you have gained in this institution, and under your private preceptors, is now to be brought practically into play. You are about to undertake new and important duties, having relation both to yourselves and your fellow men, and to claim, in a new sphere of action, the enjoyment of certain professional rights. A few cursory observations on the nature of these duties, and the extent of those rights, may properly engage our attention on the present occasion.

The duties of the members of the pharmaceutical profession,

like those of the medical, relate to some of the most precious interests and concerns of the community. The restoration of health under the favour of heaven, the assuaging of pain, and the snatching of some beloved object from the danger and perils of disease, are alike the object of both professions; of the medical, in devising the means, of the pharmaceutical, in preparing those means with intelligence and conscientious accuracy.

The qualifications which should be possessed by the pharmaceutist, about to enter upon the practical performance of the duties of his profession, are of two kinds. First, sufficient knowledge to enable him to perform his duties aright; and secondly, that proper tone of moral feeling which will prompt him, knowing his duty, to perform it with conscientious fidelity. I shall venture to detain you for a short time, while I make a few remarks under each of these heads.

The knowledge necessary to the scientific apothecary is certainly very extensive; and hence it is requisite to assist his progress by systematic instruction from lectures, at the same time that he is attending to those practical duties which he performs in the service of his immediate preceptor. The want felt for such systematic instruction was the chief impelling motive which actuated those public spirited individuals who founded this College. Through the wise foresight, and enlarged views of your elder brethren of the profession, you have enjoyed the advantages of the instruction imparted in these halls, advantages which they themselves did not possess. Having complied with the rules of this College, you have now finished your elementary course. You have been found, on due examination, sufficiently instructed in the sciences connected with your profession, and have furnished the necessary testimonials to prove that you have gone through a regular course of practical duties, under the instruction of some established apothecary or druggist. Regularly instructed, therefore, in your arduous profession, you are this evening to receive its honours, and to hold that diploma from a chartered institution, which is to form the evidence of your successful studies, and to constitute the only proper basis of public confidence.

Being now deemed fit to enter into business for yourselves as graduates of pharmacy and master apothecaries, I need hardly guard you against forming any vain estimate of the sufficiency of your present knowledge, which would lead you to discontinue your studies. You are all aware, no doubt, that, in this College, you have been enabled to lay the foundation only of pharmaceutical science; and on that foundation, it is incumbent on you to raise the superstructure of diversified knowledge, if you wish to attain eminence and wealth. As apothecaries, therefore, in business, you must still continue to be students,—students indeed to the end of your lives.

If I may venture to throw out a few suggestions on the subject of the future prosecution of your studies, I would recommend to you to continue assiduously to cultivate the sciences of Chemistry and Botany. Even supposing your present proficiency in chemistry to be highly respectable, still, to keep pace merely with the discoveries in this science, requires that the chemist should be unceasingly a student. Botany also is a science which is constantly enlarging, and, as forming the key to the proper understanding of the vegetable Materia Medica, is of the highest importance. Works on these and other sciences, bearing more or less on pharmacy, should be constantly in course of perusal, to occupy profitably those spare hours which the wasteful of time are so apt to throw away. Besides a course of reading on these sciences, chemistry may be pursued by experimental researches, and botany, by excursions into the country, with a view to the recognition and investigation of our native plants.

As a key to the acquisition of the stores of knowledge accumulated in other countries in relation to his profession, the ambitious pharmaceutist will pay attention to foreign languages, in addition to the Latin, which is essential to the accurate comprehension of prescriptions. To this end, his first attention should be directed to the French, as being the most useful of modern languages. Next to it, the German deserves to be studied, as the language in which are written the most elaborate and extensive treatises on pharmacy. The study of these languages will form a delightful occupation for that leisure time which most professional young men, at the com-

mencement of their business, are apt to have upon their hands. After some facility in reading has been attained, further improvement may be made by reading pharmaceutical works in the respective languages; and thus important pharmaceutical knowledge and highly useful foreign languages may be acquired at the same time.

In accomplishing yourselves for the pharmaceutical profession, more particularly in case you should engage in the business of importing druggists, it will be incumbent on you to enlarge your knowledge as to the geographical sources and commercial history of drugs. Here then is required of you those diversified attainments which distinguish the enlightened merchant.

Lord Bacon has somewhere remarked, that every gentleman who engages in the exercise of a profession, enters into a tacit agreement with his brethren to maintain its honour and dignity, and to endeavor to improve it by new observations and discoveries. That you will maintain the ethical principles connected with your profession, and even raise their standard, I will not allow myself to doubt; but what I here wish particularly to call your attention to, is the obligation which you are all under, of exerting yourselves to enlarge the boundaries of your profession, by adding to it important facts and observations. You have received the pharmaceutic art, enriched with numerous discoveries, the result of the joint labours of those men who have adorned your profession, or distinguished themselves in the sciences subsidiary to it. How are you to repay the advantages which you have derived from this rich inheritance of knowledge, prepared to your hands? I answer, by assiduously adding to it, and by transmitting it to your successors, still richer and more valuable than you received it. In this way only can the debt of gratitude which you owe to your predecessors be repaid.

For entering upon this honourable career of investigation, with reference to improvements and discoveries connected with your profession, our own country presents several advantages. Our plants have as yet been but imperfectly investigated, with reference to their medicinal virtues. Many of them may possess peculiar active properties, not now sus-

pected, which may be advantageously brought to bear in the cure of diseases, in the hands of skilful physicians. Our native botany, therefore, forms a field, as yet but imperfectly explored, and which, when properly cultivated, will yield a harvest of important discoveries. Connected with the discovery of native plants, will be afforded the opportunity of investigating them chemically, with a view to separate their active principles, and thus to prepare them most advantageously for the use of the physician. Here then are incentives to exertion which might arouse the most indifferent, and opportunities for distinction which are not enjoyed in Europe, where the botany and chemistry of the indigenous plants have been so thoroughly investigated as to leave far less to be accomplished than with us.

I now dismiss my remarks on the subject of the obligation, which you are all under, of continuing still to improve yourselves in your profession, and of exerting your abilities to add something of importance to the stock of its knowledge; whereby you may honourably connect your name with the pharmaceutical art for all future time. Passing from these topics, I shall next make a few remarks on some ethical points connected with your profession, which may not be out of place in the present address.

The physician has the good fortune to possess a classical work on medical ethics, written by one of the brightest ornaments of the medical profession in Great Britain. It is to be regretted, that as yet we possess no similar treatise, expressly written on pharmaceutical ethics. This desideratum is yet to be supplied, and from the want of the assistance of such a work, the remarks which I may here make will necessarily be very imperfect.

The professions of medicine and pharmacy should carefully avoid invading the province of each other. In all well organized communities, the professions are in different hands; and while the physician should not exercise pharmacy, apothecaries should carefully avoid prescribing for diseases. In country situations, however, the physician is compelled to perform some of the simpler operations of pharmacy; and

his medical education, by including chemistry, botany, and materia medica, justifies him in this course. The pharmaceutical graduate, even though he may be in a country situation, is not deemed justifiable in practising medicine; because, in connection with the pharmaceutical branches of of his education, he has not studied anatomy, surgery, and the practice of medicine; subjects essential to be known by the humblest practitioner.

In all cities and large towns, the two professions, though kindred, should be held as perfectly distinct, and the practitioners of each should disdain to encroach on the domain of the other, feeling a just pride that their respective professions are sufficiently honourable to satisfy any laudable ambition for distinction, and sufficiently elevated in their objects, and in the character of the diversified attainments necessary for their successful pursuit, to form the exclusive objects of study of the most gifted intellects.

The legitimate objects of the pharmaceutical profession are chiefly two; first, to keep and accurately dispense all the officinal and standard medicines and preparations; and, secondly, to improve the mode of preparing articles of the materia medica, by the aid of the lights of practical pharmacy and chemistry.

The dispensing of medicines on pharmaceutical principles is, for the most part, accomplished in fulfilling the prescriptions of regular physicians. Many medicines, however, are necessarily disposed of independently of prescriptions; and when the sales are restrained by proper limitations, the course is perfectly justifiable. Thus the dispensing of simple medicines to the public at large, on their own requisition, could not be declined without interfering with that reasonable freedom of action which belongs to all persons. But the question assumes a different aspect when it relates to very active and poisonous preparations. To sell laudanum, prussic acid, corrosive sublimate, arsenic, and other dangerous substances in poisonous quantities, to whomsoever may apply for them, may cause deplorable mischief,—not merely great suffering and danger, but the loss of life itself. The conscientious

apothecary will take care how he makes himself accessary, however unintentionally, to the criminal purposes of the wicked or wretched, or to the disastrous mistakes of the ignorant. In many countries, the vending of these dangerous medicines is regulated by law; but in the absence of all legal provision with us to regulate the pharmaceutist in this respect, it will be proper for him to adopt the rule not to dispense any poisonous medicine, unless on the prescription of a regular physician, or on the written order of some responsible head of a family.

In recommending to the apothecary, as a legitimate object, to endeavour to improve the mode of preparing various medicines, I do not mean that he should attempt to fit them as *cures* for this or that disease; for to effect this would be impossible. But an article of the materia medica may not be prepared on strict chemical or pharmaceutical principles. Careful experiment and observation may show that the active part of a medicine is injured or destroyed by the ordinary mode of preparation; that inert matters are uselessly retained, instead of being excluded; that a wrong or injudicious solvent is employed, or, finally, that those expedients which may be properly resorted to, to cover the taste or to lessen the bulk of the medicine, have been neglected. When errors of preparation such as these, not to mention others, occur, it is the legitimate province of the pharmaceutist to correct them, and to present the active parts of a medicine in the most favourable state for administration by the physician. But he is not to go further, and experiment with it in different diseases, and then announce to the public at large, that it is a remedy for whooping-cough, for ague, or for any other disease. To do so would be doubly wrong,—intrinsically wrong, because it is impossible that any medicine, in itself, can be a cure for any disease; and professionally wrong, because it does not belong to the pharmaceutist to investigate the remedial virtues of different medicines. An individual thus attempting to exercise the professions both of apothecary and physician, gives proof not of the extent of his attainments, but rather of his presumption.

You perceive, gentlemen, that I make a distinction between improving the preparation of medicines on true pharmaceutical principles, and their investigation as curative agents. The former is the legitimate province of the pharmaceutist, the latter of the physician. It is impossible for the pharmaceutist, the physician, or any one else, to prepare a REMEDY; that is, a SOMETHING, which shall be such intrinsically, or in its own nature. By a remedy, I understand a medicine, which administered at a fitting time, in a proper dose, and under fitting circumstances, restores health, or promotes its restoration. Under this definition, every medicinal preparation is a remedy or the contrary, according as it is judiciously or injudiciously employed. I defy, therefore, the pharmaceutist, though bringing to the task the greatest skill, to prepare a single remedy. He may prepare a medicine, containing its admitted activity, in a convenient, permament, and invariable form; but after all, it may be an instrument for good or for ill, a remedy or the contrary, according to the use which may be made of it afterwards. Skill may make it the greatest of blessings; ignorance and presumption, a curse worse than famine or the sword.

Thus you perceive, gentlemen, that nothing but the skilful and appropriate application of medicinal agents constitutes them remedies. You may make scientific preparations; but you would require to be skilful physicians, and to apply these preparations skilfully, to make them remedies.

A crude idea is entertained by the ignorant that every distinct disease is an invariable something; and hence if they imagine they have noticed a particular medicine to cure a particular case of disease, they make a sweeping conclusion, that every indisposition which is called by the same name, must necessarily be cured by the same medicine. Such people justify themselves on the plea that they go on the safe road of *experience*; but, permit me to add, it is an irrational experience, not founded on enlightened views of disease. They little imagine that two cases of sickness, though in common parlance called the same disease, may differ widely in their character, and may require remedies not only different, but

diametrically opposite in their nature. A blind reliance on experience, without sufficient intelligence to appreciate its character and bearing, is called in modern acceptation *empiricism.* This word, according to its etymology, denotes a dependence on experience; and when experience is *ju tly* appreciated, and those analogies are *carefully* traced, by the light of which alone experience can be made available, then is such dependence on experience proper. But the term by modern usage is always taken in the sinister sense, of experience *falsely* appreciated, and *irrationally* applied; in other words, it is made synonymous with *quackery.*

Empiricism or quackery, as here explained, may be entirely the result of ignorance and its usual concomitant presumption; and the measures which it pursues do not necessarily imply moral turpitude. It is far otherwise, however, when an individual professes to depend upon experience which he knows to be ill-founded, and to rest upon analogies, which he is sensible all the while are fallacious. Here empiricism becomes charlatanry, and the ignorant but well-meaning pretender is converted into the crafty mountebank.

I trust I have said enough, gentlemen, to convince you that empiricism ought to be discountenanced by the pharmaceutical and medical professions, as a blot upon their callings, and as the cause of a vast amount of suffering to the community. According to the views which I have taken, no medicinal agents should be presented by either profession to popular attention as remedies for this or that disease; as doing so is equivalent to inviting ignorant individuals to quack on their own persons, or on those of their friends and neighbors. However boldly they may be called remedies, they cannot be such unless judiciously applied; and I am sure that no one will have the hardihood to assert, that the people at large can be taught the practice of medicine in a newspaper advertisement or a handbill.

As connected with the ethical principles of your profession, I have been led to notice empiricism as a fruitful source of involuntary error in professional conduct, if not of compromise between moral rectitude and self-interest. But to

give a full analysis of empiricism, to exhibit to you separately, all the ignoble elements which enter into its composition, would be a task far beyond my analytic powers.

The essential element in empiricism is the presenting of medicinal agents to popular attention as remedies in particular diseases, or classes of diseases. But it presents different cases, according to the circumstances under which the medicine may be brought before the public. The *first* case is where some well known medicine, or combination of medicines, is presented to public favour, with an artful introduction, setting forth that it possesses such and such remedial powers; as, for instance, that it will purify the blood, allay irritation, strengthen the nerves &c. &c. The advertiser may not, in this case, reap all the profits which the sale of the medicine may produce; but the amount of harm which the popular appeal will cause, will not be lessened thereby; for this will be precisely in proportion to the number of blunders which it may induce individuals to commit in applying the remedy to themselves. In the case here supposed, it matters not whether the medicine is popularly known under the name of some physician, either living or deceased: it may even be a medicine prepared on correct pharmaceutical principles; still the objection remains, which is not to the medicine intrinsically, but to the *craft* of asking the public at large to become their own doctors.

A *second* case of empiricism is where a combination is prepared by some physician or apothecary, and, though the *receipt* by which it is made is not exactly known, its *ingredients* are mentioned to both professions, or perhaps the proportions are communicated confidentially to a few physicians, to remove their scruples to its use. Now I am willing to suppose that such a combination may be made on correct pharmaceutical principles; that it is active, without being dangerous from the minuteness of its dose. I am ready to admit, moreover, that in skilful hands it would prove a remedy. But in the hands of such unskilful practitioners as the public at large, it cannot fail to do much more harm than good. Here also, the objection does not lie intrinsically to

the medicine, but to the disingenuousness which takes advantage of popular credulity for the sake of gain.

A *third* grade of charlatanry is where a popular appeal is made in favour of the curative powers of a medicine in certain diseases, the exclusive right to prepare which is secured to an individual by a patent. Here the objection already stated applies, that the medicine patented is a remedy or the contrary, according to the judgment with which it is given.

But it may be asked, whether,—in case a pharmaceutist makes a discovery as to the best mode of extracting the active principle of a plant, or of rendering it soluble or free from liability to change,—it is morally wrong for him to obtain for such discovery a patent, in order to secure to himself the reward of his science, industry, and ingenuity. I answer, certainly not, if the process be candidly and fully set forth in the application for the patent, and the product be addressed to the medical profession through the scientific Journals, and not to the public at large, as a cure for this or that disease, which, in the nature of things, it cannot possibly be. This statement may be considered as embracing the abstract ethical principles relating to the obtaining of patents for pharmaceutical improvements. But when it is considered how difficult it would be to prevent others from adopting the improvement without the consent of the patentee, and how likely it is to happen, that the medicinal substance, in its improved form, would fall into the hands of the public, under a mistaken notion that it was a remedy, instead of being merely an improved instrument to be wielded by the skilful, it will be readily admitted that such a patent would prove useless to the possessor if honest, and liable to great abuse. Finding, then, the subject of patents for pharmaceutical improvements beset by such practical and unavoidable difficulties, I have come to the conclusion, that the reasonings which justify the granting of these exclusive privileges in the mechanic arts are not applicable here; and that the high-minded pharmaceutist, like the high-minded physician, taking into view the sacred object of his profession, will feel himself

bound to throw open his discoveries for the good of his fellow men.

The *fourth* and last case of quackery which I shall mention, is where a medicine is boastfully presented to the public as a cure for various diseases, and its composition and preparation are at the same time kept secret. Medicines which are thus kept secret are denominated *Nostrums*. In this case, as in the others, empiricism is evinced by presenting a substance as an invariable cure, and by appealing to the public at large, as if they were judges on medical subjects. But there is superadded to this, the crafty device of enveloping the medicine with mystery. This mystery gives currency to the nostrum, and creates, in many, a blind faith in its powers; and, as a consequence, the proprietor reaps a proportionably large harvest of money and public contempt. He declines making his secret public, from the sordid motive that by so doing he will lessen his profits. But why will publicity lessen his profits? Will it be because, by revealing his secret, every one may make his medicine, and enter into competition with him? By no means; it will be for quite a different reason—it will be because his medicine, stripped of the mantle of mystery in which it is wrapped, and exposed in its native insignificance, will cease to be used at all!

Such, gentlemen, is a brief analysis of that disgusting compound called empiricism. I have exhibited to you its several component parts, which, I admit, are not all equally disreputable and censurable. Some of them, indeed, are excused or justified on the various pleas of the usages of trade, and of the right of the people to have themselves deceived, if it is their sovereign will and pleasure. It is to guard you against these plausible arguments that I have thought it proper to speak of empiricism; for I am sensible that it could not be necessary to caution you against those gross arts of deception which characterize the worst ingredients of quackery.

It must be admitted that the young apothecary, just entering upon the practical exercise of his profession, is beset by several perplexing difficulties, between the claims of his business as a means of support, and his views of moral right,

which may be inconsistent with his pecuniary interest. The great defect here is the want of precise rules for regulating the conduct of the pharmaceutical body; a want which discourages those individuals who desire to adopt a high standard of professional morals. This College, it must be conceded, has done much on the score of regulations; still, much remains to be done. Upon reviewing the points of conduct censured in this address, I think the apothecary can and ought to avoid them. The question, however, is a more difficult one, how far he may permit himself to be accessory to the arts of empiricism by vending secret and patent medicines. Here I would advise, that, in accordance with truth and the lights of science, you should take every proper opportunity, in conversation, of disabusing the minds of the unwary, of the prepossession which they may entertain in favour of these preparations; and that you should decline becoming agents for the proprietors, and avoid announcing them by show-bills in your stores, or by advertisements in the newspapers. But if your customers, or others, are obstinately bent on using these medicines, and wish to be supplied by you, it cannot be expected that you should decline furnishing them. If you were to do so, you would give offence, injure your business, and do no good to the applicant, as he would unquestionably provide himself elsewhere. But thus reluctantly to yield to the prejudices of the people from unavoidable necessity, is a very different thing from taking every possible method of increasing the consumption of these objectionable preparations. On this point, therefore, of pharmaceutical ethics, I conclude that the *present* state of your profession in this country will justify you in keeping secret and patent medicines to such an extent as may be necessary to supply your customers, provided that you discourage their sale as much as lies in your power.

With regard to certain patent medicines, (so called,) the composition of which is regulated by standard receipts, I have only to remark, that some of them are valuable pharmaceutical combinations; and the objection lies to them, for the most part, on account of their activity, which makes

them agents for good or for evil, according to the judiciousness of their application. Now, as this application is made by the public at large, who are ignorant of the nice principles on which the practice of medicine is conducted; it will be readily conceded, that such medicines, in their hands, will much oftener be the instruments of evil than of good.

Another difficulty which the young pharmaceutist has to contend with is, that he is often solicited by the poor and parsimonious to prescribe. The ignorant people who do so, cannot be made to comprehend, that the pharmaceutical and medical professions severally embrace within their scope, such diversified science, that it is hardly possible that the same individual should have a competent knowledge of both. I need hardly remark here, that no apothecary is permitted, according to the rules of his profession, to pay a visit to a patient in order to prescribe. This would be a palpable interference with the rights of another profession. But frequently, in slight cases, a person applies personally at the shop of an apothecary for some medicine which may relieve him. To decline peremptorily to afford any advice, might give offence; and instead of inducing the applicant to resort to a physician, would throw him on his own crude medical resources. Now, from the very nature of the pharmaceutical profession, its members must possess much general intelligence on medical subjects, as well as exact knowledge of the doses of medicines. In the case supposed, therefore, it would be justifiable in the apothecary to give his opinion, and advise some simple medicine; in many instances correcting the views of the ignorant applicant, both as to the appropriate remedy, and the proper dose in which it should be given. In thus admitting the propriety of an apothecary's prescribing in slight cases, where refusal to do so would be productive of no good, but perhaps harm, I feel bound to advise you to avoid doing so whenever it is in your power. Nothing could be further from my views than that you should aim at being medical practitioners, influenced either by the

sentiment that it would confer distinction, or by a desire of making it a means of increasing your sales.

It will be readily conceded, that all well educated pharmaceutists must possess a stock of ideas on medical subjects, far greater than that possessed by any other class of persons out of the medical profession. If they use this knowledge discreetly and not obtrusively, with no disposition to trench upon the ground of a kindred profession, and without exacting fee or reward either directly or indirectly, no possible objection can be raised to the course. I feel satisfied that much good is done by the intelligent apothecary in correcting the crude notions of the public on the subject of proper doses; and I am equally clear that they should interpose to prevent an ignorant person from prescribing an obviously inappropriate medicine for himself. Nay, I would go further and say, that the pharmaceutist should possess such general intelligence on subjects connected with his profession, as to enable him, in cases of extreme emergency, when medical aid cannot be had, to interpose with judgment and efficiency. Cases of poisoning furnish examples of such emergency, wherein the loss of a few minutes is often attended with fatal consequences. A knowledge of antidotes, therefore, should form a part of the attainments of the accomplished apothecary. These substances act on chemical principles; and the apothecary, viewed as a chemist, is bound to understand the principles on which they operate, and the modes in which they should be applied.

There are still a number of topics, touching the duties and responsibilities, the rights and the wrongs of your profession, on which I might dilate, were I not admonished by the length of this address, that it is time to bring it to a close. In laying down principles for the guidance of your professional conduct, my aim has been not to present to your acceptance any over-strained rules; but such only as are applicable to the condition of pharmacy in this city. I wish you not to take any of my opinions on trust, but to examine for yourselves. Such of my ethical rules as, upon reflection, you may be *convinced* are well founded, you are bound to act up to. If any of them should be deemed erroneous, then I declare, that such is my respect for opinion, honestly enter-

tained, that my feelings of respect for any of you would not be lessened, should you act on different principles from those which I have laid down. But permit me to add, that, in case you are in *doubt* as to the moral propriety of any particular line of conduct, you are *bound* in prudence to *abstain* from pursuing t. In such a doubtful case, it cannot be immoral to abstain; while to take a contrary course, may cause you to lose your self-respect; a loss which no worldly gains can possibly repair.

In conclusion, gentlemen, allow me to remind you, that having honourably completed your professional studies in this College, you are about to enter upon the theatre of the world, as conductors of an important business, and as citizens. It is highly important that you should commence your career, animated with correct principles. It is on this account that it is incumbent on you to decide in the outset, on the course of professional conduct which it will be proper for you to pursue.

But I cannot allow myself to close this address, without calling to your mind the debt of gratitude which you owe to this College. This you are bound to repay by all the means in your power, by striving to distinguish yourselves in your profession, and by giving the laudable objects of the College your warmest support. I would also recommend to you to exert your influence with your young friends who are studying pharmacy, not to be satisfied with receiving the instructions of the College, but to imitate your example, and, by honourable proficiency, win its *diploma*. The College, on its part, feels interested in your success, and will protect your rights, and promote your welfare, as far as their influence as a body may extend. For my colleague and myself, I can only add, that we shall continue to feel, as heretofore, a lively interest in your advancement: and now, at the moment when we are to exchange the relation of preceptor and pupil, for that of fellow citizens of the same community and members of kindred professions, we offer you our gratulations on the honours you are about to receive, and beg you to accept our warmest wishes for your health and prosperity.

ART. XXIV.—ANALYSIS OF A WHITE POWDER FOUND IN A HORSE TROUGH, SUPPOSED TO BE POISON. By P. T. Tyson and Wm. R. Fisher, Associate Member of the Philadelphia College of Pharmacy.

The quantity submitted for examination is about one grain. It is white, not granular, and apparently free from organic matter. The quantity found and sent is so small that but a very minute portion can be allowed for experiment. It has not the appearance of arsenic or corrosive sublimate, but rather that of a vegetable powder; to determine promptly whether the latter were the case, a small speck of it was heated on a platina spatula, over a spirit lamp; copious white fumes were given off, and a very minute speck of carbonaceous matter left; this at once determined the belief of its being a mineral substance, mixed with a small proportion of vegetable matter.

A regular series of experiments was now commenced, as follows:

About one-third of the whole quantity was mixed with charcoal and carbonate of soda, and exposed in a tube to the heat of a spirit lamp, for reduction. A white crystalline sublimate was found lining the tube, invisible by transmitted light; only seen by reflection. It was evident from this that there was *no arsenic*. The appearance indicated mercury.

2d. A fresh portion of the powder was dissolved in a watch glass, in muriatic acid; the excess of acid being neutralized by caustic potassa; hydrosulphuric acid was added, and a black precipitate fell—bisulphuret of mercury.

3d. The reducing tube being divided just above the flux, and the lower end of the superior portion sealed, one or two drops of nitric acid was poured into the tube, and the sublimate (No. 1,) was dissolved; about twelve or fifteen minims of water were added, and a complete solution formed. This solution, acted on by the following reagents, gave the annexed results:

A. One drop, placed on the back of a gold watch, and a galvanic circle formed by the blade of a penknife, gave a

large, bright spot of reduced mercury, which formed the usual amalgam.

B. Another drop of the solution on glass, over a spirit lamp, was evaporated, and the heat being increased, an orange red residuum was left—red oxide of mercury.

C. To a few drops of the solution, a solution of hydriodate of potassa was added, on a piece of glass; a greenish yellow and brilliant red precipitate, partially blended, were formed—the iodide and per-iodide of mercury.

This series gave convincing proof of the presence of mercury, but the question was still, whether calomel or corrosive sublimate? The following experiment satisfactorily solved that, and the character of the powder was fully established.

4th. The remaining portion of the suspected powder was placed near the lower end of an open tube, and the heat of a spirit lamp applied. Almost the whole substance was sublimed, and condensed on the upper surface of the tube, in a beautiful *pearly white* powder. As in the first experiment, a small carbonaceous residuum remained.

A. Liquid potassa added to this, gave a black precipitate—black oxide of mercury.

B. Lime water placed upon it, also gave a brownish black precipitate—black oxide of mercury.

The difference in the shades of the black oxide of mercury precipitated from calomel by these respective reagents, is familiar to all chemists and pharmaceutists, and no shadow of doubt was left that the powder left with us for examination was calomel,—proto-chloride of mercury.

We have been thus minute in the detail of our experiments, from having frequently felt the want of minuteness in the descriptions of and directions for analysis, given in the text books. Our experiments were all accomplished by the aid of a small tube, spirit lamp, three or four watch glasses, and the back of a gold watch and penknife. In no case was more than two drops of the solution employed, and for each series of the experiments not more of the powder, in bulk, than one-third of a grain of calomel was at our disposal. What a

valuable science, then, is ours, which, from materials so scant, can furnish results so important, with all the certainty of demonstration. Had the suspected matter been arsenic or corrosive sublimate, the result would have been equally certain, and perhaps a discovery been developed by collateral circumstances, which would have brought to punishment the author of the base deed; or, as in this case, some unjustly suspected person been relieved from the foul suspicion of having intended the death of a noble animal, by the clearness and distinctness with which chemical analysis had demonstrated the absence of all ground for suspicion. We offer these remarks to induce all those who may in any way be liable to be called upon to act as analysts, to qualify themselves for the duty, and to render themselves competent, by nicety and skill, to exhibit the components of the smallest specimens, with perfect accuracy.

Baltimore, May 29th, 1835.

ART. XXV.—MINUTES OF THE ANALYSIS OF BREAD, WHICH HAD CAUSED THE SEVERE ILLNESS OF FOUR PERSONS, AND DEATH OF TWO, IN FREDERICK COUNTY, Md. By P. T. Tyson and W. R. Fisher.

A roll of bread (suspected to be poisonous,) was handed to us this day with a memorandum relating thereto, sent by Dr. Goldsborough, of Frederick. The results of the examination were as follows:

First. A few crumbs of the bread placed on ignited charcoal gave a slight odour of arsenic; the accompanying empyreumatic smell proceeding from the combustion of the bread itself impaired the value of this experiment, but there was sufficient arsenical odour to create a suspicion of the presence of arsenic.

Second. About one third of the roll was placed in an evaporating dish on a sand bath and treated with nitric acid in

excess, with a few drops of muriatic and evaporated to dryness, for the purpose of destroying the organic matters.

Third. The residuum treated with boiling water and the soluble portion filtered off, was clear and slightly coloured.

Fourth. A small portion of the solution was treated with lime water, and gave a white precipitate.

Fifth. To another small portion, ammoniated sulphate of copper was added, and gave an apple green precipitate, the colour was considered very characteristic of arsenite of copper.

Sixth. The precipitate No. 5, was separated and dried, and with a portion of soda was exposed on charcoal to the reducing flame of the blow pipe. Copious white fumes were given off, having the peculiar odour of arsenic.

Seventh. The remaining and principal portion of the liquid (No. 3,) was acidulated with muriatic acid and treated with sulphuretted hydrogen, which produced an abundant yellow precipitate, which was heavy and soon subsided to the bottom of the glass.

Eighth. The precipitate from the last (No. 7,) was separated from the supernatant liquid, and a small portion reduced on charcoal precisely as No. 6; at first the fumes of arsenic came off mixed with the sulphur volatilized along with it. But towards the close of this operation the well known fumes of arsenic came off apparently pure.

Ninth. The remaining portion of the precipitate from No. 7, was submitted to the reducing experiment in glass tubes. When the heat was applied there arose, first yellow sulphuret of arsenic, which attached itself to the upper parts of the tubes; next the red coloured sulphuret, which attached itself a little below, and lastly the metallic arsenic, which attached itself in small scaly crystals just at the lower surface of the red sulphuret.

Several of the experiments here mentioned are alone sufficiently conclusive to satisfy the chemist of the presence of arsenic, but taken altogether, they form a mass of testimony derived from different processes which clearly places the fact beyond the possibility of a mistake. The precipitate No. 7,

weighed two grains, equal to one and a half grains white arsenic, but no doubt a half a grain or more must have been wasted, which would be two grains of white arsenic, in about one-fourth of the roll; so that the whole roll must have contained at least eight grains of white arsenic. The memorandum of Dr. Goldsborough stated, that an individual in the neighborhood was suspected of having designedly introduced poison into the bread; but a few days after the above account was written, it was ascertained that arsenic was put into the bread by mistake, instead of sal æratus.

ART. XXVI.—ON CORNUS FLORIDA.

By James Cockburn, Jr.

(Extract from Thesis. Phil. Coll. of Pharm.)

The Dogwood, or Boxwood as it is commonly called in the New England states, is found in all parts of the United States: but it is most abundant in the middle sections. It flowers early in the spring, being covered with a profusion of large white blossoms, which render it one of the most conspicuous and beautiful ornaments of our forests. The bark is the officinal portion, and is derived for use both from the stem and branches, and from the root. The bark of the root is preferred. It is brought into market in pieces of various sizes, usually more or less rolled, sometimes invested with a fawn coloured epidermis, sometimes partially or wholly deprived of it; of a reddish gray colour, very brittle, easily pulverizable and affording a grayish powder tinged with red. It has sometimes a large percentage of the wood of the root mixed with it, which may be considered an adulteration. The odour of dogwood, is feeble in the dry state, but rather aromatic when fresh or moist; its taste is bitter, astringent, and slightly aromatic. The fresh bark has rather an acrid and less bitter taste than the dry. Several different samples of the bark which I had an opportunity of observing, possessed the bitter

qualities of the best varieties in very variable degrees, perhaps owing to their inferiority to the mode and time of collecting, or to the manner of drying and preparing. The decoction is officinal in the United States Pharmacopœia, and is a good mode of administering the bark; it is made by boiling ʒi of the bark in Oi of water for ten minutes and straining while hot.

Cornus *Florida* is tonic and astringent, and is thought to possess remedial properties closely analogous to those of Peruvian bark, for which it has occasionally been substituted with advantage. It has long been employed for the cure of intermittents, and still holds a favourite place in the list of domestic remedies. According to Dr. Walker it was found, when taken internally, to augment the force and frequency of the pulse, and increase the heat of the body. The decoction is the preparation so much in use among the country people.

Dr. Barton also states that a decoction of it has been found very useful in a malignant fever called the yellow water, Canada distemper &c. which has been found very fatal among horses. The ripe fruit or berries if infused in spirit or brandy, are said to make a very agreeable bitter.

The Indians employ an infusion of the flowers in intermittents. The same infusion has been much recommended by some in flatulent colic.

The bark, though generally kept in the shops, cannot be said to rank among the indigenous remedies in common use, being now principally in the hands of domestic practitioners.

The length of time this article has been in use, we might suppose, would induce the expectation of a more satisfactory analysis than any with which we are acquainted.

It is nevertheless asserted by some individuals, that they have obtained a crystalline substance from this bark, and they seem content with the mere fact of having isolated what they consider the active principle, without ever making known its chemical properties, or publishing for the benefit of science, the process which they followed, as all real inquirers after scientific truths would have held themselves bound to do; and as such we cannot take for granted any thing, and of course, do not feel disposed to give credit to that which has not

been satisfactorily demonstrated: and as has been observed, "surely they can have a very limited desire for the progress of that branch of science with which their interests are so closely allied, who would for a moment withhold any information that would tend to cultivate a spirit of research among the pharmaceutical profession; however small the amount of information communicated might be, it would still constitute an accession to the general mass, and as such, would not fail to produce its good effects."

With a desire of making known the actual constituents of this substance, I have been induced to venture the result of a few experiments, which will not be characterized by the accuracy and precision, or by that originality of research which should be the aim of the analytical investigator; and for the many imperfections, of which I must beg to be considered as an apology, the very few facilities under which I unavoidably operated.

Experiments.—The decoction, which was of a light red colour, and slight mucilaginous appearance, formed a precipitate with a solution of subacetate of lead, which consisted of gum, colouring matter, and other foreign substances. A precipitate was also formed with pure alcohol.

Upon the addition of water to the tincture, concentrated by evaporation, it threw down a curdy precipitate, which, upon examination, was found to be resin.

The decoction and tincture redden litmus paper, and cause a yellowish precipitate in a solution of gelatine, and one of a dark olive green in a solution of sulphate of iron. They also afford precipitates with sulphuric and muriatic acids, lime water, alumina, the carbonates of ammonia and potassa, tartrate of antimony and potassa. The colour becomes lighter on the addition of nitric acid, milky by the corrosive chloride of mercury, and has its colour deepened by ammonia.

A portion of the bark was digested in sulphuric ether for a few days, and filtered. The etherial tincture was of a lemon colour and reddened litmus paper, and on evaporation deposited on the sides of the vessel a fatty matter, insoluble in water, but soluble in alcohol, leaving a greasy stain upon paper;

besides this, there was a compound of oil and resin combined with colouring matter, and a substance of a light brown colour, very bitter taste, friable and very regular appearance, supposed to be a compound of a peculiar bitter principle, mixed with tannin and other matters. This was dissolved in alcohol and formed a beautiful red coloured tincture, which reddened litmus paper. Lime was then added, boiled, filtered and evaporated; a substance resembling the etherial residue remained interspersed with small, shining acicular crystals of a bitter taste, which property I am disposed to believe they owed to the bitter extract with which they were associated. The bark used in the last experiment was submitted to the action of boiling ether, which on cooling, deposited a substance of the consistence of wax which it resembled in all its properties.

Two ounces of the bark coarsely powdered were introduced into ℥viii of alcohol and exposed to a temperature of from 105° to 120° F. The alcohol was then decanted and a fresh portion added and treated as before. The liquors were then united, and a solution of sub acetate of lead added to separate the colouring matter: after the insoluble portion subsided the clear liquor was separated, a little sulphuric acid was then added to the solution to separate any excess of sub-acetate of lead. This was filtered, and the alcohol distilled off. There remained in the retort an oily like substance together with a principle of a dirty white colour, curdled appearance, resembling the residue of the etherial tincture. Ammonia was then added to the liquor to precipitate any principle remaining in solution. The residue was then treated with a little sulphuric acid, water, and animal charcoal, (previously treated with muriatic acid,) which upon evaporation deposited an abundant crystalline mass of a flaky appearance, resembling at first sulphate of quinine, but on cooling assumed a feathery appearance with a sharp saline taste, soluble in hot and cold water, insoluble in alcohol and ether, soluble in nitric acid, and resembled sulphate of ammonia in all its properties.

One pound of coarsely powdered bark was boiled for half an hour in one gallon of water acidulated with ℥iss sulphuric acid.

The tincture was poured off and treated with animal charcoal and when evaporated left a brown extract of a resinous waxy appearance, and very bitter taste, which appeared to have very much the flavour of Peruvian bark; this was again treated with animal charcoal and left, on evaporation, a crystalline mass in an impure form, which was slightly soluble in alcohol, almost insoluble in ether, but very soluble in nitric acid. The alcoholic solution was evaporated and left crystals of a very fine, long, flexible, and silky appearance: which crystals decomposed when thrown upon red coals, and did not form a precipitate with oxalate of ammonia, but were without taste.

The bitterness was entirely owing to the bitter extract, which was slightly soluble in water, soluble in alcohol, but nearly insoluble in ether. This I propose to call bitter extractive, and in this I am inclined to believe the active principle resides.

A concentrated tincture yielded by evaporation a dark brown extract slightly soluble in water, soluble in alcohol and ether, bitter aromatic taste, possessing the properties of resin. Both this and the watery extract possess the sensible properties of the bark in a concentrated form.

There is a red colouring principle in this bark, taken up very feebly by alcohol and ether, but less so by water, and has its colour rendered deeper by an alkali.

One thousand grains of the bark yielded, by incineration, a product weighing sixty-five grains: this residue was submitted to the action of boiling water, and concentrated by evaporation: it then had an alkaline taste, effervesced strongly with acids, and restored the blue colour to litmus, previously reddened by an acid; it was then neutralized with nitric acid, and upon evaporation yielded crystals of nitrate of potassa.

The insoluble residue of the preceding experiment, was dissolved by nitric acid, (with the exception of a minute portion of carbonaceous matter,) with violent effervescence; the colourless solution thus obtained threw down a white precipitate on the addition of oxalate of ammonia, and a deep blue one with ferrocyanate of potassa. It produced also a dark green or black with tincture of galls. Carbonate of soda when

added to the solution caused a white flocculent precipitate. On adding a solution of phosphate of soda, no change was observable, but when ammonia is added, a white precipitate was immediately produced, which led to the belief that a salt of magnesia was present.

From the result of these few and imperfect experiments we may venture to enumerate the following, as among the principal constituents of the *Cornus Florida.*

1, Gum. 2, Resin. 3, Tannin. 4, Gallic acid. 5, Oil. 6, Fatty matter. 7, A crystalline substance. 8, Bitter extractive. 9, Wax. 10, Red colouring matter. 11, Lignin. 12, Potassa. 13, Iron. To which may be added salts of lime and magnesia.

It will be seen that these experiments have not led me to any decided conclusion as to the nature of the active principle of *Cornus Florida,* or the form in which it exists in the bark. The peculiar bitterness of the bark, seemed to be developed to a considerable extent, in the etherial extract: but more fully in the bitter extractive, than in any other form that came under my observation. Dilute alcohol appears to be the best solvent.

The bark was also treated by several other processes, but with no satisfactory results; which were not deemed of sufficient importance to be mentioned in this place.

ART. XXVII—MEDICO-BOTANICAL NOTICES—No. VI.

African Guaiacum. Under the name of *Guaiacum Afrum*, LINNÆUS described a tree belonging to the natural order of Leguminoseæ, found in some parts of Africa and possessing most of the properties of the *G. officinale.* The wood is hard, veined and brown, and is much used among the natives of the country as an antisyphilitic. This plant has been placed in a variety of different genera by botanists. Thus MEDICUS terms it, *Theodora speciosa*, and JACQUIN has figured it under the name of *Schotia speciosa*, (*Icon. rar.* 1. t. 75.) in which he is followed by ANDREWS, (*Bot. Repos.* 348.)

Winter's Bark. Mr. WEBSTER, a surgeon in the British navy, in his valuable "Narrative of a Voyage to the Southern Atlantic Ocean," gives some very interesting medico-botanical information, which we take this opportunity of laying before our readers. He states that at Staten Island, near Cape Horn, the *Winterana aromatica* (*Drymis winteri*) is common. He describes it as an evergreen, having the appearance of a laurel, sometimes attaining a very considerable magnitude, even that of twenty feet in circumference. The general height however is only eight to ten feet, and the stem small. It is of very quick and rapid growth, the wood soft. Its leaves are very similar to those of the laurel, and the flowers which are small and white are furnished with long peduncles. The corolla is of eight petals; the stamens numerous, crowded, the germs one, two or three, swelling, globose; the berries are green, one celled, oblong, containing a glistening powder and three or four black seeds. The bark is hot, pungent, slightly bitter and astringent; its flavour is durable and somewhat unpleasant. Water scarcely extracts its virtues; a mild tincture has very much the flavour of porter. The sealers often use the dried bark as a substitute for cannella.

New Rhubarb. Mr. WEBSTER says that a small plant was very common throughout the same island, the leaves of

which when dried had such a strong taste and smell of rhubarb, that he tried its effects and found it a mild aperient, and seeming to possess all the virtues of the best rhubarb. Its habitude, he goes on to say, appeared to be different, but he thinks that it belongs to the genus *Rheum* and proposes the name of *R. humilis* for it. The root was more strong and active, and in every sensible effect equalled the best rhubarb.

Milk Trees. The first account we have of these trees was given by Humboldt; he met with it in the Cordilleras, in arid situations. In the fourth volume of his "Personal Narrative" he says, "on the barren flank of a rock, grows a tree with coriaceous and dry leaves; the large woody roots can scarcely penetrate into the stone. For several months of the year not a single shower moistens its foliage. The branches appear dead and dried; but when the trunk is pierced, there flows from it a sweet and nourishing milk. It is at the rising of the sun that this vegetable fountain flows most freely; the blacks and natives are then seen hastening from all quarters, with large bowls to receive the milk, which grows yellow and thickens at its surface." He further states that it is called *Palo de vaca* and *Arbol de leche.* This tree which Decandolle thought might belong to the family of Sapoteæ, was placed by Kunth among the Urticeæ, under the name of *Galactodendrum utile.* Since this Mr. Lockhart, director of the botanical garden at Trinidad, found other milk trees in the Caraccas. Mr. Don, who examined the flowers of this species, states that it belongs to the genus *Brosimum,* nearly allied to Ficus.

Another milk bearing tree has also been discovered in Demarara, by Mr. Jones Smith; it is called *hya* by the natives, and is perhaps the *Tabernæmontana utilis,* Arnolt. It is to this latter, in all probability, that Mr. Webster alludes; it occurs near Para, where it is known under the name of *masaranduba.* Mr. Webster has called it *Vaccodendron lactifera.* He says it is among the loftiest in the forest, being one hundred feet and upwards in height. The bark is of a brownish colour, the leaves large and ovate. It flowers in

February, and produces a delicious edible fruit, like strawberries and cream. The fruit is ripe in April, and contains from two to four seeds. The milk is a rich, white, bland fluid, without odour, and of the taste and flavour of common milk. It mixes readily with tea and coffee, without curdling or undergoing any change, and in every respect seems like cow's milk. Boiling water does not alter it. It keeps unaltered six or seven days at a temperature of 85°. In fourteen days, Mr. Webster goes on to say, it evolved a sour odour, but had not coagulated; a gummy pellicle adhered to the cork. Some vinegar was added to the recent fluid without producing any immediate change; in forty-eight hours it acquired an unpleasant odour. Bicarbonate of soda thickened it a little, and in forty-eight hours produced a separation into a watery and creamy mass, the latter on the surface. A spirituous solution of bichloride of mercury thickened it a little, and seemed to produce a pellicle of gummy matter. Sulphate of iron thickened it and discoloured it slightly. Diluted sulphuric acid produced no immediate effect. Some, which Mr. Webster kept for a length of time, separated into a sourish milky water and a white solid mass, which, when taken out of the bottle and dried in the air, was a white inflammable substance, not softening at the temperature of the body; melting at 143°; tasteless, insoluble in water and spirits, and resembling white wax more than any other substance to which it could be compared. It burnt with a bright and agreeable flame, without smell, and was neither greasy nor resinous. This tree affords a most valuable timber for ship building, and is used for that purpose at Para.

Mirabilis Jalapa. This plant, so well known in our gardens under the name of "Four o'clock," was supposed for a long time to furnish the jalap of the shops, which article it approaches in medical properties. Chamberlain says, that in doses of forty grains, it operates freely on the bowels, but according to Devaux, this effect is uncertain, even in doses of two drachms, (*Journ. de Bot.* vi. 202.) Coste and

Willemet, however, state that the alcoholic extract acts powerfully. Mr. Webster tells us that at Para, a starch or fecula is prepared from the roots, which is used as a mild laxative for infants, being made the same as arrow root or panada; it has scarcely any flavour.

The seeds consist almost entirely of a pure and delicate farina, used by the ladies of Para to powder their faces, for which purpose it is also employed in Japan according to Thunberg.

Tonka Beans. The tree producing these, is a native of many parts of South America, where it is called *coumarou* by the natives. It is the *Courarouna odorata.* Aublet. *Baryosma Tongo.* Gærtner non Rœmer, and the *Dipterix odorata.* Willdenow. The bark and wood are said to be used as a substitute for guaiacum; the seeds, which are principally employed to give an agreeable scent to snuff, abound in a crystalline substance which is allied to benzoic acid, but according to Guibourt, who calls it *Coumarine*, differs from this acid in many respects; his views are confirmed by M. M. Boullay and Boutron Chalard. Vogel and Dr. Paris, however, state that it is perfectly identical with that substance. Mr. Webster says that they are procured in vast quantities in the woods near Para; and when kept long, a quantity of white crystals spontaneously form on them in such abundance, that a merchant of that place had a bushel of this crystalline substance. The beans yield an odorous essential oil by distillation, but on expression only a bland fixed oil, resembling that from almonds. The tincture is exceedingly fragrant. R. E. G.

ART. XXVIII.—REPORT TO THE BOARD OF TRUSTEES OF THE COLLEGE OF PHARMACY OF THE CITY OF NEW YORK, ON AN ADULTERATION OF ACETATE OF MORPHINE, &c.

Your committee of inspection respectfully report, that a specimen purporting to be acetate of morphine, was submitted to them by Mr. William L. Rushton, and said to be part of the contents of the same vial of spurious acetate of morphine spoken of in the last number of the *American Journal of Pharmacy*, and which was obtained from the house of Messrs. W. and L. Krumbhaar, of Philadelphia.

Your committee examined the article and readily came to the conclusion that it was a sophistication. In order, however, to ascertain the constituents of the article, a portion of it was submitted to William H. Ellet, M. D., Professor of Chemistry in Columbia College, whose statement of the analysis is subjoined.

Messrs. Rushton and Aspinwall had previously submitted a portion, for analysis, to Messrs. J. Leowolf & Co., manufacturing chemists of this city, whose account we have obtained, and submit with that of Dr. Ellit. The conclusion in both is the same, viz.: that the powder purporting to be acetate of morphine, is entirely spurious, consisting of sulphate of lime, and a little free sulphuric acid, but resembling in its colour the genuine acetate of morphine.

Your committee, bearing in mind how essential the purity of preparations such as those of morphine are, to the suffering and the dying, cannot attribute the present case to a cupidity so atrocious; but are rather led to the conclusion that it must have arisen from error or accident occurring at the laboratory of the manufacturer.

Your committee also submit a specimen of a powder, ground by order of, and sold by a large drug-house in this city, as powdered colocynth. The taste of aloes is very distinct in this powder, and it probably consists of aloes, with

some other more inert powder, perhaps liquorice or gentian. No appearance of colocynth is discoverable.

All which is respectfully submitted.

OLIVER HULL,
C. ADAMSON,
JAMES H. HART,
} *Committee of Inspection.*

Analysis by W. H. Ellet, M. D. I have examined a substance labelled "Acetate of Morphine," furnished me for that purpose. It was in the form of a powder of unequal fineness, but with no appearance of crystalline structure. It had a slighlty yellowish colour, an acid taste, and an odour resembling that of sulphuric acid, which has been contaminated with small quantities of vegetable matter. It was very slightly soluble in water, which liquid however, even in small quantities deprived it of its taste, and became itself acidulous. The acid matter contained in the solution was found on examination to be free sulphuric acid. The undissolved portion proved to be sulphate of lime. No indications were obtained, from experiments made for the purpose, of the presence of morphia, or any other of the vegeto-alkalies.

As nearly as I was enabled to determine from the small quantity of the article furnished me, it consists of sulphate of lime, mixed with from seven to eight per cent. of impure sulphuric acid.

(*Signed,*) WM. H. ELLET.

Analysis by J. J. Tobin M. D. and S. Rosengarten. Having been requested by Messrs. Rushton and Aspinwall to analyze a powder which they had received as acetate of morphine, we herewith inform you of the result of our chemical investigation, and the method we employed in order to determine with accuracy the composition of the said powder, in as far as it was in our power so to do, in the short space of time which those gentlemen could allow us, and our other occupations would permit.

The appearance of the powder was similar in colour to that of good acetate of morphine, but it consisted of shapeless and unequal masses which induced us to suppose at first sight, that it had not been properly evaporated to dryness, and that the acetic acid prevailed over the base.

Five grains of the powder were treated with 200 grains of distilled water which only dissolved 0.4 of a grain. The action of hot water was perfectly similar. On adding acetic acid in considerable quantities, in order to see whether there was any prevalence of a base, which is often the case after long exposure to the air, or when carelessly prepared, we found to our great astonishment that only a very trifling portion (0.1 grain) of the powder was farther dissolved; thus proving to us that very little, if any morphine or narcotine are contained in the said acetate of morphine, both of these substances being perfectly soluble in acetic acid: our attention was therefore now directed to the insoluble residuum which we presumed, and found to be composed of substances perfectly foreign to acetate of morphine; but wishing if possible to determine what the soluble half grain consisted of, we precipitated it with ammonia, and having washed and dried the precipitate which had neither increased nor lost in weight, we poured over it a solution of caustic potash which produced no effect; thus convincing us that no particle of morphine is contained in the powder which we have received for analysis. To discover whether the powder was composed of organic or inorganic ingredients we treated a part of it with strong nitric acid, which only produced a scarcely visible yellow colour upon the edges of the powder; whereas had organic substances been present, the powder would have been coloured or destroyed: morphine thus treated becoming deep red, strychnine and other similar organic bodies yellow or red. Another portion was submitted to the action of fire upon a thin piece of glass, and though the latter was heated to melting, the powder remained apparently unchanged. The examination of the insoluble 4.5 grains offered the following phenomenon.

A portion of the powder dissolved in diluted nitric acid

(in which it only completely dissolved at a boiling heat) and treated with oxalate of potash gave a considerable white precipitate of lime in combination with oxalic acid.

Another portion of the same solution heated with sulphuric acid afforded a white pulverulent precipitate interspersed with fine needle-shaped crystals perfectly similar to those of sulphate of lime. In order to determine with what acid this base was combined we treated a part of our solution in nitric acid with nitrate of barytes and obtained a strong precipitate of insoluble sulphate of barytes. To be quite sure that the powder given us for examination consists as the above analysis already sufficiently proves, only of sulphate of lime with a trifling quantity of organic matter, we again treated a portion of it with distilled water, and upon adding a solution of nitrate of barytes we obtained a precipitate of sulphate of barytes, and with a solution of oxalate of potash, an oxalate of lime.

Selected Articles.

ART. XXIX.—OBSERVATIONS ON THE PREPARATIONS OF OPIUM. By L. R. Le Canu.

Following the example of some pharmaceutists, who, unfortunately have not had as many imitators as they merit, M. Soubeiran has lately made many highly interesting observations on several pharmaceutical preparations, and especially on those of aconite, sarsaparilla and rhatany. It must, however, be confessed, that the results which have been deduced from the analysis of these therapeutic agents, have often been disputed; thus M. Caventou is of opinion that the experiments of Hancock, and some other foreign chemists, do not prove, in so incontestable a manner, the volatility, or at least the rapid alterability of the active principle of sarsaparilla by heat, as to render it necessary to abandon the use of his syrup, prepared by a long decoction; on the other hand, M. Polydore Boullay has judiciously observed, that if the analyses of Bucholz and Braconnot show that the extract of aconite, prepared in the usual manner, cannot be depended upon, the more recent researches of Geiger and Hesse, demonstrate that it is an energetic remedy, since, besides the fugitive principle of Bucholz and Braconnot, aconite contains a fixed active principle, viz. aconitine. But, whatever importance may be awarded to these objections, the researches to which they apply are of incontestable utility.

And although in the actual state of organic chemistry, it is dangerous to rely fully on the data furnished by it, and to reject, as imperfect, certain formulæ which subsequent dis-

coveries may prove to be correct, and to propose new modes of operating; I am of opinion that every investigation that tends to make a wise application of the data furnished by analysis to formulæ almost always founded on empiricism, must necessarily advance the art of pharmacy. With this view, I undertook a theoretical examination of the preparations of opium.

I will show, in the first instance, how greatly the opinions of chemists on its chemical composition have varied at different epochs; and the influence these changes of sentiment has exercised on the mode of administration of this remedy.

It was long supposed that the action of opium on the animal economy depended entirely on the presence of volatile principles. Hence the general use of a distilled water of opium, of tincture of opium, of an extract of opium prepared by maceration with a small quantity of water, and concentrated in a water bath.

Afterwards, new observations having led to the opinion that it was possible to render opium purely sedative in its operation, the existence of several active principles was admitted; some of a volatile nature and narcotic, and others of a fixed character and sedative.

Hence arose the torrefaction of opium, its mixture with aromatics to disengage, or at least to neutralize its narcotic powers; hence also the preparation of extract of opium by decoction and prolonged digestion, according to the methods of Hombert, Diest and Baumé; by fermentation according to the plan of Deyeux; by fermentation in quince juice, as recommended by Langelot. All these modes of preparation were evidently principally intended to separate or alter the volatile narcotic principles, and to preserve in the extract such only as were fixed and sedative.

At a still later period, about 1804, when Derosne and Seguin had demonstrated the existence of a peculiar crystalline substance in opium susceptible of acting on the animal economy in a marked manner, without its having been shown by experiments that the crystalline substance of Derosne differed in an essential manner from that of Seguin; the crystalline

substance was considered as the active principle of opium, and it was supposed that those remedies of which opium was the basis, were possessed of remedial powers in proportion to the quantity of the crystalline substance contained in them: hence the great object became to preserve this in the extracts and even to render them more active, by separating all the resinous matter which accompanied the active principle.

The method of the Batavian pharmacopœia, which consisted in treating the opium with twice its weight of cold alcohol, drying the residuum, dissolving it in water, and evaporating this solution; that of M. Limousin Lamothe, an excellent modification of the plan of Josse, and which ordered the opium to be beaten up with a certain quantity of rosin, boiled in water, and malixated, to separate the solution of opium from the resinous mass, were both intended to separate the resin of the opium, either by dissolving it in alcohol, or by combining it with the rosin.

Finally, some years afterwards (1817) M. Robiquet, in endeavouring to perfect the method of Sertuerner, having proved, in contradiction to the opinion of the learned German pharmaceutist, that if the crystalline substance of Seguin is a true organic salafiible base, existing in opium intimately united with meconic acid; the crystalline substance of Derosne is not a submeconate, but a distinct substance preëxisting with the acid meconate; and, on the other hand, M. M. Orfila and Majendie, having demonstrated, that each of these two substances, the salt of Derosne (narcotine,) and the salt of Seguin (morphine,) had different physiological properties; it was perceived that it would be highly advantageous to be enabled to obtain opium deprived of one of these principles. The methods of Robiquet and Dublanc, founded on the property possessed by either of taking up the the narcotine from opium without attacking the acid meconate of morphine, were consequently proposed.

Thus the volatile principles of opium, which were at first esteemed as the only medicinal portions of opium, afterwards only shared the esteem of physicians and pharmaceutists, and

finally, were totally discarded in favour of narcotine and morphine.

Since 1817, the opinions entertained of the composition of opium, and of the therapeutic influence exercised by each of its constituent principles, remained much the same. Thus, in a thesis maintained before the School of Pharmacy, by M. Decoudemanche, in 1821, he states that the relative value of the different preparations of opium may be estimated by the proportion of morphine and narcotine contained in them. Very lately, however, the well proved existence of volatile principles in opium, and more especially the discovery of codeine by M. Robiquet, of narceine by M. Pelletier, and of meconine by M. M. Dublanc, jr. and Couerbe, do not permit us to consider narcotine and the acid meconate of morphine as the only active principles in opium. It therefore becomes necessary to revise the statements of M. Decoudemanche, so as to make them harmonize with the actual state of science. I shall, therefore, after having established the chemical composition of opium on the most recent and positive data, indicate the most common preparations of this article, and endeavour to determine *a priori*, from their known properties, which of the constituent principles of opium should be found in each of these preparations, and which are to be modified or eliminated.

The constituent principles of opium now generally recognized, are:

1. Narcotine of Derosne and Robiquet.
2. Acid meconate of morphine of Seguin and Sertuerner.
3. Acid meconate of codeine of Robiquet.
4. Narceine of Pelletier.
5. Meconine of Dublanc, jr. and Couerbe.
6. Caoutchouc of Robiquet.
7. Bassorine of Pelletier.
8. Sulphate of morphine of Dupuy.
9. Sulphate of lime } of Derosne.
10. Sulphate of potash }
11. Volatile matters, }
12. Resinous do. } of the older chemists.
13. Gummy do. }

14. Fatty matter having acid properties of Pelletier.
15. Ligneous fibre.

The most generally used of the preparations of opium, are: The powder; the alcoholic tincture; the liquid laudanum of Sydenham; the liquid laudanum of Rousseau; the distilled water; the extracts; and finally, the syrup.

The Powder. It is evident that this preparation must contain all the principles of opium in their natural state: it is true the volatile principle will be in the greatest proportion, when the powder is recently prepared, is kept in a well closed vessel, and is made from opium dried at a very low temperature. These conditions should always be borne in mind, when the powder is prepared, as this powder should represent opium itself.

Alcoholic Tincture. The alcoholic tincture of the codex prepared with the aqueous extract to be hereafter spoken of, should contain all the constituent principles of this extract which are soluble in alcohol at 22°. I say all, for a well prepared extract dissolves without residue in alcohol of the above strength. The results will not always be identical, if the alcohol employed, as is ordered by certain foreign pharmacopœias, is of different degrees of strength. In such case, some principles soluble in alcohol at 22°, might not be taken up, at least in part. This would be the case, principally with the gummy matter, and the sulphates of lime and potash, which would be left undissolved if the alcohol were very much concentrated, on the contrary the resinous, the acid fatty and the volatile matters, and even the narcotine will not be taken up if the vehicle be very weak.

Alcohol not appearing to exercise any reaction on the principles of opium, and the extract of this drug, being completely soluble in alcohol at 22°; it is evident that the preparation under consideration must consist of a simple aqueo-alcoholic solution of all the principles contained in this same extract.

Laudanum of Sydenham. In the preparation of the laudanum of Sydenham, a product of the maceration of opium, cloves, cinnamon and saffron in Malaga wine, this fluid dissolves allthe principles that are soluble in weak alcohol; and

consequently, the acid meconates of morphine and iodine, meconine, narceine, the sulphates of morphine and potash; but does not take up all the resinous, volatile or fatty matters: the greatest portion of the narcotine also remains undissolved.

It is highly probable, that the bassorine and caoutchouc are wholly insoluble in both the alcohol and water, though it is not absolutely certain, as an analysis of neither the solution nor the residuum has been made, but Malaga wine does not result from a simple mixture of alcohol and water. In the usual proportions of this wine of eighteen volumes of alcohol to sixty-two of water, the principles of the wine may react on those of the opium. For example, the free acids might facilitate the solution of the narcotine, which, it is well known is much more soluble in acid liquids than in those which are not so, and thus modify the physiological effects, according to the observations of M. M. Magendie and Orfila. On the other hand, the tanning matter may combine with the narcotine and codeine, as has been shown by M. M. Derosne and Robiquet, and thus neutralize them to a certain degree.

It results from the above, that any attempt to establish *a priori* the composition of the laudanum of Sydenham, must fail, though it appears evident that this remedy cannot be considered as a simple solution of opium in wine. The chemical composition of wines, is so different and ever varying in the same species, that it becomes necessary to use the wine ordered by Sydenham, to obtain a remedy as nearly as possible similar to that so highly praised by him. Added to which, the nature of Malaga wine, is not favourable to the solution of the narcotine, acts but slightly on the codeine, and above all the tinctures made with it are not apt to change, as it contains less free acid and tannin, and more alcohol and sugar than most of the French wines.

Laudanum of Rousseau. The laudanum of Rousseau, appears to constitute a remedy less uniform in its composition than the last mentioned, as fermentation is an operation so little understood, that we cannot neither produce it nor arrest nor direct it when produced. Its composition must vary not only when instead of preparing it according to the original

formula of Rousseau, by adding to the liquid evaporated to the consistence of a syrup, the alcoholic fluid collected during the evaporation; it is prepared according to the amended formula of Baumé, by adding to the syrupy liquid a quantity of alcohol, equivalent to that supposed to be lost during the evaporation; but also, on account of the products which are formed during the fermentation. Hence, it would be impossible to judge of its composition *a priori*. This, in my opinion, is one of those remedies that must be scrupulously prepared according to the original formula, waiting till further researches shall reveal to us the rationale of the process and its results; but at the same time it ought not to be discarded, because on the one hand, its action has been too often verified to permit us to doubt its efficacy, and on the other, our ignorance of its true composition does not permit us to use a substitute for it.

Distilled water. Water distilled over opium, contains, according to the experiments of M. Pelletier, organic matters; consequently, whatever may be the nature of these matters, which are as yet but imperfectly understood, and without prejudging the debatable question of their therapeutic importance, it may be admitted that the vehicle may give them a certain action on the animal economy, and that a perfect identity cannot exist between preparations in which no attention is paid to these volatile matters.

At the same time, I would remark, that if some physicians have been in error in attributing therapeutic properties to certain bodies, which they do not possess, pharmaceutists on the other hand, have equally erred in not paying proper attention to the principles of organic bodies, and in doubting the properties attributed to various substances, because their means of analysis have not enabled them to explain their effects physically or materially. Of late years, for example, it was denied that a certain colourless fluid, of a slightly empyreumatic odour, has the property attributed to it, of arresting hæmorrhages, because reagents have no effect upon it, and because by evaporation and other means of analysis, nothing is found except traces of an empyreumatic substance,

whilst at the present day we are fully satisfied that the fluid in question may owe its physiological properties to the presence of a small quantity of creosote.

Extracts.—The formula of the older pharmaceutists, already alluded to, those of Hombert, Diest, Baumé, Josse, Limousin Lamothe, Cartheuser, Croharé, and finally, that of Cornet, which is now adopted, and consists of several times macerating for thirty-six to forty-eight hours, opium of commerce, in six times its weight of cold water, filtering, evaporating, redissolving the product when reduced to the state of a soft extract in eight parts of cold water; again filtering and evaporating three different times, appear to me to furnish aqueous extracts, containing the various articles found in that analized by M. Pelletier, namely, acid meconate of morphine, meconine, narceine, gum, narcotine, resin, oily matter, brown acid colouring matter.

I would add: volatile virous principle, acid meconate of codeine, discovered since the analysis of M. Pelletier, sulphate of morphine, sulphate of potash, and sulphate of lime.

The residue is therefore composed of: a little brown acid extractive matter, which is never wholly taken up by the water, a little gum, a large proportion of the virous principle, of the narcotine, fatty matter, resinous matter and sulphate of lime, all the caoutchouc, bassorine and vegetable fibre.

But it should be remarked, that in these different extracts, the soluble principles must not be expected to be always found in equal proportions. For example, the narcotine, resin and fatty matter appear to be more abundant in extracts made by means of hot water, than in those in which cold water has been used; in extracts made by treating the opium by small quantities of water at a time, than in those made with a large proportion of water; in extracts made by simple evaporation than in those by successive solutions and evaporations. The cause of this is, first, that the presence of a large proportion of the soluble principles of opium favours the solution of principles which, in themselves, are but slightly, or not at all soluble; second, that this solubility is also

augmented by the application of heat, which induces a kind of combination between the principles; third, that by redissolving the extract of opium in a large quantity of cold water, and afterwards concentrating the solution, at each successive repetition of the process, a certain quantity of fatty matter, resin and narcotine is eliminated. On the other hand, the volatile principle must be in a less quantity in extracts made by long digestion, than in those made in the usual manner in a water bath, either from its being driven off, or from its having suffered an alteration.

The chemical composition of these extracts, therefore, although very analogous, is not precisely identical.

The extracts prepared according to the Batavian Pharmacopœia, or to the formulas of Lemery and Quincy, also appear to me, must contain all the principles found by analysis in the watery extract of opium, and in the same state, since there is probably no reaction between the alcohol and these principles. The process of the Batavian Pharmacopœia, which orders the opium to be washed with alcohol, to dissolve the resin, before it is treated with water, must necessarily also dissolve a certain portion of its active principles; whilst in the extract of Lemery, prepared by treating opium with alcohol and water successively, the caoutchouc, bassorine, earthy matters and vegetable impurities only are separated. The first of these processes may in reality furnish a more active extract than that made with water alone, if it be true that cold alcohol takes from the opium a proportionally larger quantity of fatty and resinous matter than of the active principles. The second must afford, as regards its bulk, an extract less rich in acid meconates of morphine and codeine, meconine and narceine, as it contains all the resin and fatty matter. At the same time, the greater proportion of narcotine in this extract may, in some degree, compensate for this diminution of the other principles.

The extract by wine, proposed in the codex of 1758, appears to have much analogy to that of Lemery; but the addition of the constituent principles of the wine, principles that must be considered not only as regards the reaction they

may exercise, but also as to the foreign matters they add to the extractive mass, do not permit us to establish that analogy between these two extracts that might have been supposed to exist. What we have said of the laudanum of Sydenham may be applicable to this extract, as the wine contains alcohol, and acid and tanning matters in variable proportions. But, as the codex has not prescribed the quantity of wine that is to be used, the extract may be different, all other circumstances being the same, if different proportions of wine be employed.

The extract by ether, according to the methods of M. M. Robiquet and Dublanc, jr., differ in a striking manner from the preceding; for not only the ether employed separates the narcotine and fatty matter, of which the watery extracts always retain a portion, but also takes up the meconine which is also soluble in ether, which is not the case with the meconates of morphine and codeine or narceine.

This extract, therefore, is widely different in its composition, and doubtless also in its physiological properties, from the other extracts.

To conclude, the preparations of opium spoken of cannot be considered as identical in their composition, either, because the constituent principles of opium exist in them in different proportions, or in different states. Hence their action on the system cannot be the same.

But as the physiological effect which physicians wish to produce by their administration, are extremely various, there may be a real advantage in using one or other of them in certain cases, or *vice versa*. Thus, when the physiological effect is intended to be produced, it is better accomplished by the acid meconates of codeine and morphine, than by narcotine, or even unfavourably modified by the presence of this latter substance; the extract of M. M. Robiquet and Dublanc being free from it, will be found preferable to the common watery extracts; and in like circumstances the laudanum of Rousseau, prepared according to the original formula, will be better suited to the case than that prepared according to the reformed formula of Baumé. Each of the above men-

tioned preparations may then offer special advantages, but it by no means follows that they are of equal value.

In the first place, it must be conceded that such of the preparations of opium, which, like the extracts and laudanum made by fermentation, are prepared by manipulations which do not always afford identical products, have a marked disadvantage. In the next place, there are others which appear to present so much analogy of composition, on account of the methods by which they are prepared, that it is rational to suppose that they may be used for the same purposes. To this class belong most of the watery extracts.

It is therefore necessary to fix the best method of forming the first, and to determine of chemical and physiological experiments, if among the latter, that which is the most readily made, possesses any advantage over, or is equal to the others. Researches of this kind, in my opinion, will be of greater advantage to the pharmaceutic art, than the introduction of new preparations of the article under consideration, which in a few years are perhaps destined to become as problematical as their predecessors. I am confident that nothing is more prejudicial to our art than the great increase of new preparations, which do not produce either immediate principles possessed of unvarying properties, or combinations faithfully representing the primary article.

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ART. XXX.—ON THE MANIOC, AND ANALYTICAL EXPERIMENTS ON THE JUICE OF ITS ROOT. By O. Henry.

The Manioc (*Jatropha manihot, Janipha manihot,*) of the family of the Euphorbiaceæ, is a plant indigenous to America, and the cultivation of which is much attended to from Florida to the Straights of Magellan, as well as in many parts of Asia and Africa. In fact, this plant furnishes one of the principal sources of food to the inhabitants of these countries. There are two kinds of manioc, the *bitter* and the *sweet*, both of which are cultivated and afford different products; the bitter manioc, notwithstanding the active poisonous principle it contains, is the most esteemed, and yields the largest product; it is well known that this dangerous principle is dissipated or destroyed by the action of heat, and it is then easy to extract from the root a substance that is extremely nutritive both to man and animals. All authors agree in their accounts of the methods employed to extract this alimentary product, hence I shall not dwell on this point, but will merely present some details which I trust may prove interesting, as they were obtained from actual observation. I am indebted for them to Dr. Sureau, who, having lived for ten or twelve years in St. Domingo, has had numerous opportunities of inspecting every part of the process.

The *Janipha manihot* presents, as I have before said, two very distinct varieties, one *sweet*, and not poisonous; the other *bitter*, containing, besides the alimentary principle, a violent and subtle poison; this latter kind is the most generally cultivated.

It is difficult to distinguish the roots of these two varieties from each other; but on closely inspecting them, it will be perceived that in those of the sweet manioc, there are ligneous fibres towards the centre, which are not found in the bitter; and moreover, the first becomes soft by boiling, whilst the other does not. From these roots are prepared, *cassava*, *tapioca* and *flour of couscous*.

To obtain cassava, roots of the size of the arm are washed

and reduced to a pulp with a coarse rasp or grate, and this pulp subjected to pressure in bags of different kinds, but that generally used is formed of the bark of a tree, and the pressure made by suspending weights to its bottom; the liquid which is forced out is received in proper vessels.

The *cassava* is prepared by taking the pulp thus freed from the juice, and spreading it about two inches thick on iron plates, over a fire, after which the cakes thus formed are dried in the sun.

The root of the manioc furnishes a great quantity of fecula, which is prepared in the usual way, and sold under the names *starch*, *cipipa*, or *moussache*. Washerwomen make use of it, but prefer *arrow root*, which they erroneously term *sago*. It is important in the practice of medicine to ascertain the origin of the feculas sold in the shops, for serious consequences have resulted from the administration of that of the manioc.

Those parts of the pulp which remain on the sieve, are dried, slightly roasted and contused, so as to form a very coarse powder, termed *flour of couscous or tapioca*, when boiled with milk it forms an excellent article of food.

The root of the bitter manioc, as has already been stated, is very poisonous, and it is evident from the above, that its poisonous principle resides in the juice; this principle appears to be very volatile, and its penetrating odour resembles that of hydrocyanic acid. Nevertheless, although the juice of the bitter manioc is extremely dangerous the negroes often apply thick layers of the recent pulp on large ulcers, without experiencing any other effects than a marked melioration of the disease. It is probable then, that if hydrocyanic acid forms part of the poisonous principle, in such proportions as are indicated by the smell of the juice and the volatility of the poison, this pulp could not be applied with impunity on surfaces of so great an extent, even making all due allowances for the diminished vitality of the parts, for it is only to old fungous and callous ulcers that it is applied.

Dr. Sureau has also transmitted to me, a case exemplifying the poisonous action of this juice, which possesses no slight interest.

It is known that the slaves in the West Indies often attempt to commit suicide. The following says Dr. Sureau, was communicated to me by a magistrate of Cavaillon, St. Domingo, the son of a physician, and a well informed man.

"Before the revolution, said he, I was one of the inspector generals of culture; taking my rounds one day, I arrived at a house where they informed me that one of the negroes had just taken a quantity of the juice of the bitter manioc. He was surrounded by the other work people, and we much feared that his example as is almost always the case, would be followed by his companions. I immediately ordered him (already beginning to feel the effects of the poison,) to be whipped. He was therefore turned over to the inexorable overseer, who pursued him round the court yard, armed with his treble whip. The dragoons of my escort also pursued him, and the poor wretch to escape the blows, ran about, rolled himself on the ground &c. The punishment being over, it was fully expected that he would soon fall a victim to the poison he had taken, when to our joy, he experienced no ill effects from it. About a month afterwards another negro in the same neighbourhood, poisoned himself in the same way; one of the dragoons, who was present at the *cure* of the above, immediately advised the remedy then prescribed; the patient was severely scourged, and recovered."

Hogs are very fond of manioc, and when cassava is making they often deceive the vigilance of their keepers, and swallow large quantities of the juice. When this is the case, they are pursued for an hour, so as to fatigue them greatly, which generally prevents the poison from taking effect.

It would be easy, says Dr. Sureau, to give a satisfactory explanation of these facts. In general, absorption takes place in an inverse ratio to the degree of force and vital energy. Thus individuals who are enfeebled from moral or physical causes, readily contract contagious disorders. Those, on the contrary, who lead an active life, and are endowed with much moral energy, or a certain degree of recklessness, are less exposed than others to contagious miasmata.

There can be no doubt, that in the case in question, the

fatigue, the whipping, and the exertion made by the patients, by accelerating the circulation, produced an abundant perspiration, and prevented the absorption of the poisonous principle.

The facts just related leave no doubt as to the poisonous character of the root of the bitter manioc. Its active principle resides in the juice extracted by expression, and appears to be very soluble and volatile or destructible by the action of the heat used in preparing the pulp for food. It, therefore, is of importance to ascertain the nature of this principle. M. M. Souberan and Pelletier have already examined a small quantity of the juice; but on account, in all probability of the minute portion on which they operated, the juice on distillation only afforded them a smell of bitter almonds, without any other indication of the presence of hydrocyanic acid, a small quantity of uncrystallizable sugar, and an azotized substance. Having received a bottle of the juice of the bitter manioc from Dr. Sureau, sent with the greatest care, and accompanied with some of the distilled water of the same plant, I subjected these products to various trials, hoping that the juice, although very alterable, might still present some interesting peculiarities, and a portion of the active principle. The distilled water, giving no indication of hydrocyanic acid, nor any thing thing that was remarkable, I pass at once to the analysis of the juice.

Analysis of the Juice. This fluid, obtained from the fresh pulp by expression, was of a greenish yellow colour, not very consistent, translucid, especially after filtration, which separated some amylaceous particles mixed with glutine. Its taste was somewhat bitter, and at the same time sapid and not disagreeable. When evaporated in the open air, it afforded small but very distinct crystalline grains.

Reagents demonstrated the presence of very little lime, but of a tolerably strong acid, alcohol produced viscous white flakes and barytes and nitrate of silver threw down precipitates.

On exposing the juice to the action of heat, a sensible odour of hydrocyanic acid was disengaged, which was followed by

a very pungent smell of another kind. To verify the nature of these volatile principles, I collected the vapours with the greatest care in a diluted solution of nitrate of silver; white flakes were formed, which when collected on a watch glass, washed with alcohol and water, gave out on the addition of hydrochloric acid, an unequivocal smell of cyanogen. There exists then, in the juice of the manioc, either hydrocyanic acid, or a principle capable of giving birth to it. After this trial, the fumes continuing very pungent but not acting on the salt of silver, I received them in pure water, which soon acquired a marked acidity.

Wishing to ascertain the nature of this acid, and to prove whether it was not constituted of formic acid, originating either from the hydrocyanic acid or from a peculiar cyanic radical preëxisting in the juice, I evaporated to dryness the acid liquid, previously neutralized with caustic soda; the salt which resulted, heated in a small tube with deutoxide of mercury, did not present the marked character of the formiates; namely, the formation of metallic mercury and carbonic acid: But when treated with sulphuric acid this salt produced pungent fumes of acetic acid. It is therefore this acid that exists in the juice examined; it may perhaps have resulted from the alteration of saccharine principles during the time the juice remained in the bottle.

The substance remaining in the retort after the above operation, had acquired a brown colour, it was not exempt from acid properties, and its bitter taste indicated the presence of an osmazomic principle. I evaporated it very cautiously over a water bath, to the consistence of a syrup; during this evaporation an odour of acetic acid was very perceptible. The syrup when cold became solid, the mass was placed on a cloth, drained, pressed and washed with alcohol: the result was a whitish deposit AA.

The drainings and washings again concentrated, were bitter, very acrid and irritated the throat very powerfully; their osmazomic odour was more marked. Finally, on the addition of a little yeast, a slight fermentation was produced, after the acid had been completely neutralized. Hence, it

appeared to be a mixture principally formed: 1st, of an acrid, bitter principle; 2d, of acetic acid; 3d, of vegetable osmazome: (or what I have termed such,) 4th, of a trace of sugar.

The whitish deposit AA, after the washing with alcohol, was dried at 100° C., when it became pulverulent; it was then dissolved in tepid, distilled water and filtered, (there was a very small residuum of insoluble phosphate of lime;) the solution was limpid, without any sensible colour or taste; when treated with reagents it gave no indication of free acid; the oxalate of ammonia formed a slight white precipitate in a short time. Caustic soda afforded a gelatinous white precipitate. Ammonia a flocculent one. Phosphate of soda produced a turbidness, which became more evident on the addition of ammonia. The acetate of lead, and nitrate of silver produced only a slight turbidness. Corrosive sublimate, proto-nitrate of mercury, and the red oxide of the same metal gave no indications of the presence of a formiate. Alcohol caused a tolerably large precipitate. Muriate of barytes gave a sensible deposit.

The solution evaporated by a gentle heat, afforded a neutral, brilliant, white crystalline salt, slightly efflorescent when exposed to the air. This salt, when calcined in a platina crucible, was decomposed, giving out an odour of burnt bread: after a long calcination there was a white residue which was found to be magnesia; it formed about thirty-eight to forty per cent. of the salt calcined.

Finally, a portion of the organic salt having afforded a white precipitate with muriate of barytes, I washed this carefully, and by means of diluted sulphuric acid, obtained some small needle like crystals, which were soluble in alcohol. I am of opinion that this salt, contained a peculiar organic acid, but the quantity was too small to determine the fact with certainty; I have termed it *manihotic acid.*

From the above experiments, it appears that the juice of the bitter manioc examined by me, was composed of:

1st. Hydrocyanic acid, or at least of a volatile principle capable of giving birth to it.

2d. Of acetic acid, produced, in all probability, by the presence of a certain proportion of sugar in the juice.

3d. Of an organic salt, having a base of magnesia, the acid united with it appearing of a peculiar character, (manihotic acid.)

4th. Of an acrid, bitter principle, irritating the throat, and very soluble in water and alcohol.

5th. Of a brown compound substance, soluble in the same fluids, having an osmazomic smell and taste, and mixed with traces of sugar.

6th. Of some salts, especially phosphate of lime.

7th. Of amylaceous fecula and glutine, forming an insoluble deposit in the unfiltered juice.

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ART. XXXI.—NEW METHOD OF OBTAINING CANTHARIDINE.

By M. Thierry.

M. Robiquet was the first chemist that isolated the vesicating principle of cantharides, or at least that which enjoys this property in the most marked manner. He gave it the name of *cantharidine*, and pointed out its distinguishing characters: but his mode of extraction is long, complicated, and gives but a trifling product. For a long time past I have endeavoured to extract cantharidine by a more simple and expeditious procedure, when at last I hit upon it by accident.

About ten years since I prepared vesicating plaster, which, not acting as expeditiously as I wished, to render it more active I moistened its surface with an etherial tincture of cantharides which had been made for some time. Some hours afterwards on examining the plaster, I was surprised to find its surface covered with crystalline scales.

Having to prepare cantharidine by the method of M. Robiquet, and having obtained a very small quantity, I reflected on what other means might be employed, and recollected the above occurrence, which I determined to take advantage of.

Cantharidine may be produced by three methods which are very analogous, differing only in the price of the menstruums used. These are alcohol, etherial alcohol at 40° and alcohol at 34°.

Whatever may be the vehicle employed, the product is identical in quality and quantity. When cantharides are treated with ether, but little green oil is obtained, and it is easy to separate the cantharidine from this oil. With etherial alcohol, there is more green oil, and finally, with alcohol the proportion is still greater. The difficult part of this process is to separate the cantharidine from the green oil.

The etherial tincture of cantharides is of a slight greenish yellow, although the green oil is very soluble in ether. The etherial alcoholic tincture is much higher coloured, and that prepared with alcohol is almost black.

To obtain cantharidine the cantharides are to be macerated in one of these menstruums for some days, and the mixture then placed in an apparatus for filtering by displacement. When the solution has drained off, another portion is to be added till it passes almost colourless. The quantity retained by the powder is obtained by chasing it off by means of water. The tinctures are to be mixed together, and distilled, to obtain the ether or alcohol employed.

This being done, the retort is suffered to cool, when the cantharidine will crystallize in scales, if the solution is concentrated; and in beautiful four-sided prisms, if it is weak.

This cantharidine, not being perfectly white, it is again to be subjected to the action of boiling alcohol, with the addition of animal charcoal. Instead of subjecting the filter made use of, to pressure, if cold alcohol be poured on it, this will dissolve all the green oil which contaminates the cantharidine.

Pure cantharidine has no smell. When heated in a glass tube, it melts at 210° C. and is sublimated in white fumes which condense at the upper part of the tube, in brilliant, acicular crystals. A black matter remains at the bottom of the tube which is insoluble in water, alcohol or ether.

Concentrated sulphuric acid does not dissolve cantharidine,

except when aided by heat; the solution in the latter case is of the colour of dark brandy; on the addition of water to this solution, the cantharidine is precipitated in small acicular crystals. Nitric acid, with the assistance of heat, dissolves it without change of colour. The solution, on cooling, deposits crystals of the some form, but of a larger size than those from the sulphuric acid. Hydrochloric acid acts like the nitric.

A solution of caustic potash dissolves cantharidine. If acetic acid be added to this, the cantharidine is precipitated in a crystalline state. A solution of caustic soda acts in the same manner. Liquid ammonia has no action.

Oil of turpentine, when boiling, dissolves cantharidine, and on cooling deposits it in a crystalline state. Almond and olive oils dissolve it with the assistance of heat, but it again separates on cooling. Axunge acts in the same way.

From the analysis of M. M. Pelletier and Henry, cantharidine is composed of

Carbon	68.56
Hydrogen	8.43
Nitrogen	9.89
Oxygen	13.15—100.03.

It may be said, that when cantharides are mixed in olive oil or axunge, these substances become charged with the vesicating principle, and thus form very active ointments! This is true. Cold alcohol dissolves only a very small quantity of pure cantharidine; and yet I prefer it as a vehicle for its extraction; but when cantharides are treated with alcohol, this acts at the same time on the cantharidine and the green oil with which it is combined in the insect.

To prepare an ointment with cantharidine, this must be divided by adding a small quantity of rectified alcohol, mixing this with a little axunge, triturating for a long time, and finally incorporating it with the rest of the grease. One grain of cantharidine to the ounce of axunge forms a very active ointment.

Two kilogrammes of cantharides treated as above describ-

ed, gave eight grammes (two drachms,) of pure cantharidine.

I have treated cantharides which contained no cantharidine. Some that I left in a drying stove for six weeks, gave no trace of this principle. It is probable that the means sometimes used to kill these insects, influence the quantity of cantharidine to be obtained.

It has been said that the green oil has no vesicating property; this is true, but it is only when it is very old and has deposited all the cantharidine it contained. To verify this, I rubbed my arm with some oil recently prepared; twelve hours afterwards the skin was red, and this irritation lasted several days. With some prepared a year before, no such effect was produced. *Journ. de Pharm.*

ART. XXXII.—PREPARATION AND EMPLOYMENT OF ACONITINE.

By Dr. Turnbull.

We have made several attempts to obtain aconitine from the Parisian chemists, for the purpose of employing it in medicine, but have never hitherto succeeded. It is now, however, prepared in town, and may be had in sufficient quantity for present use, by those practitioners who may wish to make trial of its properties. We have contrived several processes for obtaining it, two of which shall now be given: the first is the easier to manipulate, but the second yields a much purer result.

A quantity of the fresh root of the Aconitum Napellus must be procured, and care should be taken that it be sound, and that the root be that of monkshood; for sometimes other roots are sold for it. Let it be carefully and cautiously dried, and then reduced to powder; this latter operation is not unattended by danger, especially if a part of the fine dust which rises

from it be inhaled. One part by weight, of the powder, and two parts, by measure, of strong alcohol, are to be digested together in a gentle heat for seven days, and the tincture, while warm, is to be filtered. It is then to be reduced to the consistence of an extract by careful evaporation, at a low and well regulated temperature; the object of this, is to prevent the destruction or expulsion of the active principle, which would very propably ensue, if the temperature employed were higher than barely sufficient to carry off the alcohol. To the extract thus prepared, liquid ammonia is to be added, drop by drop, and well mixed with it, to precipitate the alcaloid: and in this part of the process, care must be taken that too much be not added, as in some instances the product appears to have been decomposed by inattention to this circumstance. It is difficult to give a precise rule as to the quantity; but enough will have been added, if the extract give out the odour of ammonia, when stirred.

The mass now consists of impure aconitine, mixed up with a quantity of extractive and other matters, soluble in water; and it may be taken up either with boiling alcohol, or sulphuric ether; or the soluble matter may be removed by repeated washings with small quantities of cold water, which will leave the aconitine. This latter process, is the one we have generally employed, and is performed by pouring a little water on the extract, and mixing them carefully together, then allowing the undissolved part to subside, pouring off the fluid, and repeating the operation, as long as any soluble matter is taken up; a quantity of light brown, or grey powder is left, which may be purified by subsequent solution in alcohol. This powder contains the active properties of the aconite, in a high degree of concentration. A grain of it was dissolved in a drachm of alcohol; and twenty drops of the solution put into the mouth of a guinea-pig, occasioned death in a few minutes. Other experiments have been performed; all of which prove the extreme energy of the substance.

The second process consists in dissolving the alcoholic extract, prepared as before, without the addition of the ammo-

nia, in as much cold water as will take it up, and carefully decanting the solution from the insoluble part, and then filtering it. To the filtered solution, liquid ammonia is to be added, drop by drop, as long as it occasions any precipitation. When the precipitate has subsided, the supernatant fluid should be carefully poured away, or drawn off by means of a syphon; and after the precipitate has been deprived of as much of the fluid as possible, it should be purified by a sufficient number of washings with small quantities of cold water, and then carefully dried. The product obtained by this process is white.

The aconitine is possessed of an action similar, in some respects at least to that of Delphinia. When a small quantity of it, either made into an ointment or dissolved in alcohol, is rubbed for a minute or two upon the skin, a sensation of heat and prickling is experienced; to this succeeds a feeling of numbness and constriction on the part, as if a heavy weight was laid upon it, or as if the skin was drawn together, by the powerful and involuntary contraction of the muscles beneath. This effect lasts from two or three to twelve, or more hours, according to the quantity rubbed in. So small a portion as the one-hundredth part of a grain, has produced a sensation that has continued a whole day; but the alcaloid in this instance was in a high degree of purity.

The action of the Aconitine upon the cutaneous vessels, appears to be less than that of either veratria or delphinia; for in no case hitherto observed, has it produced a greater degree of vascular excitement, than might easily be accounted for by the friction itself; and in one instance where the Veratria ointment did occasion irritation, the aconitine has been employed without giving rise to any.

The diseases in which I have chiefly employed the aconitine externally, are tic douloureux and neuralgic affections generally, and in gouty and rheumatic cases; and its success has fully answered the anticipations that had been formed of its utility. I have employed it in the form of solution in alcohol, in the proportion of one or more grains to the drachm, and in ointment made according to the following prescription:—

Aconitæ, gr. ii,
Alcohol, gtt. vi,
tere optime et adde,
Axunge, ʒi,
ut fiat unguent.

The object of adding the alcohol, is to prevent the aconitine from forming a thick compound with part of the lard, which renders it difficult to make a proper ointment.

The proportion of the alcaloid in this prescription will, in general, be sufficient to begin with, but it may be augmented to four or five grains to the drachm, if necessary; and in one case of tic douloureux of unusual severity, I prescribed as much as eight grains to the drachm, with the most marked benefit. The best manner of applying the ointment, is simply to rub a small part of it over the whole seat of the affection, till the pain be either for the time removed, or until the full effect upon the cutaneous nerves above described be brought about; and the friction should be repeated three or four times, or more frequently in the day, according to the effect produced upon the disease. The proportion of the aconitine ought to be increased at every second or third friction; and the same rule elsewhere laid down, in regard to the action of Veratria and Delphinia, also holds good in the present instance, namely, that unless the friction occasion a full developement of the peculiar impressions caused by the aconitine when rubbed on the skin, no benefit whatever is to be looked for from its employment. It is almost needless to remark that an application of such activity should not be resorted to, if there be the slightest abrasion of the surface of the skin, and that it should be carefully kept from coming in contact with any of the mucous membranes.

The next preparation that requires notice, is the ammoniated extract of aconite; this is propably the best appellation for the substance, although it be in reality a mixture of all the active principles, along with the extractive and other matters. It is made by evaporating very carefully, and at a low temperature, the tincture of the dried root of the plant, prepared as already directed in the process for obtaining the aconitine, to

the consistence of an extract. To every drachm of this, eight or ten drops of liquor ammoniæ should be added; and after the mixture has stood a short time in a very gentle heat, to drive off the excess of ammonia, it is to be used in the form of ointment, according to the following prescription:—

℞. extract, aconit. ammon. ʒi. axung. ʒiii. M. ut fiat unguent.

This, from its dark colour, may be a less agreeable application than the aconitine ointment; but it appears to me, to be at least as efficacious, and it has the advantage of being easily and cheaply prepared: and on these accounts, it is better suited for hospital practice. The proportion of the extract may be increased two or three fold according to circumstances.

When this ointment is rubbed upon the skin, it occasions sensations in the part, similar to those which are produced by the aconitine ointment; they are however, rather more pungent in their character; and this probably arises from the extract containing what is called the acrid principle of the plant, as well as the alcaloid itself; and it is absolutely necessary, that with this preparation also, these sensations should be induced, in order to its having a full effect on the disease for which it is applied.

In the report of the preceding case, it might be inferred that the discovery of the properties of the aconitine, when applied externally, was due to Dr. Roots; but in justice to him, I must state that the report was not drawn up by him, and that he has in the most handsome manner disclaimed all merit in the discovery.—*London Medical and Surgical Journal, for February*, 1835, *and N. A. Arch. Med. and Surg. Sci.*

ART. XXXIII.—ON THE BERRIES OF THE RHUS CORIARIA.

By J. B. Tromsdorff.

This species of Rhus is a shrub, found in poor ground. The leaves and young branches are ground and sold in commerce under the name of *Sumach*; and are much used in the preparation of morocco leather.

The berries are distinguished by an acid and slightly astringent taste. M. Tromsdorff analyzed them many years since and obtained an acid salt, which he erroneously supposed to be acid tartrate of potash; his late experiments on a large quantity of these berries, however, have enabled him to correct his mistake.

The acid of these berries he finds to be the malic, principally combined with lime in the state of a super salt; but they also contain a small quantity of malate of potash. The acid exists in the greatest proportion in the down or coating of the berries.

This fruit may be advantageously employed to obtain a pure malic acid, by the following process. Boiling water is to be poured on the berries deprived of their footstalks, and placed in an earthen pot; after remaining in the fluid for about a quarter of an hour, the whole is to be poured on a linen strainer, a red and very acid liquid passes through; the residue is to be well washed with boiling water, and the washings added to the first solution.

This liquid is to be evaporated in a porcelain capsule by a gentle heat; during this process a slight deposit of extractive matter takes place, when the fluid is to be again strained and the evaporation continued. When this has reached a certain point, a large quantity of crystals of a very acid salt of a whitish gray colour will be formed. The last crystallizations will be of a darker colour, and contain a certain proportion of malate of potash.

Finally, a thick and very acid liquid remains from which no crystals can be obtained, which will be presently spoken of.

To purify the crystals, they are to be pulverized, mixed with animal charcoal, and dissolved in boiling water, this method, however, occasions some loss. In fact, the charcoal is not necessary, all that is requisite being to redissolve the impure salt and to again crystallize it.

Pure malic acid may be made from this salt by dissolving it in water, precipitating the lime by carbonate of potassa, and decomposing the solution by acetate of lead. The precipitate obtained is malate of lead, which when dried is very brilliant and of a dazzling whiteness. If the precipitation is performed on a hot solution, the precipitate assumes on cooling the form of small brilliant scales; these are to be collected on a filter, and after being drained and washed with cold water, they are to be suspended in water and decomposed by a current of sulphuretted hydrogen, the sulphuret separated, and the acid liquid evaporated, when it will afford pure malic acid in needles, forming mammillary groups by their agglomeration; these crystals deliquesce on exposure to the air.

Mr. Tromsdorff next examined the syrupy mother water spoken of above; he diluted it with water and added a hot solution of gelatine; a considerable quantity of a combination of gelatine and tannin separated from the fluid, in the form of an elastic mass; but one portion of the precipitate remaining in suspension in the fluid, this continued turbid even after filtration. It was then agitated with a little white of egg and rapidly boiled, when it became clear and was strained through a woollen cloth. It had now lost all its astringent taste, had no action on the salts of iron, or on a solution of isinglass; but still retained some colour, and had a strong acid. By a slow evaporation and the addition of alcohol, it afforded a large quantity of acid malate of lime in dark crystals, which were purified by redissolving and again crystallizing. *Journ. de Pharm.*

ART. XXXIV.—ON AN ACID FROM SAPONINE. By E. Fremy.

On the 17th of February the author addressed a note to the Royal Academy of Sciences, on *Esculic acid.* When pulverized horse chestnuts are treated with cold alcohol, this menstruum takes up the acrid principle they contain, and on evaporation affords a gelatinous mass, of a light yellow colour, which has the following properties: It is soluble in water and alcohol in all proportions, but its solubility decreases in proportion to the augmentation of the concentration of the alcohol; it is insoluble in ether. The aqueous solution froths on agitation; when treated with nitric acid it is transformed into a yellow resin. It is seen that these properties are the same as those of the saponine obtained from the Egyptian soapwort. It may, therefore, be asserted that horse chestnuts also contain saponine.

If this saponine be treated with hydrochloric acid, a precipitate is not immediately formed, but the fluid soon becomes turbid, and deposits an acid, white substance; if heat be used this precipitation takes place at once. This precipitate is scarcely soluble in cold water, very soluble in alcohol, and crystallizes in small granular forms. The author has given it the name of *Esculic acid.* Besides this acid, the saponine in question contains a very acrid colouring principle which has acid properties. The combination of this substance with potash is insoluble in weak alcohol, whilst the esculate of this alkali is very soluble in that fluid.

Saponine, therefore, is to be treated, either with the aid of heat, or otherwise, with a little potash; then alcohol is to be added, which precipitates the combination of the colouring matter with the potash, in the form of a thick syrup. The supernatant fluid is to be decanted and evaporated, to drive off the alcohol. It is then to be treated with an acid, which precipitates the esculic acid. It is therefore evident, that in the saponine of the horse chestnut, this acid is retained by this yellow colouring matter, which prevents its precipitation. Pure esculic acid is almost insipid, and scarcely soluble in water,

very soluble in alcohol, insoluble in ether; nitric acid transforms it into a yellow resin; its combinations with bases are decomposed by carbonic acid. Its composition is:

H. = 8.352,
C. = 57.260,
O. = 34.388.

Calculating from this, which is the mean of several analyses, we are led to the following formula, C^{13} H^{23} O^{6}. Its capacity for saturation was determined on the salts of lead and silver; its atomic weight is 6.944. The atomic composition of esculic acid is therefore: C^{52} H^{92} O^{24}.

This acid, in combining with bases, does not lose its water. The only soluble esculates are those of potash, soda and ammonia. *Journ. de Chim. Med.*

ART. XXXV.—MEMOIR ON TEA. By F. Pigou.

With observations by A. Chereau.

So much has been written on tea, of which there is so great a consumption in and exportation from China, that we should be cautious in crediting what may be published as new on the subject. Nevertheless, when the powerful interest it excites is considered, and how much uncertainty and how many errors exist respecting it, the necessity for further details becomes evident, if it can be proved that they are derived from an authentic source. Those given in the present paper are derived from a report made by Mr. F. Pigou to the English East India Company, who had commissioned him to procure all the information possible with respect to the culture and preparation of this article. To accomplish this, as access to the places where it is cultivated is prohibited to foreigners, Mr. Pigou employed intelligent agents, among others, Chou-qua, who made eight journies to the district, and remained there from four to six months each time; the information he thus obtained forms the basis of Mr. Pigou's report.

The Chinese all agree that there is but one species of the tea plant, and that all the difference observable in the teas of commerce, are owing to the soil and preparation. This is a well known fact, and was first stated by Lord Macartney and Sir George Staunton, who observed it in their passage through the tea district, in the progress of their embassy from Pekin to Canton. Besides which, Chou-qua states that many cultivators, especially about Ankoi, mix the leaves of several other plants with those of the tea shrub. This may be verified by examining the tea of commerce, by immersing it in warm water and unrolling the leaves, all the leaves which are not dentate are spurious.

The different species of tea are artificial. Thus the *Bohea* may be changed into *Hyson* at will, and it is the same with all the other kinds. But Chou-qua affirms that experience has shown, that much depends on the cultivation and soil; so that the *Bohea* will make good or indifferent *Hyson*, according to the locality; however, in the province of Tokein, which is emphatically the tea district, *Hyson* is manufactured in large quantities.

The Bohea district, which forms part of this province, is very mountainous, though the plants are cultivated both on the elevated grounds and in the vallies.

The author has shown that the true *Souchong* is very rare and commands a high price. That sold to foreigners as Souchong, is only the first quality of Congo, and the Congo of the Canton market, is again the first quality of Bohea.

In a tea plantation, (situate on a hill,) there is perhaps but one shrub which furnishes a sufficiently good product to be termed Souchong. And even in this case, the finest and youngest leaves only are classed as such, whilst the rest furnish Congo and Bohea.

Tea harvest. There should be but three gatherings of the leaves, or at most four, (for Souchong but one.) Any attempt to strip the bush beyond this, militates against the goodness of the crop of the succeeding year. The first, which takes place from the middle of April to the end of May, is termed *Loro-tchune;* the second, from the middle of June

to the middle of July, is called *Curl* or *Geech-chtune;* the third, from the commencement of August to the end of September, is denominated *San-chtune.*

Tea is never gathered during the winter. The plants last for several years; when they become old, they decline and die, but the root furnishes suckers. The ground is never manured, but is worked with great care. Tea is not gathered leaf by leaf, the whole twig being cut off. The gathering is made at all times of the day, as it is immaterial whether the leaves are wet or dry.

Manner of preparing Bohea. When the leaves are gathered, they are placed in large, shallow baskets to dry. These baskets are disposed on frames in the open air, and exposed to the action of the sun, if it be not too violent. This exposure lasts from morning till noon. The leaves now begin to acquire their aromatic smell. They are then heated on a stove,* on which a half catty ($\frac{2}{3}$ lb.) is placed at a time; the leaves are twice stirred rapidly with the hand, for the stove is kept very hot, when they are removed with a short brush. On the removal of the leaves from the stove, they are again placed in large flat baskets, and rubbed between the hands, to roll them up, after which they are subjected to the action of milder heat than at first. They are then put in large baskets, suspended over a charcoal fire, well dried, and afterwards spread on a table where they are sorted, and broken leaves &c. removed.

The Congo, according to Chou-qua is twice subjected to the action of the stove, as well as the Souchong: but Youny-shau, another emissary of Mr. Pegou's, says, that Souchong and Congo are not manufactured in this way, but are only two or three times heated over a charcoal fire. He also says that the Souchong, Congo and Hyson, as well as the beautiful Singlo, are beaten with flat sticks, or bamboos,

* *Tacht*, a cast iron stove. As the action of heat renders the tea milder, by extracting the oil, the stove gradually becomes coated with an oily crust, which it is indispensable should be removed by washing. Whenever the leaves become moist, they are again placed on the stove. This process augments the weight of the tea, at each repetition.

after they have been wilted by exposure to the air or sun, and have acquired sufficient pliancy not to be broken by this operation, which developes the aroma, and deprives them of their acridness.

When Bohea has not been twice stoved, it is considered as badly prepared. In this case the infusion, instead of being green, is yellow. The common tea, used by the lower classes in China, is first subjected to the action of boiling water, which, however, does not prevent its preserving much acrimony, strength and bitterness.

Different kinds of Tea. Peko. This tea is prepared with the leaves of plants of three years of age; but only those are taken which have just expanded, whilst they are still whitish, velvety and covered with a soft down. Shrubs of from five and six years of age may also furnish a certain proportion of Peko, but after this the product becomes Bohea, if the plants grow in the valleys, and Congo if on the hills.

Lint-sessin. This appears to be composed of very young, convoluted leaves with their petioles; the Chinese do not esteem it—it is not stoved. It is only prepared to please the eye; the leaves are gathered too young to have any perfume.

*Leoo-ching.** This tea is prepared like Bohea, or like the green tea, as the demand may be; but it is generally used for the manufacture of Singlo, for which it is best suited.

Ho-ping. So called from the country where it grows, about twelve days journey from Canton. The Ho-ping is prepared like the Bohea, but with less care, on account of its inferior quality. Wood is used instead of charcoal in drying, which adds to the unpleasant odour which this tea derives from the nature of the soil where it grows.

Honan. This tea grows opposite to Canton. It is prepared in April and May for the Canton market, especially for female use; it is not exported. It gives a reddish co-

* Leoo-ching is a district about eight days journey from Canton; it produces annually 1000 peculs of tea; the pecul is 133⅓ lbs.

loured infusion. It is worth three candarines a catty; but the best quality will bring twelve candarines.*

Ankoi. So called from the country which produces it, about twenty-four days journey from Canton. It is prepared much in the same manner as Bohea. When this tea is intended for exportation, it is packed in large baskets, similar to those used for Bohea, and heated over a charcoal fire. There is another kind, *Ankio peko.*

Sing-lo and *Hyson.* These teas are prepared in the following manner: after the leaves have been gathered, they are at once stoved, and rubbed between the hands to roll them; after which they are spread on a table to separate them, as they are apt to adhere. This latter operation is performed by women and girls, who, according to their proficiency, can prepare from one to four catties a day.

These operations are repeated, and the tea packed tightly in boxes, whilst hot, as otherwise it would break and crumble.

Sing-lo is more powdery than Hyson, and must be fanned twice, whilst a single process of this kind is sufficient for the latter. The *Tunkei*-singlo is the best, arising from the soil which produces it. It grows in the Hyson districts.

Hyson skin is thus called from its resemblance to the skin or pellicle of the Hyson, and is not as much esteemed as that tea. Hyson skin consists of larger but less handsome leaves, of a poor colour, and is known in London by the name of *Bloom tea.* The *gomi* and the *oot sein* are also varieties of Hyson. The leaves of the first are small and twisted, resembling pieces of twisted wire; the oot sein has a shot like form.

Bing tea, has received its name from the person who first prepared it. It grows about a four days' journey from the Hyson district. The leaves of this tea are long and thin, those of Singlo are short and thick.

* Chinese accounts are kept in tales, maces, candarines and cashes. The tale is divided into 10 maces, 100 candarines, or 1000 cash.

Mr. Pigou then gives an account of the numerous frauds and deceptions practised in the tea trade.

In the Bohea district, when tea is dear, and probably the same is practised in the other districts, the old and hard leaves are gathered, they are steeped in hot water, and then prepared as usual, after which they are pounded and mixed with other teas, in the proportion of five or six catties to ninety-five of good tea.

The Chinese have also several modes of changing Bohea into green tea; for this purpose, they use the coarse Ankoi, the larger leaves of which are selected; ten catties of these are softened in water, or an infusion of tea, when the leaves are somewhat expanded, they are placed on a heated stove, with a small quantity of powdered *chico*, (a magnesian stone,) and proceeded with as before. The last part of the operation is to sift it. If it is not yet sufficiently green, it is again put on the stove; these processes give the green tinge.

The Ho-ping already described, and which is a Bohea, is often changed into a green, resembling the Leoo-ching, also spoken of. It is then sold at Canton for Singlo. All these manufactured teas, as they may be termed, as well as those of bad quality, are generally mixed with the finer sorts for exportation.

The differences observed in teas depend on the soil. As to the modes of preparation, they appertain to the manufacturer, and are the fruit of his skill, and often of his caprice; sometimes he neglects his fire, as well as other steps of the process; sometimes from economy, he employs wood, and even green wood instead of charcoal, or makes use of straw or other substances, for the inferior qualities. The season also, has much influence on the qualities; they are always best when the temperature is mild.

The Chinese at Canton also endeavour to sell all their teas as fresh, striving to give them this appearance, either by mixing with really fresh tea, or by again stoving them.

It is calculated that of one hundred Chinese, forty only are enabled to drink tea, the remainder using water alone. Many of these latter, after their rice is cooked, fill the cooking utensil with water, and as some of the rice has become

burnt, it imparts some colour and taste to the fluid, which is then used instead of tea.

Properties. The Chinese consider the old Bohea as good, they make use of it in fevers to produce perspiration, and they sweeten with an impure sugar, to which they add a little ginger.

Old Hyson is said to be efficacious in obstructions of the stomach from indigestion. When a sense of weight is felt a few hours after a meal, the infusion of Hyson is salutary.

Names. Bohea is pronounced *Voo-yee*, which is the name of the district.

Congo, *Cong-foo.* This tea requires great care in the gathering and preparation of the leaves.

Peko, *Pe-how.* This is the young leaf, whilst still white.

Souchong, *Se on chong*, (a good thing.)

Oo-ching. From its place of growth.

Ho-ping. do. do.

Ho-nan. do. do.

An-koi. do. do.

Sing-lo. do. do.

Hyson. He-tchune. First gathering.

Quantity of Tea gathered in China, yearly.

Singlo	50,000 peculs.
Hyson . . .	4,000
Lonk-ann, or small leaves not exported,	20,000
Mo-i-shan, not exported, . .	2,000
Bing	2,000
Phow-go, a kind of Bohea, . .	2,000
Bohea, including Congo, Peko and Souchong, . .	120 to 130,000
Ankoi, and varieties of green tea,	50,000
Openg . . .	15,000
Ing-ann, a kind of Bohea . .	400
Cow-lou, made into Bohea or Slingo,	2,000
Loot-sien	2,000
	269,400

Journ. de Chim. Med.

ART. XXXVI.—ON THE QUANTITY OF WATER CONTAINED IN CRYSTALLIZED BARYTES AND STRONTIA. By RICHARD PHILLIPS, F.R.S.L. & E. &c., Lecturer on Chemistry at St. Thomas' Hospital.

DR. DALTON in his Chemical Philosophy (vol. i. p. 523.) states that he found that 80 grains of fresh crystallized barytes, dissolved in water and saturated with sulphuric acid, gave 36 grains of dried sulphate of barytes; and hence he infers, that in the crystals 20 atoms of water are united to one atom of barytes. On looking into chemical works I do not find that any other chemist has attempted to ascertain the quantity of water which these crystals contain; indeed Dr. Dalton's statement is quoted by both Thomson and Turner.

Not remembering any case in which a binary compound like barytes unites with so many as 20 equivalents of water, and as Dr. Dalton admits that his experience on the crystals of barytes has been limited, I was induced to repeat the experiment, in order to ascertain whether or not these crystals formed an exception to what appears to me to be a general rule.

With this intention I decomposed some sulphate of barytes by heating it with charcoal, and dissolving the sulphuret of barium in water: the solution was heated with peroxide of copper, and filtered while hot. On cooling, crystals of barytes were plentifully obtained, which were dried, as well as they could be, by repeated pressure between folds of blotting-paper. One hundred parts of these crystals were supersaturated with muriatic acid, and the solution was decomposed by sulphuric acid: in one experiment 72.19 parts and in another 72.15 parts of sulphate of barytes were obtained, giving a mean of 72.17; now as 116 of sulphate of barytes contain 76 of the earth, 72.17 parts contain 47.28 of barytes, which, deducted from 100, the crystals employed, leave 52.72 as the quantity of water which they contained. Now a compound of

$$\left.\begin{array}{l}\text{1 equivalent barytes } 76\\ \text{10 eqnivalents water } 90\end{array}\right\} \text{give } \left\{\begin{array}{l}45.8\\ 54.2\end{array}\right\} \text{in } 100.$$

which agree sufficiently well with my experiment to show that the crystals contain only 10 equivalents of water, instead of 20 as stated by Dr. Dalton.

According to Dr. Hope, the crystals of strontia contain 68 per cent. of water, and Dr. Dalton concludes from this statement that they contain 12 equivalents of it. I prepared some crystals of strontia in the same manner as those of barytes above described; they were dried in a similar mode, and taking the mean of two experiments, which differed but very little, 100 parts of the crystals, after saturation with muriatic acid and treatment with carbonate of ammonia, give 51.57 of carbonate of strontia; and as 74 of this substance consist of 22 of carbonic acid and 52 base, 51.57 contain 36.24 of strontia, which, deducted from 100, the crystals experimented upon, leave 62.76 as the quantity of water contained in them. The crystals are therefore evidently composed of

1 equivalent of strontia 52, or 36.62
10 equivalents of water 90, or 63.38
} in 100.

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and resemble those of barytes with respect to the quantity of water they contain.

ART. XXXVII.—ON THE REACTION WHICH TAKES PLACE WHEN FERROCYANURET OF POTASSIUM IS DISTILLED WITH DILUTE SULPHURIC ACID; WITH SOME FACTS RELATIVE TO HYDROCYANIC ACID AND ITS PREPARATION OF UNIFORM STRENGTH. By THOMAS EVERITT, Esq., Professor of Chemistry to the Medico-Botanical Society, &c.

As the decomposition of the ferrocyanuret of potassium by means of sulphuric acid is likely to become the only method by which hydrocyanic acid will be prepared for chemical and medical purposes, on account of the cheap rate at which this salt is now to be had chemically pure; and as in all operations of this sort the more exactly we adhere to the proportions indicated by an accurate knowledge of the nature of the interchange which takes place during the process, the more uniform and satisfactory are the results, and the more do we economize our time, I have been induced to examine very narrowly the above reaction.

(2.) Assuming the composition of the crystallized yellow ferrocyanuret of potassium to be 2 K Cy + Fe Cy + 3 Aq, I find that on boiling it with sulphuric acid in a close vessel, $\frac{3}{4}$ths of the potassium remain in solution as bisulphate of potassa, its cyanogen going off as hydrocyanic acid: the remaining $\frac{1}{4}$th combines as cyanuret of potassium with all the cyanuret of iron to form a yellow insoluble salt: thus,

2 proportions of the crystals.	with	yield as results
4 K, 4 Cy	—	3 Cy H. which escape as gas.
		3 ($\dot{K}$ + 2 $\ddot{S}$) bisulphate of potassa in solution.
2 Fe, 2 Cy, 6 Aq	6 $\ddot{S}$	3 Aq—free.
		K Cy + 2 Fe Cy, which fall as yellow salt.

Or in numbers:

2 proportions of salt	Real sulphuric acid.	Results.
39.15 × 4 potassium	40 × 6	3 (26.39 + 1) hydrocyanic acid,
28 × 2 iron		3 (39.15 + 8) + 6 (40) bisulphate of potassa.
26.39 × 6 cyanogen		9 × 3 free water.
9 × 6 water		(39.15 + 26.39) + 2 (28 + 26.39) yellow salt.

Hence

2 proportions of salt 212.47 × 2	=	424.94
6 proportions of sulphuric acid 40 × 6	=	240.00
		664.94.

yield

3 proportions of hydrocyanic acid 27.39 × 3	=	82.17
3 proportions of bisulph. of potassa 127.15 × 3	=	381.45
3 proportions of water 9.00 × 3	=	27.00
1 proportion of yellow salt K Cy 65.54 + 2 Fe Cy 108.78	=	174.32
		664.94.

(3,) This was proved as follows:

(*a.*) 212·5 grains of the crystals of ferrocyanuret of potassium were dissolved in two fluid oz. of water, to which were added 600 grains of dilute sulphuric acid of specific gravity 1·179, containing 20 per cent. of real acid, and therefore amounting in all to 120 grains real acid; the mixture was kept boiling in a vessel partially closed to prevent the free ingress of air, till the odour of hydrocyanic acid ceased to be given off; the yellow salt collected, washed, and dried at 220°, weighed in Experiment No. 1, 88·1 grs.; No. 2, 88·0 grs.; No. 3, 87·1grs. The calculated number is 87·16. The salt is very liable to assume a delicate green tint unless the air be very carefully excluded from the vessel, and hence its true colour cannot be seen, unless the flask, previously to adding the acid, be filled with carbonic acid gas: the green tint always goes off on drying it at about 300° F.

(*b.*) The colourless solution which passed the filter, leaving the yellow salt on it, and which contained the bisulphate of potassa, required, to render it neutral, of crystallized bicarbonate of potassa, (I used this as being the most definite and manageable salt we have,) in

Experiment No. 1, 152.1; No. 2, 151.0; No. 3, 150.6 grs. The calculated quantity is $1\frac{1}{2}$ (K̇ + 2 C̈ + 1 Aq) 150.58 grs., showing that three proportions of sulphuric acid had taken up only $1\frac{1}{2}$ potassa. After neutralizing the liquid with bicarbonate of potassa, it was in two cases evaporated to dryness, and the neutral sulphate weighed, which confirmed in both cases the above results, and proved that no other salt was in the solution: also, in one case, the sulphuric acid was

precipitated by nitrate of barytes, which proved that all the sulphuric acid was in the solution.

(*c.*) The hydrocyanic acid given off was estimated by taking 106.3 grs. of the ferrocyanuret of potassium in two fluid ounces of water, + (300 grains of dilute sulphuric acid of specific gravity 1.179) = 60 grains of real acid, and by means of a tube and cork conducting the vapour into a large receiver, containing a dilute solution of nitrate of silver: the cyanide collected and weighed, gave in

Exp. No. 1, 103 grs.; No. 2, 102.3 grs.; No. 3, 101.4 gr. The calculated number is 100.8 grains. Most likely in experiment No. 1, the matter was not perfectly dried; but the three come sufficiently near to leave no doubt of the theoretical quantity.

(4) Hence I conceive that the exposition of the reaction given at the commencement of this paper is fully proved. I am well aware that in the 46th volume of the *Annales de Chimie et de Physique*, p. 77, M. Gay Lussac states that a white salt is produced during this reaction. I have operated with distilled sulphuric acid, conducted the process in a narrow-necked flask, into which a stream of carbonic acid passed during the whole of the boiling, and it was always of a light lemon colour: in ordinary cases, when this extreme care was not taken, it was greenish. Perhaps M. Gay Lussac poured strong sulphuric acid on the powdered crystals, when a very complicated change takes place. (See Thomson, 7th edition, vol. ii. p. 251.) M. Gay Lussac also states, that after making a few experiments on the new salt, the results appear ("*semblent*," showing that he trusted more to the pen than the balance,) to lead to the consequence that it is a compound of 9 cyanogen, 7 iron, and 2 potassium; so that supposing we have enough of the original ferrocyanuret of potassium to yield 14 proportions of potassium, 7 of iron, and 21 of cyanogen, then by boiling with sulphuric acid, 7 proportions of iron, + 2 potassium + 9 cyanogen fall, 12 of cyanogen go off as hydrocyanic acid, and 12 of potassium are dissolved by the sulphuric acid. Now, I prove by (*b.*) that the relation of the potassium dissolved by the sulphuric acid to that pre-

cipitated is as 3: 1, and not as 6: 1; by (*c.*) that the relation of the cyanogen disengaged as hydrocyanic acid is to that in the precipitate as 1; 1, and not as 12: 9. And the quantity of yellow salt produced in (*a.*) serves to confirm both the above results.

The theory of the subsequent conversion of the salt into Prussian blue, by moistening it with dilute sulphuric acid and exposing it to air, is consequently unknown. I have not yet examined the precise change which takes place, with sufficient care to give an opinion: that potassa is dissolved out, and that the action of free oxygen is essential to the change, is certain.

(5.) Had I examined Gay Lussac's paper before I began my experiments, his high authority would have made me consider any further experiments on this subject as useless; but as I had finished the experiments marked Nos. 1 and 2, before I saw his paper, I was induced to repeat my experiments with redoubled care: hence the series No. 3, and hence their nearer approach to the calculated numbers. I must therefore conclude that M. Gay Lussac has operated on the salt obtained by the action of concentrated sulphuric acid on the crystals. The change in that case, according to Thompson, is so complicated that sulphurous gas, ammonia, carbonic oxide, azote, are given off. I doubt if any definite conclusions can be drawn from it.

(6.) The best proportions, therefore, of the ferrocyanuret of potassium and sulphuric acid to be used when we want hydrocyanic acid are as follows. To every 212.47 grains of the crystals dissolved in about 2 fluid ounces of water, add so much dilute sulphuric acid as shall contain 120 grains of real acid, and by conducting the distillation carefully, 41 grains of hydrocyanic acid pass off, and that I find with the first third of the water: of course the water must be put into the receiver and kept very cold. But no process for procuring a dilute solution of hydrocyanic acid, in which distillation or filtration is had recourse to, will yield an acid of uniform strength, however carefully the process may be conducted, not even, as I have proved, if the receiver be sur-

rounded with ice. Hence the *absolute necessity* of assaying in all such processes, the ultimate product, either by the nitrate of silver or the peroxide of mercury method; the first is to be preferred: we have the great advantage that any error committed in collecting, drying, and weighing, is reduced to one-fifth in estimating the quantity of real acid, 100 grains of the cyanide of silver corresponding to 20.38 of hydrocyanic acid.

(7.) In addition to the very elegant application of the nitrate of silver for detecting the presence of free hydrocyanic acid in its passage as vapour from a dilute solution, or in any plant containing the acid, (thus, masticate a bitter almond, put it in watch-glass, and cover it with a bit of glass, on the under surface of which a drop of dilute nitrate of silver is placed; in a few minutes the cyanide of silver is formed,—an experiment which may serve as a class illustration of the extreme volatility of the substance,) recommended by Mr. Barry in the London and Edinburg Philosophical Magazine, vol. iv. p. 151. Mr. Barry has also put me in possession of a means as elegant for the testing of the presence of minute quantities of hydrochloric or sulphuric acid in hydrocyanic acid, viz. Put some of the acid on a watch-glass, add two or three drops of liquor ammoniæ, put the glass on the sand-bath, and evaporate to perfect dryness, when all ammonia and hydrocyanic acid pass off, leaving only, if any hydrochloric or sulphuric acid be present, a little hydrochlorate or sulphate of ammonia behind; a drop or two of distilled water will dissolve these, and by nitrate of silver added to one-half, and nitrate of barytes to the other, the presence or absence of the above acids will be determined. If the hydrocyanic acid be quite pure, the watch-glass after evaporation is scarcely soiled, and water dissolves nothing: this method is far preferable to that by means of carbonate of lime usually recommended.

(8.) In a paper which I read to the Medico-Botanical Society, on Tuesday, Dec. 9, 1834, on the methods of assaying medicinal hydrocyanic acid, I stated that I had examined samples of the acid procured from various shops in town, and

that the frightful difference of strength had induced me to make the results known, with a view of calling the attention of the medical profession to the evil. Thus, samples from Allen, Hanbury and Co., yielded 5·8 per cent.; from Apothecaries' Hall, at different times, from 2·1 to 2·6 per cent.; and from several sources I found acid containing only 1.4 per cent. These samples I procured from the several shops personally, and asked for Scheele's strength. They were assayed within 24 hours after they were in my possession, both by the nitrate of silver and the oxide of mercury method, and the results in no cases varied more than one-tenth of a grain from each other. Now, it is true we have no fixed standard, and therefore it is impossible to say whether Allen and Co.'s is too strong or the others too weak; but this much is certain, that if a medical man were pushing the exhibition of hydrocyanic acid gradually to a maximum dose, the prescriptions being carried to a shop where the acid had only one-fourth per cent. and then by some accident or other cause taken to where Allen's acid was used, a sudden, and I fear a fatal increase would be the result, for more than a triple quantity would be taken. For the possibility of a fatal accident, I need only refer to the case of seven individuals near Paris being killed by a slightly increased dose, recorded in all the medical periodicals a few years since.

(9.) On the same evening I called the attention of the members of the Medico-Botanical Society to the method for procuring medical hydrocyanic acid recommended by Dr. Thomas Clarke, by cyanide of potassium and tartaric acid; a method which can now be employed by any one, since Mr. Laming has brought into the market a very pure salt. From very numerous trials, I find that the procuring of this salt, the cyanide of potassium perfectly pure, must be expensive; and I have never been able to procure it strictly in this state without using alcohol to crystallize it from: and many chemists, I find, (see Mr. Barry's paper above alluded to,) object to it, from its being so excessively deliquescent, and hence rather unmanageable, and also to the liability of this highly poisonous salt being mistaken for other white salts on their

counters. This latter objection, I must say, is hypercritical: if people will be careless, there is no means of preventing mistakes, and I conceive the objection of Mr. Barry applies with tenfold force to many arrangements of a druggist's shop, where we often see tincture of opium flanked right and left by other dark tinctures; and who that has manipulated has not caught himself laying hold of, and using one acid, &c. for another, when the mind is also at work?

(10.) I have made many trials as to the practicability of applying the cyanide of silver and dilute hydrochloric acid for procuring medical hydrocyanic acid. The cyanide of silver presents many advantages: it is perfectly stable, being neither affected by light nor moisture; its purity can be very easily ascertained, and every five grains of it will yield one grain of acid. It can be procured by conducting the vapour from the process described in section (6.) of this paper, into a pint of water, holding 255 grains of nitrate of silver, washing and drying at 212°. It yields 201.6 grains of white cyanide. I should recommend that the bottle containing this salt be accompanied by a small stoppered phial with dilute hydrochloric acid of such strength, that one minim will exactly decompose one grain of the cyanide: thus, suppose one corked phial having 200 grains of cyanide with one ½ oz. stoppered bottle with hydrochloric acid of specific gravity 1.129, this would be enough to make five fluid ounces of dilute hydrocyanic acid, of the Dublin strength, if the following formula be followed. Into a phial capable of holding rather more than one fluid ounce, put forty grains of the cyanide, add seven fluid ounces twenty minims of water, and forty minims of the dilute hydrochloric acid; cork closely, shake several times for the first quarter of an hour, set aside to allow the chloride of silver to fall, decant the clear liquid into another bottle, to be preserved for use: every fluid drachm will contain one grain of real hydrocyanic acid.

The only objection I had *a priori* to this process, was the liability of a little free hydrochloric acid remaining in the solution, since all books echo that the presence of a minute quantity of the mineral acids very much hastens the decom-

position of this acid; a statement perfectly opposite to fact, at least as far as concerns hydrochloric acid. I prepared four ounces of hydrocyanic acid perfectly pure by distillation off chalk; to two ounces I added five drops of hydrochloric acid; the other two ounces in another phial were left perfectly pure, both inverted and placed in a glass case, so as to have diffused light during the day. After three weeks the pure acid had become quite brown, and a considerable quantity of solid deposit had formed; the other remained quite limpid and colourless, and on actual trial was found to contain nineteen-twentieths of the acid which it had at first. Mr. Barry also informed me that his fourteen years' experience led to the same result; and that, being aware of this, he adds purposely a little hydrochloric acid to all his medicinal acid. Perhaps some may object to the price of the preparation: a case containing the two bottles with 200 grains of the cyanide would leave one-half profit if sold for 5*s.*; this brings an ounce of acid to 1*s.*, and where so small a quantity is used, surely this cannot be a very weighty objection, if a uniform article can be secured.—*London and Edinburg Philosophical Mag.*

ART. XXXVIII.—ON THE PREPARATION OF MERCURIAL OINTMENT.

By M. Coldefy Dorly.

The possibility of promptly killing mercury by prepared lard, having been doubted, I have the honour of sending to the Society of Pharmacy a specimen of axunge, by which twenty-four to thirty-two times its weight of mercury can be extinguished in a few minutes.

About five years since, I laid before the Society a series of manipulations, among which was the following, and which I preferred.

After having melted the axunge, it is to be poured in a

small stream into a large vessel of cold water, to divide it; it is then to be placed on a somewhat coarse hair seive, and kept in a dry place, protected from dust. In about fifteen or twenty days, it will be found capable of extinguishing seven or eight times its weight of mercury, and this property goes on increasing as it acquires more rancidity and viscosity, so that in a few months it will promptly act on thirty-two times its weight of mercury.

I leave it to more experienced chemists to explain why the same axunge, under other circumstances, and even appearing to be more rancid, does not act in the same manner. There is so much difference of opinion on this subject, that I will abstain from mentioning my views, and will merely give facts.

℞	Prepared axunge	℥ij.
	Mercury	lbs.iij.

They are to be rubbed together in a moderate sized mortar, having an ovoid bottom. If the axunge is too hard, a small quantity of olive oil is to be mixed with it; the mercury disappears in four or five minutes, and the mixture assumes a pearl gray colour. *Journ. de Pharm.*

Miscellany.

Chinese Vermillion.—The *Nouveau Journal Asiatique* contains a translation by M. Stanislas Julien from a Chinese encyclopedia, giving a full account of the preparation of vermillion. After stating that the best is found native in Mayang, and is used for painting the houses of princes and persons of distinction, it goes on to give the process for making it from crude mercury. A crucible of porcelain, or a double vessel of metal is employed indifferently for this purpose; to one pound of mercury, two pounds of sulphur are added; the mixture is triturated until it forms a blackish powder; it is then put into a crucible, which is covered with an iron plate held down by a transverse iron bar firmly attached to the vessel. All the openings are carefully luted and the pot placed upon an iron tripod, under which a fire of resinous faggots is maintained for a considerable time; whilst the cover is kept cool by means of an old swab soaked in water. The mercury combines with the sulphur and sublimes in a fine powder. The vermillion on the inside of the cover is the brightest. One pound of mercury gives fourteen ounces of vermillion of the first quality, and three and a half of the second. When intended to be used in writing, it is ground with gum water, and made into small cakes. Rubbed upon a stone pallet it presents a red of the greatest brilliancy; if pounded on a tin slab, it forms a black colour, and is then fit for the varnishers and gives to objects a glistening tint which enhances their price. Mixed with the oil of the *Thoung* tree it is very brilliant, but the addition of the varnish destroys this and gives it a dark black colour.

Journ. Asiatic Soc. Bengal.

To separate magnesia from potassa and soda.—M. J. Liebig proposes the following plan for this purpose as more simple than any hitherto described. It is specially designed to recognise the presence of sulphate of soda in sulphate of magnesia. With this view, the sulphate of magnesia is precipitated by the sulphuret of barium, which separates all the magnesia from the soda; this latter remains in the fluid in the state of sulphuret of sodium, mixed with an excess of sulphuret of barium, by neutralizing with sulphuric acid, evaporating and heating to redness, the

quantity of sulphuret of soda is obtained. This plan will answer when the alkalies and magnesia are combined with other acids. It sometimes happens that when an excess of sulphuric acid has been used, and afterwards ammonia in excess added, that the solution from which the magnesia was precipitated by the sulphuret of barium, on the addition of phosphate of ammonia becomes somewhat turbid, this turbidness is owing to lime, from which magnesia is rarely exempt. The use of caustic barytes instead of the sulphuret gives the same results.

Journ. de Pharm.

Ambergris.—It is said that ambergris is the intestinal concretion of the whale, and generally the produce of disease. The bills of cuttle fish or rather the smaller sepia, are frequently found in ambergris, from which one might suppose that they may enter into the formation of ambergris. And I was very much struck with the peculiar odour evolved on drying some cuttle fish, having a faint trace of musk, or more properly speaking, of ambergris; and the carbonaceous matter particularly, produced the smell. A tendency to putrefaction heightens the odour: and several of the officers as well as myself recognized the fragrance for which ambergris is valued.

Webster's voyage to South Atlantic, Vol. 1.

Cape aloes.—In our rambles on shore we found the plant from which the cape aloes are extracted. It appears to be abundant, although neglected. It is from three to six feet in height; and, when grown has a moderately thick woody stem, sending forth numerous flowering branches on all sides. The bark is brown; and the flowers assume the form of a spike in an erect position, and of a dense scarlet colour. The leaves are fleshy and ovate, and the wood has no concentric rings. The leaves of this shrub are cut, and thrown into a sheep skin on the ground. In this state the liquor is allowed to drain from them; it is afterwards poured into a copper, in which it is evaporated, the remainder, forming the aloes of commerce.

Ibid.

Cockroaches.—Sailors have a notion that soy is made from cockroaches, because the Chinese at Canton have a large soy manufactory, and they are particularly solicitous to obtain cockroaches from ships, from which circumstance sailors immediately conclude that it is for the purpose of making soy of them. Captain Wm. Owen, well known for his scientific attainments, states that the Chinese use cockroaches as bait in their fishing excursions, and that they answer the purpose admirably. I was also informed by him that the infusion of cockroaches is a most powerful antispasmodic, and is useful in tetanus, and that his surgeon in the Eden, Dr. Birnie, had used it with beneficial effect. I am aware that in some

warm climates this infusion has been used with advantage; but Dr. Hall has tried it at Maranham, in a case of tetanus, without any beneficial result. At Bermuda it is used as an antispasmodic in whooping cough, with reputed benefit. I always kept some strong tincture of cockroaches by me in climates where tetanus is of common occurrence. Happily, however, I had no cause for trying its effects. In the course of my experiments on the infusion of the cockroach, I could not but notice that common salt and water saturated with the juices of these animals, had all the odour and some of the flavour and qualities of soy, so that the opinion of the sailors as to its composition, may not be far from the truth.

Ibid.

Codeine.—M. Merck has obtained this substance in a very simple manner by treating morphine precipitated by soda, with cold alcohol, saturating the tincture with sulphuric acid; distilling to get rid of the alcohol, diluting the residue with cold water, till the solution becomes clear, filtering, and evaporating till the liquid assumes a syrupy consistence, introducing it when cold into a large flask with a certain quantity of ether, then adding an excess of caustic potash, and shaking the mixture for some time. The ethereal fluid becomes so highly saturated, that the codeine is deposited in a crystalline form in a few hours, on evaporating the ether and treating the residue with alcohol, the codeine will gradually be obtained in a state of purity, totally exempt from an oil, which has always been a great obstacle to its crystallization.

Journ. de Pharm.

Tonic collyrium for chronic opthalmia.—

℞. Acacia seeds	℥ss.
Rose water	℥vi.

Infuse the seeds in a glass or porcelain mortar, adding the rose water in small quantities at a time, and filter. This solution is to be used to wash the eyes, and also to be applied during the night, by means of compressers.

Ibid.

Cantharides.—M. Piette of Toulouse states that the best mode of preparing these insects, is to place them alive in a large vessel, and to moisten them by a small stream of essence of lavender or of any other of the labiate plants. This soon kills them, after which they are to be dried in a stove. By this plan, they preserve a beautiful green colour, and are not subject to the attacks of mites, thus preserving all the cantharidine.

Ibid.

Extract of aconite in acute rheumatism.—Dr. Lombard of Geneva, has employed the extract of *Aconitum napellus* with great success in acute rheumatism. This extract is prepared from the expressed juice of the

fresh plant, previously coagulated and filtered, and then evaporated in a water bath; the watery extract thus made, is dissolved in alcohol and again evaporated to a pillular consistency by a gentle heat.

By administering this remedy in doses of a quarter to half a grain twice a day, and gradually augmenting the dose to six or nine grains a day, M. Lumbard has found that the pain and swelling rapidly disappear. No unpleasant symptoms were produced, except when a very large quantity was taken,(one drachm and a half in twenty four hours) in this case a great cerebral excitement was induced.

Ibid.

Tapioca.—Dr. Perrine has given the following particulars respecting this article. According, says he, to honest Bernal Diaz, the name of the peninsula of Yucatan, is indicative of the prevalence of the Jatropha manihot, and is derived from two native words, signifying *Cassave land.* The Maya Indians, who constitute four-fifths of the population, still call the root Yuca, the place of its growth Tal; and etymology has been unusually careful in merely changing Yucatal into Yucatan. When prepared for bread, this pulp is denominated cassava; when the paste is passed through holes to granulate it for exportation, it has taken the name of tapioca. There are two species cultivated, the *acrid* and the *sweet*, but the difference is no more visible to the botanist, than that of the sweet and sour orange trees. The natives, however, easily recognize the Yuca agria along side of the Yuca dulce, and in case of doubt do not hesitate to decide by tasting. The Yuca dulce is brought to the table like yams, and is eaten, boiled or roasted, like the common potatoe. The Yuca agria, besides supplying cassava cakes for the food of the healthy at home, and tapioca grains for the nourishment of the sick abroad, is also converted into pure starch, both for domestic consumption and foreign exportation. However thickly the ground be covered with stones, if there be in every two or three feet square, two inches of earth to insert the cuttings of the Yuca stem, the labour is done and the crop secure. Each cutting should have at least three buds, and is inserted obliquely, leaving one germ in the air to shoot up into a stem, and the other two below the surface, to spread in the shape of creeping roots. In Yucatan the lowest computation of pure starch produced is at the rate of 2500 pounds to the acre, and 4000 pounds is not admitted to be a very extraordinary crop. The cheapness of its production may be inferred from the fact, that pure Yuca starch is actually selling at Campeachy at three dollars and a half the hundred pounds, although its transportation on mules from the distant interior, amounts to half that sum.

Amer. Jour. of Med. Sciences.

Artificial Ultramarine.—M. Robiquet gives the following process to prepare a blue colour, resembling that of the artificial ultramarine of

Guimet, though it is not so intense. Introduce into a stone ware retort, coated with clay, a mixture of one part of kaolin, one and a half parts of sulphur, and one and a half parts of dry and pure carbonate of soda; then heat gradually, as long as any vapours are disengaged, let the retort cool, break it, and there will be found in the interior a spongy mass of a very fine green colour, but on attracting moisture from the air, it passes gradually to a blue. Wash the mass; the excess of sulphate dissolves, and there remains a very beautiful blue. Wash by decantation, dry and calcine again at a cherry red heat, to expel the excess of sulphur.

Ann. des Mines & Amer. Journ. Sci. & Arts.

Reduction of chloride of Silver.—The best mode of reducing the chloride of silver, is that of Mohr, which consists in mixing the chloride with one third of its weight of rosin, and heating the mixture gradually in a crucible, until the flame loses its blue colour: after which, a strong heat is applied to melt the reduced silver.—*Erdmann. Jour. and Idem.*

Mode of preparing Smaltz in Sweden.—The cobalt ore is roasted until most of its arsenic is expelled, after which a sufficient quantity of concentrated sulphuric acid is mixed with it to form a thick paste, which is exposed to a moderate heat at first, and afterwards heightened to a cherry red, for one hour. The sulphate thus obtained is reduced to a powder, and dissolved in water; and a solution of carbonate of potash added to it in a gradual manner, in order to separate the iron, and when it is perceived by the blue colour that the cobalt is thrown down, the supernatant liquid is decanted and filtered, and the cobalt precipitated by a solution of silicate of potash, which is prepared by heating in an earthen crucible, a mixture of ten per cent. of potassa, fifteen of well pulverized quartz, and one of charcoal, and treating the melted mass with boiling water.

Dict. Tech. and Idem.

Purification of Water.—In order to precipitate the earths mechanically suspended in water, it is recommended to employ the silicate of potassa, gelatinous silica or phosphoric acid. The last is an excellent reagent for throwing down the oxide of iron, without introducing any foreign principle in the water.

Ann. des Mines and Idem.

Balsam Copaiva. Mr. Webster says that at Para, the balsam copaiva is esteemed a capital vermifuge in large doses, and is sometimes used to mix paint with; it gives work the appearance of being varnished. The seeds are large and black, and are kept in apothecaries' shops as an astringent; they contain a quantity of oil, and some hydrocyanic acid. The tree is very large and lofty, and is used for timber.

Voyage to South Atlantic, II.

Mangrove. The same author states that the wood of the red mangrove (*Rhizophora*,) is an excellent firewood, burning well even in a green state. Boats sent to obtain it are always much stained, and a ship's deck becomes reddened by it. The bark is a good astringent, and is used for tanning. It is of a red colour internally. The simple infusion of the bark is of a light red colour, somewhat like a mixture of blood and water. A solution of iron does not blacken it, but rather deepens the colour; alum has scarcely any effect. An alkaline infusion is of a vivid blood red colour, which dyes cloth of a permanent red brown. The alkaline infusion, in drying, concretes in a gummy mass, retaining all the fine colour of the solution. Neither the simple nor the alkaline infusion show the least disposition to fade, but preserve their virtues for a considerable time. *Ibid.*

Capara guareoides.—This fine plant, according to Mr. Webster, furnishes a large quantity of seeds or nuts, of a nauseous and bitter subastringent taste. The capsule in which they are contained is nearly two inches in diameter, and covered with a gummy exudation. The seeds yield, by grating, a quantity of starch or fecula, but the chief use is for making oil. For this purpose the seeds are put into warm water to steep, to separate the husk; they are then beaten into a paste, and made into balls, and exposed to the sun on an inclined plane; the oil exudes and runs into a trough. After which they are boiled in water to extract any remaining oil, which, however, is of an inferior quality. This oil is bitter and stimulating; it is the general lamp oil of the country, is used in the manufactory of soap, is a good remedy for the itch, and is superior to any known substance for making the hair grow. *Ibid.*

Purgative for children.—

℞ Oil of Croton tiglium	gtts.ij.
White sugar	ʒij.
Gum Arabic	℥ss.
Tinct. cardamom or cinnamon	℥i. ʒij. M.

This mixture is given in doses of two tea spoonfuls every three or four hours, until the desired effect is produced. It has an agreeable taste, and may be given without danger to the youngest children, taking care to proportion the dose to the age. *Journ. de Pharm.*

Iodic Acid.—This may be obtained on a large scale, by the following process: Put one part of recently prepared iodine into a matrass with a large neck, to which a long tube of about two lines in diameter is fitted, make a mixture of eight parts of nitric acid with one and a half to two parts of nitrous acid, and pour upon the iodine enough of the mixture to dissolve a half or two thirds; afterwards apply a mild heat and gently

agitate the vessel to throw down the iodine which has condensed on its neck; after a few minutes add a new dose of acid, and proceed in this way until all the iodine has disappeared. Then pour the whole into a capsule of porcelain, and the iodic acid is deposited. But it will be yellow, and in order to have it perfectly white, it must be dissolved in distilled water, filtered, evaporated, and when sufficiently concentrated, once or twice its volume of pure and fuming nitric acid added to it, in order to precipitate the iodic acid. Decant the mother water, wash the acid once or twice with a little nitric acid, redissolve the residue in three times its weight of distilled water, and add to the solution two thirds its volume of pure nitric acid, and evaporate to dryness in a porcelain capsule upon a sand bath, when very beautiful and perfectly crystallized iodic acid will be obtained. *Jour. de Pharm.*

Zittman's Decoction.—This nostrum once enjoyed great repute in the cure of syphilis, but fell into disuse; it has, however, been lately revived, and great encomiums bestowed on its powers, in this and other diseases.

℞. Rad. Sarsaparill ℥xii
concis. infund. in lebete stanneo C. aq. font Ms. xxiv.
Sacchari aluminis,* ℥iss
Merc. dulcis, ℥ss
Cinnab. antimon. sublim. ʒi
coque, donec supersint Ms. viij et subfin. coct. add.
Sem. anisi
Sem. fœnic. aa ℥ss
Fol. Sennæ ʒiij
Rad. Liquirit ʒiss
ebullit. decoc. exorta redundatis evitetur. Coletur d. ad. decub. viij. S. Decoctum fortius.
℞ Specibus residuis demio addantur
Rad. Sarsaparill contus ʒvj
coque C. aq. font. Ms. xxiv. sub finem coct. add.
Cort. citri
Cardom. minor
Rad. Liquirit aa ʒiij
colentur lb. xvj d. ad. ʒviij S. Decoct. mitius.

The treatment is to begin with a cathartic of calomel and jalap. Next day the patient is to take eight ounces of the strong decoction warm, and remain in bed. At noon he may rise, and at one, take a pint of the weak decoction cold. At night, eight ounces of the strong decoction cold. This course is to be pursued for four days. On the sixth, another ca-

* Equal parts of sugar and alum.

thartic, and the decoction for four days as before. On the 11th, the course terminates by another cathartic. Should the cure not be complete, the entire course, or half of it, must be repeated, at an interval of eight days. The most rigid diet must be observed. After the cure, the patient must remain in the house for some time, on low diet, returning very gradually to his usual mode of living. Some practitioners advise a still more rigid discipline, the patient being confined to bed during the whole treatment, and a full pint of the strong decoction, warm, given in the morning, and the same quantity of weak in the afternoon; with the same attention to diet. *N. Am. Arch. of Med. & Surg. Sci.*

Carbonate of Soda.—Prukner gives the following process. Commence by changing the calcined sulphate of soda into sulphuret of sodium, by treating it to redness with pulverized charcoal. Dissolve the sulphuret and add oxide of copper to the warm solution. Filter and evaporate until the specific gravity = 1.41 or 1.48. On leaving the solution for twenty-four or forty-eight hours, the undecomposed sulphate of soda crystallizes. Evaporate the supernatant fluid to dryness. This process gives about sixty-five of crude caustic soda for one hundred of sulphate of soda. To convert this into carbonate, heat gradually to redness with charcoal. Metallic copper, as well as its oxides, may be used to separate the sulphur from the sulphuret of sodium; but on the large scale, the protoxide is preferable. In order to procure this oxide, heat metallic copper to redness and plunge it into water containing 0.002 of the nitrate of soda of Chili. The sulphuret of copper derived from this manufacture, mingled with one-sixth of powdered sulphur is easily transformed into a sulphate by washing. *Ann. Schweigger. & Amer. Journ. Sci. & Arts.*

Best mode of administering Oil of Turpentine.—A writer in the London Medical Journal proposes the following formula for the administration of this article:

℞ Ol. Terebinth ℥iss. vel ℥ij.
Magnes. Carbon. ℥i. Tere et adde.
Aqua Menth. sativ. ℥v.
Syrup limonis,
Spt. lav. comp. aa ℥ij.

M. et div. in haust iv. capt. j, ter quotidie.

N. A. Arch. Med. & Surg. Sci.

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ART. XXXIX.—ON MELIA AZEDARACH.

By R. Eglesfeld Griffith, M. D.

Nat. Ord. Meliaceæ.

Sex. Syst. Decandria Monogynia.

Melia: *Calyx*, five-parted, small: *Petals* five. Lepanthium cylindric, ten-toothed, dentures bifid at the points, orifice internally antheriferous. *Style* cylindric; stigma five-rayed; *Drupe* globose; nut five-celled, five-seeded.—*Nuttall.*

M. Azedarach. Leaves bipinnate, leaflets smooth, ovate, dentate.—*Lin.*

Synon. M. Azedarach. Lin. Sp. Pl. 550. Willdenow. Sp. Pl. II. 558. Nuttall. Gen. Am. Pl. I. 276. Michaux. Arb. Forest. III. 4. &c.

Azedarach. Dodon. Pempt. 848. Brown. Zeyl. 40. Raii. Hist. 1546. Parkin. Herb. 1443.

Arbor fraxini folio, flore cæruleo. Bauhin. Pin. 415.

Azadirachta indica, folios ramosis minoribus, &c. Comm. Hort. 1, 147.

Azedaraca. Tourn. Institut. Adanson.

A. amœna. Rafinesque. Med. Flor. U. S.

A. deleteria. Moench.

Pseudo Sycamorus. Cam. Epit. 181.

Zizypha candida. Ger. 1306.

Icon. Cavanilles. Diss. t. 207. Hort. Cliff. 161. Camer. Herb. 103 f. 2. Lamark. Illus. Ency. Met. t. 252. Michaux. arb. Forest III. 1. Bot. Mag. t. 1061.

Officinal. Bark of the Root.

Description.—Tree thirty to forty feet in height, spreading. Bark scabrous, roots horizontal, rather superficial, extending to a considerable distance. Leaves large, alternate, bipinnate, each pinnule with five to seven, opposite, lanceolate acute, dentate leaflets. Flowers odorous, of a light violet or pink colour, forming a drooping panicle, springing from the axil of the upper leaves. The calyx is very small, and having five obtuse, slightly pubescent lobes. The petals are much longer than the calyx, spreading, oboval and obtuse. The stamens are united into a tube, which is rather shorter than the petals, dilated at its base, of a dark violet colour, and ten-toothed, but each division being bifid, it appears twenty-toothed, except on close inspection. The anthers which are bilocular, alternate with the dentures of the tube, and are attached on its inner surface. The ovary is globular, surmounted by a thick style, which is terminated by a small stigma, which is five lobed or rayed. The fruit is a fleshy berry of an ovoid shape, about the size of a cherry, and containing an elongated nut which is five-celled and five-seeded.

Habitat.—The Pride of China is a native of many parts of Asia, but has been long naturalized in the southern countries of Europe, from whence it was introduced into the United States at an early period after the settlement of Carolina and Georgia, where it has become as common as if originally a native. It succeeds perfectly well as far north as Virginia, and will sometimes survive for a few years in Pennsylvania, but is most generally destroyed by the severity of the winters, even when by care and protection it may have attained a large size.

Rafinesque states that it is a native of Arkansas and Texas, but does not give any authority for the assertion; and as all other writers on American plants unite in declaring it to be of foreign origin, it is likely he has been led into error, by finding some individuals in uncultivated situations. This, it is well known, is by no means a certain guide as to whether a plant is indigenous, as most of the naturalized species

are to be found in the most secluded spots. In the case of the melia, the seeds are widely dispersed by birds, some species of which, as the robin and mocking bird, feed eagerly on the berries.

Botanical History.—The genus Melia derives its name from the resemblance of the leaves of its principal species to those of the ash, Melia of the Greeks. It belongs to the natural order of MELIACEÆ, which contains many species possessing medicinal properties, though by no means of an identical character.

The Melia has long been known to botanists, and was described by the earlier writers under the name of *Azedarach*, which was unnecessarily changed by Linnæus to that it at present bears. It appears to have been introduced into Italy, from Syria, after the conquest of that country by the Romans, as Pliny speaks of it as by no means uncommon, and was apparently acquainted with its narcotic properties.

Medical History.—The early medical history of this plant is involved in much obscurity, for although as just stated, Pliny would seem to have known that it was possessed of deleterious and narcotic qualities, the first certain account we have of it is by Avicenna, (lib. iv.) who says that its leaves and branches are very poisonous to animals; this statement, however, is erroneous, as will be noticed hereafter. In the United States it was early resorted to as an anthelmintic, and was at one time in considerable repute. Dr. B. S. Barton had a high opinion of it, and it was favourably spoken of by D. Duvall, who made it the subject of his inaugural thesis in 1802.

Medical Properties and uses.—The most efficient part is the bark of the root, which has a bitter, nauseous taste, and unpleasant, virose smell. Its active principle appears to be volatile, as it is is much more efficient in the fresh than in the dried state. It possesses marked anthelmintic powers, and in large doses is narcotic and even emetic. As above noticed, Dr. B. S. Barton, who gave it an ample trial, says, it is one of the most valuable anthelmintics ever discovered;

and Dr. Kollock, of Georgia, uses the following language with regard to it: "It is a vermifuge of efficacy. Its use is in some measure general among the planters, and with many supercedes the use of all others. I have given it with success, where all others in common use have failed of relieving. But when given in the months of March and April, while the sap is mounting into the tree, it has sometimes been followed by stupor, dilatation of the pupil, stertorous breathing, &c. But these symptoms, like those sometimes produced by Spigelia, pass off without any perceptible injury to the system." This article he goes on to state is also applicable in the same manner as the pink root to those febrile affections of children, resembling the irritative fever often accompanying the presence of worms.

Dr. Duvall also gives much corroborative testimony in support of the efficacy of this remedy, not only in cases of Lumbrici, but also where Tæniæ are present. In Cochin China, according to Ainslie, (*Mat. Ind.*. ii. 455,) it is well known to the native practitioners, by the name of *din*, *oots* or *sedan*, and used as an anthelmintic, but is administered with great caution; quia nimia dosi vertigeriem et convulsiones affert. (*Louriero; Flor. Coch. China*, i. 269.)

The leaves are likewise endowed with some activity; in the *Dict. Univer. des Plantes* it is stated that a decoction of them is eminently purgative, but this does not appear to be supported by the experiments of Dr. Duvall, added to which horses and cattle feed on them, with perfect impunity; in all probability, they will be found very analogous to those of the *M. azadirachta*, which are astringent and tonic. Dr. Skipton of Calcutta, has used the latter with the happiest success in hysteria, (*Trans. Med. & Phys. Soc. Calcutta*, i. 123.)

The berries, which are sweetish, are said by Dr. Kollock to be anthelmintic, though only in large doses; in some cases, however, they cause unpleasant effects; thus M. Tournon gives a case in which convulsions and the most copious vomiting and purging were produced by the ingestion of two or three of them. (*Journ. Gen. de Med.* xlviii. 25.) They fur-

nish much oil on expression, which is used as an anthelmintic by the Javanese, and is also much esteemed as an external application to foul ulcers, and as a liniment in rheumatic and spasmodic affections. Michaux states that an ointment prepared with the pulp is employed in Persia, in cases of Tinea capitis and other obstinate cutaneous affections.

Pharmaceutic Preparations and Mode of Administration.—As an althelmintic, the bark of the root may be given in substance in doses of gr. xx. The usual form, however, is that of a decoction made by boiling four ounces of the fresh root in a quart of water, till the menstruum is reduced to a pint, this is given in doses of half an ounce every two or three hours, till it produces the desired effect. It is also given night and morning for several successive days, followed by an active cathartic.

Dr. Duvall is of opinion that the neatest and most efficacious mode of exhibition is in form of a tincture, but general experience has not confirmed the validity of his suggestion.

Analysis.—No correct chemical examination of the azedarach has been made; from the imperfect analysis of Dr. Duvall, it would appear that the active principle is soluble both in water and alcohol.

Economical Uses.—The wood of the Pride of China is very durable, and is applicable to many uses. Michaux considers that it would supply the place of elm, for every purpose to which that wood is applied.

The nuts are used in the south of Europe for rosaries, for which purpose they are well suited, from having a natural perforation through the centre, and being susceptible of a high polish. Owing to their employment in this way, the tree has been called *Arbor sancta*, and by the Spaniards *Arbol Parayso*.

The pulp or pericarp furnishes an oil, and the whole berry is fed upon by birds, but according to the observations of Dr. Duvall, does not appear to be nutritious, as however freely they may be eaten by the species using them for food, they never become fat, and their flesh acquires a strong and disagreeable taste.

Besides the above, there are four other species of Melia, all natives of the East Indies, the most important of which is the *M. azadirachta* or Margosa tree: this species is very closely allied to the azaderach, in many particulars, and it is often confounded with it by writers on Materia medica. The bark of this is bitter and astringent, and is considered by the Hindoo practitioners, as one of their most valuable tonics, giving it for almost every purpose for which cinchona is prescribed with us. The tree furnishes much gum, somewhat analogous to gum arabic. The flowers are supposed to be efficacions in cholera morbus, and a sort of toddy is obtained from the young trees, which is prescribed as a stomachic, an ounce and a half being given every morning.

Dr. Piddington, of Calculta, has obtained an alkaloid from it which he termed *Azadirine*; this principle is white, and crystalizes in small brilliant prisms; in all probability, the *M. azederach* will be found to owe its remedial properties to the same substance: the process for procuring it is much the same as that for Quinine.

ART. XL.—PHARMACEUTICAL NOTICES—No. 11.

Impurity in Hydrargyrum cum Creta.—It is a matter of sincere regret that we are so frequently called upon to notice the wilful sophistication or accidental impurity of medicines, as it conveys an implied stigma upon the character or skill of fellow labourers in the same cause. But having determined to expose every case which comes to our knowledge, in order that those who are conscientious in the discharge of their duties, may not be deceived by the faults of the adulterator, or the carelessness of the unskilful, we submit the following remarks from our note book. 1835—*June.*

Complaints having been made of the quality of *Hydrargyrum cum Creta*, procured from a respectable establishment in this city, and a small portion of it having been submitted to us for examination by Professor Dunglisson, on account of its effects having been very violent, in a case in which he had prescribed it, we were led from a cursory examination of this specimen to suspect an important impurity, and hence procured a large portion in order that we might correctly determine to what cause such effect was to be attributed.

Physical properties.—The specimen examined bears Mauder, Weaver and Mauder's label, and is of a deep bluish or rather brownish colour, essentially differing from the colour of that prepared according to the U. S. Pharmacopœia. It is not perfectly triturated, having small white specks diffused through it. Sp. grav. 2.120. It appears to be made with a precipitated oxide of mercury, instead of, by trituration, with metallic mercury. Its taste is sensibly metallic, nauseous, and coppery, very persistent, although this is not perceived when first taken into the mouth. When washed with water, in order to separate the chalk, a few small globules of mercury are left with the oxide. In the process of washing, the chalk, which is suspended in the water, flows over the vessel quite blue, indicating that it is not completely separated from the oxide.

Chemical Examination—To a portion of the oxide remaining after the chalk had been washed away as above, very dilute acetic acid, was added guttatim. Digestion was carried on in the cold for about two hours, when a solution of hydriodate of potassa added to the solution, gave an immediate precipitate of periodide of mercury, thus indicating promptly the presence of a salt of the *per* oxide of mercury, in the solution.

Another portion of the Hydrargyrum cum Creta, was dif fused through water, and acetic acid added, cautiously and by single drops, until effervescence ceased. After digestion in the cold for one or two hours, solution of hydriodate of potassa, gives a red, and pure potassa an orange yellow precipitate, conclusive evidence of the existence of *per oxide of mercury* in a preparation which is administered to the most delicate stomachs on account of its mildness, and reputed character of possessing less irritating properties, than calomel or any other preparation of mercury!!

A whitish powder, or precipitate, is formed during the digestion in acetic acid, which becomes yellow when water is poured on it. This may be a *sub acetate of mercury*, as such a salt is mentioned by Thompson, to which this property is ascribed.

Every precaution was taken in the above experiments to prevent the formation of per oxide during the process, and we feel confident that such an effect could not have been produced. How the per oxide happened to be present, we cannot of course explain; but we think it may have been occasioned by one or the other of the following causes:—either that the oxide when precipitated was heated, to hasten its drying, or it was precipitated from some acid, which had a disposition to furnish oxygen to the metal, and thus formed a combination of a *per*, and *proto* salt at the same time.

Having had occasion subsequently to the above experiments, to precipitate the oxide from a sulphate of mercury, we observed that the colour of the oxide thrown down by potassa, bore a strong resemblance to that of the oxide left by the washing, from the Hydrargyrum cum Creta, under ex-

amination. The discovery of this impurity, with that of numerous others detailed, in late numbers of the Journal, are powerful incentives for the adoption of the universal practice among those engaged in dispensing medicines, of preparing their own pharmaceutical materials. Those who, from ignoance or neglect, or parsimony, refuse to adopt this rule, will inevitably fall behind in the race with their competitors, and pay the penalty, which the universal law of nature invariably inflicts, while they who pursue this course, with industry, capacity, and a certain knowledge, that what they dispense for the sick is pure, and the best of its kind, will as invariably secure to themselves an honourable standing, and a clear conscience, if although a pecuniary recompense may not reward their labours.

W. R. F.

Baltimore, Sept. 24, 1835.

Mercurial Ointment.—Several methods for making this valuable preparation have been given in former numbers of the Journal of Pharmacy, but none of them appear to have fulfilled the desired result. The following mode unites the great desiderata, in the most efficient manner. A few pounds of mercury and pig's foot oil were introduced into an iron bottle, which was well closed, and attached to the frame of a saw, at a saw mill in full operation. After it had been subjected to the violent agitation necessarily resulting from its situation, for about six hours, it was removed and examined. The result was a well formed and homogeneous ointment, of good consistence and colour.

C. D. B., *Cincinnati.*

ART. XLI.—ON THE IONIDIUM MARCUCCI.

By R. Eglesfeld Griffith, M. D.

Some of the natural orders of plants are remarkable for the identity of the medical properties of all the individuals composing them; this is strongly exemplified in the Violaceæ, all of which are more or less emetic, particularly in those species found in tropical climates.

The genus *Ionidium* may be considered as the type of the order in this respect: the roots of all the species being emetic or emeto-purgative in an eminent degree, as has already been adverted to in a former volume, (*Journ. Philad. Coll. Pharm.* iii. 192.) These roots, although in general use, and high estimation in their native countries, have not attracted much attention elsewhere, though many of them are fully equal to Ipecacuanha, as remedial agents, and some are endowed with properties of a high order.

This would appear to be the case with the subject of the present notice, the *Ionidium Marcucci*, Bancroft, for specimens of which as well as the following information respecting its therapeutic properties, we are indebted to Dr. Mutter.

Ionidiun Marcucci. Suffruticose, procumbent, branching; branches with two lines of pubescence; leaves alternate, ovate, cuneate at base, serrate, serratures glandular at tip; stipules ovate lanceolate, rather longer than the petioles; sepals ovate, acute; lateral petals falcate, upper petal widely obcordate, lower twice the length of the calyx: peduncles, marked with a pubescent line, longer than the leaves; capsule sphero-trigonal; seeds ovate globose, with a concave truncation at tip, shining brown.

This species of Ionidium is a native of Quito and was imported into Maracaibo, by Mr. Marcucci. His attention was attracted to it by observing that it was employed by the indians near Bogota, for the cure of cutaneous affections. They termed it *Cuichunchullo.* Specimens of it were transmitted to Dr. Bancroft, of Jamaica, who drew up the above specific description, and dedicated the species to Mr. Martucci.

It has been employed in Maracaibo, in Elephantiasis, with the most marked benefit, in doses of ½ drachm in substance or infusion, every two or three hours, in the course of 24 hours, a copious flow of urine and numerous alvine evacuations are produced. In a short time all the symptoms of this terrible and loathsome disease rapidly decline, and the natural functions of the skin are restored.

Although its full powers and true efficacy have not been fully tested, it has been considered of such importance and value, that the Congress of Venezuela have passed a decree, to encourage a search for it.

It is evident from the above, that the *Cuichuncullo* closely resembles the *Madar* of the East Indies, in its medicinal properties, but is more certain and prompt in its effects. Should it on a more extended trial, be found beneficial in the hitherto intractable disease, in which it has been used, we have every right to expect much from its powers in other obstinate cutaneous affections. It richly deserves the notice of the medical profession, and should be fully and carefully experimented upon.

ART. XLII.—MEDICO-BOTANICAL NOTICES.—No. VII.

Adansonia digitata.—Monkey bread or baobab. This extraordinary tree which attains a greater size as regards the diameter of its trunk, than any other known vegetable, is a native of Senegal. It is said to be also found in Egypt and Assyria, and a single tree has been propagated in the Island of St. Vincent. The first correct account of it was given by *Adanson,* since which several descriptions have been drawn up by travellers, the latest of which is that by Mr. G. Bennett. (*Wanderings in New South Wales.*) He states that a tree

which he saw in the Cape de Verd Islands, measured forty feet in circumference, and was about sixty feet high. Adanson, however, says that the diameter of the trunk is sometimes thirty feet. The bark is smooth and of a grayish colour, the branches are of a great size and terminate abruptly, and from these truncated extremities the smaller branches are given off. The fruit which is attached to a long, twisted, pendent foot stalk, varying in length from one to two feet, is of an oval form, about six inches in length, and three or four in circumference, rough externally, and when mature, of a brownish yellow colour; on the outer shell being broken, Mr. Bennett found that it contained not the yellow pulp usually described, but a white farinaceous substance, enveloping the dark brown seeds, and of an agreeable acid taste. Mr. Bennett, it is evident, examined an old and withered fruit, as all other observers agree in stating that at first the fruit contains a pulpy substance, which becomes farinaceous on drying.

The young leaves dried and reduced to powder, are much employed by the negroes under the name of *Lalo*, to mix with their food; they are of opinion that a constant use of this condiment tends to diminish the excessive perspiration to which they are subjected, and Europeans have found it useful in cases of diarrhœa, &c.

The juice expressed from the fruit is used as a lemonade in the fevers of the country. (*Hooker. Bot. Mag.* 2792.) The dried pulp mixed with water is considered to be efficacious in dysentery, and from the experiments of Dr. L. Frank, it would seem that its virtues have not been overrated. (*Delile. Cent.* 12.) From the analysis of Vauquelin, it appears that this pulp is composed of a gum, resembling gum arabic, an acid analogous to the malic, sugar like that of the grape, starch, &c.

The fruit forms an object of commerce in Africa, and is conveyed to great distances. If it be injured or decayed it is burned, and the ley of the ashes boiled with palm oil, to form a soap.

Sago.—Dr. Hooker, (Bot. Mag. 2827,) in speaking of the *Cycas circinalis* says, "it is a native of the East Indies, and

especially of the Mollucca Islands, where the fruit is eaten, and where a substance is said to be taken from the stem, resembling the Sago produced by trunks of many palms. But this is probably a mistake; at any rate, it is by no means from this tree, as some have supposed, nor from any species of *Cycas*, that the Sago of the shops is produced, but from a species of *Sagus*, a true palm, though from what particular species, or whether from any one exclusively, does not appear to be ascertained." He goes on to say, that when RHEEDE speaks of the Sago produced from the *Todda panna*, he evidently confounds some Japanese palm which produces Sago, with the *Cycas circinalis*.

Dr. HAMILTON is of opinion that the *Sagus genuina*, RUMPHIUS (the *S. inermis*, ROXBURGH; *S. Rumphii*, WILLDENOW,) yields the best Sago, and the *S. farinifera*, LAMARCK, the worst.

Xanthorrhea hastile, or yellow gum of New South Wales, is, according to Mr. Bennett (o. c.) a shrub of eight to ten feet in height; the trunk is surrounded by two or more heads, each bearing a flowering stem, which rises from the centre of the foliage to the height of six feet or more. This scape terminates in a cylindrical spike of small white flowers, succeeded by triangular capsules containing three black seeds in distinct cells.

It secretes a yellow gum resembling gamboge, being externally of a dull yellow appearance, but breaking with a bright yellow fracture. When heated it volatilizes, diffusing an agreeable odour resembling frankincense. It exudes from the trunk in very small globules, and is formed in very thin layers about the petioles of the leaves. There are several species, all of which furnish an analogous product.

Cedrela odorata.—Among several interesting articles of the materia medica, &c. lately brought to this country by Mr. R. de la Sagra, director of the botanic garden of Havana, were several masses of a gum derived from the *Cedrela odorata*, or Spanish cedar, the wood of which is so extensively used for segar boxes. This wood, as is well known, has a disagreeable and somewhat nauseous odour, apparently depending on

a peculiar resin. The gum, which from the size of the masses must be furnished in considerable quantities, is of a dull yellowish white colour, and closely resembles gum Senegal in fracture and lustre, it is insipid, and soluble in water in almost every proportion, forming a consistent tenacious mucilage, and might be used for every purpose to which gum Senegal is used.

Cerbera Tanghin.—The fruit of this plant, a native of Madagascar, is the most virulent vegetable poison with which we are acquainted. The kernel is not larger than an almond, and yet is sufficient to cause the death of twenty persons. Dr. Hooker, who has given a representation of the plant in the Botanical Magazine, 2968, states on the authority of Mr. Telfair, a resident of the Mauritius, that it was formerly used by the kings of Madagascar, as an ordeal, and that its ingestion in the small dose above spoken of, was attended with the following symptoms: On some persons it begins to operate in half an hour or less. Convulsions ensue, accompanied with nausea; when vomiting occurs at an early period, recovery generally follows; this however is seldom the case. The Cerbera belongs to the natural order, Apocyneæ, and produces a wood, which, from its hardness and beauty, is well suited for cabinet work.

Cocculus Palmatus. Notwithstanding the unwearied labours of botanists, and the rapid improvements and discoveries that have been the necessary result, much remains to be done in the elucidation of the true origin of many articles of the vegetable materia medica. It is especially remarkable that till within a very recent period, we have known least respecting the plants furnishing the most important and most generally employed of these articles, as Ipecacuanha, Jalap, Rhubarb, &c.

The subject of the present notice has been known under the name of Columbo, for a very long period, and it was early ascertained that it was a product of some part of the East Indies, but its exact habitat and the plant from which it was derived, remained involved in great obscurity.

Commerson, during his residence in the Isle of France, gathered some specimens of a plant, which he designated as

"*Columbo*, in Indiis *vocatum*." These were described by LAMARCK, under the name of *Menispermum palmatum*, and he further suggested that it might be the true Columbo. There the matter rested until 1811, when Dr. Berry gave an excellent description of a figure of the male plant, in the tenth volume of the Asiatic Researches. He states that it is abundant in the dense forests of Mozambique, &c., on the east coast of Africa. The roots are dug up in March. The main root is not removed, but the offsets from the base taken. These are cut into slices, strung on cords and dried in the shade. It is deemed of a good quality, when on exposure to the sun, it breaks short, and to be unfit for commerce when it is soft and black. It is in high repute among the natives as a remedy in almost every disorder. They term it *Kalumb*, whence the name under which we know it.

The latest and fullest account we have of this important article, is that by Dr. HOOKER, in the Bot. Mag. 2970, 2971, who there describes the male and female plants accompanied with excellent representations, under the name of *Cocculus palmatus*. He derived his information from Mr. TELFAIR, of the Mauritius. The root according to this gentleman, is perennial, composed of a number of fasciculated, fusiform, somewhat branched, fleshy, curved and descending tubers, of the thickness of an infant's arm, clothed with a thin brown epidermis, marked towards the upper part especially, with transverse warts; internally they consist of a deep yellow, scentless, very bitter flesh, filled with numerous parallel, longitudinal, fibres or vessels.

The fruit is drupaceous, or berried, about the size of a hazel nut, densely clothed with long spreading hairs, which at the extremity are tipped with a black gland. The seeds are sub-reniform, clothed with a thin black shell, transversely striated.

Monodora Myristica. According to information transmitted by Dr. BANCROFT, of Jamaica, to Dr. HOOKER, (Bot. Mag. 3059) a single individual of this tree exists in Jamaica, reported to have been brought from South America, though Mr. BROWN considers it more probable that it was introduced by the negroes from Africa. The fruit was described by GÆRT-

NER, under the name of *Amona myristica.* LONG, (*Hist. Jam.*) says the seeds are impregnated with an aromatic oil, resembling that of the eastern nutmeg, from which they differ so little in flavour and quality, that they may be used for similar purposes in food and medicine; the only perceptible difference to the taste being that they are less pungent than the East Indian fruit.

Myrobalans. In the various changes and revolutions which have occurred in the science of medicine, many remedial articles formerly in the highest repute, and considered almost indispensable in the treatment of disease, have fallen into disrepute, or have been supplanted by others, perhaps of not as real efficacy. No drugs were in more general use, at one period, than the various kinds of Myrobalans. These are the unripe fruits of several species of *Terminalia* (*Myrobalanus*, GÆRTNER,) all natives of various parts of Asia. They were formerly employed as purgatives, and entered into most of the numerous theriacs and diascordiums then so universally employed as panaceas in almost every disease. They have now fallen into complete disuse, and even their name is scarcely remembered. It would appear, however, that in the East they still retain some of their former reputation, and are successfully employed in diseases of the bowels.

We sometime since received some specimens of a drug from Syria, which on examination and comparison with the figures of the Myrobalans, given by CLUSIUS and GÆRTNER, proved to be *Myrobalani chebula* and *Indicæ*, or fruit of the *Terminalia chebula.* They are of a black colour, of an ovoid or irregularly oblong form, about the size of a small olive, and longitudinally straited. Their fracture is resinous, compact, of a brown black colour, and seldom presenting more than the rudiments of a nut. Their taste is bitter and very astringent, resembling that of the unripe persimmon.

Their Arabic name is *Hindy Sheirif.* A tea spoon of the powder is given at a dose, to be administered when the patient is perfectly free from fever; he is to abstain from solid food for a few days; if the case be obstinate, a second dose always proves successful. It is also employed in powder or decoction for sore mouth. R. E. G.

Selected Articles.

ART. LXIII. OBSERVATIONS ON THE CRUSTA GENU EQUINÆ, (SWEAT OR KNEE SCAB, MOCK OR ENCIRCLED HOOF KNEES, HANGERS, DEW CLAWS, NIGHT EYES, OR HORSE CRUST,) IN EPILEPSY. By John S. Mettauer, M. D. of Prince Edward County, Virginia.

The grounds upon which this new agent rests, for at least a favourable consideration of its claims upon the profession are, its successful employment in the cure of some forty or fifty well-marked cases of epilepsy.

The substance designated by the several appellations at the head of this article, is furnished by the horse; four oval surfaces, situated on the inner aspects of the extremities, near the knees, are the parts of the animal from which it is obtained. The secretion is poured out so gradually, and in such small quantities at a time, as not to be observed in its fluid, or even semi-fluid states. The crust is of variable colour, as well as density; its exterior is always of a lighter appearance, and harder than the interior, which is dark and soft; it is of a lamellated and fibrous texture, and when broken, resembles dark, soft horn; its odour is very penetrating, diffusible, and peculiar; it is deciduous, and separates gradually two or three times during the year; when prematurely or forcibly removed, the surface from which it is taken, sometimes bleeds a little, inflames, and becomes tender and sore.

Our investigations in relation to the peculiar function of the surfaces, or the offices they subserve in the economy of the animals themselves, do not enable us to say much, if any thing on this subject. Nothing certain seems yet to have been ascertained as to their uses. Conjecture and an extremely vague and loose tradition, afford the only explanations. The sur-

faces have been supposed to separate and eliminate from the system, a fluid possessing many of the constituents of sweat, and loaded besides with properties peculiar to itself, which, if detained, deteriorates the health of the animal. The constant and regular discharge of this fluid, has been thought necessary for the perfect health of the animal, in promoting a sound state, more especially of the extremities, after-heels, hoofs and legs, all of which have been supposed to become diseased in some way by obstructions of the surfaces.

Emunctories somewhat similar, exist on the inner surfaces of the extremities of the swine, near the knees, which, if long obstructed, generally result in lameness and dragging of the posterior extremities; a secretion is continually distilling from them, which, like the crust of the horse, displays the peculiar odour or scent of the animal, more particularly observable when surprised or irritated.

As a *medicinal agent*, the crust has been long known in this part of the country. How it found its way into use as a remedy, is not certainly ascertained. It is conjectured that the coincidence of the horse being observed to bite the crust, and to pass worms from the bowels soon after, suggested it as such, and the conjecture is by no means improbable, when it is remembered, that this article was first employed as a vermifuge with that animal. The fœtid odour of the crust, it would seem, might naturally have suggested the idea of its possessing remediate powers, and doubtless did indicate it as a nervine and antispasmodic, after it was supposed to possess vermifuge properties.

We have long known and employed this substance as an antispasmodic; but the merit of introducing it into regular practice, is due to Dr. Joseph Mettauer, (the writer's father) who employed it in epilepsy, so early as 1782 or 1783. During the last twenty-five years we have enjoyed many, and satisfactory opportunities of using the crust as a remedy in epileptic convulsions.

In collecting the crust for medical purposes, it is necessary to attend carefully to its loosening tendency from time to time, or it may fall off and be lost. It may be made to separate

a little sooner by gentle solicitation, and occasionally by firm compression with a bandage. This should be suffered to remain on after the period of disquamation is near at hand, to prevent the accidental loss of the crust. After it is obtained, it should always be dried a short time in the shade, and then it may be kept for use in a close jar, to prevent, so far as possible, the escape of its volatile properties.

We have to regret our inability to furnish a correct, or even a tolerably satisfactory chemical analysis of the crust; from what has been ascertained, the urate of soda seems to be one of its principal constituents; we are inclined to believe that ammonia, in combination with perhaps the lithic acid, may also enter into its composition: from the peculiar compound odour which it often inhales, much resembles that emitted by common urine after standing some time.

Two forms for administration are only used—the powder and tincture. When the powder is to be used, it should always be freshly prepared, either by pounding and rubbing the dry crust in a mortar, or by grating it with a common nutmeg grater: this last process will be found, (generally,) most convenient, as it enables the practitioner to reduce it, at once, to a very fine and equable powder, even if the crust is imperfectly dried.

The tincture is prepared by simply digesting the broken or powdered crust in diluted alcohol, or common brandy, exposed to a gentle heat for eight or ten days in the proportion of one part of the former to four of the latter.

The doses of the powder vary from two to twenty grains; it may be given diffused in any liquid which the patient fancies. With young patients it is safest to begin with the minimum, and increase very gradually to the maximum doses. Should the disease yield before the largest doses are reached, no further augmentation need be made. When the tincture is employed, from 3ss. to $\frac{\text{z}}{\text{ʒ}}$iss. are its extreme doses. Diluted with water and sugar, it may be given with very little difficulty to the youngest subjects, as it is tasteless, and in a great measure inodorous. In this form also, the doses should be very gradually increased, to prevent, as far as possible, the

danger of exciting the system too much, which might result from the menstruum, should the doses be suddenly augmented.

Possessing properties perfectly analogous to the crust, and employed with the same intention, and in nearly similar doses and forms, we will mention the parings of the hoof. In some cases it has been thought more efficacious than the crust itself. We have used it frequently in the form of tincture in the proportions of one part hoof to two of spirits, with complete success. A favourable result from the use of this remedy, (which we had prescribed in a case of epilepsy,) has been communicated to us since commencing this essay. Extreme doses, ʒj. to ℥ij.

The administration of the crust should always be preceded by a purgative or aperient. This step is designed to prepare the system for the action of the remedy, which it effects by unloading the intestines of vitiated secretions; increasing at the same time the nervous susceptibility of their mucous membranes to remedial impressions, and by determining from the head.

Aperients, or the milder purgatives, should be employed, and generally preferred in those cases of epilepsy distinguished by slight aberations in the animal economy; in such examples the pulse, bowels, and skin are very nearly in the condition of healthy organs; the paroxysms are short and transitory, succeeded by little or no coma, or even drowsiness. In cases marked by symptoms of greater violence, in which a decided inflammatory or congestive character predominates, cathartics should be used: to be varied in activity and strength in proportion as the symptoms partake more or less of acute characters; these are to be repeated until a decided impression is made. Cases of this latter description sometimes require V. S. also, and when this remedy is employed, blood should be always detracted from one or both of the external jugulars, if possible. Occasionally mercurials alone, or in combination with antimonials, are required.

In the first description, or milder cases of epilepsy, some preparations of rhubarb, or rhubarb itself, should be preferred. In the more violent cases, a combination of aloes, scammony,

and jalap, has generally been found most suitable; of each from two to five grains. Calomel with tart. antim. may be added, should the biliary secretion prove very defective, in proportions of two to four grains of the former, and one-fifth to one-third of a grain of the latter. These are to be repeated daily, or once in two days, until the circulation is balanced, the encephalic congestions in a measure dislodged, and the sympathies restored. These preparatory steps having been premised, the crust may be commenced with.

The form or preparation is to be determined by the peculiarities of constitutions, or the complications which modify the disease. Should the case occur in a constitution displaying a highly wrought sanguineous developement, the crust in simple powder will be most applicable, and should be preferred.

It will be safest to begin with the remedy at night, and as soon after the disturbances of the preceding paroxysms have subsided as possible. When given at night for the first time, it is more certainly retained by the stomach, and patients too, are less averse at this period of the day to the taking of an offensive remedy, very probably because the gastric organ is rendered less fastidious by the action of food and drinks upon it during the day.

With young subjects from six to eight years of age, two grains will, in a majority of cases, constitute the commencing dose. We have never used it with patients younger than six years, or older than thirty. Older patients, say from eight to twelve, or fifteen years of age, will bear four or five grains, or even larger doses in the commencement, and with such it may be more suddenly increased to the maximum doses, without gastric disturbances. The remedy rarely offends the stomach when the foregoing precautions are properly attended to; on the contrary, it seems rather to compose and tranquillize this organ. Three doses, in a majority of cases, are as many as will be required in the twenty-four hours. Should cases occur marked by convulsions of unusual violence, with frequent paroxysms, it may be given oftener. From many trials with this article, it has not been perceived that there is

much diversity of effect when employed in large or medium doses with young subjects.

Cases requiring the tincture, differ from those already noticed, chiefly on account of the more strongly marked developements, with which they are associated; in such examples of epilepsy, a decided hydropic diathesis not unfrequently obtains; the adipose textures generally, but more especially of the skin, are disposed to bloat a little, with universal pallidness and reduced temperature; the secretions from the skin, bowels and kidneys, are generally defective; the pulse is occasionally slow, feeble, and soft, but more frequently it is preternaturally active and corded, from the nervous mobility generally attendant upon imperfect sanguification; such patients are nearly always languid and sluggish, and often require diffusible stimuli to rouse the enfeebled energies, both of body and mind, to something like a comfortable state of excitation: with such subjects the approach of the paroxysm is more gradual, and may, in many instances, be foreseen for hours, and sometimes days. To this complication of epilepsy, the tincture is most happily adapted, as it presents the remedy in the form best calculated to act promptly, as well as to meet the several indications of cure. It should, (as advised with regard to the crust in substance,) always be commenced with at night, and in the minimum doses; from ʒss. to ℥iss. may be given, properly diluted, three or four times during the day. Being less permanent in its effects, the tincture should be given more frequently than the crust in substance, especially if the symptoms are urgent; these doses may be repeated with safety as often as once in three or four hours.

Occasionally in this form or complication of epilepsy, it becomes necessary to employ tonics, either mineral or vegetable, or perhaps both, before the tincture, (or powder,) can be given with the least benefit. By invigorating the organic tone, upon which the normal functional actions materially depend, (especially of the digesto-nutritive systems,) our agent is enabled the more effectually to produce its specific remediate excitation. That debility exists in these cases, may be inferred from the general anæmial aspect of such patients.

as well as from the marked benefits following the use of tonics. It is an observation worth remembering, (the truth of which has been often verified in the course of our practice,) that nervines rarely benefit when the organic tone is greatly depressed; like mercurials, they are more certainly remediate, under certain circumstances of energy of the organic vitality; depressed, (or exalted,) inordinately, both fail of their remediate effects.

Should costiveness supervene, (which will be often the case,) a combination of scammony, aloes, and rhubarb is to be used, in doses of from two to four grains of scammony, about the same proportion of aloes, and from four to eight grains of rhubarb, made into pills. This compound should be given at night, and the doses so managed, as to elicit only one or two evacuations, the design not being to purge freely. In restoring the solubility of the bowels, we know of no combination so well suited to such cases as the one just recommended; its action is gentle, but effective, particularly in eliciting the biliary secretion, upon which circumstance the peristaltic movements of the intestines are mainly dependent.

The crust, administered in either of its forms, should be suspended during the employment of aperients or cathartics; and should not be resumed, until, at least, the active cathartic movements subside. To correct the acidity which is occasionally present in this form of epilepsy, it has been found necessary to employ alkaline absorbents; and for this purpose a weak lixivium of hickory, or grape-wine ashes, has seemed to answer best: it should be prepared by mixing one heaping table-spoonful of the ashes in a quart of water; of the clear liquid, from ℥ss. ℥j. may be taken two or three times daily, after eating, or as often as may be found necessary, without irritating the bowels, which it will sometimes do if continued too long.

In both modifications of the disease, the diet should be particularly attended to during the whole course of the treatment, and indeed for some time after the cure may be supposed to have been effected. In the sanguineous variety it should be decidedly abstemious; animal or oily substances

are to be inhibited; cooked farinaceous articles; some of the soft pulpy fruits; molasses; and occasionally, thin animal broths will be found most suitable; very little food of any kind should be taken into the stomach after 2 o'clock, P. M. The epileptic patient should always retire to bed with the stomach nearly empty.

In the lymphatic complication, some latitude in diet may be allowed; that is, animal substances, moderately coagulated, and of a purely muscular character, may, (after the bowels are *regulated*,) be used in small quantities; should acidity abound, or a tendency to it in the stomach be discovered, the use of animal food is not only allowable, but particularly applicable.

As auxiliary means in the cure, the earliest attention should be given to uniformity of temperature; the skin should be well protected against the unequal action of cold, during every stage of the treatment; and for this purpose, the wearing of flannel next the skin should be directed. Thus protected, under all circumstances of climate and exposure, the individual may, (as it is requisite he should do,) indulge in moderate exercise, and even pursue many of his ordinary avocations, with comparative safety. This suggestion will not be regarded as supererogatory, when it is recollected, that epileptic attacks often originate in a want or neglect of comfortable clothing; and every practitioner much conversant with the disease must have witnessed relapses from exposure to the causes of catarrh.

The remedy which we have been considering should be discontinued or suspended upon the accession, and during the continuance of any new or acute diseases; and when resumed should be commenced within medium doses.

Employed in either of its forms, the crust should be continued perseveringly, until a cure is effected, or a satisfactory trial of its powers has been made. In no disease, which "flesh is heir to," is it more important to inculcate patience during treatment than epilepsy, and the failures of medical practitioners in contending with it, are to be attributed to the disregard of this admonition, rather than to the incurable nature

of the disease; we might mention also, a want of confidence in remedies, among medical men, as an obstacle in the way of satisfactory trials. In every successful case our remedy should be continued sometime after the convulsions have ceased to return; the patient cannot be considered cured until the general health too is restored, even if the convulsions have long subsided.

It is not pretended that the crust will prove remediate in every case of epilepsy, nor even in all such examples as are idiopathic; some of these may be so strongly engrafted upon the system, from long continuance of the disease, as to have become completely constitutional and fixed, and necessarily irremediable. In the case connected with organic lesions of the skull or brain, (could they possibly be distinguished,) we should never advise the crust; but as it must be confessed that such cases cannot be discriminated, it will be safest in every instance to give the remedy a fair trial, (more especially as it is not likely to aggravate the incurable cases,) and such has uniformly been our custom.

In obstinate cases the crust should be continued for more than a year before it is to be discarded, or the case abandoned as incurable; both forms should always be employed and used alternately.

The crust in form of tincture is also a valuable nervine and anti-spasmodic in hysteric convulsions, and indeed in hysteria generally. In that variety, connected with or proceeding from uterine irregularities incident to sterile married, (or unmarried,) females, it will be particularly serviceable; with such the paroxysms most strikingly resemble epilepsy.—*Jour. of Medical Sciences.*

ART. LXIV. OBSERVATIONS ON THE MEDICAL PROPERTIES OF THE VERATRUM VIRIDE. By Charles Osgood, M. D. of Providence, Rhode Island.

Some of the popular names of this plant are American hellebore, swamp hellebore, Indian poke, Indian Uncas, poke weed, bear weed, itch weed, tickle weed. Beside these, there are others of a more local character, and of those already enumerated, there are several which are equally applied to other plants. It is indigenous—found in almost every part of the United States, the product of swamps and wet meadows—top annual, and root perennial. It appears early in the spring, and is one of the first plants which attract our notice at the commencement of returning vegetation. It is often found associated with the *Ictodes fœtidus*, particularly on the margin of small streams in low boggy lands. Both require the same soil, and grow with equal luxuriance. Its flowering season in the northern and middle states is in June; in the southern as early as May. This plant in its botanical characters is closely allied to the *Veratrum album* or white hellebore, a distinguished medicinal plant found in most countries of Europe. Its botanical description is fully given in most of our works upon that subject. The *root*, the part employed in medicine, is bulbous, the upper portion tunicated like an onion, the lower half solid, sending forth a large number of strong, whitish radicles. This root has a strong acrimonious taste, leaving its pungency in the mouth and faucus a considerable time after being masticated. The decoction, though intensely bitter, is less acrimonious than the root in substance. The proper time for collecting this, as well as most other medicinal roots, is in the fall of the year, after the decay of the top. Its medicinal properties are then most active, and appear to be the most permanent. When kept *over* more than one season, its active properties become impaired; it should therefore be gathered every year, and preserved in a dry place.

The early history of this plant is involved in much obscurity. Our accounts of its medicinal use by the aborigines are altogether vague and unsatisfactory. It appears to have been known to them rather as a poison than a medicine. Its use in the election of their chiefs is noticed by Joselin, an early visiter to this country, who calls it "white hellebore." According to this writer, that individual whose stomach was least susceptible to its deleterious effects, was regarded as the "strongest of the party, and entitled to command the rest." It has been long and extensively used for the destruction of vermin and birds. Among many of the farmers of New England, it still continues a common practice to protect their corn fields from the havoc of birds, by scattering the ground with kernels of corn saturated in a strong infusion of the root: this is done just as the corn is springing from the ground, it being then most liable to depredations from the feathered tribe. With many it is customary to subject their seed corn to the same process before planting. A short time after partaking of corn thus prepared, muscular action becomes so much paralyzed as to prevent either flying or walking, and in this torpid state they are readily taken and killed. Unless caught while thus narcotized, many of them recover and fly away.

The analogy in external appearance between this species and the *Veratrum album* of Europe, was the circumstance which first led to an investigation of its medicinal properties. But notwithstanding this analogy in botanical affinities, there is a decided difference in their medicinal operations—the album being hydragogue cathartic; whereas, the viride has not the slightest laxative effect. So far as I am acquainted, this plant has never been the subject of a thorough analysis. It is commonly said to contain the proximate active principle *veratrine* as the seat of its medicinal properties. This opinion, however, seems to be entirely gratuitous, being drawn from its analogy in its external appearance with the European species, rather than from actual investigation. If we consult analogy in medicinal properties, instead of external appearance, our conclusions will be more rationally founded. This is, indeed, the only analogy that can give much weight to an

opinion upon this point; and so far as this goes, is in decided opposition to the hypothesis, that the active principle of this species is the same as of the European—that, as has been before observed, being hydrogogue cathartic, while this possesses no cathartic powers. It has been suggested, that this diversity in medicinal effects might be explained on the supposition that veratrine, though the proximate active principle did not exist in the plant in the form of a bi-gallate, as in the European species—the diversity in medicinal properties warranting the belief that the salt was different, though the base might be the same. This opinion, though at first view plausible, is neither supported by analogy, nor in accordance with the known laws of vegetable chemistry. Although solubility and activity are often affected by a change of acid simply, I have no knowledge that vegetable chemistry furnishes us with any instance of a change in the medicinal properties of the proximate active principles of a plant, by varying the acid with which the proximate principles or base may be combined. Among many instances which may be adduced where this integrity in medicinal effect is preserved in spite of a change of acid, the sulphate and acetate of quinine, sulphate and tartrate of sanguinarine, sulphate and acetate of morphine, are familiar examples. I have been thus particular on this point, as the general impression of identity in active principle with the European species has greatly interfered with the investigation this plant deserves, and would otherwise have received.

Since the above was written, I have endeavoured to test the correctness of my conclusions by chemical analysis. Although my experiments were not sufficiently extensive to accomplish this object, still I would briefly detail the process adopted. The preparation from which I attempted to obtain the proximate active principle was the infusion, prepared by adding boiling water to the finely bruised root, and allowing it to macerate twenty-four hours, the quantity of root being such as to saturate the water. After filtering this infusion, a precipitate of a dull white colour was thrown down by ammonia. This precipitate, after being repeatedly washed, was

boiled for about five minutes in alcohol, with a small quantity of animal charcoal, and filtered while hot. On cooling, a small portion was again thrown down, the alcohol still holding the greater part in solution, which was afterwards obtained by evaporation. This substance, after being thus subjected to the action of alcohol and animal charcoal, was of a clear white colour, pulverulent, inodorous, and very acrid, producing a peculiar stinging sensation when taken upon the tongue. Whether this was the principle in which the medicinal properties of the plant reside, is a point I am unable to determine, being deprived of an opportunity for extending my investigations, by inadvertently losing the greater part of the specimen obtained. Not being aware of its extreme volatility, the filter containing it was placed for the purpose of drying in a temperature which appeared to be but little higher than that of the body, at the extent I should think it could not have exceeded 120° Fahr. At this temperature most of it volatilized, and was lost.

Since the above experiments, I have had no opportunity for repeating the process.* The *medicinal operations* of this plant have been variously estimated. In the United States Dispensatory by Drs. Wood and Bache, it is represented as agreeing in its effects with *Veratrum album*, which seems to be the most common opinion. From the very limited extent to which it has been used as a medicine, but few facts relative to its medicinal properties have come before the profession. Among the causes of this limited use, the common prejudice against the medicinal products of our own country has doubtless had an influence—a prejudice which, in this instance, has the character of inconsistency, so far as prevails the impression of its identity with the Europran species. Our own medicinal articles can never receive a due share of attention, so long as they have to encounter *our own* prepossessions against them, and in favor of those of a transatlantic origin. Pro-

*It is my intention to do this at some future time, and if successful, will forward the result.

fessor TULLY,* of the medical department of Yale College, (whose extensive use of this article well qualifies him to judge of its medicinal properties, and justly to appreciate its value as a remedial agent,) is of the opinion, that as an article of medicine, it ought entirely to supercede, not only the other species of the genus, but also the *Colchicum autumnale.* On many accounts it is certainly far less objectionable. In its general deobstruent effects it appears to be similar to its congener, the *Veratrum album,* as well as to the colchicum. But as possessing fewer of their objectionable features, and being equally efficient as a medicine, it should have the precedence in practice: it is not liable to the same uncertainty in its operation; it does not produce uncontrollable purging in one case in doses which have little or no effect in another; it does not leave the alvine canal in an irritable condition. On the contrary, it operates with as much certainty as any article in the materia medica: is never catharic, and always leaves the bowels in a good condition. It requires but a moderate degree of attention to render the operation of the *Veratrum viride* perfectly safe. It should, therefore, on this account, take the precedence of an article possessing no superiority in medicinal powers, whose operation is not within the control of vigilance and caution.

I am aware there is some diversity of opinion respecting the safety of the colchicum, as well as of the *Veratrum album.* It is occasionally employed for a length of time without manifesting any distressing or dangerous symptoms. But the confidence thus inspired, is too often interrupted by the occurrence of some unfortunate case. I have met with but

*An apology is due Dr. Tully for the liberty I have taken in quoting his authority. Many of the leading principles which form the basis of this article were derived from his public instruction, and while acknowledging myself responsible for its errors, it is but justice to say, that much of whatever merit it may possess, is the result of his discriminating research and extensive observation. Few men in our own country have more assiduously studied the character of our indigenous articles of medicine, or prosecuted this study with greater success. The publication of his lectures on the materia medica would be a boon to the profession, which, it is hoped may, ere long, be realized.

few of my professional brethren who, after an extensive use of this article were not led to consider it unsafe, as occasionally accumulating upon the system, and producing hypercatharsis and prostration, which no medication could relieve.

There is still another reason why the *Veratrum viride* is preferable—being indigenous, it can always be obtained in its recent state, and therefore of uniform activity, while the European species being often collected at improper seasons, and imported in the form of powder, is liable to much variation in strength, and is occasionally inert. Professor Tully, whose authority I have before quoted, thus enumerates the operative effects of this plant. 1st. Deobstruent or alterative. 2d. Acrid narcotic. 3d. Emetic. 4th. Epispastic. 5th. Errhine. In doses as large as the stomach will bear without nausea, its deobstruent operation is manifested by a gradual and general change in the secernent and absorbent system, correcting vitiated secretions, and promoting those which are deficient. As secondary or subordinate parts of its deobstruent operation, it is *resolvent*, producing resolution of inflammations by internal use; *antipsoraic*, having the power of removing certain cutaneous affections; *cholegogue*, producing an increase in the biliary secretion; *expectorant*, promoting the excretion of fluids from the bronchial membrane; *diuretic*, causing a moderate increase in the secretion of urine: *discutient*, possessing the power of dispersing tumours from local application; and finally, *sialogogue*, producing a decided increase in the secretion of the salivary glands, both from topical and internal use. This latter operation is much more prominent in some constitutions than others. It is usually slight, and of little consequence.* It does not appear to be directly *diaphoretic*, though diaphoresis may be produced by virtue of its emetic operation; the secretion of the skin being more of a clammy, adhesive nature than is usually caused by the simple

* Dr. Peabody, of Norwich, Connecticut, informs me, that in one instance, he found the continued internal use of this medicine produce as powerful salivation as often witnessed from the use of mercury. This, however, passed off directly with the discontinuance of the medicine, leaving no unpleasant effects.

emetics. I am inclined to think that it is *emmenagogue*, but have not sufficiently attended to this operation to arrive at any very satisfactory conclusions. Some of my medical friends, who have made considerable use of this article, are of the opinion that it possesses emmenagogue properties. Further observation is still requisite fully to establish its effect upon this secretion. Of the different operative effects of this medicine, its deobstruent or alterative is the most important. To obtain this operation fully, the nearer the strength of the circulating system approaches a healthy standard the better. If there be phlogistic action, it is necessary to precede its use by bleeding or refrigerants; if debility, this should be removed by tonics, and a supporting regimen. Its narcotic effects are very prominent, and when the system is brought fully under its influence, are manifested by faintness, somnolency, dimness of sight, dilation of the pupils, vertigo, head-ache, impaired muscular action, hiccough, cold clammy sweat, small, unfrequent, and compressible pulse. Its influence upon the circulating system is very decided. By the exhibition of full doses, I have frequently known the pulse, when ranging from 75 to 80 in the minute, reduced to 35 or 40 in the course of a few hours. Its effect upon the strength of the pulse is as great as upon its frequency. For counteracting its ultimate narcotic effects when carried to an undue extent, I have invariably succeeded with small doses of laudanum and brandy, often repeated; camphor and ammonia are valuable adjuvants, but far inferior to opium and brandy. It is usually emetic in doses of from four to six grains of the substance; one to two fluid drachms of the tincture, or one to two grains of the extract, requiring a greater length of time to produce vomiting than most other emetics, excepting those of the deobstruent kind. The larger the dose, the more speedily is the vomiting produced. For the mere purposes of an emetic, however, this article can never be advantageously employed, on account of its acrid narcotic effects, excepting perhaps in those cases which may indicate a narcotic operation in conjunction with the emetic. As an epispastic, (used as a generic term, including the various

grades of irritation, vesication, rubefaction, &c.) it is sometimes employed with advantage, though for this operation it is comparatively of minor importance; other articles being equally efficient and more generally at hand. Its errhine powers, (if this be an operation distinct from the latter, and I am inclined to think it is,) are produced either by the fine powder of the root, or the extract. When snuffed into the nose it produces long continued and sometimes violent sternutation. As illustrative both of the medicinal powers of this article, and its activity in the form of extract, I will briefly detail its effects, as produced on myself and another individual, a member of the profession, whose experiments were at my request, and in my presence.*

At 12 o'clock, M. I took two grains of the finely pulverized extract. At 1 began to experience a slight sense of uneasiness at the stomach, but not amounting to nausea. This uneasiness at the stomach, though so slight as to be attended with very little inconvenience, continued till about half past 1, when vomiting commenced. The contents of the stomach were thrown off without nausea, but with a sense of rising in the œsophagus, which perhaps might be compared to the rumination of animals. Judging from my sensations at the time, should suppose the muscular fibres of the stomach contracted gradually and steadily upon its contents, until they were expelled, the diaphragm and abdominal muscles remaining entirely inactive. After the vomiting had continued a considerable length of time, it appeared to be more the effect of spasmodic action, and was attended with chills and coldness of the whole body, but moisture of the skin. At the expiration of about an hour vomiting ceased, and was followed by dimness of sight, dilatation of the pupils, vertigo, faintness and somnolency, pulse at the wrist 40 in the minute, and scarcely perceptible. I then took 25 ♏ laudanum, and fell asleep. After the lapse of an hour, awoke with the continu-

* These experiments with the extract were made immediately after this preparation was formed, and before it had been at all used as a medicine. Its effects were noted down at the time, the substance of which are here given.

ance of the same symptoms, together with a dull pain in the epigastrium, and immediately repeated the laudanum. But finding no relief, the dimness of sight increasing, and on motion of the body, or turning the head, amounting almost to blindness, a sensation of stiffness in the voluntary muscles supervening, particularly the temporal and extensors of the head, together with considerable general prostration, the dose of laudanum was doubled. This produced a partial abatement of the symptoms, and after another similar interval was repeated, with half a gill of brandy, which soon effected entire relief. In connexion with these symptoms, it should be observed that I am unusually susceptible to the operation both of narcotics and emetics.

The individual to whom I have alluded as also taking this extract, may perhaps be considered as at the other extreme in the range of susceptibility. He commenced at 9 o'clock in the evening, with two grains. In ten or fifteen minutes, slight uneasiness at the stomach; at half past 9 took four grains more; at 10, a sensation of something like a ball rising in the œsophagus, which seemed to extend up as far as the top of the sternum, as if propelled by a gradual tonic contraction of the stomach. At quarter past 10, vomiting commenced. This was attended with very little inconvenience at first, but after continuing a short time became more severe, the ejections consisting principally of bile; together with the vomiting, there was much ineffectual retching; almost constant hiccough; chilliness; dimness of sight; vertigo; inability to control the voluntary muscles; distress at the stomach; pulse small and creeping, and 34 in a minute; the ordinary frequency ranging from 56 to 58. As these symptoms were becoming more aggravated, he took ʒss. of laudanum, and went to bed scarcely able to walk. In ten or fifteen minutes the laudanum was repeated, which soon produced sleep. In the morning was apparently in better health than he had been for several months. At 7 the same morning, three grains more were taken; at 9 complained of a confused sensation in the head, and almost an entire loss of power of the gastrocnemii muscles. At 12 M. three grains more were taken,

and at half past 12, all the muscles of the forearm were affected in the same manner. At 1 vomiting; pulse 40, and other symptoms essentially the same as the day before, excepting a less degree of chilliness. At half past 2, took 45 ♏ laudanum, and in the course of two hours the effects of the medicine entirely subsided, excepting the inability of using the gastrocnemii muscles. At 11 in the evening two grains more were taken, which, in about three quarters of an hour, produced vomiting like the other cases, but without any appreciable narcotic effect.

The freedom with which the extract was taken by this individual, was not in conformity with my request, as I had previously tested the effects of two grains upon myself. My wishes, however, were overruled in the confidence he had in his own powers of withstanding the effects of narcotic agents. He afterwards made experiments with this article in smaller doses, and at regular intervals. Doses of half a grain once in three hours, after being repeated three or four times, were followed by an uneasiness at the stomach, with the same paralyzed condition of the extensors of the feet. The dose was then diminished to a quarter of a grain, and continued three days at the same intervals. With these doses, muscular action was not so constantly interrupted, this effect occurring only after considerable exercise, as walking or jumping. By continuing this article three or four days in doses of one-eighth of a grain, once in three hours, it was followed by moderate diuresis. The same effect was also noticed in two other individuals, who experimented with it at the same time. This operation, however, does not appear sufficiently prominent for the treatment of hydropic diseases. In no single instance in the experiments with this article upon myself and others, did it operate in the least as a cathartic; nor in my practice since, have I ever discovered in it any disposition to pass off by the bowels. Dr. John Ware, of Boston, who experimented with it in the form of powder of the root, states that he administered it in thirty cases, and "in no instance was it very clear that purging was produced."*

* Vide Dr. Bigelow's American Medical Botany, Vol. II. Part 2d.

The pharmaceutic preparations of this plant are tincture, wine, extract, ointment, infusion, decoction and powder of the root. Of these, the tincture, wine, extract and ointment, are the most eligible forms, and for common medicinal purposes, appear to be all that are requisite.

The tincture is prepared by adding the recent bruised root, ℥vj. to diluted alcohol, Oj. I was formerly in the habit of using ℥viij. to the pint, but this appears to be more than is necessary for saturation: medium dose from f. ʒss. to f. ʒj. For the wine, recent bruised root, ℥vj.; white wine, ℥xiv.: officinal alcohol, ℥ij. The alcohol is necessary to prevent the preparation from becoming sour in warm weather; dose the same as of the tincture. In reference to the relative value of these two preparations, I do not know that any thing can be said in favour of the wine, which would not with equal truth apply to the tincture. In medicinal efficacy, there appears to be no appreciable difference. The extract is made simply by expressing the juice of the recent root, and inspissating in the sun. Thus prepared, it is hard and dry, of a grayish colour, and capable of being reduced to an impalpable powder. It requires a considerable quantity of the root to produce much of the extract. To obtain the juice it must be strongly bruised and subjected to strong pressure.

I was first induced to make this preparation for the purpose of having a form which would embody the greatest activity in the least bulk, and which would retain this activity a longer time than the crude root. In these particulars my expectations have been fully realized. Its activity is sufficiently attested in the experiments already detailed. Medium dose from one-fourth to one-half grain. I have rarely been able to exceed one-half of a grain, when repeated at intervals of three or four hours, without producing more or less narcosis and disturbance of the stomach. For what length of time this extract when excluded from the air will fully retain its medicinal activity I am unable to say; I now have in my possession a part of the first parcel which I prepared, and although about three years old, does not appear to have lost any of its strength. It has been kept excluded from the air, though not

from the light. I am inclined to think this extract will, to a considerable extent, supersede the other preparations. Its activity in this form, and the facility with which it may be administered, certainly favour this supposition. The extract by decoction is an inferior article, possessing but little medicinal power. Heat appears to injure it very materially. The ointment is the only preparation which has been made officinal in the Pharmacopœia of the United States. The following are its directions: "Take American hellebore in powder, ℥ij.; oil of lemons, 20 ♏; lard, ℥viij. and mix them." For this purpose I have found the pulverized extract far preferable to the powder of the root. The following is the formula I have usually adopted: ℞. Extract in fine powder, ʒj.; oil of lemons, 3 ♏; simple cerate, ℥j.; to be thoroughly incorporated without heat. Cerate is preferable to lard, as the latter is melted by the warmth of the body. The greater activity and fineness of the powder of the extract make it more eligible than the powder of the root.

It is unnecessary fully to enter upon a therapeutic application of this article, or to enumerate all the diseases in which it has been employed. Among those, in which it stands foremost in our list of remedial agents, are the arthritic inflammations. In this class of diseases, it should be given in such doses as at first fall short of producing disturbance of the stomach, as one-third of a grain of the extract, or ʒss. of the tincture, regularly repeated every three or four hours, and gradually increasing to the extent of producing narcosis or vomiting on the one hand, or resolution of the disease on the other. To ensure it best effects, opium in moderate quantities should be conjoined. A combination of the wine, with the tincture of opium, in the proportion of three parts of the former to one of the latter, cannot it is said be distinguished in its operation from the celebrated *Eau medicinale*, excepting by the catharsis which sometimes ensues from the use of the latter. This combination is much more efficient than the wine or tincture alone, producing less disturbance of the stomach, and can be employed in larger quantities without inconvenience from its narcotic effects. In *gout*, of the regular

kind, this article manifests its best powers. It is the opinion of Dr. Tully, that with proper management it will cure a majority of cases. It proves most successful in those constitutions which are not impaired by habits of gluttony and intemperance, at the same time it is much better adapted to broken down constitutions, than the colchicum or *Veratrum album*, on account of the exhaustions these articles are liable to produce. If used in efficient doses, and perseveringly continued several days, there are few cases but will be decidedly benefitted, if not radically cured. It appears to be as well adapted to rheumatism as gout. In the treatment of that disease, both in its acute and chronic form, the article is well worthy the attention of the profession. There is no remedy in the materia medica within my knowledge, with the exception perhaps of the *Actæa racemosa*, to which *acute rheumatism* more easily yields. In this disease it should also be combined with opium, for the purpose of relieving pain, and qualifying its effect upon the stomach. The amount of opium conjoined should be graduated in some measure by the severity of the pain. Thus qualified, it should be administered at regular and short intervals, generally as often as every three hours, in such doses as at first fall short of producing nausea, and gradually increased. Thus administered, the system is kept under its steady and uniform influence. If the doses fall short of producing its specific effects upon the stomach and brain, or if administered so irregularly that the effects of one dose pass off before another is given, but little will be accomplished. In a common case of acute rheumatism, a cathartic of calomel should first be premised, unless the bowels are in a relaxed condition, or some other circumstance exists to contravene this practice. If the stomach is not in an irritable state, it is then best to commence with f. ʒj. of the tincture, in the combination recommended in gout, each dose to be increased 5 or 10 ♏, as the case may require, till some effect is produced. All local applications should be avoided, as in no way promoting the operation of internal means, and only liable to draw the disease from one part to another, where perhaps its presence is still more to be dreaded. The more acute the disease,

the more erratic in its character, and the earlier in its progress, the more speedily does it yield to this course of medication. In *chronic rheumatism*, unattended with inflammation and swelling of the joints, it is less successful than in the acute, from its being a less controllable form of the disease. In this variety, however, it is probably more efficient than any other remedy of equal safety which we possess. It is often necessary to continue its use several days before much benefit is perceived. It is not very material whether it is exhibited in the form of tincture or extract. In acute rheumatism, where greater promptness is requisite, and small variations of dose often desirable, the tincture is most eligible; but in the chronic variety I have generally used the extract for the purpose of exhibiting in the form of pill, which in medium doses is not so liable to produce disturbance of the stomach. The following formula for a common rheumatic pill appears to be well adapted to a majority of cases. R. Ext. ver. vir. grs. x.; opii. grs. v.; sapon. venet. grs. xv.; muc. gum. Arabic, q. s. M. To be divided into thirty pills. Dose, one pill to be repeated every three or four hours, as the urgency of the symptoms may require. After two or three repetitions, there is usually some disturbance of the stomach, and occasionally slight narcosis. In metastasis of rheumatism to internal organs, this remedy is equally valuable. In cases of transfer to the brain, from external applications or other causes, it has been found highly beneficial, not only from its resolvant powers in arthritic inflammation, but from its narcotic properties in reducing the frequency and strength of the pulse. In a case of this kind which came within my observation about two years since, the pulse in a few hours was reduced in frequency from ninety-five to forty in a minute, with manifest relief of the existing delirium. I think it will also be found a valuable remedy in arthritic inflammation of the heart. So far as my knowledge of its use in this affection extends the result has been favourable.

Pneumonia, with the exception of low typhoid cases, is a disease in which it has been advantageously employed. It appears to be best adapted to the variety *notha*, and has often

succeeded in breaking up the disease when acute and fully formed. I have also used it in the variety *vera* with decided benefit. Most cases require a small quantity of opium in combination, and when administered with the view of breaking up the disease, it should be given in full doses, and repeated at short intervals. It is also one of our most valuable remedies for arresting the cough, which is sometimes a protracted sequel of this disease, and in consequence of the irritable condition in which severe cases are liable to leave the lungs. Protracted cases of *common and epidemic catarrh*, where other means have failed, not unfrequently yield to this article. I have occasionally combined the tincture of *Sanguinaria Canadensis* with increased effect. These two remedies, with the camphorated tincture of opium in equal parts form a valuable compound, and may be given in doses of 50 or 60 ♏ repeated at intervals of four or five hours. When the disease from neglect or other cause assumes the form of membranous phthisis, much less is to be expected from its use. In cases of this kind the *Actæa racemosa* is a valuable adjuvant, and should enter largely into the combination. It has been successfully employed in simple *idiopathic cough*, and seems to be well adapted to the kind, or irritation on which this cough depends. I have often used it in this affection with entire relief, in doses short of the nauseating point, repeated four or five times in the twenty-four hours. In many cases much is gained by a judicious combination with other deobstruent narcotics, as Actæa, Sanguinaria, Digitalis. In such combinations, there is usually less disturbance of the stomach, and less inconvenience from ultimate narcosis.

There is much testimony in favour of this article in the disease commonly called *asthma*, (Dyspnœa exacerbans of Good.) Dr. Tully thinks it a valuable remedy, and one which will often break up the disease. It should be given in the drachm doses of the tincture, as the paroxysms are coming on and continued at short intervals. The paroxysms is generally relieved by the first dose, which should be conjoined with ʒss. of the tincture of opium. In *dysentery* it is also recommended by Dr. Tully. The non-malignant cases of this dis-

ease are those in which it is more particularly indicated. In cases of this kind, Dr. T. thinks its operation is analogous to that of mercury in removing the specific inflammation of the mucous membrane of the bowels, on which the existence of the disease depends.

Dyspepsia in some of its forms is relieved by this remedy. It is principally valuable by virtue of its chologogue powers, and is consequently best adapted to those cases attended with a deficient or vitiated secretion of bile. Its effect upon the mind in cases of depression of spirits, so frequently a symptom of the disease, is sometimes very prominent. I have often observed this effect after the system has been for a time under its influence, and the narcosis allowed to subside.

The full extent of its *discutient* powers are yet to be learned by further experience. In several cases of syphilitic enlargement of the inguinal glands, in which the common mercurial ointment produced but a partial reduction of the swelling, I have speedily succeeded in completing the cure with this remedy. The cerate prepared as before directed, is best adapted to this purpose. As an *antipsoraic*, it has been used in many cutaneous affections, with much authority in its favour. Of its value in this class of diseases I can say nothing from my own experience. Salt rheum, (var. of ecpyesis impetigo of Good,) scalled head, (E. porrigo,) itch, (E. scabies,) are the forms of cutaneous diseases in which it has been more particularly recommended.—[*Am. Jour. Med. Sciences.*

ART. XLV. CHEMICAL EXAMINATION OF DIGITALIS AND HYOSCYAMUS. By M. M. Brault and Poggiale.

About six months since we were occupied with the analysis of the Digitalis, and especially of digitaline. These researches not possessing, in our opinion, sufficient interest or novelty to require notice, we did not publish them. But specimens of *digitaline* having been lately sent to the Royal Academy of Medicine, which proved to be nitrate of potash and sulphate of lime, we shall now make known the result of our labours.

In making these researches, our intention was to study, analyze and endeavour to classify this substance. We had no doubt of its existence, as we could not suppose that so many persons could be deceived. We therefore several times repeated the processes employed to prepare this pretended alkaloid, but never were able to detect it.

At one time we supposed that we had succeeded, because we obtained beautiful white crystals, but these proved, on analysis, to be sulphate of lime.

The process of M. Pauquy consists in boiling the leaves of the digitalis in distilled water which has been rendered sour by the addition of sulphuric acid, treating the decoction with calcined magnesia, and the dried precipitate with alcohol. This, when distilled, afforded a white substance in fine acicular crystals. Without fear of contradiction, we assert that this process will never afford the desired results. It is of importance that others should repeat it, and we trust such will be the case, that a process so defective should no longer be quoted and referred to.

We have also tried the method proposed by M. Leroyer, which is too long for insertion, and have always obtained, with that chemist, a brown pitch-like substance, possessing an excessively acrid bitter taste. This is the active principle of the digitalis or the digitaline of M. Leroyer. We have examined this brown substance with great care, as we hoped to extract a crystalline principle from it, and became con-

vinced that it is nothing more than an extract composed of a great proportion of chlorophylline, much resin, a fatty matter, and different salts of lime and potash. We arrived at these results as follows: The extract was dissolved in water sharpened with sulphuric acid, this precipitated a great part of the chlorophylline. On filtration the liquid assumed a yellow colour. It was evaporated to a syrupy consistence, cold water added and the whole filtered. This operation was repeated until the whole of the chlorophylline was separated, the fluid then became of a pale yellow colour. This liquid was again evaporated, and permitted to cool, when a brown substance was obtained, having all the properties of the resins. This resin, which was deposited at the bottom of the vessel, contained a fatty matter which was removed by means of ether. On the surface of the fluid was a beautifully crystallized substance, which proved to be sulphate of lime, after all this had been removed by several crystallizations, a small quantity of sulphate of potash remained in solution.

M. Leroyer states that M. Prevost had seen crystals of digitaline with a magnifying glass. Nothing, however, proves that these were really crystals of digitaline; on the contrary, we are convinced that they were nothing more than salts of lime and potash. A microscopic examination is not enough; the substance itself must be studied; if this had been done by M. Leroyer, he would have seen that this body was not a vegetable but a mineral substance.

The properties ascribed by M. Leroyer to his digitaline, are additional proof of our assertions; he says it attracts moisture from the air. When we reflect that it contains salts of potash and hydro-chlorate of lime, this property is not astonishing.

We need scarcely add that the digitaline of M. Planiava is only an extract composed of nearly the same principles as that of M. Leroyer.

It results from the above, that digitaline has not yet been obtained. That of M. Leroyer is a compound of chlorophylline, resin, a fatty matter, and some salts of lime and potash. That the method of M. Pauquy furnishes no product.

From our experiments it would appear that the leaves of digitalis are composed of—

1. Chlorophylline. 2. Resin. 3. Fatty matter. 4. Starch. 5. Vegetable fibre. 6. Gum. 7. Tannin. 8. Salts of lime and potash. 9. Volatile oil. 10. A fatty oil. 11. Oxalate of potash.

We are of opinion that we are rendering a real service to science in publishing these reflections. If we have not discovered the active principle of digitalis, we have at least corrected an error. Why, in fact, seek for a base in digitalis which in all probability exists in theory only? Is its presence required to explain the properties of this plant? We think not. Without affirming that digitaline does not exist, we believe that the purgative and diuretic properties of digitalis are owing to a union of all the substances composing it, and especially to the resin. This resin, in fact, is bitter, acrid, and almost corrosive. If a very small portion be applied to the tongue, a very painful sensation of heat and constriction of the throat is felt. Two grains cause a great irritation of the stomach. It is very soluble in hot alcohol, soluble in ether and the volatile oils, insoluble in water alone, but taken up by water sharpened with an acid. What perhaps proves still more that digitalis owes its properties to this resin, is, that the alcoholic tincture possesses the same action. It is also well known that the fecula deposited by the expressed juice has been much used in medicine, because the resin combined with it communicates active properties to it.

Hyoscyamus.—If the observations of several distinguished chemists did not lend support to our investigations, we should not dare to assert that hyoscyamine is no better known than digitaline, and that it has never been isolated. M. Chevalier, who has several times attempted to separate it, has never succeeded, and certainly no one will contest the skill of this chemist.

In commencing this investigation, we had not the wish to prove that hyoscyamine does not exist, on the contrary we were desirous of discovering and studying it. Although we have not obtained it, we are of opinion that we ought to publish

our researches. It may perhaps induce a severe scrutiny as to their truth, which cannot fail of eliciting truth.

According to M. Brandes, hyoscyamine is obtained by precipitating decoctions of the plant by an alkali, drying and treating the precipitate with alcohol. By evaporating this alcohol, prismatic crystals are obtained, susceptible of combining with nitric and sulphuric acids, and forming salts.

We have repeated this procedure four times with the greatest care, and have always obtained a white powder which attracted moisture from the air. This powder was composed of acetates, phosphates, sulphates and hychochlorates of potash, lime and magnesia. Before treating this powder with the reagents which established the presence of these salts, we subjected it to the action of concentrated sulphuric acid at a high temperature, and were convinced that it was of a mineral nature. This operation was performed with both the seeds and the leaves of the hyoscyamus, with the same results.

If instead of limiting themselves to giving the physical characters of a new substance, chemists would analyze and carefully study it, these errors would not be committed. In 1824, M. Payen made a detailed report to the Society of Pharmacy on a memoir by M. Runge, on the modes of discovering the slightest traces of the active principles of belladonna, hyoscyamus and datura, in cases of poisoning with these substances. We shall notice only the method which this latter chemist has proposed for isolating the active principle of hyoscyamus.

This is as follows: an alcoholic tincture is prepared with the roots or dried leaves or the watery extract of hyoscyamus; this is evaporated to dryness, and the residuum dissolved in water. The resin is precipitated, and the hyoscyamine remains in the water in combination with an acid. This solution is treated with acetate of lead and hydro-sulphuric acid, and the acetate of hyoscyamine decomposed by ammonia. On evaporation a white powder is obtained, which is very slightly soluble in water and oil, more so in alcohol. According to M. Runge this principle neutralizes acids, and forms crystallizable salts.

M. Payen could not have repeated this process, or like us, he would have found that this white powder is formed of the sulphates of potash and magnesia, carbonates of potash and lime, phosphates and acetates.

Hyoscyamus also contains much fatty oil, a peculiar resin, woody fibre and gum.

We conclude from the above that hyoscyamine has not as yet been isolated, and that the white substance which has been mistaken for it is a mixture of various mineral salts. The acro-narcotic properties of hyoscyamus are probably owing to a union of all the principles composing it.—*Journ. de Pharm.*

ART. XLVI. MODES OF DETECTING THE EXISTENCE OF SULPHUROUS ACID IN THE HYDROCHLORIC ACID OF COMMERCE. By J. Girardin, Professor of Chemistry at Rouen.

The hydrochloric acid of commerce is far from being pure. It is always of a yellow colour from an admixture of the perchloride of iron, which results from the action of the hydrochloric acid gas on the cylinders in which it is made. It also often contains chlorine and hyponitric acid which likewise tend to colour it. It generally contains variable proportions of sulphuric acid, or small quantities of sulphate of soda and lime. Finally, it is frequently adulterated with sulphurous acid.

Of all the foreign matters spoken of above, the last is by far the most injurious, and more especially where the hydrochloric acid is used for the manufacture of chlorine, the chlorites, and the hydrochlorate of tin; and hence it is extremely important to be able to recognise with ease and certainty the least traces of this adulteration.

The methods hitherto devised do not fulfil these indications. That cited by M. M. Bussy and Boutron Charlard, in their "*Traité des moyens de reconnaitre les falsifications des drogues*

simples et composés, (page 17) consists in saturating the hydrochloric acid with barytes water, after having diluted it with three or four times its weight of distilled water. A white precipitate of sulphite and sulphate of barytes is formed, which washed several times to separate the chloride of barium, and then sprinkled with concentrated sulphuric acid, exhales the odour of sulphurous acid. Independently of the time and the manipulations required by this plan, which are of themselves sufficient to prevent its use, it has another serious defect; which is that it requires a great sensibility of the organ of smell, which is seldom found among manufacturing chemists.

Another mode has been proposed by M. Chevreul, in his Leçons de chimie appliquée à la teinture (xi. Leçon, page 15.) This learned chemist has ascertained that by adding a solution of sulphite of potash to a salt of the deutoxide of copper, a yellow precipitate is formed, consisting of the double sulphite of potash, and protoxide of copper; and that if this precipitate be heated with water it is decomposed into sulphite of potash which dissolves, and sulphite of the protoxide of copper, which is insoluble, and of a red colour. From this fact, M. Chevreul concluded, that when a hydrochloric acid contained a notable quantity of sulphurous acid, that it might be verified, by saturating the former with potash, and adding a solution of sulphate of copper, thus producing a yellow precipitate, which would become red by ebullition. But these theoretical views are not confirmed in practice. In fact, the plan of M. Chevreul, though well calculated to distinguish sulphurous acid when free or combined with bases, does not answer when this acid is mixed with the hydrochloric. We have often applied this process to hydrochloric acids *surcharged* with sulphurous acid, and have never obtained the reaction indicated by M. Chevreul. The addition of the sulphate, or any other salt of copper to these acids, neutralised by potash, does not occasion any precipitate, and when they are concentrated, it only produces a light bluish deposit which does not change on ebullition.

Gay Lussac was the first to recommend (*in* 1813, *Ann. de*

Chim. t. 85, *p.* 206) the red sulphate of manganese, as the best reagent that that can be employed, to recognise if a body is capable of oxidizing. This salt, which some regard as a sulphate of the sesquioxide of manganese; others as a sulphate of the bioxide, and some as a sulphate of the bioxide mixed with hypermanganesic acid, is obtained, by digesting peroxide of manganese, reduced to an impalpable powder, in concentrated sulphuric acid for a few days; a beautiful red, and very acid liquid results, which is the salt in question. All the combustible bodies greedy of oxygen, organic substances, the slightly oxygenated acids, as the sulphurous, phosphorous, &c., cause a loss of its beautiful colour, by reducing it to the state of a salt of the peroxide. It may therefore be employed to ascertain the presence of sulphurous acid in the hydrochloric acid of commerce, as a few drops of this red liquor, on being added to the latter acid will speedily become colourless, if any traces of the former be present. But the use of this reagent in this case is not attended with all the advantages that might have been supposed. First, this salt, like all the red salts of manganese is not stable; it loses its colour by long exposure to the air, and is immediately changed on the addition of water; but above all it is as readily acted upon by nitrous as by sulphurous acid, and hence it happens that a hydrochloric acid containing the former, which is often the case, will act on this reagent as if it contained the latter, thus giving rise to mistakes.

Being constantly consulted by manufacturers of Rouen on the purity of hydrochloric acids, and consuming a large quantity myself, in the manufacture of artificial mineral waters, I endeavoured to discover a simple, prompt and infallible method of discovering the least traces of sulphurous acid in these acids. The following appears to unite all these conditions, and has never failed.

It is formed on the action of the protrochloride of tin on sulphurous acid. Pelletier, Senr. long since taught us (*Ann. de Chim.* 12, *p.* 231.—1792) that when placed in contact with this latter, it becomes deoxigenated, and gives rise to a precipitate of a beautiful yellow colour, consisting of sulphur and peroxide of tin.

The mode of operating is as follows:

About half an ounce of the hydrochloric acid to be tested, is to be poured into a glass, and two or three drachms of white and unaltered salt of tin added to it, the mixture is to be stirred with a glass tube, and two or three times as much distilled water added.

When the hydrochloric acid contains no sulphurous acid, no remarkable phenomenon takes place on the addition of the hydrochloride of tin or the water; the first dissolves, and the solution only becomes turbid after standing some time, owing to the action of the air on the salt.

But if it contains sulphurous acid, immediately after the addition of the salt of tin, the acid will become turbid, yellow, and when the water is added, an odour of sulphuretted hydrogen is perceptible, and the liquor assumes a brown colour in depositing a powder of the same colour. These phenomena are so apparent, that there can be no hesitation in deciding on the presence or absence of sulphurous acid.

Sometimes the brown colour is not developed for some minutes, and it is dark in proportion as the quantity of sulphurous acid is greater. The disengagement of sulphuretted hydrogen takes place only on the addition of the water. By leaving the coloured liquid to stand, it deposites a powder of a yellow brown colour, this is a mixture of sulphuret of tin, and peroxide of the same metal.

This curious reaction is readily explainable. A portion of the salt of tin is transformed into perchloride at the expense of another portion, whilst the tin thus set free reacts on the sulphurous acid, so as to produce both the peroxide and protosulphuret. As to the small quantity of sulphuretted hydrogen which escapes on the addition of the water, it arises from the decomposition of a little of the sulphuret formed in the hydrochloric acid.

It is essential to obtain these phenomena, that the salt of tin should be added to the hydrochloric acid before the water, for if the acid be first diluted, the addition of the salt will induce no change of colour.

This method is recommended from its simplicity and easy

execution, as a minute is sufficient to determine the purity of a hydrochloric acid, without trouble and without expense. It is so delicate, that a hundreth of sulphurous acid will not escape detection.

I have learnt that many manufacturers who obtain hydrochloric acid charged with sulphurous acid, get rid of it by passing a certain quantity of chlorine through it, which transforms the sulphurous into sulphuric acid; this is one reason why certain of the hydrochloric acids of commerce contain so much sulphuric acid.—*Journ. de Pharm.*

ART. XLVII. ACTION OF TANNIN ON ORGANIC SALIFIABLE BASES, &c. By O. Henry.

Among the characteristic properties of the alkaloids, or vegetable alkalies, there is one peculiar to the whole of them—their precipitation by an infusion of galls. This character, which was noticed by M. Dublanc, Jr., as a test for morphine, is applicable to many of the other alkaloids in a far more striking degree. Is this effect attributable to the tannin or to the gallic acid? This does not appear to have been fully explained, and it was therefore with the hope of throwing some light on the subject, that I undertook the following experiments.

M. Pelouze, in his interesting memoir on tannin, has shown that this body forms almost insoluble precipitates with quinine, cinchonine, morphine, iodine, narcotine, strychnine, and brucine. At the time of the appearance of his memoir, I was endeavouring to discover an exact and yet expeditious mode of determining the quantities of quinine and cinchonine contained in the Peruvian barks of commerce. Pure tannin, it

appeared to me, would answer this end, and form a good *alcaloimeter*.

Some months since I laid the details of this plan before the Society of Pharmacy, (see Journal of Pharmacy, 1834,) and which I will briefly recapitulate: it is founded on the almost total insolubility of the compounds of tannin and cinchonine or quinine in cold water, and consists in adding, by means of the graduated test glass of Descroizilles, a solution of known strength of perfectly pure tannin, to a neutral solution of the cinchona alkaloids, perfectly free from the red colouring matter, as well as from magnesia and lime. The number of degrees required to produce complete precipitation, enables the operator to judge of the quantity of these organic bases, for it has been shown that 100 grammes of quinine or cinchonine, are perfectly precipitated by 250, 63 or 268 grammes 18c. of pure tannin.

To return to the subject under consideration. I had remarked that the tannin, in precipitating the vegetable alkalies, produced very large, white, caseous compounds, and for the most part almost insoluble in cold water; I had, moreover, observed, when potash, soda, lime or ammonia are employed to isolate them, that they become diminished or altered in a marked manner. Tannin, on the contrary, produced abundant precipitates from solutions on which the above substances had no effect.

When to an aqueous solution of pure tannin, or of extract of nut galls, or of any other liquid containing tannin, a somewhat acidulated solution of an organic alkali is added, there will be an immediate formation of a white, flocculent precipitate. This phenomenon takes place with the alkaloids in a more or less marked degree.

If the solution of tannin be replaced by one of pure gallic acid, previously left in contact with gelatine for twelve hours, no distinct precipitation takes place.

The following table shows the effects produced by solutions of pure tannin and gallic acid on the vegetable alkalies.

Veget. alkalies.	*Pure tannin.*	*Effect.*	*Gallic acid.*
Quinine,	White precipitate.	.002	No precipitate.
Cinchonine,	do.	.002	do.
Morphine,	do.	.09	do.
Codeine,	do.	.09	do.
Narcotine,	do.	.002	do.
Strychnine,	do.	.002	do.
Brucine,	do.	.002	do.
Ematine,	do.		do.
Veratrine,	do.		do.
Delphine,	do.		do.
Atropine,	do.		do.
Aconitine,	do.		do.
Coneine,	do.		do.

Observations.—Ammonia gave no distinct precipitate in a solution containing .002 of some of the alkaloids, and .09 of others, whilst the effect of the tannin was very sensible.

The action of tannin on the organic salifiable bases is analogous to that exercised by it on the metallic oxides, that is, it combines with them and produces true salts.

These saline compounds may be analyzed either by means of gelatine, or by double decomposition with the salts of lead, tin, antimony, peroxide of iron, or which is better, by barytes, lime or magnesia. With either of these, the tannin is set at liberty and combines with the animal matter or the metallic oxides, whilst the freed alkaloid either remains in an isolated state, or unites with the acid of the decomposed metallic salt. At the same time I must admit, that the decomposition is rarely easy by the gelatine or the inorganic salts. It was only by means of barytes or lime that I was always able to effect a ready and prompt decomposition of the vegetable tannates. By using these in the state of hydrates and of a soft or gelatinous consistence, and mixing them with one of the alkaline oxides spoken of above, a blueish green colour is produced, which gradually passes to a reddish brown; if the mixture be dried at 100° C. till it becomes pulverulent, and the powder treated with boiling alcohol, this fluid will dissolve

the vegetable alkali, but has no action on the calcareous tannate. It will be found that the tannin had produced no modification in the alkali during its combination with it, and if care be taken, very little of it is lost during these successive manipulations. In operating in the above manner on diluted solutions, acidulated by one or two drops of sulphuric acid, of quinine, cinchonine, morphine, codeine, &c., I was always able to obtain them again in their original quantities, and without any change in their properties; hence, it is probable that all the other vegetable bases are capable of combining with tannin without undergoing any modification.

I have said that when a solution of a vegetable organic salt is treated by tannic acid, an abundant white precipitate is produced, scarcely soluble in water, this precipitate must be considered as an acid or bitannate. I prepared in turn this salt of the thirteen alkaloids as noticed in the preceding table, but as they closely resemble each other in their prominent characters, I will not describe them in detail, but will merely indicate their general properties.

General characters of the organic bitannates.—All the organic bitannates are white, and caseiform, when in the state of hydrates, scarcely soluble in water, but somewhat so when heat is used; they then form a styptic liquid, which on cooling becomes turbid and affords a brown substance resembling resin. When dried in the air, they are reduced to a white powder, which has a musty smell; on exposure to heat, they melt into a brown resinous mass, which is flexible whilst hot, but brittle and friable when cold.

These compounds are soluble in some of the diluted acids, and in boiling alcohol at 32° or even 28°; this latter solution reddens litmus paper; its taste is rather styptic than bitter; none of them appear capable of crystallization.

When exposed in a bell glass containing two-thirds of oxygen, in a mercurial trough, for some weeks, the most part of them become very soluble in water, and strike a blue colour with the persalts of iron. This modification, which takes place without much diminution of the gas, appears to depend on the formation of gallates, and is analogous to that which

occurs when pure tannin is placed in the same circumstances. This experiment was made with the bitannates of quinine and cinchonine.

By means of the metallic oxides, as those of the peroxide of iron, tin, lead, antimony, barium, calcium, and magnesium, these bitannites are decomposed with more or less ease. The alkaloid is set at liberty, and it can be taken up by alcohol, which does not act on the metallic tannate.

Potash, soda and ammonia decompose them in the same way, but the organic bitannate is always soluble in an excess of these alkalies. I obtained by means of heat, a needle like precipitate from the bitannate of morphine, by cautiously adding ammonia; this on examination proved to be pure morphine.

The mode of preparation of these compounds, and their decided action on litmus, show that they are acid salts—true bitannates formed by the union of one atom of the base to two atoms of the tannic acid.

The quantity of pure tannin which unites with a known weight of the organic alkali, is exactly that pointed out by calculation based on their theoretic composition; thus I obtained as follows, with one gramme each of:

Quinine,	Pure and dried at 120° C.	Bitannates melted at 120° C.	3,47 grammes.
Cinchonine,			3,50
Strychnine,			2,69
Brucine,			2,42

Afterwards taking those organic bases, whose elementary analysis is best settled, as quinine, cinchonine, and morphine, and subjecting them in the form of perfectly pure and dry tannates, to decomposition with deutoxide of copper, &c., I found the same relations between the carbon and nitrogen, thus obtained.

Bitannate of Quinine,	Pure and dry, afforded to one of nitrogen.	23,6 carbon.
Cinchonine,		23,7
Morphine,		30,1.

Hence the composition of these salts is:

Organic Bitannates.	*Atoms.*		*Tannin.*	*Alkaloid.*
Bitan. Quinine,	1 at Quin.	2,145	71,48	28,52
	2 " tannin.	5,376		
" Cinchonine,		2,005	72,84	27,16
		5,376		
" Morphine,		3,613	59,81	40,19
		5,376		
" Codeine,		3,296	62,—	38,
		5,376		
" Strychnine,		3,034	63,93	36,07
		5,376		
" Brucine,		3,485	60,45	39,55
		5,376		

This combination of the vegetable bases probably often occurs in nature, at least as regards part of the alcaloid; in the Peruvian barks for example, an analogous compound of quinine and cinchonine with the red colouring matter (a kind of tannin) constitutes the abundant deposit which takes place on the cooling of hot decoctions of bark. This may be regarded as a species of bitannate.

The organic salts of tannic acid and the vegetable bases may be obtained by carefully adding a solution of pure tannin, or infusion of nut galls, to one of the alkaloid. The precipitate, being collected and drained, when dried in the open air, is *a white, pulverulent, hydrated bitannate*, if exposed to 100° C. it assumes a resinous appearance and is anhydrous.

Method of Extracting the Alkaloids by means of Tannin.— The vegetable bases exist in nature, principally in a state of combination with different acids, and form salts which are more or less soluble in water: sometimes this solubility is only sensible on the addition of another acid; and it is on a plan analogous to that I have described for the preparation of sulphate of quinine, that all the vegetable alkalies may be extracted.

It is well known that these bodies being for the most part almost insoluble in water, are precipitated from their acid solutions by the addition of a slight excess of a mineral alkali, as potash, soda, lime, magnesia, or ammonia, when the alka-

loid can be separated from this precipitate by means of alcohol; but it often happens that this alkaloid is in very minute quantities, and moreover is slightly soluble in water, or becomes so under the influence of the precipitating agent: finally, as it is necessary to concentrate the solution to obtain the desired product, there may also be a loss from the reactions, caused by heat, or the formation of mucilaginous matters, which render the solution so viscid, as to greatly retard the complete separation of the precipitates. These obstacles are constantly met with, and are the frequent cause of want of success in these operations. The property of tannin of producing salts with vegetable alkalies, almost insoluble in cold water, may remedy these inconveniences, by permitting all the alkaloid to be concentrated in the precipitate.

Method.—The powdered vegetable, (roots, leaves or fruit,) its extract, or what I prefer, the juice of the fresh plant, is to be treated with warm water, slightly acidulated by means of sulphuric acid. The clear liquid obtained after expression is to be permitted to *cool*, and then *almost* neutralized by potash, soda or ammonia; and, finally, a concentrated infusion of nut galls, or of oak bark added as long as any precipitate takes place. The precipitate is to be collected on a linen cloth, washed with cold water, drained and pressed till it becomes of a pasty consistence. In this state the precipitate is to be mixed as exactly as possible with a slight excess of pulverized slacked lime. A green or bluish colour is produced, which soon changes to a reddish brown, then the magma is to be dried on a water bath, till it becomes pulverulent. In this state it is to be treated with hot alcohol, or sulphuric ether, which have no action on the calcareous tannate, and after distillation of the filtered liquor, a product is obtained containing the alkaloid. By exposing this to the air, it generally crystallizes in a few days, but it is often advantageous to saturate it as exactly as possible with phosphoric or sulphuric acid before it is left to crystallize. If crystals or a granular gelatinous mass is obtained, they are to be collected on a linen cloth, and after being slightly expressed, are to be purified by another crystallization. The alkaloid is now to be isolated in the

usual way; that is, a solution is to be made in a small quantity of water, and soda, potash or ammonia, or what is better, pure magnesia, carefully added, the alkaloid is then to be re-dissolved by means of alcohol or sulphuric ether, from which it can be freed by distillation or evaporation.

If the vegetable base is volatile, some modification of the manipulation is necessary.

This matter has been applied to the extraction of quinine, cinchonine, strychnine, brucine, codeine, atropine, aconitine, caffeine, &c., and the results have shown that it may be attended with advantageous consequences.

Quinine and Cinchonine.—The product of an acidulated alcoholic decoction is to be taken, and treated with an excess of hydrate of lead, the clear liquid on being distilled will give a residue which is to be neutralized by acetic acid; this liquid being diluted and treated with tannin as above, will afford the alkaloids of bark.

By acting on the yellow uncrystallizable mother water of sulphate of quinine, I have readily separated both quinine and cinchonine.

Strychnine and Brucine.—In operating with tannin on the clear product of an acidulated decoction of nux vomica, I have obtained a precipitate of bitannate, from which I separated strychnine and brucine by means of boiling alcohol of 18° to 35°; these were combined with sulphuric and acetic acids, and thus afforded me a very white and crystallized acetate of strychnine, and an equally good product of sulphate of brucine.

Codeine.—This alkaloid which is not met with in all the opiums of commerce, or at least in very minute quantities in some of them, is so perfectly characterized as to leave no doubt of its existence. It is, however, only by operating on very large quantities of opium that it can be successfully obtained. Having ascertained that by the acid of tannin it was possible to extract small proportions of codeine from a fluid containing it, I followed the following plan, operating on two or three ounces of opium only:

The opium was exhausted by warm water; the solution was filtered and properly concentrated, and a great excess

of ammonia added to precipitate the morphine and narcotine. The ammoniacal liquid was evaporated, there was a white precipitate of meconate of lime which was separated by the filter; and when four-fifths of the fluid had evaporated, it was neutralized and tannin added; the precipitate that ensued was treated as before described. After the distillation of the alcoholic tincture, a brown, pitch-like, bitter product, which was capable of saturating acids, was left. When carefully united with nitric acid, it afforded, after two purifications, silky crystals, from which codeine was precipitated by means of potash; this precipitate was soluble in ether and alcohol; boiling water also dissolved it, and on cooling presented at its surface a sort of oil which rapidly changed into prismatic crystals. These crystals were readily soluble in ammonia, and formed a salt with acetic acid, which was not deliquescent, whilst with morphine the contrary is the case.

Emetine.—M. Boutron and I have also succeeded in obtaining white, pulverulent emetine from ipecacuanha, by means of this process.

Atropine and Aconitine.—Some months since I presented to the Society of Pharmacy, a crystalline substance obtained from the root of the belladonna, by means of tannin. These crystals, which were bitter, were decomposable by heat, soluble in alcohol, precipitated from this solution in flakes, on the addition of water; when saturated with sulphuric acid, they afforded a granular, pulpy mass, furnishing an abundant precipitate by means of tannin. I considered them to be *atropine;* they could not be asparagine, or an ammoniacal salt, as these substances are not affected by tannin. I have since repeated my experiments, (the root of the belladonna was treated with acidulated, warm water, filtered, saturated, an infusion of nut galls added, the precipitate washed, treated with lime, &c.,) and although it was with difficulty that I obtained crystals, I extracted a brownish, very acrid, bitter product, which saturated sulphuric and phosphoric acids, forming a granular, gelatinous mass. These salts dissolved in water and decomposed by means of pure soda, gave a gelatinous mass which when collected on a linen cloth, assumed a crystalline appearance. They were soluble in al-

cohol, precipitated by water; bitter, acrid, and afforded an abundant precipitate with tannin.

A watery extract of the fresh leaves of the aconite, treated with tannin, gave me, after the evaporation of the alcohol, a brown residue, which, redissolved by means of an acid, then filtered and decomposed by potash, afforded a very bitter, acrid, flocculent, whitish precipitate, soluble in alcohol, and fusible by a gentle heat into a sort of resin. This product had a great resemblance to what has been described under the name of *aconitine*.

Caffeine.—M. Boutron has successfully made use of this process to extract caffeine.

Application of Tannin in the detection of very minute quantities of the Alkaloids.—It often becomes necessary to ascertain the presence of very small quantities of certain of the poisonous vegetable alkalies, which have been added to wine, soup, coffee, &c., with a criminal intention. By means of tannin I have obtained results, which I am of opinion are of no little importance in their applications.

Some years since M. Dublanc, Jr. proposed a similar method to detect morphine in cases of poisoning, and M. Orfila observes, "this plan consists in evaporating the suspected mass to dryness, treating it several times with boiling alcohol; adding a tincture of galls to the alcoholic solution, which precipitates the animal matter, leaving a compound of morphine and tannin in solution. The fluid is then to be diluted with water, and gelatine added, and the alkaloid isolated by means of alcohol." M. Orfila, however, adds that after several trials he was not satisfied of the advantages of this method.

Whether the gelatine only effects a partial decomposition of the vegetable salt, or from some other cause, this plan has never been attended with the desired success.* From the good effects I had obtained with tannin, in the extraction of the vegetable alkalies, I was of opinion that it would prove

* Since the above was written, M. Pelouze has stated that the cause of the failure of M. Orfila, was probably owing to his having used tincture of galls that had been too long prepared, in which gallic acid had replaced the tannin.

useful in these cases, and the following experiments have proved the truth of this opinion:

1. I took one and a half to two grains of well crystallized morphine, strychnine and brucine, each of these salts were dissolved in half an ounce of water, with the addition of one drop of a very much diluted acid, tannin was added to the solution; the abundant, white cheese-like precipitate, was collected on a linen cloth, washed and mixed with a small quantity of slacked lime, the mixture dried on a water bath, reduced to powder, and treated with boiling alcohol at 36°. The evaporation of the menstruum was carried on in a watch glass, and always afforded me the vegetable alkali in a crystallized state, or susceptible of forming the most beautiful crystals on the addition of an acid: thus with the morphine I formed a silky plumose hydrochlorate, with the strychnine a white, acicular acetate; and with the brucine a prismatic and acicular sulphate.

2. I added the above salts in the same quantities to soup, wine, coffee, sugar, flour, &c., and operated as above on the liquids; in the case of the flour I removed the alkaloid by means of cold water, acidulated with a few drops of very weak sulphuric acid; then filtered and added the tannin.

In all cases I isolated the alkaloids which were dissolved in weak acids, to get rid of the fatty and colouring matters of the soup, wine, &c. The acid solutions were carefully concentrated on watch glasses, and afforded me the organic salts in well characterized crystals.

3. Finally, I made mixtures of soup, wine, &c., with two drachms of laudanum on the one part, and with a decoction of half an ounce of powdered nux vomica on the other. The mixtures being rendered almost neutral, were subjected to the same mode of treatment, and afforded me very distinct crystallizations of the alkaloids.

To conclude, these experiments which I repeated several times, and which only require a little care in their performance, always succeeded with me; and I do not hesitate to publish them as susceptible of useful applications; I moreover think, that after the ingestion into the stomach of the poison-

ous organic salts, that by means of tannin all of them that have not been absorbed, may be separated from the fluid and other contents of that viscus. I would also add, that pure tannin might be administered with success as an antidote against several of the vegetable poisons.

From the above it may be concluded:

1. That pure tannin, or substances containing it, forms very abundant whitish precipitates which are in the state of hydrates, and almost insoluble in cold water, when added to solutions containing vegetable organic salts.

2. That these compounds, whose insolubility permits the extraction of very minute proportions of the vegetable alkalies, are composed of one atom of base and two of tannin, and must hence be considered as bitannates.

3. That this property of tannin leads to very useful applications, as well in the extraction of the vegetable alkalies, as in the detection of them when criminally administered.—*Journ. de Pharm.*

ART. XLVIII.—EXTRACTION OF PLATINA IN RUSSIA.

By P. Sobolewskoy, Chief Engineer of Mines.

The discovery of Platina in the Russian empire, forms a remarkable epoch in the history of this metal; in 1822 it was found in the gold washings of the Ural, but the discovery of mines of this metal was not made till 1824. Since that time the product has increased from year to year, and at present is estimated at upwards of 110 pouds per annum.

From the middle of 1824, to January, 1834, nearly 476 pouds of pure platina have been obtained, of which 400 have been coined, and the remainder used for assay vessels, &c.

The platina of Ural has hitherto been only found disseminated through sand. The richest locality is in the mines of

Tagil, belonging to the heirs of Nicholas Nikitisch Demidoff: it is found near the surface, under a layer of earth, mixed with a greenish sand, which evidently owes its origin to a mixture of hornblend, greenstone and serpentine. This sand contains .00025 to .00075 of crude platina; this sometimes is in fine grains, sometimes in flat spangles, but it is not rare to find large masses. In June, 1827, one was met with that weighed 10 pounds 54 solotniks: in March, 1831, another was found weighing 19 pounds 52½ solotniks. Since then a fragment of 20 pounds, 24 solotniks; another of 19 pounds 24 solotniks, and finally, two of upwards of 13 pounds have been discovered.

The crude platina of Ural closely resembles that of America in its composition; there are three different kinds, distinguished from each other by the quantity of platina they contain: it is always accompanied by its usual concomitants namely, palladium, iridium, osmium, and rhodium. The proportions of these metals have been determined by the experiments of Berzelius. The three kinds of crude platina of Ural need not be described, they are designated as 1, crude platina from Goro Blagodat: 2d, crude platina from Tagil: 3d, osmium-iridium: this last is the poorest in platina.

Among the numerous modes proposed to reduce platina to a malleable state, that proposed by a French jeweller, Jeannetty, was for a long time exclusively made use of; this as is well known, is based on the fusibility of platina when mixed with arsenic. Being afterwards wholly abandoned on account of the great danger to which it exposed the workmen, when used on a large scale, it was replaced by those of Breant and Wollaston. These two chemists were very successful for many years in reducing platina, but kept their processes secret, and it was not till 1828, a short time before his death, that Wollaston made his public. It is somewhat different from that pursued in Russia, of which, however, we have had no exact account until the publication of the present memoir.

The whole operation is divided into two distinct series of manipulations: the first designed to separate the crude plati-

na from foreign substances; the second to render this platina malleable. To obtain pure platina, the crude metal is dissolved with the assistance in *aqua regia*, (composed of three parts of hydrochloric and one of nitric acid, experience has shown, that the most advantageous strength is 40° B. for the nitric, and 25 for the hydrochloric.) The solution is made in open porcelain capsules, holding from 25 to 35 pounds; these when filled with a sufficient quantity of acid and platina, are placed on a sand bath capable of accommodating about 30. This sand bath is situated under a hood, closed on all sides with moveable glass windows, and openings for removing the capsules; from this arrangement, all the acid gasses are carried up the chimney.

This operation lasts from eight to ten hours, or until no more red vapours are given off; at this time the solutions contain a great excess of hydrochloric acid, but this excess is indispensable to the retention of a greater part of the iridium, &c., when at an after part of the process the platina is precipitated.

After the solution is effected, the liquor is decanted into large earthen vessels, and sal ammoniac added, the precipitates thus formed, are permitted to become deposited; they are then washed several times with cold water, dried, and heated to redness, in platina crucibles; in this manner the platina is obtained in a spongy state. The degree of its purity, principally depends on two circumstances: 1st, that the solution contains an excess of acid, to retain the iridium; 2d, that the precipitate has been well washed. This last precaution, augments, it is true, the washings, and their evaporation is one of the longest parts of the process; but the combination of platina and ammonia is thus perfectly freed from all admixture with foreign metallic chlorides, which would be injurious to the malleability of the platina.

The washings are divided into two portions, and treated separately; the first are poured into glass retorts, and evaporated on a sand bath to one-twelfth of their original bulk; on cooling, there is a deposit, of a combination of ammonia

and iridium, part in the form of a deep purple powder, and part in regular octahædrons.

The other washings are evaporated to dryness in porcelain capsules: the residue is heated to redness, and then treated with *aqua regia.* The platina obtained from these washings is rarely pure, and must be re-dissolved, as otherwise it would not be malleable. When this spongy platina is dissolved a second time, a little iridium is generally found in the state of an insoluble residue.

The differences between this process and that of Wollaston are, that this chemist uses aqua fortis, and dilutes the hydrochloric acid with an equal proportion of water; by a digestion of the crude platina in this menstruum for three or four days, he avoids the solution of the iridium. It is possible, says M. Sobolewskoy, that this method may attain the desired end, on a small scale, but in large operations, it is indifferent whether the first solutions contain less iridium, as the remainder of the crude platina will retain a much larger proportion, and its quantity will go on progressively increasing in each succeeding solution, for the solubility of the iridium is in a direct ratio to the quantity of it, mixed with the crude platina. Moreover, experience has shown that the presence of iridium in solutions of platina does not injure the purity of this metal, if care be taken to keep the acid in excess, and if the precipitate be well washed. The employment of weak acids occasions a great loss of time. The concentrated acids, on the contrary, although dissolving a portion of iridium with the platina, offer the most simple and effectual means of extracting the latter from its combinations.

The solution of one part of platina requires ten to fifteen parts of *aqua regia*, of the indicated strength. The proportion of acid to be employed must depend on the size of the grains of platina, and their texture. That of Tagil which is in large fragments requires more acid than the fine grains.

The purified platina is forged in the following manner: the spongy mass, is reduced to powder in a brass mortar, by means of a pestle of the same, then passed through a fine sieve; with this powder a cylindrical iron tube is filled, and subjected to

great pressure by means of a steel rod acted on by a powerful press; after it is sufficiently compressed, it is taken from the mould, and is now in the form of a solid, flat cylinder, or disk, of great density, but the molecules have so little cohesion, that a blow is sufficient to destroy their continuity. When a sufficient number of these disks have been made, they are heated to redness, in a porcelain furnace; this part of the operation lasts for near a day and a half, when the platina has been well purified, and above all well washed, as directed above, the disks are now malleable and fit for use.

It is worthy of remark, that however great may have been the pressure to which the platina has been exposed, its bulk is always diminished by the action of the furnace. A disk of platina, which, when taken from the mould is four inches in diameter, and 3-4 of an inch thick, loses when heated to redness, 3-4 of an inch in diameter, and 1-4 in thickness.

The platina is then forged into bars, or rolled into plates; if the metal has been well purified, these operations require no particular attention.

In the laboratory of the mines, the operations are so carried on, that each day a poud of platina may be purified and forged into bars. The expenses of producing a pound of forged platina, are estimated at about 29 roubles.

Jour. de Pharm.

ART. XLIX.—ON THE CONEINE OF GEIGER. By M. Deschamps.

It was announced in the "Gazette Medicale" for March 1832, that M. Geiger, Professor in the University of Heidelburg, had succeeded in obtaining the active principle of conium. This coneine he described as a volatile alkaloid, united in the

plant to an acid which retains it on a distillation with water alone, but allows it to pass over if a solution of potash be used. Its odour, he continues, is extremely penetrating, pungent, and disagreeable, resembling that of mice. This alkaloid is easily decomposed, and it appears probable, says the author of the article in question, that coneine exists only in the fresh plant, as he has never been able to detect it when in a dried state. The coneine contained in the extract made from the fresh plant, is soon decomposed. The seeds, however, retain it for a long time, as the author detected it in some that were sixteen years old.

It is difficult to conceive how this principle which is retained so strongly by an acid, as to require a high temperature and a powerful base to extract it, can disappear by the mere process of drying. There must be some other cause than mere temperature to occasion this. I thought at one time that humidity might perhaps aid in this decomposition.

To investigate this phenomenon, I began by endeavouring to obtain the coneine of M. Geiger. After having subjected the fresh plant to a prolonged distillation with water, to deprive it of its essential oil, I placed the plant and the liquid remaining in the still, in an earthen retort, and having added some caustic potash, adapted a worm to the retort and distilled. The liquid that was obtained reddened turmeric paper, and restored the blue colour to litmus reddened by an acid. The colour of these tests was also changed when they were held over the vials containing the fluid. These characters evidently were characteristics of alkalinity and volatility. The smell resembled that of mice. These properties being noted, I supersaturated the liquid with acetic acid, and continued the distillation, and then evaporated the whole by a very gentle heat. I obtained a dark brown extract of a very disagreeable odour. A portion of this extract was placed in water, in ether, and in ley, and left to macerate for several days, then introduced into a retort and subjected to distillation. The product which was collected in a receiver, kept cold by a freezing mixture, was ether containing a volatile, alkaline principle, having a strong smell of cantharides. This

fluid, on the addition of a small quantity of sulphuric acid and subsequent evaporation furnished an odorous salt.

A second portion was treated in the same manner, but without ether. The product was volatile and alkaline; it formed white clouds on hydro-chloric acid being brought near it. When saturated with this acid and evaporated, it produced an odorous saline mass of a red colour. This mass, when dissolved in water, treated with animal charcoal and evaporated, gave a colourless and inodorous salt.

A third portion was treated in the same manner, but with potash. The distilled liquid was placed in a capsule, this capsule in a larger one containing weak hydrochloric acid, and the whole covered with a bell glass, and left at rest for a day at a temperature somewhat higher than that of the air. The fluid in the small capsule was somewhat alkaline, but lost this property on evaporation. That in the larger vessel gave a slightly coloured salt.

Extract of conium without chlorophylline, alcoholic extract prepared in 1832 and 1833, the extract of Caventou, that of Starck of 1832, that of Parmentier prepared some years before, extract of the seeds, the seeds themselves, and the dried plant, treated in the same manner, afforded the same results.

Some drops of the solution of these hydrochlorates, when evaporated on a piece of glass, presented the beautiful arborescent crystallization of hydrochlorate of ammonia, and all these salts on the addition of potash and at the ordinary temperature, disengaged ammonia, which was more or less pungent according to the colour of the salt.

The acetous vapour which passed through the plant in the preparation of the extract of Caventou, when collected and evaporated at a moderate temperature, gave out alkaline fumes on the addition of potash.

An acetous extract prepared by infusing the fresh plant in in water acidulated with strong vinegar, (de Mollerat) one drachm to the pound of plant, was preserved in a jar covered with paper. A year after its preparation, it was soft and odorous, its smell being analogous to that produced by the evaporation of the liquid obtained on the distillation of the

plant with potash, this liquid having been saturated with vinegar of a less strength. This extract afforded ammonia with great facility.

The extracts of conium, treated with hydrochloric and acetic acids, aided by heat, and potash afterwards added, gave out an odour of ammonia and cantharides; this disappeared on the addition of an acid, but was restored by saturating this acid with alkali.

To determine the source of the ammonia, five grammes of of the extract of conium were placed in a capsule with an alcoholic solution of potash, and heated for an hour in an oil bath, adding distilled water from time to time. To this liquid, acetic acid in excess was added; this produced a brisk effervescence. The filtered fluid precipitated nitrate of lead. The precipitate washed and dried, was partly crystalline. Decomposed by hydro-sulphuric acid, after filtration and evaporation a small quantity of crystals were obtained, some of which were flat, and the others in prismatic needles. These crystals, treated with alcohol at 35° B. gave on evaporation, by a gentle heat, very acid, acicular crystals. Calcined on a leaf of platina they gave an odour of tartaric acid, and left a residuum which reddened turmeric paper. These facts suffice, in my opinion, to characterize malic acid; this acid has been discovered in conium by Schrader, and M. Braconnot has ascertained that alcohol, in contact with unpurified malic acid, will dissolve malate of lime.

Eight grammes of the same extract were treated in a retort, furnished with a long tube, the extremity of which was plunged into mercury, to get rid of the carbonic acid, and the above process repeated with the same results.

M. Guersent states (*Dict. des Sci. Med. art. Cicuta,*) that a physician of Edinburgh was of opinion, that an extract prepared with seeds, was more efficacious than that made from the plant, but that experience has not verified this idea.

We may conclude from the above:

1st. That extracts of conium, more than six weeks after they have been prepared, and even the dried plant, when exposed

to atmospheric variations, disengage ammonia when treated with potash.

2d. That the odorous principle which accompanies the ammonia, is not alkaline, that it does not saturate acids, and unites with charcoal like a colouring matter.

3d. That the coneine of M. Geiger owes its alkalinity to ammonia.

4th. That if the active principle of conium is an alcaloid, it is still to be discovered.

5th. That the extrication of carbonic acid, resulting from the action of potash on the extract, by the addition of nitric acid, and the disengagement of ammonia, indicates that these bodies are formed under the influence of the potash, at the expense of a peculiar body, as yet unknown.

6th. That the alteration of the acetic extract of conium tends to prove that the acetic acid, after having taken up this principle, and destroyed its natural combinations, again abandons it, from its property of forming unstable combinations only, and that this body, thus set at liberty, is decomposed.

7th. That the action of hydrochloric and acetic acids on the extracts, are thus explained.

8th. That the seeds have less activity than the plant.

9th. That the extract without chlorophylline, and the alcoholic extract prepared with fresh conium, and alcohol at 35° B. are the most active preparations.

10th. That the method of M. Caventou is liable to destroy some of the properties of the conium.

The advantage of his extract, if its greater efficacy be admitted, would reside in the combination of the active, volatile principle with the acetic acid. If this be the case, it is evident that the fresh plant is preferable to the dried, and that the whole preparation might be reduced to pounding the plant, extracting the juice, freeing it from the chlorophylline and albumine, adding acetic acid 3i. to the lb. evaporating and preserving the extract in a close vessel. This mode of preservation ought to be adopted with all extracts which

attract humidity. An easy plan is to cover the pot with a disk of glass, maintained in its place by a luting.—*Journ. de Pharm.*

Note.—The committee appointed to report on the above memoir, M. M. Planche and Boutron, appear to think that the author has not fully established his conclusions. They give the original process of Geiger, of which it would appear that M. Deschamps was ignorant, and hence, perhaps, failed in his endeavour to separate the active principle of conium. This process is as follows: "To obtain coneine, fresh conium is to be distilled with caustic potash and water, as long as the product has any smell. This product is to be saturated with sulphuric acid, and evaporated to the consistence of a syrup. Absolute alcohol is added till there is no precipitation of sulphate of ammonia. The alcohol is to be distilled, and a very concentrated solution of caustic potash added to the residuum, and the distillation repeated." They also state that M. Soubeiran, who repeated this process, obtained a substance identical with that described by the German chemist.

ART. L.—ON CAPNOMOR. By Dr. Reichenbach.

In the preparation of the different substances obtained by Dr. Reichenbach from the product of the dry distillation of organic bodies, this able chemist had constantly to guard against a peculiar oily body, which resisted all direct modes of separation. This body altered the purity, 1st, of Eupion, rendering its flame smoky; 2d, of Creosote, whose medical properties it greatly deteriorated; 3d, of Picamar, of which it diminished the specific gravity; and 4th, of Paraffin, the solidification of which it prevented. To get rid of it, Dr. Reichenbach adopted the following plan:

In distilling the wood tar, those portions only are to be

kept which are heavier than water. To remove the acetic acid, the product is to be mixed with carbonate of potash, till no effervescence is produced. The oil is to be separated and mixed with a cold solution of caustic potash of a specific gravity of about 1.20, stirring the mixture well. If it becomes solid on standing, (owing to the presence of a large proportion of picamar,) it is to be liquified by exposure to heat. All that is not dissolved on a second treatment with the potash is to be rejected. The alkaline solution is now to heated in an open vessel, the heat being slowly increased till ebullition is produced, which is to be permitted for a few instants only, when the fire is to be allowed to go out; after the fluid is cold it is to be decomposed by a slight excess of diluted sulphuric acid; this sets free a large quantity of a brownish black oil. It is now to be poured into a retort, and so much of the solution of caustic potash added as to render the mixture alkaline, and the whole distilled, but not to dryness. The product of the distillation, which is oily, transparent, and of a pale colour, is to be dissolved in a solution of caustic potash of a specific gravity of about 1.16, and the above process repeated; that is, the undissolved portion is to be rejected, the solution heated to ebullition in an open vessel, permitted to cool, diluted sulphuric acid added, the oil separated, potash added till the fluid is rendered alkaline and the distillation repeated. These operations are to be renewed several times, diminishing the strength of the solution of potash at each repetition to 1.12, 1.08, 1.05. Each time a residue of insoluble oil is obtained in the alkaline solution, and it is these residues that contain the substance under consideration, but the two last in the state of the greatest purity, and hence they only should be used to obtain it. As they retain a portion of creosote, a solution of potash of a specific gravity of 1.20 is to be added to them, the mixture well stirred, permitted to settle, decanted and distilled. The product of the distillation is colourless, and it is to be mixed with great precaution, very gradually, and constantly stirring, with an equal volume of fuming sulphuric acid; the mixture becomes somewhat

red, and there is scarcely any disengagement of sulphurous acid.

When the preceding operations have been properly performed, the oil dissolves without residue in the sulphuric acid; if not, a white, transparent oil (impure eupion) will be found floating on the acid; the solution is to be permitted to stand for a few hours, or till it is perfectly cold, when it is to be mixed with twice its quantity of water. It becomes hot and turbid, and a small quantity of oil rises to the surface, and is to be removed. The mixture is then to be neutralized with ammonia, and left to clear, after having removed any portion of oil that may have separated, it is to be distilled in a glass retort. At first, water containing ammonia and a small quantity of oil will pass over; these are to be rejected, then pure water, and finally, when the residue begins to become dry and the temperature is increased, oil passes over which was closely united to the ammoniacal salt; this oil is to be again dissolved in an equal volume of sulphuric acid, the mixture diluted with water, neutralized with ammonia and redistilled. The oil which comes over at the close of this process is to be washed with a solution of potash, and distilled once or twice, till the oil obtains a specific gravity of 0.98. A small residue of oil mixed with some foreign matters will remain in the retort. Finally, the oil is to be digested with fresh and dry chloride of calcium, which is to be several times renewed, and the process terminated by rectifying the product over a spirit lamp.

Dr. Reichenbach has called this oil *capnomor*, signifying *part of smoke*. It is a transparent, colourless fluid; its refringent power is equal to that of creosote. Its smell is not very powerful, but is agreeable and aromatic; some persons compare it to that of ginger, others to that of rum; its taste is at first scarcely perceptible, but in a few moments becomes more powerful; it is neither bitter, acid nor sweet; it evaporates rapidly, without leaving a trace, if its specific gravity is 0.9775 at a temperature of 20° C. It boils at 185° C.; but does not congeal at 21° C. It leaves greasy traces on paper

which disappear at the usual temperature in an hour to an hour and a half.

Capnomor has no action on litmus or turmeric; it does not absorb oxygen from the air even when heated; it burns in giving out much smoke. It is almost insoluble in cold water, and but slightly acted upon by hot. It is, however, taken up in all proportions by alcohol, sulphuric and acetic ether, picamar, eupion, petroleum, carburet of sulphur, essence of turpentine and creosote. When united with chlorine or bromine, it gives rise to an elevation of temperature, and the formation of hydracids and new oily substances which Dr. Reichenbach thinks are analogous to chloral and bromal. If the purity of capnomor is adulterated by the least trace of the oil from which pittacal is obtained, it produces, on contact with chlorine, a violet colour which changes to yellow when the capnomor is saturated with the gas. It dissolves a large proportion of iodine, becoming of a brown colour; it also dissolves phosphorus, sulphur and selenium. Weak nitric acid colours it of a deep brown; when more concentrated, decomposes it, giving rise to carbazotic acid, a great quantity of oxalic acid, and a new crystalline body. Sulphuric acid of a specific gravity of 1.850 dissolves more than its own weight of capnomor without decomposing it; the temperature of the mixture becomes raised, but there is no production of sulphurous acid. Hydrochloric, hydrobromic and hydriodic acids have no action on it.

It is very slightly soluble in acetic acid, and itself dissolves some of the other organic acids, though in small proportions. Succinic acid, however, is very soluble in it when aided by heat, but crystallizes almost entirely on the cooling of the solution; and the carbazotic, benzoic, margaric, oleic and stearic acids are dissolved in it in large quantities, even when cold. Potassium, sodium, potash and soda have very little action on this body; ammonia and the hydrates of lime and barytes, none. Like creosote, it combines with some salts, as the sulphate of potash and sulphate of ammonia.

It dissolves, even when cold, camphor, paraffin, napthaline, myricine, mastic, benzoin and colophane; it swells caoutchouc,

and completely dissolves it with the assistance of heat; if the solution be heated on a glass, the oil evaporates, leaving the caoutchouc in an unaltered state. It also dissolves some of the alkaloid and neutral bases, without heat, whilst others are soluble only by the aid of this agent.

Capnomor is distinguished from creosote and picamar, by its taste, by its almost total insolubility in acetic acid, by its insolubility in the alkalies, and by the facility with which it dissolves caoutchouc; from eupion by its specific gravity, by its point of ebullition, by the smoke it emits in burning, by its solubility in sulphuric acid, by its decomposition by nitric acid, by the property it possesses of dissolving carbazotic acid, &c.

This new substance is found in all tars, even in that of coal, and likewise in Dippel's animal oil. Its use is as yet unknown.

Journ. de Pharm.

ART. LI.—PRODUCTS OF THE DISTILLATION OF PIT COAL.

By F. F. Runge. (Poggendorff, Annalen xxxi. 65.)

From the oil of pit coal rectified over oxide of copper, three bases and three acids are partly separated, or are partly formed, which differ in their chemical properties from any substances hitherto observed.

BASES.

1. *Cyanol.*

Cyanol (blue oil) is a volatile substance, almost destitute of any peculiar smell, neutralizing acids and forming salts which partly crystallize. It produces in a solution of muriate of lime a blue colour, which is removed by an excess of chlorine. The salts of cyanol dissolve in solutions of muriate of lime, producing a fine violet blue colour, which by free chlorine is converted into orange. They impart to the colourless solution of the white pith of the elder and pine wood, an intense yellow colour, which is not destroyed by chlorine,

at least under the circumstances in which other organic colours disappear. Thus, a piece of Turkey red cotton speedily loses its colour, when after being moistened with oxalic or tartaric acid it is immersed in a solution of muriate of lime. Paper, cotton, linen, wool, and silk are not coloured yellow. The effect of the salts of cyanol in colouring pine wood is so strong, that a drop containing only $\frac{1}{500,000}$ of cyanol produces a distinct yellow colour in the wood. The yellow colouring is not imparted to the fibrous part of the wood, but to a peculiar matter in the wood which also exists in other species of trees. The resin has no connexion with this colouring power.

The oil of pit coal contains a great quantity of cyanol, whose presence is easily detected by mixing one part of oil with a solution of twenty water and one part muriate of lime. The oil becomes dark red and the solution assumes a blue colour, similar in intensity and appearance to the moist ammonia sulphate of copper. It is changed by the muriate of lime into an acid which forms compounds possessing a blue colour.

Cyanol is very readily detected by muriatic acid, when coal oil is mixed with the latter in the proportion of three volumes to one. The acid becomes brown; and a splinter of fir wood introduced into the solution, has the yellow colour already described communicated to it, thereby indicating the presence of cyanol.

2. *Pyrrol.*

Pyrrol (red oil) in a pure state is a gaseous body possessing the odour of turnips, (*markochen ruben*) and may be detected by dipping a stick of fir moistened with muriatic acid in a vessel containing pyrrol, when it is tinged purple red, and which like the effect of cyanol is not removed by chlorine. Paper, &c., treated in the same manner remains colourless. The colouring power of the compounds of pyrrol is not less strong than that of cyanol. Nitric acid produces in the aqueous solution of pyrrol a red colour.

It is difficult to detect pyrrol in coal oil, as the cyanol and carbolic acid render its reaction indistinct, but it may easily

be discovered in water which has been employed to wash common street gas, by saturating it with muriatic acid, and dipping into it a stick of fir. A purple red colour is occasioned.

Pyrrol forms the principal constituent of empyreumatic ammonia, and when its peculiar smell is known, it may be distinguished among the odours which are disengaged by the distillation of bones and horns. Pyrrol is also contained in tobacco oil.

ACIDS.

1. *Carbolic Acid.*

This acid is a colourless oily substance, sinking in water. Its smell is extremely empyreumatic; it is caustic and burning, and has a strong action on the skin. When the skin is rubbed with it a feeling of burning is felt, and a white spot is produced, which on being touched with water becomes red, and in some days desquamates. In this respect it corresponds with creosote, but differs in being acid; in being precipitated by acetate of lead, and in not being altered by ammonia or the atmosphere, and in being converted by nitric acid even diluted into a reddish brown matter.

Carbolic acid dissolves in water. The solution is colourless and the acid is easily rendered conspicuous with nitric acid. The water is at first yellow or orange, and afterwards reddish brown; a stick of fir plunged in dilute carbolic acid, takes after being moistened with muriatic acid in half an hour, a blue colour. The vapour of muriatic acid also tinges shavings moistened with carbolic acid of a blue colour. This tinge withstands the action of chlorine in a high degree.

The salts of carbolic acid are colourless, and many of them can be crystallized; their aqueous solutions present the same appearances with fir as the solution of carbolic acid. Carbolic acid precipitates albumen, prevents organic substances from putrefying, and removes the putrid smell of meat when digested with an aqueous solution, much better than chlorine. The presence of carbolic acid may be detected in

coal oil by mixing it with lime water, filtering and evaporating to the consistence of a syrup. Muriatic acid separates impure carbolic acid from this mass, which is impure carbolate of lime.

(To be continued.)

ART. LII.—CULTIVATION OF THE POPPY AND MODE OF PREPARING OPIUM.

Mr. C. Texier, who is at present exploring Asia Minor, has transmitted from Constantinople to the Academy of Sciences of Paris, the following details respecting the cultivation of the poppy and the preparation of opium.

The seeds are sold at Kara-Hissar by measure of 60 ocques at 20 paras, the ocque, that is 30 piastres, (or about a dollar and a half.) The ocque of Constantinople is equal to about $2\frac{3}{4}$ pounds. They begin to work the earth in December by means of a hoe, or sometimes with a plough. The furrows are sufficiently large to permit persons to pass without damaging the stems of the poppies, which are planted in beds of three feet and a half wide. The seeds are sown broad cast but very thin. One ocque is sufficient to sow 1600 square metres. A few days after the flowers have fallen, the heads are slit horizontally, taking care that the cut does not penetrate to the interior. A white milky juice exudes, which is left for twenty-four hours, and then scraped off with large, dull knives. Each head furnishes but a few grains of opium. The drug is sophisticated by portions of the epidermis being mixed with it, thus increasing the weight about a twelfth. The opium is now in the form of a sticky granular jelly. It is placed in small earthen vessels and pounded, the operator spitting in it from time to time. When the peasants are asked why they do not use water instead of saliva, they reply that water would injure it. The opium is then wrapped in dry leaves, and is fit for sale. The seed is not injured by cutting the heads.

The quality and abundance of the crop are favoured by the absence of heavy rains during May and June, a few days rain being sufficient to cause a great loss.

On the above being read, M. Guibourt stated that in his opinion this mode of collecting and preparing opium, was peculiar to the spots visited by M. Texier, but that it is not probable that the opium of commerce is thus manufactured; as it is not noticed by other travellers, and also that an inspection of good opiums of commerce, show that they have not undergone such manipulations.

M. Guibourt has already proved (*Dict. de Med. et de Chirur. prat.* art. Opium) that it is erroneous to suppose that we do not possess the true *opium* of the ancients, or the product of an incision of poppy heads; and to say that we have only the *meconium* or the product of the expression or decoction of the plant. M. Guibourt is satisfied that the Smyrna and even good Constantinople opium, (grown in part of Natolia,) are the product of incisions of the poppy head, and adduces in proof, that by carefully tearing these opiums and observing the fracture with a magnifying glass, they appear to be formed of small tears or drops, agglutinated together. It is evident that they have undergone no other preparation than that of being formed into cakes, and when sufficiently dried, each enveloped in a leaf of the plant, and in the Smyrna opium also with seeds of a *Rumex*, which however does prevent the cakes, in many instances, sticking together and becoming united.

This Smyrna opium exactly agrees with the description of Belon: "The best of opium, says he, is very bitter, hot to the taste so as to burn the mouth. It is of a yellow colour, approaching that of the skin of a lion, the masses are composed of a number of small grains of different shades of colour. For in collecting the said opium, the grains obtained from the different poppy heads are united together."

Olivier does not speak of any other preparation of opium, and the concurrence of these two travellers, joined to the physical characters of the Smyrna opium, does not furnish a doubt of the mode in which it is manufactured.

But another method of preparing it does exist; this is mentioned by Dioscorides and Kœmpfer. According to the former, the juice collected from the capsules, for two successive days, is mixed together in a mortar; according to the latter, "it is moistened with a *little water*, so as to soften it, when it is well worked in a wooden bowl, with a wooden spatula, till it acquires the consistence, colour and tenacity of malaxated pitch. When it has been thus worked, it is several times stretched out and rolled with the hands, and then made into cylinders."

The opium prepared by either of these processes will not present the drops or tears so distinct in the Natolia, but will resemble the uniform texture of the Egyptian and Persian. M. Guibourt has specimens of the Persian opium given to him by Mr. Morison, of London, which has all the characters spoken of by Kœmpfer. It is in cylindrical pieces, which have sometimes become square from their pressure on each other; they are about four inches and a half long, and about five or six lines thick, wrapped in satin paper and tied with a cotton thread. Each stick weighs about 20 grammes; internally they are uniform, reddish, presenting some appearance of agglutinated tears, when viewed with a magnifying glass, but of a smaller size than those of the Smyrna opium. It has a virous smell, mingled with mustiness, which also characterizes the Egyptian variety, prepared in the same manner.—*Jour. de Pharm.*

ART. LIII.—ON IODOUS ACID.—By M. Sementini.

Considering that nitrous acid was nothing but nitric acid, *plus* nitrous gas, M. Sementini was led by analogy, to think that an acid resulting from the combination of iodic acid with the oxide of iodine, should be called iodous acid. Having effected this combination, he obtained a fluid of an amber yellow colour, which when kept in a close vessel, lost none of its colour, but soon became colourless, when exposed to the

action of the air; the oxide of iodine being dissipated in the same way as nitrous acid gas loses its colour by the volatilization of the oxide of azote.

This combination does not take place in all proportions, but in definite quantities; for, if oxide of iodine in excess be added, it is decomposed, and the iodine precipitates. The author thinks that this phenomenon can only be explained, by admitting, that when the dose of oxide of iodine is sufficient, the iodous acid which forms immediately, decomposes the oxide, by depriving it of its oxygen, and is itself again converted into iodic acid; and, in fact, during the precipitation of the iodine, the yellow colour of the liquid disappears. This M. Sementini thinks is a strong proof, of the intimate union which takes place between the two compound substances, each of which, evidently acts on the other. He has prepared iodous acid by combining one hundred parts of solid iodic acid dissolved in water with three parts of oxide of iodine of the greatest density.

Although the analogy which exists between nitrous and iodous acid appears to intimate that this latter would not form iodites, as nitrous acid forms nitrates and not nitrites, he has combined iodous acid with ammonia; the union took place without the disengagement or precipitation of iodine, although the yellow colour disappeared at the moment of the combination of the acid with the alkali. The solution on evaporation, furnished a salt differing from the iodate of ammonia in many particulars.

The iodite of ammonia is less efflorescent, its taste is less saline, it detonates when heated in an open vessel, disengaging vapours of iodine for a long time; its colour is of slight green. The solubility of the two salts is very different, the iodite being soluble in one half less water than is required to dissolve the iodate. M. Sementini has not given an exact analysis of these two salts, but having detonated equal quantities of each in a proper apparatus, he observed the following results: a production of a much greater quantity of aqueous vapour from the iodite, and also a greater residuum of iodine.—*Journ. de Pharm.*

Miscellany.

Oil of Croton.—M. Soubeiran proposes some modifications in the mode of extracting the oil of the *Croton tiglium*. This acrid purgative owes its properties to different principles, as a very acrid, volatile oil (the crotonic,) and above all to a soft, brown resin. The oil is obtained by expression, but this mode gives but a small product, and hence, it is most advantageous to extract it by means of alcohol. M. Soubeiran fearing that those products were not identical, engaged Dr. Piedagnel to make comparative trials with them, the result of which proved that they were perfectly analogous in their medical properties. M. Soubeiran, therefore, advises the following method of obtaining the oil:

The seeds are to be ground, the powder enclosed in a hair bag, and subjected to pressure between two hot iron plates. The oil obtained is to be suffered to rest for two weeks, when it will deposit a large quantity of a half solid substance, which appears to be stearine; the whole is then to be carefully filtered. The residue after expression, is to be again ground and treated with twice its weight of rectified alcohol, in a water bath at 50° to 60° C., and subjected to pressure. The product when distilled will afford a thick oil containing stearine, from which it is to be freed as above, and the clear product added to the first, and kept in a well closed vessel. This process requires great care to avoid all contact with the seeds and the irritating vapours produced, and it is seldom an operator will escape some action on his system.

Bull. de Therapeut.

Grenadine.—This substance described by M. Latour as the active principle of the Pomegranate root, has recently been examined by M. M. Boutron Charlard and Guillemette, who are of opinion that it is identical with mannite, thus confirming the original analysis of M. Mitouart.

Journ. de Pharm.

Crystalline principle of the Melilot.—M. Vogel published in 1820 that he had discovered benzoic acid in the Tonka bean and the flowers of the melilot. M. Guibourt about the same time ascertained that the crystalline matter of the former was not benzoic acid, but a new principle to which he gave the name of *Coumarine*. This was confirmed by the experiments of M. M. Boutron and Boullay. No trial was however made to ascertain whether the crystalline matter of the melilot was also coumarine. Lately M. Chevallier and Thubuef announced the existence of a new crystallizable substance in the distilled water of melilot. Still

more recently, M. Cadet Gassisourt gave an account of a crystalline matter in the distilled water of the melilot, to which he gave the name of *melilotine*. About the same time, however, M. Guillemette examined the melilot with great care, and has shown: that the crystalline matter is not benzoic acid, as stated by Vogel, but an immediate neutral principle, having all the properties of coumarine, and consequently entitled to that name; that the distilled water of melilot owes its odour and properties to this substance. *Ibid.*

Combustion of zinc.—M. Sementini has observed a remarkable property in zinc. If when it is melted at a red heat, the crucible be withdrawn from the fire, the combustion of the metal will continue as long as any of it remains, provided it be continually agitated, and the oxide removed as fast as it forms. It would be curious to observe, by operating on large masses, whether this combustion would continue for a length of time without any other heat than that developed by the metal itself. By this combustion it forms a gray oxide differing from the common oxide; its specific gravity is greater, and it does not absorb carbonic acid from the atmosphere.

Journ. de Pharm.

Benzoic acid.—Giovanni Righini gives the following process for purifying benzoic acid. Dissolve the acid in four or five times its weight of sulphuric acid, diluted with six parts of water. During ebullition, add a very small quantity of the purest animal charcoal, filter, and while cooling, the acid will separate in crystals. Should long beautiful needles not be found, and should it still possess an odour, the operation must be repeated. Collect the crystals on a filter, remove the sulphuric acid by washing, and leave them to dry in the shade. Sulphuric acid dissolves the resin and oil, which renders the acid impure. To have this acid in beautiful crystals, dissolve in alcohol the purified acid, and put the solution in a subliming apparatus over a sand bath. Manage the fire in such a manner that the alcohol alone shall be volatilized, and long needles perfectly white, and without odour will be obtained.

Gaz. eclet. di Farm. and Ed. Med. and Surg. Journ.

St. Ignatius' bean.—From an analysis of this article by M. Jori of Reggio, it would appear that the active principle is united to tannin, as is the case with many other of the organic alkalies. The results of his experiments show that it is composed of: 1st, a very soluble, very bitter tannate of strychnine; 2d, of free tannine, which reacts like an acid, and strikes a dull green with the salts of iron and their solutions, and especially with the salts of the peroxide; 3d, of an organic alkaline salt—strychnine which is soluble in an excess of tannin, and is precipitated when this is

neutralized; 4th, of gum. 5th, of insoluble gum; 6th, of a great proportion of starch; 7th, of a small quantity of a resinous, aromatic substance. 8th, vegetable fibre.

Journ. de Pharm.

New Opium.—M. Guibourt has described an opium from the East Indies, sent him by Dr. Christison of Edinburgh. This opium is in flat black masses, about half an inch in thickness, and covered with a plate of mica. Dr. Christison stated that he had obtained nine and a half per cent of muriate of morphine from this opium, and thence concludes that it may be considered in some respects equal to the Smyrna, which furnishes ten per cent. of the same salt. *Ibid.*

Codeine.—M. Winckler has prepared codeine in the following manner: He treats opium with cold water, adds a solution of ammonia to precipitate the morphine, then chloride of calcium to precipitate the meconic acid. He afterwards separates the colouring matter by sub-acetate of lead; decomposes the excess of the metallic salt by sulphuric acid; adds caustic potash to the filtered liquid, exposes the mixture to the air, that any excess of this alkali may become a carbonate; then agitates the solution with ether, and after the spontaneous evaporation of the ethereal solution, he obtains the codeine in a yellowish transparent mass, which on the addition of hydrochloric acid affords fine crystals.

Journ. de Pharm.

False Guaiacum wood.—Under the name of false or female guaiacum, logs of a very compact, brown wood with a white heart, have been imported into France. This wood when split is sometimes yellow with brown or violet veins, or greenish with brown undulations of different shades. It is susceptible of a fine polish, which appears greasy; it has neither the taste, smell, or other properties of the true guaiacum. It is principally imported from St. Jago de Cuba, for cabinet work.

This is the green or yellow ebony of the Antilles. It appears that this wood is furnished by two different varieties of the *Bignonia leucoxylon*, and should not be confounded with the false guaiacum of Africa which is furnished by a species of *Schotia*, and has sudorific qualities.

Ibid.

Vienna caustic.—The slow action of caustic potash when used as a cautery, and the accidents that sometimes arise when it liquifies too rapidly, have determined many practitioners to make use of a new caustic, known under the name of *Vienna powder*. This is made as follows:

℞.	Caustic potash	5 parts.
	Powdered Quicklime	6 parts.

These are to be well mixed together and kept in a wide mouthed, glass stoppered bottle, and in a dry place. When it is to be used as a cautery, a small quantity of it is to be mixed with a few drops of alcohol or water, so as to form a liquid paste, which is to be spread between two pieces of adhesive plaster, the lower one of which is to be pierced with a hole of the size and form of the intended issue. The action on the skin is rapid though not very painful, and almost always is terminated in half an hour.

Ibid.

Origin of sulphur.—C. Gemellaro has read before the academy of Catania, a memoir, entitled, a new theory relative to the origin of sulphur. He supposes it originates in the decomposition of naked molluscæ, and that being acidified by the action of subterranean fire, it has been converted into sulphate of lime, and also has given rise to the sulphate of strontian, which in the tertiary class of Sicily is associated with the preceding minerals. *Am. Journ. Sci. and Arts.*

Ointment for the cure of scrofulous conjunctivitis.—M. Canon de Villard gives the following recipe for the treatment of this obstinate complaint.

℞.	Ol hepatis Rajæ	℥i.
	Cyanid. Ferri.	grs. xxiv.
	Cyanid. Hydrarg.	grs. viii.

Mix the oil cautiously with the cyanides, previously well agitated and then add, Ol. essent. lauro-cerasi. gtts. iv.

To prepare the oil, it is only necessary to take a sufficient quantity of the liver of that fish, and submit it to a slow heat, until it is so far prepared, that the oil can be obtained by expression. It is of a dark colour, and resembles cod liver oil, except that it becomes concrete on cooling. To give it more consistence, when necessary, a small quantity of spermaceti or palm oil may be added. This ointment is very active and must be cautiously used. At first it should be applied diluted with an equal proportion of simple cerate, and the strength increased as the eye becomes accustomed to it. *Bull. gen. de Therapeut.*

Oil of Euphorbia lathyris.—M. Soubeiran states that this oil contains an acrid resinous matter, which he considered as the active principle. Lately he has found this supposed resin to be a very compound body, and has extracted four very distinct substances from it, viz.; a white crystallized matter; a brown oil having a very disagreeable smell and acrid taste, readily soluble in alcohol; a kind of black resin which is insoluble in alcohol, and scarcely soluble in ether, but which is readily taken up by the fixed oils; and finally a solid, brown, pulverulent substance, which he has not yet examined. M. Soubeiran goes on to observe that the methods proposed by M. Chevallier to extract the oil, namely, by simple ex-

pression, by alcohol at a heat of 50° or 60° C., and finally sulphuric ether, cannot afford identical products. The first gives an oil much less charged with the resinous substances, and it is more than doubtful, whether the products of the two latter processes have the same properties. *Ibid.*

Syrup of Orgeat with milk.—

Sweet almonds,	750 grammes,
Loaf sugar,	3000
New milk carefully skimmed,	2000
Cherry laurel water,	
Orange flower water,	aa 125

The almonds, deprived of their pellicle, are to be pounded with four ounces of sugar and as much milk, when a homogeneous paste has been made, two pounds twelve ounces of milk are to be added and the emulsion strained, and the marc treated with the remainder of the milk and the aromatic waters. This second emulsion after being strained is to be united to the first, the sugar is then melted in it in a water bath, and the syrup thus formed strained through a coarse cloth and bottled when cold. *Ibid.*

Turpentine in Gonorrhœa.—Dr. Ebriart speaks in high terms of the efficacy of turpentine in the cure of gonorrhœa, after the inflammatory stage has been subdued by antiphlogistic measures. His formula is as follows:

℞	Aq. Menth.	℥iv
	Terebinth. venet	ʒi
	Gum Arab.	q. s.
	Syrup simp.	ʒi
	Extract belladona,	gr. i

mix and make emulsion.

When this potion acts too immediately upon the intestinal tube, it must be intermitted for a few days.

Journ. des Con. Med. and *Am. Journ. Med. Sci.*

Digestive ointment of Dr. Canquoin.—

R. Acetic infusion of Mezereon,
Molasses,
Olive oil,
Ox gall,
} aa ℥iss.

Mix and reduce to the consistence of an ointment; then remove from the fire and add:

Ung. Basilicon,
Ung. de la mere, aa ʒiss.

Mix carefully and add to each ounce—

Sub-deuto nitrate of mercury, ʒi.

This ointment is used for indolent schirrous tumours of a dark red character. When cancerous and inflamed tubercles exist on the skin, the author destroys them by applications of a solution of cyanide of potassium made with ten or twelve grains of the salt to two ounces of distilled water. *Journ. de Pharm.*

Colour of eschars produced by various chemical agents.—

Nitric acid causes a yellow eschar, not very firm.

Nitrate of silver, a brown eschar on the skin, and a thin white one on wounds.

Caustic potash, a black semi-coriaceous, somewhat thick one.

Acid nitrate of mercury, a blood red one on the skin, a pale gray semi-coriaceous, somewhat thick one on the flesh.

Sulphuric acid, a semi coriaceous iron grey one.

Muriatic acid, a white, hard, somewhat thick one.

Nitro-muriatic acid, a yellowish, semi coriaceous, somewhat thick one.

Chloride of zinc, a white, very hard, thick one.

Arsenious acid, a livid, hard thick one.

Sulphate of copper, a brown, very hard, thick one.

Chloride of antimony, a white, soft, thick one.

Ibid.

Remedy against cancer.—The *Hippomanes mancinella* or manchineel has long been known as a most virulent poison; the Indians employ its juice to envenom their arrows, and it is also extensively used by the tribes inhabiting the banks of the Orinoco as an anticarcinomatous remedy. Numerous experiments have proved that arsenic is neutralized by the secretion of a cancerous ulcer, while it preserves its poisonous properties when placed in contact with any other sore. The same phenomenon is observed with respect to the manchineel, its poisonous effects being in like manner neutralised by the secretion of cancerous ulcers. The Indians when employing it, surround the cancerous sore with a pasty border, and apply to the centre of it a few drops of the juice of the manchineel, an eschar soon forms, which comes away in about 48 hours, leaving a clean wound. *Journ. de Con. Med. and N. A. Arch.*

Plaster in whooping cough.—M. Corsin says that he has recently obtained very prompt and happy effects in several cases of whooping cough, by the application of the following plaster between the shoulders:

R.	Emplast. cicuta,	ʒi.
	" Pic. Burgund.	
	" Diachylon.	aa ʒss.

The mass should be spread uniformly on chamois leather, and sprinkled with six, eight, ten, or twelve grains of tartar emetic according to the age of the child. This plaster applied within the first week of the attack, constantly produced, in the course of twenty-four hours, active rubifaction and the development of small pearly pustules, and occasioned a marked abatement of the number and violence of the paroxysms of coughing and vomiting. *Lancette. Francaise and N. A. Arch. Med. and Surg. Sci.*

Lactic acid as a medical agent.—M. Majendie thinks that as lactic acid is one of the efficient agents in the dissolution of the food in the stomach, that it might be employed with advantage in dyspepsia, or in cases of simple debility of the stomach. With this view he has administered it both in the form of lemonade and pastilles :

Lactic Lemonade.	R.	Liquid lactic acid	ʒi—iv.	
		Water,	lb. i.	
		Simple syrup,	℥ij.	M.
Pastilles of Lactic Acid.	R.	Pure lactic acid,	ʒij.	
		Powdered sugar,	ʒi.	
		Gum tragacanth,	q.s.	
		Oil of vanilla,	gtts. iv.	

To be made into pastilles weighing half a drachm each, which should be kept in a close vessel. As many as six of these pastilles may be taken in twenty-four hours. *Ibid* and *Ibid.*

Hydrosulphuret of lime in Itch.—M. Lutens has used the liquid hydrosulphuret of lime as prepared by M. Deherde, with great success in the cure of itch. It is made as follows : Take one part of sulphur, two parts of sub-carbonate of lime, and nine parts of water, boil them in an earthen vessel to complete saturation; then decant the liquid and filter. Frictions with this fluid are to be employed three times a day, an ounce and a half being employed at a time. The fluid is transparent, of a deep brown colour, and has the odour of sulphuretted hydrogen. When rubbed upon the skin, it leaves an orange yellow stain, which disappears in a few hours. On the first day it produces considerable itching, and all the pustules become cauterized as if with a strong acid, but no excoriation or exfoliation of the cuticle is produced, if common care be taken.

Bull. Med. Belge et Ibid.

Anhydrous formic acid.—M. Liebig states that an anhydrous formic acid may be obtained by decomposing dry formiate of lead by sulphuretted hydrogen. This acid is extremely corrosive, far more so than concentrated sulphuric acid; the most minute drop when applied to the skin produces the sensation of a red hot iron, and causes the formation of a vesicle and finally of an ulcer that heals with great difficulty. It crystallizes

at 32° F., and boils at 212° F,: the common acid boils at 218° F., and crystallizes at —5° F.

Test for Hydrocyanic acid.—Mr. Barry of London is of opinion that the nitrate of silver is the most delicate test for the presence of hydrocyanic acid, detecting the ten-thousandth part of a grain. The application is very simple. The suspected fluid is to be slightly acidulated by the addition of acetic acid. If an excess of acid be present it is to be not quite neutralized by carbonate of soda. Two or three drops are then put in a watch glass, and immediately covered with a plate of glass, whose under surface, to the breadth of a pea, is moistened with a solution of nitrate of silver, formed by dissolving one grain of lunar caustic in 100 grains of distilled water.

If the inverted drop of the silver solution retain its transparency, the absence of prussic acid is established, for had it been present, the test would in a few moments have become clouded by the formation of a white precipitate, an effect which indeed is almost instantaneous when the prussic acid is not excessively diluted. If, on the other hand, the precipitate appeared, the conclusion must not be drawn, that it is cyanuret of silver, until identified as such by two properties; first, its speedy resolubility, as denoted by the cloudy drop becoming clear when placed over a vessel of caustic ammonia, in which respect it differs from the silver compounds of iodine and bromine; and secondly, in retaining unchanged its pure white colour after exposure to the sun's rays or to a strong light. As this property essentially distinguishes it from the compound of silver with chlorine, it is important to establish it by a separate experiment, upon a somewhat larger portion of the precipitate, which should be obtained by candle light, by successively placing the inverted drop of nitrate of silver over renewed portions of the liquid in a saucer; as soon as the precipitate separates into distinct and like particles, it is ready for exposure to the sun's rays.

Another property which distinguishes the cyanide of silver from the chloride, is, that upon being ignited in an open glass tube, the cyanogen burns with a flame of the usual colour, leaving the metal pure, if sufficiently heated, a quality the more valuable as it furnishes an index to the proportion of prussic acid it represents, which upon ordinary occasions may be estimated as equal to one-fourth the weight of the residual silver.

Philos. Mag.

Fig. 1.

Drawn from Nature by W. F. Burton

CORNUS FLORIDA
(Dogwood)

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Original Communications.

ART. LIV.—ON CORNUS FLORIDA.

By Charles Ellis.

Nat. Ord. Corneæ.

Sex. Syst. Tetrandria Monogynia.

Cornus. *Calyx*, four-toothed: *Petals* four. *Stamens* four, alternate with the petals. *Drupe* not crowned; nut with two cells; cells two-seeded.—*Hooker.*

C. florida. Arborescent, leaves opposite, ovate acuminate, entire, ribbed; leaves of the involucre four, large, obcordate, nerved, white; flowers in terminal heads.—*Beck.*

Synon. Cornus arborea, involucro maximo, &c. Lin. Hort. Cliff. 38. 171.

Cornus mas Virginiana, flosculis in corymbo digestis a perianthio tetrapetalo albo radiatim cinctis. Pluk. Alm. 120. t. 2. f. 3. Catesb. Car. 1. t. 27.

C. florida. Lin. Spl. Pl. 171. Marshall. Arbust. Am. 14. Mich. Flor. Am. boreal. 1. 91. Nuttall. Gen. Am. Pl. 96. Eaton. Man. Bot. 108. &c.

Icon. Lin. Hort. Cliff. 38. S. 171. Pluk. Alm. 120. t. 2. f. 3. Catesb. Car. 1. t. 27. L'Heritier. Cozn. No. 3. p. 4. Mich. arb. Forest. 3. 138. Schmidt. arb. t. 62. Curtis. Bot. Mag. t. 526. Barton. Veg. Mat. Med. U. S. t. 3. Bigelow. Med. Bot. f. 28.

Common names. Dogwood. Boxtree. Dogtree. Great flowered Cornel, &c.

Pharm. Cornus florida. U. S.

Officinal. The bark. Pieces of various sizes, more or less rolled,

sometimes with a fawn coloured epidermis, sometimes deprived of it; of a reddish gray colour, very brittle, and affording, when pulverized, a grayish powder tinged with red. Odour very feeble; taste bitter, astringent, slightly aromatic.

Description.—This tree is found abundantly in the western and middle states, as far east as Massachusetts, in most of the southern states, and in Florida—wherever the soil is sufficiently moist and gravelly.

Its height is usually from fifteen to twenty feet, and diameter four or five inches, but the former sometimes exceeds thirty feet, and the latter nine or ten inches.

The branches which are not very numerous, are regularly disposed, partly opposite, and partly arising in fours. The leaves are about three inches in length, opposite, dark green on their upper surface, whitish underneath, and of an oval form. Towards the approach of winter, they change to a dull red colour.

In Pennsylvania and New Jersey the flowers are fully blown early in May, whilst the leaves are only beginning to unfold themselves. The flowers are of a yellow colour, small and aggregated, surrounded by a very large involucre, composed of four white floral leaves. This latter constitutes the great beauty of the flowers, which are very numerous; and the tree thus robed in white in the spring of the year, adds variety and ornament to the American forest.

The wood is compact and heavy, and susceptible of a fine polish; but the interior bark both of the root and branches, is that which enhances its value to the pharmaceutist. It is extremely bitter, and has been long used in the country as a remedy in intermittent fevers. As possessing remedial properties analogous to Cinchona, and as a substitute for that invaluable exotic in the autumnal fevers which prevail in the United States, it is considered by physicians who have employed it extensively in their practice, as being unsurpassed by any vegetable product, indigenous to this country. Several attempts have been made to analyze the bark—to ascertain if its virtues existed in a vegetable proximate princi-

ple; and about ten years since an essay was published by George W. Carpenter, announcing the discovery of a vegetable alkali, which he denominated Cornine. The process by which he obtained this new alkaline substance has never been published; and the quantity obtained is believed to have been small. Yet sufficient of the sulphate of cornine was furnished to several physicians of this city, to ascertain that it possessed unequivocal powers as a febrifuge—in some instances where quinine had entirely failed. Dr. Samuel G. Morton, in the 11th volume of Philadelphia Journal of Medical and Physical Sciences, gives a detailed account of the trials he made with it in the cure of intermittent fever. He describes the sulphate as of a grayish white colour, intensely bitter—deliquescent when exposed to moisture, and partially soluble in water.

A well written thesis by J. Cockburn, Jr., was published in the July number, present volume of this Journal, to which the reader is referred for the result of his experiments. He was unsuccessful, however, in obtaining any cornine.

In accompanying the present number of our Journal with a plate of this native of our forests, it is a source of regret that there is not sufficient time to prosecute the experiments further. My intention would have been to subject a portion of the bark obtained from the root, which is much the strongest, to the process generally adopted for the preparation of sulphate of quinia, viz.: by acidulated decoction, and precipitation by lime or magnesia, &c.; and to have endeavoured by this or other experiments to obtain some definitive results.

The fact that the Cornus Florida abounds throughout our country, that the bark of it both in decoction and powder has been extensively used in fevers, and in many instances much preferred to the cinchona, constitute the strongest reasons for a further investigation of the subject.

Since writing the above, I have conversed with Dr. Jackson, a very intelligent physician, of Northumberland, Penn., who informed me that he had been in the practice for many years, of using the dogwood bark in the treatment of intermittent fevers; and that as long ago as 1823, previous to any

analytic experiments being made with it, he subjected a portion of the bark collected from the root of the older trees, (which he esteems much the strongest) to the formula first published by M. Henri, Jr. for extracting quinia from cinchona bark; and that without carrying the process so far as to obtain a crystalline salt, he used the concentrated alcoholic solution, obtained from the precipitate thrown down by lime from an acidulous decoction, with the most decisive results as to its remedial powers.

This experiment was satisfactory evidence to his mind that the solution contained a vegetable principle analogous to quinia; but further research at the time was incompatible with his professional engagements.

ART. LV.—ON THE PRESERVATION OF MEDICINES.

By Augustine Duhamel, Graduate of Pharmacy.

The importance of the subject upon which I am about to treat, will be made apparent to every reflecting mind, as well as to the Apothecary, for whose perusal it is especially intended. Indeed, when we consider the situation in which we stand, with regard to the confidence reposed in us, by the community at large, the elevated rank we have attained in our profession, and above all the conscientious duty of relieving suffering humanity, it may be remarked as a matter of surprise, that so little attention has been given in this country to that branch of Pharmacy, relating to the proper, or best mode of preserving or keeping for a length of time in good condition, our medicaments. The able authors of the United States Dispensatory, in treating upon the subject of Pharmacy and its various branches, as connected with the cultivation and collection of medicinal substances, their preparation for

exhibition, and further preparation for internal administration, or outward application, have but slightly touched upon this point. That their observations are so limited on this head, is to be regretted, but as rules to determine the best manner of preserving drugs and medicines, can come only from a knowledge gained by long experience in the practice of this art, it is hoped that the *collaborators* of the American Journal of Pharmacy, some of whom are peculiarly fitted for it, from their long standing in business, will benefit science by the publication of the results of their experience.

It is to the interest of the Apothecary to keep always on hand, fresh and efficient remedies, for in addition to the confidence of Physicians reposed in him by this act, and consequent increase of reputation, his pecuniary interest is manifoldly implicated in it. But as is justly observed by M. Virey, and the author of a paper, I shall shortly allude to, "*the good preparation of a medicine, is but half of its value, if the art of preserving it, be not known.*" Unfortunately great ignorance prevails upon this subject among some of our coadjutors in other than the principal cities of the Union; and it is still more to be lamented that among them, are to be found, some whose speculative propensities, or mercenary spirit, lead them to practices which degrade the profession. It is that of looking more to the price than to the quality of drugs;—many of them in writing for supplies, which they generally procure, without personal attendance, from the wholesale druggist, limit the price, and leave the selection entirely to him; when received, whether good, bad, or indifferent, they are kept for use in a negligent manner, until all consumed, perhaps for a series of years, before they obtain another supply. This is the cause of many of our indigenous medicinal plants having been brought into disrepute: the Physician prescribes one of them, an Apothecary of the above description furnishes the article, probably inert from age and careless exposure, and the Physician finding it to fail in producing any effect upon his patient, at once pronounces the plant worthless, without searching into the cause.

I would not apply these remarks to the members of the profession in this city, who as a class amply deserve the confidence reposed in them by their fellow citizens; neither would I wish to reflect on the Pharmaceutists of our sister cities, many of whom are of acknowledged talent, and of the strictest integrity in the discharge of their duties. The only remedy against the evils complained of, lies in the establishment of a protective policy, or jurisdictional act, similar to those of Europe, some account of which has been published in the excellent address of the President of the College.

This paper is suggested by an essay published by Mr. Menigaut in the No. of the *Journal de Pharmacie* for August, 1835, entitled *Conservation et Reposition des Medicaments*, wherein he comments upon an article under the same head, by Messrs. Henry and Guibourt; he gives great credit to these gentlemen for the views they have taken of this subject, and enriches it by observations from his own experience. This essay which I at first intended only to translate, was found afterwards to treat of so many preparations that are not in use in this country, and was so incomplete as respects those peculiar to the American and English Pharmacopœias, that I thought it preferable to give a new article compiled from these essays, with such additions as my own experience would allow me to furnish. In the extracts which I shall give from Mr. Menigaut's paper, which is somewhat prolix, I shall follow the sense, without employing strictly the author's own words:

"Practising Pharmacy in a small provincial town, where the consumption of medicines is always limited, my attention has been necessarily directed, as well to their preservation, as to their preparation. I shall here detail the results of my experience.

Heat, light, air, and moisture, are the four great agents in the alteration of medicines. The great object of the apothecary should therefore be to protect them from the deteriorating influence of those agents, in the most effectual manner.

As mentioned by Henry and Guibourt, where there is no

moisture, no organic change can occur. The apothecaries' care should be to prevent the access of this, as much to avoid its primary effects, which are mouldiness, or other elementary modifications, as to prevent its secondary influence, which is the developement of a number of destructive insects, precursors, even more ominous of decomposition, than mouldiness itself.

Thus entire plants, or their parts separately from the root to the seed, ought to be very dry, shut up in impermeable vessels, screened as much as possible from the contact of light, and of a capacity proportioned to the quantity of matter. In my own establishment I always make use of boxes and bottles of such a capacity as to be emptied in a short time.

The preservation of roots, woods, leaves, flowers and fruits in general, require no other attention than that of putting these substances, very dry in vessels shutting as exact as possible, and least accessible to moisture. However, the necessity of opening them often; variation of temperature; atmospheric pressure acting in the interior of the vessel, the renewal of the air, and this air incessantly charged with moisture, which moisture by hygrometical affinity for organic matters, combines with and completely saturates them, all act in an injurious manner. Thence, the necessity of putting the same substance in contact with heat several times in the course of the year, and of enclosing it when perfectly dry in the same vessel previously well cleaned, and thoroughly dried. Without these precautions, the moisture extricated in vapour during the warm season of the year, not being able to escape, owing to the resistance of the sides of the vessel, falls down again upon the substance, and occasions a sudden alteration in it.

Change of colour, mouldiness, and increase of insects are never more frequent in substances, shut up in close vessels, than at the commencement of spring and during the course of the summer. This is why I have always used the precaution, at the end of March, of subjecting such substances as remained on hand during the winter to the action of heat in

a drying room (*Etuve*,) and this operation I repeat in the hottest part of June and July. The heat of the sun, is often sufficient at these epochs.

The roots most subject to be covered with mould as Althea; those most easily attacked by worms as Angelica, have been preserved as long as I have wished. The same may be said with regard to leaves, containing the most extractive matter, as Cicuta, Fumitory &c., and those of the most fugacious odour, as Balm, and Ground Ivy; they lost after a number of years, scarcely any portion of their green colour and delicate aroma."

In addition to what is here stated respecting roots, I would observe that in the large Pharmaceutical establishment of Mr. E. Durand, with whom I have been for the lapse of six years, and whose stock, from the circumstance of European Physicians and foreigners generally, resorting to him, embraces a large variety of medical herbs, common to the other side of the Atlantic, I have noticed during this period those most susceptible of decay, from mouldiness or attack of insects; among the roots are the Orris, Peony, the different Aristolochias, Tormentil, Squill, Liquorice, Colchicum, Dandelion, Fern, Burdock, &c. Many of these being seldom called into requisition, and kept in close glass vessels, that are as seldom opened, have undergone no evident change. Others, particularly indigenous roots in common demand, which are brought to the market in an imperfectly dry state, we have been obliged to examine from time to time. Upon these occasions it is usual with us to dry them by heat, then brush and finally replace them in clean and dry vessels.

As regard to leaves, and other medicinal parts of a plant such as we have coming for the most part, from the Shaker Settlement at New Lebanon, they need no other attention, than that of simply placing them in close drawers in a dry place. These plants it is well known, are pressed into a very compact form, and neatly put up in small packages, protected by strong paper envelopes. I have not found these to deteriorate by keeping. Though the form of the plant is lost by

pressure, they retain after a number of years their colour, and the odour and efficiency common to each. I must however except the Digitalis, which from the soil, manner of cultivation, or want of care in drying, has disappointed the expectations of our Physicians; even when well prepared, it has not proved as satisfactory in its effects as the European Digitalis. The latter should be enclosed in tin cases, and when in powder, in glass stoppered bottles; it is even recommended to be kept from the contact of light.

With reference to seeds, some of which have a tendency to spoil suddenly, from various causes, if no particular attention be paid to their condition, such as Carrot, Water Hemlock, (Phellandrium aquaticum,) Grains of Paradise, and Dill, with some of their congeners, it is worthy of notice, that Mr. Durand has had in his possession, upwards of twelve years, quantities of these seeds which are now in a remarkable state of preservation; this arises from their having been kept in glass bottles, while seeds, Cumin in particular, kept in drawers, were completely destroyed, a long time since.

Mr. Menigaut says, that no flower can be preserved a single year in good condition, without the precautions here urged, have been taken. He adds that with the care of drying, shutting them in close vessels, and repeating the dessication from time to time, he had preserved for several years, Lime tree flowers, (*Tilia Europea*) with all their aroma, and fine yellow colour; the Elder flowers although kept the same length of time, had acquired but a slight fawn yellow tinge; but the centaury (*Erythræa Centaurium*), red roses, coltsfoot, althea, and red poppy-petals, were well preserved, though gathered eight years.

Parts of some of these plants very easily change, as in the case of the poppy, and Arnica montana, but these may be preserved by the precaution indicated by Mr. Menigaut.

Mr. Menigaut then introduces the subject of the preservation of fruits, which are to be found in all the French Pharmacies. But in our large cities, they are not generally kept, on account of the convenience afforded in being able to pro-

cure them fresh from the Confectioners, when wanted for preparations.

The author gives his mode of preserving dates, jujubes, and almonds; the two first are not in use here; the latter, from the liability to a demand for almond emulsion is kept by most country apothecaries, to whom the following information may be interesting.

"In the month of October, 1828, I took about 20 lbs. of sweet almonds of the season, which I exposed for eight or ten days over a baker's oven to a temperature of 25 or 30° C., and when they were very dry and brittle I enclosed them yet warm, in six bottles of two quarts each, very clean and dry. I corked and sealed them carefully, and laid them upon shelves on a ground floor, seven or eight feet above the soil. Each following year I opened one of these bottles, and found the almonds as good, and as sound, as on the day when they were put up. I generally however, dry them well, and enclose them at the commencement of winter in large glass bottles with tin covers, and repeat the dessication upon the approach of hot weather. Almonds thus taken care of, easily keep two or three years without change."

Tamarinds should be preserved in a thick, well boiled syrup, then put away in jars, well corked, and tied over with bladder. Their condition should be examined from time to time, and the syrup replenished, as evaporation may render necessary. Mr. M. says:—

"Cantharides from their high price and active qualities, should be perfectly dried, both before and after pulverization, and distributed in glass vessels, well corked, and in size proportioned to the consumption."

He also says that it is useless to preserve them entire, and that they should be dried, particularly after pulverization, so that any moisture absorbed during that process, might not injure them afterwards. The same remarks are applicable to powdered squill.

Lozenges, if not perfectly dried, before putting away, are apt to moisten, and adhere together, but if previously well

dried and kept in glass vessels, and not in too large quantities together, they will remain unimpaired. The alkaline lozenges of soda, which are white when fresh made, should be kept as much as possible from the contact of air, or they will moisten and become yellow; this most commonly arises from the employment of a simple carbonate of soda.

Extracts are liable by keeping, to be covered with mould which is by some considered unavoidable; some assert that an extract loses none of its activity by mouldiness, and hence take no measures to prevent it; others with the view to oppose it, protect the upper surface of extracts by paper saturated with spirit of wine, which is but a temporary shield; or mix a portion of olive oil with them, during their preparation, which answers this purpose very well, and serves also to keep them of a proper consistence. The last may, however, be deemed objectionable, from their want of ready solubility.

The common method of covering extracts is by means of bladder or sheep skin. This does not prevent their becoming mouldy, nor does it preserve their consistence, for the extracts are sometimes found so hard as to be with difficulty separated from the pots which contain them, when it is necessary to make them up again, by means of a water bath.

When the alcoholic extracts of colocynth, jalap, and nux vomica, become hard, they may be rendered of a good consistence, without any trouble, by dropping some alcohol upon their surface, which gradually incorporates itself with them. Extracts should be kept in porcelain pots, with covers of the same material. A small one only should be kept for officinal use, and the remainder put away, after the manner recommended by Mr. M., in double vessels, in the first of which are to be put now and then a few drops of water. The imported extracts, principally German and French, are the best, and in greater demand, from physicians being able to depend upon their efficiency; and are much superior to those of this country, which are chiefly obtained from the Shakers. These last extracts from being entrusted to persons, ignorant of the first principles of chemistry, are often negligently prepared,

and sometimes burnt in the evaporation, which it is well known, constitutes the chief part of the preparation.

Mr. M. says that the fixed oils, liquid or solid, animal or vegetable, may be preserved as long as desired, with the simple care of keeping them in completely filled, and well corked bottles.

All the ointments undergo rapid alteration, giving rise to rancidity, which renders them unfit for use. They should not be prepared in large quantities at a time; and when the consumption is small, should be confined to a few only, of the most needful, such as simple, basilicon, tar, and mercurial ointments. The ointments of zinc, lead, and white and red mercury—the latter of which soon decomposes—are often kept ready prepared, and very improperly so, as the acridity peculiar to rancid lard, produces irritation when applied to sores. With simple cerate, two-thirds of the ointments in common use, may be prepared extemporaneously, by rubbing up with it in certain proportions, the different substances previously levigated. For this purpose, I find a glass muller and marble slab, more convenient and serviceable than a pestle and mortar. In this manner may also be prepared such vegetable ointments as stramonium, cicuta, and others, by mixing with cerate the finely powdered leaves, or what is sometimes recommended instead, and which may be used when the leaves cannot easily be obtained, good extracts of these plants.

"The essential oils from being used every day, are often exposed to the air, which changes them entirely. The only efficient mode I have found of diminishing this alteration, has been to mix them with an equal weight of alcohol of 36°. This alcohol, suitable to almost all essential oils, permits me better to fraction their use, and forms at the surface of the oil, a bath that isolates it from the air retained in the vessel, and greatly tends to its preservation. Oil of aniseed mixed in this way, has continued to crystallize as if it was unmixed, and implicating in its solidification, three-fourths of alcohol."

"All the syrups, with the exception of some acid or alcoholic, are very difficult to keep from the variations of temperature. It may be said, that fermentation is the only kind of alteration they experience, for I do not consider as such, the mouldiness that may be perceived upon their surface. On the contrary, it is worthy of remark, that mouldiness is a sure sign of non fermentation. In fact, I have never seen a syrup ferment when covered with mould; the one always appeared to the exclusion of the other, for as is well known, and as Baumé has observed, mouldiness changes nothing of the quality of syrups, since it is light and superficial. I often induce its appearance on syrups, which I purpose to keep for long time, or of which a quantity is prepared at certain seasons, as that of violets, and asparagus tops."

It is a fact deserving of being better known, that syrups prepared by alcoholic maceration after the manner recommended for our compound syrup of sarsaparilla, are not so liable to fermentation, and are of easy preservation. Mr. Durand has practised for a number of years past this mode of preparation, particularly for such syrups as are made from roots, abounding in mucilaginous matters, and which most readily ferment from contact with the air, as the compound syrup of squill, &c. When made in this way, the fecula and inert portions are got rid of, and besides producing a neater and more active preparation, it will keep for a length of time. So certain is the effect of the hive syrup thus made, that a few drops of it is sufficient to vomit a child, while it is often complained, that a teaspoonful of the syrup made in the ordinary way failed to act as an emetic. It is a mistaken notion, to attribute its certainty as some do, to alcohol contained in it, for the alcohol is entirely driven off in the evaporation.

Gum Arabic syrup, and all those made from fruits, rapidly ferment after a short exposure. They should be boiled to 31° Baumé, and if put, immediately after cooling, in bottles completely drained of the water with which they have been washed, then well corked, and afterwards placed in a cool cellar upon their sides, they will keep good. The test of ex-

perience has proved that syrups bottled while yet warm, are sure to give rise to mould, and as much as Mr. M. is disposed to encourage its formation, I am as little inclined to consider the value of a syrup enhanced by it; its appearance in syrups is certainly not calculated to win for it favourable opinions from our patrons.

Brown mixture, a kind of cough syrup, consisting of a saturated solution of extract of liquorice, united with gum Arabic, antimonial wine, and paregoric, was once a difficult preparation for me to keep; though several ways were tried to prevent it, it invariably turned sour after it had been made three or four days, until by the addition of an extra portion of paregoric, I succeeded in keeping it perfectly sweet for months together.

Lastly come the distilled medicinal waters, with which Mr. M. concludes his paper. It may be well to acquaint my readers, that in Europe, particularly in France and Germany, a great use is made of waters distilled from freshly gathered medicinal plants. They frequently employ the highly charged waters of lettuice, balm, savine, hyssop, cherry-laurel, lime tree flowers, and others, in the virtues of which they place the greatest reliance in almost every disorder. In the same manner are prepared their aromatic and perfumed waters; these, when freshly distilled, have a slight empyreumatic odour, which disappears after some time, leaving a finely perfumed water that improves by age. The properties of all these waters, are preserved with ordinary care in all respects, but that of clearness; they are subject to a deposition of mucilaginous matters, from time to time, in the form of a slight film, which obliges them to be filtered on these occasions.

The few aromatic waters made use of in this country which are the cinnamon, mint, orange flower, and fennel, and prepared by the suspension of their essential oils, through the intervention of magnesia, are as easily kept as made. But the rose water prepared according to our Pharmacopœia invariably becomes sour, from the alcohol contained in it,

leading to acetous fermentation. It is hoped, that the authors will amend the formula in their next edition of this work.

In conclusion I will remark, that much more might be said upon this subject, than the few observations here called forth, by the paper of Mr. Menigaut; but enough has been said to show the importance of this branch of Pharmacy, and it now remains for the more experienced to benefit their art, by giving the results of their experience, which will establish the truth of these remarks, or point out any errors.

ART. LVI.—MEDICO-BOTANICAL NOTICES.—No. VIII.

Janipha Manihot.—In addition to the particulars respecting this root, contained in a preceding number, the following, most of which are derived from the *Botanical Magazine*, 3071, will serve to complete the history of this valuable plant. The genus *Janipha* was separated from *Jatropha* by Kunth, (Nov. Gen. ii, 85,) and has been recognized by most botanists. Tourneфort, Adanson and Pohl, had, however, bestowed on it the name of *Manihot.* It is stated by the last author to be a native of Brazil.

It has always been stated that there are two varieties generally cultivated, the bitter and the sweet, the first containing a poisonous juice, the other possessing no noxious qualities; notwithstanding these marked differences in their properties, they are precisely similar in their botanical characters, though they possess sufficient characters to enable cultivators to discriminate between them.

The juice of the manioc or poisonous variety will occasion death in a very short time, and was used for this purpose by the natives before the Spanish conquest. Dr. Fernier, of Surinam, made many experiments with it on animals, these died in about half an hour in great agonies. On dissection no marks of inflammation were visible, the influence of the poison being apparently spent on the nervous system. Thirty-

six drops were administered to a criminal, and caused an immediate sensation of almost intolerable agony in the stomach, followed by convulsions which terminated by death in six minutes. On dissection no alterations were observable, except that the stomach was contracted to half its natural size.

This poisonous principle is volatile, and is destroyed by the action of fire, hence the cassava made from the manioc may be eaten with impunity. The root is the basis of several kinds of fermented liquors, and an excellent condiment for seasoning meat, called *Cabion, or Capion*, is prepared from the juice. The leaves beaten and then boiled form a substitute for spinach, and the fresh root forms a good application to unhealthy ulcers.

Spix and Martius state that an acre of ground planted with manioc yields a greater proportion of food than six acres planted with the best wheat. In Brazil, after burning the felled trees, the land is planted with cuttings of the Janipha. In eighteen or twenty months, during which time the farmer endeavours to check the upward growth of the plant, by nipping off the leading shoots; the roots attain their full size. After three successive crops the land becomes exhausted and is abandoned.

Jamaica *Tapioca* is made, according to Lunan, (*Hort. Jam.*) from the sweet cassava, by grating the roots, washing and infusing in water, and evaporating the liquid so as to obtain a sediment like starch, which is thoroughly dried in the sun.

Sandal Wood.—The true sandal wood is furnished by the *Santalum album*, a native of various parts of India, but more especially of the mountains of the Malabar coast. That from the Sandwich Islands, and which forms so important an article of trade, is derived from a different species of the same genus, the *S. freycinetianum*. In New Holland five other species have been discovered, of which but little is known beyond their botanical characters.

The red sandal wood, or as it is generally called, red saunders, is the product of the *Pterocarpus santalinus*, and not

of a species of santalum, of which it possesses none of the qualities, being solely employed for its tinctorial properties.

Some commentators on the Bible have supposed, and with an appearance of probability, that the true sandal wood is the *Algum* of the Scriptures, used in the construction of Solomon's temple, (Hooker, *Bot. Mag.* 3235.)

In commerce it is often divided into red, yellow and white, according to the shade of colour, of which the first, which however, is never as dark as the red saunders, is the most valuable; the best pieces and those most highly prized as possessing the strongest smell, are from near the root.

Sandal wood owes its peculiar smell to the presence of a volatile oil, which is heavier than water, and readily concretes at a low temperature. It was formerly much employed in medicine, but has fallen into disuse, though it still enters into some preparations of the foreign Pharmacopœias, as compound syrup of rhubarb, &c.

Heracleum lanatum.—This umbelliferous plant, which attains a very large size in favourable situations, and is to be found in most parts of the United States, is considered by Sprengel as identical with the foreign *H. panaces*, a native of Siberia; Nuttall also states that it is scarcely distinct from the *H. spondylium*. Both of these have been employed for remedial purposes, but more especially the last, principally however as external applications to indolent tumours. The *H. lanatum* deserves the attention of the medical profession in an eminent degree. Dr. Orne, of Salem, in 1803, in a communication to the Massachusetts Medical Society, spoke of it in the highest terms as a remedy in epilepsy, and stated that three out of five cases of this disease in which he administered it were cured. At the same time it is evident, from his own admissions, that in all these the disease was not dependant on a primary affection of the brain, but that the epileptic symptoms were connected with a disordered condition of the digestive organs. He gave it in large doses both in substance and infusion. Its good effects as a stomachic and carminative are amply confirmed by other practitioners, especially in

dyspepsia, accompanied with cardialgia and flatulence. It should be noticed, however, that Dr. Bigelow is of opinion, that this plant possesses a virose character, and that it should be used with great caution, more especially when it grows in watery or moist situations; this agrees fully with what Decandolle says of the *H. spondylium*, and in fact is applicable to most of the umbelliferæ.

In Sicily it is said that the officinal Angelica, instead of being furnished by the *A. archangelica*, is the root of the *H. cordatum*. This is aromatic, blackish, and endowed with the qualities for which the true root is prized. R. E. G.

ART. LVII.—NOTE IN REPLY TO ART. IX. AND ART. XXVIII. AMERICAN JOURNAL OF PHARMACY.

By W. & L. Khrumbaar.

In the April number of this Journal we noticed a paper of Mr. W. L. Rushton, on "the adulteration of morphia," to which we appended a note stating that a full explanation of the subject should be given. This promise we made, relying upon the assurances of Mr. Cance, (a party even more interested than ourselves) that he would furnish us with such a statement as would refute all the charges made in the above paper.

Indulging the hope that he would enable us to lay a satisfactory exposition before the public, and wishing at the same time to afford him every opportunity in our power of defending his character as a chemist, we have deferred redeeming our promise. As however, the subject remaining in this situation has an injurious effect upon us, we find it imperative, in justice to ourselves, that the point at issue should be brought to some definite conclusion.

Mr. Cance having allowed so much time to elapse without supplying us with his promised refutation of the charges, no

other alternative remains for us, but to take such measures as may be in our power, to exhibit our agency in the business, and to exculpate ourselves from the imputation of an adulteration of the article, or of vending the same, knowing it to be bad.

We shall accordingly at the next stated meeting of the College of Pharmacy, make application for the appointment of a special committee of investigation—before whom we pledge ourselves to lay the whole matter open, leaving it for them to place the censure upon those that merit it.

ART. LVIII. PHARMACEUTICAL NOTICES.—No. XII.

Hydriodate of Ammonia.—Having been occasionally called upon for a new preparation—viz.: the combination of hydriodic acid, with ammonia, I send for the Journal, the process usually adopted in its preparation. There are two modes by which the same result may be attained, either by direct combination of the acid with ammonia, or by the decompotion of hydriodate of iron. By the former process, the salt is said to be white when first prepared, but speedily changing to yellow. The latter is the formula which I have used, and which is to be preferred as more simple and less expensive. The product of it has uniformly been of a pale yellow colour. It is prepared as follows:—

Take of solution of proto-iodide of iron, or hydriodate of protoxide of iron, prepared according to the formula published in Vol. 4, p. 287, of this Journal, Q. S. Add to it a solution of fresh carbonate of ammonia, in small quantities at a time, as long as any precipitate of carbonate of iron falls. Then carefully separate the carbonate of iron by filtration, and evaporate the clear liquor which contains in solution, the hy-

driodate of ammonia, over a water bath. The crystals obtained are of a yellow colour, very deliquescent and require to be kept in a close stoppered bottle. They are soluble in alcohol and in water. The preparation of it most in use is the ointment. The following is the recipe:—

Take of hydriodate ammonia ℈i.
Cerat. Simp. vel axungia ʒi.
M. ft. ung. s. a.

It has been found highly useful in glandular indurations and for other purposes, to which iodine is generally applied.

The product which I obtained in using 20 drachms of iodine, was only 8 drachms of the salt. CHARLES ELLIS.

Emplastrum Plumbi.—In the preparation of Emplastrum Plumbi, it is well known that water enters into chemical combination with sweet oil and litharge, and is essential to the formation of the plaster.

The following is a statement showing the exact increase in weight, derived from the addition of the water, beyond that of the other ingredients. The quantities given are those taken at the time the plaster was manufactured.

Olei olivarum	36 lbs.	6 oz.
Lythargyri	24 "	8 "
	60	14 oz.
Aquæ ad libitum,		
Increase in weight,	6	2
Product lbs.	67	

Showing an increase of 10 per cent. in weight; the plaster being well worked with the hands, and thus deprived of any water that might otherwise remain uncombined with it.

C. E.

Resin of Jalap.—The following mode of obtaining the Resin of Jalap, devised by M. Planche, although it does not afford as large a product as some others, gives a purer article and is less expensive.

The roots are to be contused, and placed in an earthern vessel with eight or ten times their weight of pure cold water. They are to be permitted to macerate for twelve hours, the liquid decanted, and the process repeated till the water comes away tasteless. The exhausted roots are then to be pounded in a marble mortar with a wooden pestle, till they are reduced to a thin pulp. During this operation much resin will adhere to the pestle, and is much increased in quantity by adding ten or twelve times its weight of water to the pulp. The whole is then to be expressed through a coarse cloth. The product is milky, and deposites a little resin and much starch. The resin adhering to the pestle and sides of the mortar is to be removed with an iron spatula, and placed in an earthern vessel. The marc is to be a second time pounded with an additional quantity of water, and any resin that separates is to be collected and added to the first.

The resin which is soft, and of a brownish gray colour, is far from being pure; it contains ligneous particles, a little starch and extractive. It can be purified by stirring it with an ivory spatula for some time in a large quantity of water, the starch, extractive and almost all the ligneous particles are then separated. This is completely effected by heating it with three times its weight of highly rectified alcohol, over a water bath, the solution is to be filtered and the resin precipitated by the addition of water. The product properly dried, is friable, transparent, of a greenish yellow colour, soluble without residue in absolute alcohol.

Kermes Mineral.—The following method of making Kermes mineral, for which we are indebted to Liebig, is said to afford a more beautiful product than any other.

One part of dried carbonate of soda is to be mixed with four parts of pulverized sulphuret of antimony, and the mixture melted at a red heat, taking care that no iron instrument be used to stir it. The melted mass, is to be poured out on a tile or marble, and when perfectly cold, reduced to a fine powder. One part of this powder is to be boiled for an hour in sixteen parts of water, in which two parts of crystalized

carbonate of soda have been dissolved; the mixture is then to be filtered and permitted to cool. The kermes precipitiates in the form of a heavy powder. The mother water is to be decanted and again boiled with the residue. This operation is to be repeated several times, and affords an additional quantity of kermes. This kermes is not to be washed in warm water, or it will be decomposed.

Butter of antimony.—M. Cottereau gives the following as the best method of making this caustic preparation:

Pulverized sulphuret of antimony, is to be treated with the hydrochloric acid of commerce, till the latter becomes saturated. The solution is to be filtered through pounded glass, then introduced into a retort, to the beak of which a mattrass is to be attached, and a gentle heat applied by means of a reverbatory furnace, until the fluid that comes over begins to concrete in the beak of the retort. The recipient is then to be changed, and the fire augmented, when the protochloride will distil over and concrete in the recipient. To remove it, it is to be melted on a sand bath, and poured into small bottles with large mouths, and ground glass stoppers.

R. E. G.

ART. LIX.—LECTURE INTRODUCTORY TO THE COURSE ON MATERIA MEDICA AND PHARMACY IN THE UNIVERSITY OF PENNSYLVANIA. SESSION. 1835—6. By George B. Wood, M. D.

[In presenting our readers with those parts of Dr. Wood's address which have a direct bearing on the subjects to which this Journal is specially devoted, we are convinced that they will receive both pleasure and instruction from it, and appre ciate our desire of giving it that wide circulation its merits so decidedly demand.]

Gentlemen—

You are aware that I have been chosen to teach Materia

Medica in this Institution. The first duty incident to the charge, is to introduce the subject to your notice, and to recommend it to your favour. For this purpose, I now address you. It is scarcely necessary for me to state, that Materia Medica is the science which treats of the history, properties, and relations of medicinal substances. Its origin must have been nearly coeval with that of disease. Pain seeks for relief no less than hunger for satisfaction; and the same combination of instinct and reason which discovers food for health, finds also medicine for sickness. No tribe of men is so savage and destitute as not to possess its list of remedies. But, in his ignorance of the laws of external nature, and of those which regulate his own system, the uncultivated man not unfrequently ascribes the cures he may have experienced or observed to wrong causes; and, in the apparent absence of any physical agent, often spares himself the trouble of investigation by an easy resort to the intervention of supernatural influences. Hence the Materia Medica of a people advanced beyond the lowest grades of barbarism is apt to be loaded with superfluities, and deformed by superstition; and in this state was the science at the date of its earliest records among the ancients.

Little remains to us of all that was written on the subject of medicines before the time of Celsus. This author, who lived in the first century of our era, and is celebrated as the most classical of the Latin medical writers, enumerates most of the substances then employed as remedies, and gives the ingredients of various compound preparations; but his notices are meagre, and, in general, simply therapeutical, and convey no accurate knowledge of the substances mentioned. The first work especially devoted to the subject of medicines was that of Scribonius Largus, written during the reign of the Emperor Claudius. It is the oldest Pharmacopœia extant, and presents the most precise information in our possession of the modes of preparing medicines then in vogue. After Scribonius, followed successively Dioscorides, Pliny, and Galen, of whom the first and the last may be considered as

the most celebrated writers upon medicines in ancient times. Galen, particularly, obtained a reputation and authority which have, perhaps, been unequalled in the history of the medical art. His dogmas speedily gained general credit from the ignorance of the age; and for the space of fifteen hundred years, his writings were almost unanimously recognized as a kind of medical Gospel, which it was heresy to dispute. He flourished in the second century, and was the last author upon the subject of medicines, particularly worthy of notice, among the ancient Greeks and Romans.

At no period of antiquity had the science of Materia Medica advanced beyond the mere rudiments. The catalogue of medicines was numerous, but abounded in superfluities, introduced either upon false experience or absurd theoretical opinions. Thus, resemblances or analogies in colour, shape, or other sensible property, between the medicine and certain parts of the body or certain products of disease, were supposed to have an important bearing upon its curative powers; and a mysterious influence naturally existing, or imparted by incantations or other supernatural agency, was believed to be possessed by various substances, which were worn as amulets about the body. Objects calculated to inspire disgust, fear, or horror, were thought to extend over the frame the same spells in which they held the spirit; and hence toads, reptiles, venomous insects, and even human bones received a place in the Materia Medica. Many of these absurdities, though long since banished from the schools, have found a refuge among the vulgar, even in the most polished nations, and, in various semi-civilized countries of the old continent, flourish in almost their pristine vigour. To most of us it may appear strange, that men of the least cultivation should ever have yielded to such absurd claims upon their faith; but no stretch of credulity seems too great for an intellect not carefully instructed in fundamental truths; and when we witness, among our own contemporaries, such extravagances as a belief in the almost universal virtues of a secret panacea on the one hand, and in the powerful efficacy of the trillionth of a

grain of silex on the other, our wonder is directed away from the peculiar folly of the ancients, to the general weakness and fallibility of the human intellect.

Abounding as the ancient Materia Medica did in superfluities, it was greatly deficient in remedies of real importance. Many of our most valuable vegetable medicines had not been discovered; very few from the mineral kingdom were used internally, and the whole circle of chemicals, now among the most efficient employed, was quite unknown. Pharmacy, or the art of preparing medicines for use, was not less imperfect, embracing only a few simple and uncertain processes directed to the preparation of external remedies, or of those compounds the chief recommendation of which was in the vast number of their ingredients.

But crude and imperfect as was the knowledge of Materia Medica possessed by the ancients, it was certainly preferable to that savage ignorance of this, as of all other sciences, which spread over Europe after the subversion of the Western Empire. For many ages, almost the whole continent remained submerged in a deluge of barbarism, with only here and there floating fragments of civilization, or isolated ruins rising out of the darkness to show what had before existed. The Arabians, who conquered the Asiatic and African provinces of the Eastern Empire, and established upon its ruins the throne of the caliphs, as they were originally less barbarous than the hordes of Germany and Scandinavia, were better prepared to adopt the learning, science, and arts of the conquered people. The writings of the Greeks were zealously studied, and their facts and opinions appropriated with an avidity little short of that which had led to the usurpation of their dominions. Bagdad became the seat as well of science as of Empire in the East. Medicine was cultivated with peculiar care; and the fame of not a few Arabian writers still endures, who treated with various merit upon the subjects of Materia Medica and Pharmacy. But with the merits of Grecian medicine, its errors, follies, and absurdities were also adopted; and to the present time, in some Mahomedan countries of the

East, the doctrines of Galen are admitted as implicitly as in the days of their greatest glory. The credit of the Arabians is not confined to the mere preservation of the knowledge of the ancients. They made considerable additions to the remedies before known, introduced various new processes, prepared the way for the effectual application of chemistry to the Pharmaceutical art, and laid the foundation of that distinction between the professions of Medicine and Pharmacy which has subsequently tended so much to the advantage of both.

With the lust of conquest, the Arabians carried with them the spirit of improvement also into the West of Europe; and their dominions in Spain became as distinguished for the cultivation of all the sciences of the age as their earlier empire in the East. This enlightened spirit spread even beyond their boundaries into the dark barbarism of the North, which their arms were unable to penetrate. Medicine was among the sciences which now returned to Europe from their long exile. Schools were established, a collection of works upon medicines was published, and practical Pharmacy began to take root in the more civilized portions of the continent.

It may be readily conceived, however, that both Materia Medica and Pharmacy were in a most imperfect state. Life had been breathed into them, and the embryo began to evince the organizing movements which were going on within it; but the soil in which it had been planted was yet too sterile to afford the food requisite for its rapid or perfect development. It was under these circumstances, that the conquest of Constantinople by the Turks, about the middle of the fifteenth century, opened the sources of a fertilizing flood, which gradually spread over Europe, and brought the languishing germs into energetic and productive action. The exiled Greeks carried into Italy the stores of ancient learning which had for centuries been locked up in the Eastern capital, and by teaching their language afforded a key which rendered these stores accessible. The spirit which had been awakened by the Arabians, thus found abundant materials for the employment

of its plastic energies. The recent discovery of the art of printing, came happily in aid of the impulse imparted to the human intellect. Gifted with wings which never wearied, knowledge, in a thousand forms, flew hither and thither over Europe, bearing into distant regions the riches of favoured spots without exhausting these, gathering every where in order every where to diffuse, and directing the energies of a whole continent into one united effort for improvement. Immense effects could not but result from such a movement. An impulse was given to the human mind, which has been propagated with almost constantly increasing vigour to the present times, producing in every age fruits which have astonished while they benefited the world, and promising to go on shedding its blessings throughout the indefinite future.

But with the knowledge of the ancients were revived all their follies and extravagancies. The intellect had remained too long inactive to be able to distinguish truth from the mass of error with which it was mingled, and the aroused appetite was too keen to reject even the husks and offal which were presented to it along with more wholesome nutriment. But the Materia Medica of the fifteenth century excelled that of the Greeks and Romans in the accessions which it had received from the Arabians, and in those which began to accrue from chemical research. The labours of the Alchemists added greatly to its resources. At first sight, it may appear incomprehensible that sagacious men should ever have engaged in that wild search after miraculous energies in the products of nature. But the human mind had been subjected to no discipline. Awakened from a long sleep, it beheld an infinity of objects moving before it, and dazzled by the unwonted splendour, could not at once trace that secret cord which bound the apparent confusion in a beautiful system of order. No wonder that some of the wild dreams which had been flitting past it for centuries, should, in the first moments of aroused consciousness, still cling to its recollections with the force of realities. The two strongest emotions of the human breast—the love of life and the lust of power—co-ope-

rated with the weakness of an unexercised intellect to blind the judgment to the truth. The hope of living for a thousand years, and of possessing wealth and consequently power beyond the reach of human conception, was too dear to the heart to yield to the feeble contradiction of a weak and bewildered reason. The elixir of life and the philosopher's stone, which were to be the instruments of gratification to these lofty wishes, did not seem to be impossibilities in a world, where nothing was known to be impossible which did not involve a contradiction. The zeal therefore, which sought these creatures of the imagination through every region of nature, is not in fact, surprising. It was amply repaid both in its failure and its successes; for the objects longed for, would, if attained, have proved a curse to mankind, while the numerous discoveries made in the progress of the search have proved a blessing. In digging for gold, the Alchemists, though they failed to find the metal, prepared the soil for the production of a more useful harvest. The resources of the medical art were greatly extended by their labours; and some of the most efficient instruments now employed in the treatment of diseases, had their origin at this period. The introduction of the antimonials and mercurials into the Materia Medica was an event which alone would illustrate an age.

The maritime discoveries of that eventful era contributed also greatly to enrich this department of medicine. Several new and highly important remedies were introduced into Europe from the new continent, and those derived from India, particularly the spices, became more abundant in consequence of their cheaper carriage by the southern passage.

Up to the close of the seventeenth century, we may consider that the process of accumulation, in relation to medicines, was steadily going on; and that, though some enlightened spirits had escaped from the bondage of authority and superstition, the great majority still adhered to the absurdities of past ages; and the Materia Medica, with its new accessions, retained most of its former vices and superfluities. At length, however, that intellectual craving which had followed

the inanition of a thousand years appeared to be appeased. The squeamishness of satiety succeeded; and asserted facts as well as doctrines began to undergo a closer scrutiny before they could be admitted. The process of digestion had commenced; and the judgment was too much occupied with the selection and appropriation of the solid and nutritious matter, to receive with complacence the same kind of heterogeneous mixture which had hitherto satisfied the taste. The philosophy of Bacon, which rejected all theory not based upon and supported by facts, and admitted nothing as fact except upon positive evidence, began to be received as the only legitimate guide in the search after truth. Under the influence of these principles, antiquity ceased to be venerable; and imagination was banished from science into poetry. An immense mass of rubbish, the accumulation of all preceding ages, was washed away in the operation of experimental inquiry; and the particles of pure gold which had weight enough to withstand the current, remained to reward the labors of the search. Magic, and astral influence, and all the host of imaginary powers which dwell in the strange, the disgusting, and the horrible, fled with ghosts and fairies before the new day which broke upon the human intellect. The removal of the weeds and rubbish which had choaked the sprouting sciences, now left a clear field for their growth. Botany sprang rapidly from its embryo state into a flourishing existence; and, in the accessions which it afforded to the Materia Medica, and the greater precision which it introduced into this branch of medicine, bore fruit sufficient to prove that it was not a mere ornament in the garden of knowledge. But it was from the wonderful improvements in Chemistry during the last century, particularly towards its close, that Materia Medica and Pharmacy experienced the greatest benefit. Not only were new and valuable medicinal compounds produced, but those already in use were rendered purer, and therefore more uniform in their action; the processes for the preparation of medicines were simplified, and brought under the direction of precise rules; certain principles

were established by which the pharmaceutist might conduct safely the numerous operations which could not be made the subjects of officinal formulæ; and a spirit was, to a certain extent, subjected to his commands, which, pervading all nature, and ruling every secret movement of unorganized bodies, became a powerful instrument in his hands for the purposes of improvement or discovery. Since the commencement of the present century, the advantages from this source have been constantly on the increase; and the discovery of the vegetable alkalies, and other active principles of medicinal plants, and of the modes of extracting them, will probably be considered hereafter as the foundation of a new era in our science.

I have thus presented you with a rapid and imperfect sketch of the origin and growth of that branch of medicine which it has become my duty to teach. It would afford me much pleasure to do justice to the numerous individuals, who by their writings or discoveries have contributed to its present flourishing state, especially those of our own country, and of this particular school, who have illustrated the subject of the American Materia Medica. But from this gratification I am precluded by the narrow limits assigned to a discourse like the present, and must content myself with referring you to my future lectures, in which the opportunity will be offered of giving to each individual due credit, in connexion with the particular improvement or discovery which may constitute his claim to distinction. At present it is more important that I should endeavour to impress you with a conviction of the great value of the Materia Medica, and thereby afford you the strongest inducement for entering zealously upon its pursuit. This is the more necessary, as the science of late has been somewhat undervalued. The current of medical partiality appears to have set strongly into the channel of Pathology. The successful cultivation of this science in France, the distinction attained by some of those who have prosecuted it most diligently, and the warm and contagious zeal which characterizes their writings, have kindled the emulation of some

of our ardent countrymen, whose enthusiastic convictions and impassioned eloquence have worked their usual effects among the young devotees of medicine. Attention has thus been diverted, in some measure, from the Materia Medica, and the effect has been greater, as the tendency of the doctrines inculcated is to produce an impression, that comparatively few remedial agents are necessary in the treatment of disease.

No error is greater than that which would limit the Materia Medica within a very narrow compass. It is true that the *general* indications for the use of medicines are not numerous, and may therefore be answered by a few remedies. But there are countless varieties in the circumstances of disease, dependent on the degree, peculiar nature, and complications of the morbid action, and on the habits, tastes, and dispositions of the patient, which modify the main indication, and consequently require some modification in the character of the remedy proposed. To meet these diversified calls of disease, nature has provided an equal diversity of means; and he who neglects to avail himself of the advantages thus afforded him, is guilty of injustice alike to his patient and himself. Let us suppose, for example, that, in a number of cases presenting different aspects, there may exist a coincident indication for the use of a cathartic. It is not allowable for the physician to meet this indication, in every instance, by the use of the same medicine. On the contrary, it is his duty to observe the peculiarities of each case, and endeavour to select the particular cathartic applicable to these peculiarities. Thus, if the symptoms requiring the use of purgative medicine be complicated with acidity of stomach, he will employ magnesia; if with hepatic derangement, calomel; if with general debility, rhubarb; if with febrile excitement, one of the neutral salts; and so on through a long catalogue of cathartics. The same remark is applicable to other classes of the Materia Medica; and it will be at once perceived, that, upon these grounds, the number of medicines at the command of the physician can

scarcely be too great, provided they possess the requisites of activity and diversity of power.

But in order that the practitioner may be able to select the remedy applicable to any particular case, it is obvious that he must be acquainted not only with the general character, but also with the minute peculiarities of the whole circle of medicines. It is not sufficient for him to possess an accurate knowledge of the seat of the *disease*, just views of its nature, and a clear insight into the indications for its treatment. All these will avail him little, unless he is at the same time enabled, from his familiarity with the properties of medicine, to select that which is calculated to answer the indications presented. He who neglects the study of Materia Medica, under the impression that it is inferior in importance to those branches of medicine which have a more immediate reference to affections of the system, may become a profound physiologist or pathologist, but will be an inferior practitioner; and it has been observed of those who have devoted themselves with a partial zeal to the study of disease, that they are not always the most successful in its treatment.

But a knowledge of the remediate powers of medicines is not all that it necessary. The physician should also be acquainted with their characteristic sensible properties, in order that he may recognise them when placed before him; with the signs of their purity and efficiency, that he may avoid imposition in their purchase; with their various chemical characters and relations, that he may escape the disappointment which must result from the joint use of incompatible substances; finally, with the modes of most advantageously combining and preparing them, that he may avail himself of every modification in nature and form, which the palate or stomach of the patient, or the peculiarity of his disease may demand. They who give due weight to these considerations will, I am convinced, join me in the sentiment, that the study of Materia Medica cannot be deemed of little importance, or postponed, with impunity, to that of any other branch of medical science.

I am fully aware, that when speaking of a favourite pursuit, especially when attempting to recommend it to the attention and affections of others, it is difficult for the lecturer to avoid what may seem to the audience a tone of exaggeration. Perhaps I may be guilty of this fault in stating my impression, that, in addition to the claims which may be urged for the Materia Medica, on the score of importance, to a high station among the medical sciences, it possesses, when properly taught, a degree of interest to an inquiring mind, which might compensate for some deficiency in real value. It must be admitted that the study of medicine is considered by many as dry and forbidding; and is therefore entered on with reluctance, and, after the attainment of a superficial knowledge, abandoned with pleasure. Perhaps, however, this is as much the fault of the mode of instruction as of the subject itself. Materia Medica is, to a certain extent, a demonstrative science. The student who merely reads or hears a description of certain medicines, without having them before him, can form no definite or satisfactory notion of their sensible properties, and finds great difficulty in properly discriminating them in his own mind. Upon hearing the name of some one of them mentioned, he may remember that it is cathartic, or diuretic, or diaphoretic, that it produces particular effects upon the system, and is administered in certain states of disease; but he has rather the description before him than the object itself, of which he has no picture in his memory. His recollections are uncertain and indistinct, as they are not aided by any impressions on his senses, nor any vivid associations. But if, as in other demonstrative sciences, the object be presented to him, so that he may test by the evidence of the sight, and taste, and touch, the accuracy with which it is described, and make himself familiar with all its obvious characters, he will soon feel himself on the footing of an acquaintance, and will experience a curiosity to know it more intimately, to learn its history and external relations, precisely as we all take a much greater interest in the affairs of an individual whom we have

personally met with, than of one who is known to us only by reputation. The Materia Medica, therefore, should always be studied and taught with the individual medicines before the student; and this not only in their entire state and ordinary form, but in all the varieties in which they are found in the market, and in all the states of preparation to which they are officinally brought.

Other sources of interest exist from which the teacher may draw liberally without dimininishing the value of his instruction. A continuous detail of facts, which, from the necessity for their remembrance, demand close attention, often becomes excessively fatiguing by keeping the mind constantly on the stretch. In the Materia Medica, frequent opportunities are offered of intermingling with the description of the medicine narratives of its original discovery and therapeutical application, and various circumstances with regard to the plant producing it, the mode of its collection, and its commercial history, which, as they are not essentially important, allow of some relaxation of the attention, and thus refresh and invigorate the mind for new efforts. Nor can the impression which such narratives may leave on the memory of the student be considered as altogether unprofitable. They do not enable him to cure disease with greater facility; but they augment his fund of pleasing reflection by connecting with the substances which come under his daily notice a numerous train of associations, afford him the means of appearing to greater advantage in social intercourse by increasing his conversational resources, and give that kind of pleasing relief, in the eyes of the world, to the solidity of his professional knowledge, which the column in Grecian architecture receives from the ornaments about its capital.

It is a great mistake to suppose, that no other knowledge is requisite for the accomplished physician than that which is essential to the mere physical management of disease. In any pursuit or business whatever, an exclusive devotion to one train of thought, has the effect of narrowing and cramp-

ing the character, of incapacitating for liberal and impartial views of the relative importance and mutual benefit of the various occupations of social life, and of producing not unfrequently a ludicrous pedantry or offensive contemptuousness of manner, that tend very considerably to restrict the limits, within which any peculiar skill derived from such exclusiveness of devotion can have the opportunity of displaying itself. To our profession the warning suggested by this remark is especially applicable. We may be said to live upon opinion. In most other occupations confidence in superior skill will go far towards counteracting the influence of repulsive traits of character and manner; but the physician comes so often into contact with those who employ him, enters so intimately into all their privacies of feeling, opinion, and social connexion, is so blended in the mind of the patient and his friends with their hopes and fears, joys and regrets, that the conviction of his supremacy in skill must be absolute, and the supposed necessity for his interference extreme, before persons to whom his character and manners are repulsive, can be induced to place themselves in his hands. It behoves us, therefore, to cultivate all those kinds of knowledge which can enlarge, liberalize, and adorn our minds; giving, however, a due preference to such as is more especially requisite to qualify us for the practice of our art, and taking care that the tracery which we throw around the structure of our professional knowledge be not so abundant, nor so improperly arranged, as to conceal the main edifice from the public eye.

Harmony in intellectual attainment is always desirable. An individual who seeks the public patronage in a certain line of occupation, should endeavour, in the acquisition of knowledge not strictly connected with his duties, so to shape his studies as to maintain some relation between them and his chief pursuit; so that his literary or scientific culture may not appear too glaringly contrasted with his profession.

Applying these remarks to the Materia Medica, we shall be prepared to admit, that the species of knowledge before

alluded to as appropriately occupying a portion of the lecturer's attention, is not only admissible as a relief from the more essential and laborious parts of the study, but is positively useful to the learner by the influence which it contributes, with other analogous information, to exert upon the character of his mind, his social standing, and even his professional reputation.

ART LX.—ON AN ADULTERATION OF SULPHATE OF QUININE, By John Farr. AND A REPORT OF THE COMMITTEE OF INSPECTION.

A short time since, a quantity of French sulphate of quinine, was sent to our laboratory to be recrystallized, and purified from fragments of broken glass, sealing wax, &c., with which it had become mixed by the breaking of the vials, in which it was packed.

On attempting to dissolve it in water, a considerable portion of white powder separated, and remained insoluble; the precise quantity could not be ascertained by reason of the glass, &c., with which it was mixed. With a view to ascertain this, a fresh portion of the sulphate was obtained from the same source, which was subjected to the following experiments:

The article was put up in one ounce vials, and bore the seal label of Delondre, Nogent, near Paris. On the label certain tests were given for detecting adulterations. The first of these, viz: its solubility in boiling alcohol was employed; 50 grains were boiled in a florence flask, in one ounce of alcohol of ordinary strength, and suffered to stand a few moments to allow the precipitate to subside, the solution of quinine was then poured carefully off, and the insoluble precipitate washed with boiling alcohol on a filter, until it ceased to be bitter; the precipitate remaining on the filter, when dry, weighed 6 grains.

Fifty grains more well boiled in four ounces of water, and the clear solution poured off, the precipitate was again boiled in a fresh portion of water, washed on a filter and dried; the precipitate weighed 6½ grains.

In water acidulated with sulphuric acid, nearly the whole dissolved on boiling it a few minutes.

With a view to ascertain the precise quantity of pure quinine contained in the article, 50 grains were dissolved in boiling water; when nearly cold, water of caustic ammonia was added until all the quinine was precipitated, which being collected on a filter, washed with a small quantity of water, and carefully dried with a gentle heat gave 33½ grains, indicating 84 per cent. sulphate of quinine, or 16 of impurities. Taking M. Robiquet's analyses of sulphate of quinine as correct, which the decomposition of 3 or 4 different portions justify me in doing, the two articles will stand as follows:—

Pure Sulphate Quinine.		Delondre's.	
Quinine,	79	Quinine,	67
Acid,	11	Acid,	9.3
Water,	10	Water,	8.5
		Impurities,	15.2
	100		100

It is gratifying to me to learn, that my friend Mr. Durand, to whom a portion of this article was sent, confirms the results of most of my experiments.

While manufacturers or venders, can be tempted by the hope of gain to vend impure or adulterated articles, the only remedy for the evil must be found with the retail apothecary, through whose hands the articles finally pass: let him acquaint himself with, and apply, the test, and the evil cannot long exist. To enable every apothecary to test the purity of sulphate of quinine, I would suggest the following simple experiments: First, try its solubility in boiling alcohol, 50 grains if pure will dissolve perfectly in one ounce of boiling alcohol. Should it be found to dissolve perfectly, and not speedily deposite crystals, the result is satisfactory. Then let 50 grains more

be boiled in four ounces of pure or rain water, if this also forms a clear solution in its boiling state, add 5 or 6 drops sulphuric acid to convert it into a super-sulphate, which is much more soluble; let it stand in the flask till nearly cold, then add caustic water of ammonia gradually, until it ceases to give a precipitate. Collect the precipitate on a filter, and wash it with a small portion of water, and carefully dry it at a low temperature, not exceeding 100,° lest it run into a mass. Weigh the precipitate, which is pure quinine, and if the sulphate was pure should amount to 39½ grains, any deficiency, if the experiment has been carefully conducted indicates the amount of impurities. Neither of these experiments are sufficient alone to establish the purity of the article, yet the successful result of the two will be sufficient to establish it; and one or both, will detect any article (so far as my knowledge extends) that would be likely to be found mixed with it. In all these experiments, the sulphate of quinine is spoken of in its dry crystalline state; if the article has become effloresced by exposure to the air or heat, 10 per cent. must be deducted for the water which it has lost.

It is better to dry and balance the paper before it is used to filter with, and then should the quinine become fused by heat, the result can be equally attained, deducting for the weight of the paper.

To the Board of Trustees of the Philadelphia College of Pharmacy.

Since our recent appointment by the Board, there has been submitted to us for examination, a sample of sulphate of quinine, containing a considerable quantity of impurity. This article was put up in one ounce vials, and bore the label and seal of Delondre, Nogent, near Paris. A large quantity of it in broken vials was sent to Farr & Kunzi, operative chemists of this city, for the purpose of having it recrystallized—and the impurity was thus discovered by them.

The following are the results of our examination:

The appearance and taste of the article were fair; it was imperfectly soluble in boiling water and alcohol. Tests for fecula, sugar and stearine, negative, as well as for the presence of cinchonia. One hundred grains were treated with boiling alcohol, thrown on a filter and repeatedly washed with warm alcohol. The residue which was left on the filter, insoluble in alcohol, was carefully dried and found to consist of a dull white powder, without bitterness, and weighing about 12 grains. The alcoholic solution evaporated to dryness over a water bath, afforded 85 grains of a crystalline matter—having all the characteristics of pure sulphate of quinine; a part of this last subjected to Phillips' test, with salt of barytes (nitrate or muriate) indicated the presence of the requisite proportion of sulphuric acid. Fifty grains more of the same sample were treated with boiling water, and the filter carefully washed as above. The dry residue weighed 6 grains. The residue of both solutions afforded the same indications as to taste and colour. Both dissolved readily in dilute nitric and muriatic acids, but sparingly in sulphuric. The solutions were all precipitated by carbonate of potass, by ammonia and its oxalate. The liquor precipitated by this last reagent, having been immediately filtered, showed a second precipitate by the addition of solution of phosphate of soda; thus indicating the presence of both lime and magnesia. Five grains of the impurity subjected to a red heat for about ten minutes, were reduced by incineration to three grains of a grayish powder, containing visible particles of charcoal.

From these results we should conclude that this sulphate of quinine contains from 12 to 15 per cent. of impurities, consisting principally of insoluble vegetable matter, lime and magnesia.

The committee are unwilling to pronounce this article as intentionally adulterated by the admixture of foreign matter, for the purpose of defrauding the public. It has probably been the result of careless manipulation; the impurities may have remained in the liquor with the sulphate of quinine from

imperfect filtration, been evaporated with it and thrown into the market, without due attention on the part of the head manufacturer.

We are aware of the objections that suggest themselves to this view, from the distinct acicular crystals which the sulphate of quinine will form—generally indicating, if any, the presence of foreign matter. But in addition to the close examination which we have given the subject, the circumstance of its bearing the seal and label of a respectable house induces us to suppose it may be either the result of great carelessness or wilful imposition, first practised upon M. Delondre himself by the operative chemist whom he employed for this product.

A similar kind of imposition occurred with a very respectable house in this city, by their placing entire dependence for the purity of a vegetable alkali, upon their foreman, by whom they were deceived. We hope these circumstances will prove how cautious the manufacturers should be in the choice of those to whom they confide their operations, and how careful in testing all the products prepared by other hands in their employ; otherwise they will find the reputation of their establishments will suffer considerably by this want of proper attention; for it is the determination of our apothecaries to expose all impure articles that may be found in the market.

CHARLES ELLIS,
E. DURAND,
JOHN C. ALLEN,
} Committee of Inspection.

Philadelphia, 12 Mo. 22, 1835.

Selected Articles.

ART. LXI.—ON THE PREPARATION OF THE IODURET AND HYDRIODATE OF IRON. By A. T. Thomson, M. D.

Precautions necessary in the preparation of the Ioduret and the Hydriodate.—One part of the iron wire should be rubbed in a porcelain or a Wedgwood's mortar, with about three or four parts of iodine, gradually adding distilled water, until fifteen parts of the fluid shall have been used: the whole is then to be introduced into a Florence flask, with an additional portion of iron wire, and of distilled water. This excess of iron is a matter of indifference in the preparation of the hydriodate; and, in that of the ioduret, it is necessary for preserving the combination from decomposition, during the evaporation of the solution. These materials are next to be boiled together, until the fluid acquire a pale greenish color, when it should be filtered. This solution contains a hydriodate of the protoxide of iron; and, if the exact quantity of the iodine be previously ascertained, so as to enable us to procure the solution of a definite strength, it may be kept in this state for medicinal use. In general, however, the solution is evaporated to dryness; and for this purpose it may be poured into a clean flask, containing a piece of iron wire sufficiently long to reach from the bottom to the surface of the fluid, and the boiling should be continued until the bulk of the solution be reduced to one-third. It must then be filtered: after which the evaporation should be continued to dryness. It is necessary to break the flask as soon as the mass is cold, in order to obtain the solid ioduret, which should be immediately transferred to a dry bottle, fitted with an accurately ground stopper. The bottle should not hold more than two ounces of the pre-

paration; for, when it is large and not full, the ioduret deliquesces nearly as rapidly as when it is exposed to the free action of the atmosphere. When the flask is broken and the ioduret bottled before the mass is cold, deliquescence also takes place; a peroxide of the metal is formed, and iodine is evolved.

Precautions necessary for preserving both Preparations.—The ioduret requires to be well secured from the influence of the atmosphere; both on account of its deliquescent property, the rapid oxidizement which the iron undergoes when deliquescence occurs, and the consequent decomposition which takes place. It is important to prevent this state of things, as the peroxide of iron is inert as a medicinal agent; whilst the free iodine, extricated during its formation, alters altogether the virtues of the medicine. This partial decomposition of the ioduret is rendered immediately apparent, on dissolving it in twenty times its weight of distilled water and filtering; instead of a permanent, clear, very pale greenish yellow, we obtain an ochre-colored or brown solution, which soon becomes turbid, and gradually deposits an ochre-coloured completely insoluble precipitate. Much of the ioduret usually prepared both by many chemists and druggists, and also general practitioners, is of this description; and to this we may refer some of the disappointment and discrepancy of opinion of different practitioners respecting the operation of the medicine in similar cases. Even when the ioduret has been carefully prepared, and is good of its kind, it often contains a little free iodine; but it is chiefly owing to the carelessness of assistants and apprentices, in compounding prescriptions, by frequently exposing the ioduret to the air, that its properties, and consequently its medicinal powers, are impaired; hence, it is preferable to keep it in solution, or in the state of the hydriodate.

If the solution be prepared with a definite quantity of iodine, as already described, it will keep without changing its characters; but, as it is usually made by dissolving the ioduret in distilled water, it requires to be rendered neutral by the following means. Introduce into a flask, the solution of any

given strength, and place in it two or three doubles of clean soft iron wire, sufficiently long to extend to the surface of the fluid; boil it for a few minutes, and then leave it at rest until the solution becomes clear, after which it may be either decanted off from the precipitate which forms, or filtered: no farther change takes place in a solution thus treated if it be kept in a blackened or a green bottle, however long it may be preserved. In this process, the wire affords iron to saturate any free iodine present in the solution, or that may have been extricated by the formation of the peroxide of iron in the ioduret; and a perfectly neutral solution being thus obtained, by the immediate conversion of the new formed ioduret into the hydriodate of the protoxide, no subsequent change takes place so long as the solution is kept secluded from the light. It is not easy to explain this influence of light in decomposing the solution of the hydriodate of iron; but several others of the metallic hydriodates are affected in the same manner by light. The best proportions for forming the medicinal solution are three grains of the dry solid ioduret to each fluid drachm of distilled water. If the water be not either distilled, or filtered rain water, perfectly free from foreign ingredients, particularly if it contain any earthy or saline carbonates, decomposition instantly takes place, iodine is extricated, and a carbonate of iron, which rapidly passes into the state of the peroxide of that metal, is precipitated.

Physiological Effects of Hydriodate of Iron.—"When taken in doses of from three to five grains, the hydriodate of iron makes no sensible impression on the stomach, although it sharpens the appetite and improves the digestive function; it seems to stimulate moderately the intestinal canal through its entire length, as it opens the bowels; and whilst it produces the black color of the alvine discharges characteristic of all the preparations of iron, it corrects their fœtor. When it does not affect the bowels, it augments the action of the kidneys, increasing the flow of urine; and if the solution be taken two or three times a-day, for several days successively, the presence of both the iodine and the iron can be readily

detected in the urine. The temperature of the skin is moderately elevated, and the insensible perspiration increased. On one occasion, having taken ten grains for a dose, it almost immediately caused an uneasy sensation at the epigastrium, accompanied with nausea that continued for several hours; and a slight degree of head-ache. These symptoms were relieved by a copious stool, which was perfectly black. Two hours after swallowing the medicine, a large quantity of urine was discharged; and on being tested, it displayed the presence of both the iodine and the iron.—*Am. Journ. Med. Scien.*

ART. LXII. ON THE EMPLOYMENT OF THE PROCESS OF DISPLACEMENT IN PHARMACEUTIC PREPARATIONS. By M. A. Guillermond.

A process long made use of in certain arts for the purpose of extracting the soluble principles of a substance, with the least possible quantity of a menstruum, has within a short time been happily applied in pharmacy. This process is founded on the fact, that a fluid impregnated with the soluble portions of a powder with which it is in contact, can be driven off by the addition of another fluid, or an additional quantity of the same fluid. Lixiviation, claying of sugars, &c. are well known applications of this fact, which was first announced by Vauquelin, who by alternately passing fresh and salt water through sand, verified that one fluid could be displaced by another.

At a more recent period, M. M. Robiquet and Boutron introduced this process into organic chemistry, and remarked that on adding ether to powder of bitter almonds to obtain the fixed oil, the ether acted like a piston, and drove off the oil without mixing with it. But we are indebted to M. M. Boullay for a more extended application of this method, and

for their having caused greater attention to be paid to it by pharmaceutists.

M. Guillermond says, that all his experiments on the subject were performed under the supervision of M. Soubeiran. He divides them into two classes; 1, treatments with water; 2, with alcohol.

In each of these series I followed, says he, three different modes of operating. 1. Maceration, or the method of M. Cadet, that is, moistening the powder with double its weight of water, subjecting it to the press after a maceration of 12 hours, and replacing the expressed fluid by a fresh quantity, equal to the original weight of the powder:

2d. Continued displacement:

3d. Maceration and displacement, that is, subjecting the powder to displacement after a previous maceration.

The two first operations were conducted simultaneously, and the results compared, that any differences that existed, might be at once perceived.

The third was performed alone, except with a few substances, in which case the results were compared with those of the two first.

After having finished the experiments with alcohol, I was naturally led to examine if the displacement had taken place in as regular a manner as had been announced by M. M. Boullay.

It need scarcely be observed that in all these experiments, the greatest care was taken to prevent contravening accidents or mistakes. In all cases I used distilled water; each substance was coarsely powdered, passed through a seive, and the fine powder which resulted, divided into equal portions according to the number of experiments to be performed. I employed glass funnels, in which the powder was retained at a certain height, by means of a little straw and a layer of cotton; the surface was covered with filtering paper, pierced with holes. Finally, the continued displacement was performed as exactly as possible, and in all cases, I divided the liquors as I collected them, and evaporated them on a stove.

FIRST SERIES. *Treatment with water.*

RATANHY.—

Maceration.

Powder, 185 grammes.
Water, 370 "
After having been pressed, the powder retained 100 grammes of water, and afforded 270 of result.

1. treat.	270	gave	13 gr. ext'ct.
2 "	270		8
3 "	270		4
	810		25

Displacement.

1. treat.	100	gave	8 of extract.
2 "	100		8
3 "	100		5
4 "	100		2
5 "	100		2
6 "	100		3
7 "	100		2
8 "	100		1
9 "	400		4
	1200		35

The method by displacement was most advantageous as regarded the product, since it gave 35 of extract against 25. It was equally advantageous with respect to the quantity of water employed. By maceration it required 270 grammes to obtain 15 of extract, whereas by displacement 16 were obtained with 200 grammes. Moreover, to obtain 15 grammes of extract, I employed 810 grammes of water in the process by maceration, whilst I had an equal result with 500 grammes of water by displacement. It was likewise observable that the liquors obtained by maceration were of a dull red, whilst on the contrary those by displacement were of a brilliant tint.

This operation, repeated on a fresh quantity of the same root, gave an analogous result.

LIQUORICE ROOT.—

Maceration.

Powder, 330 grm.
Water, 660
The powder retained 140 of water.

1. treat.	520 grm.	gave	38 extract.
2	520	"	18
3	520	"	3
	1560		59

Displacement.

1.	100	11 extract.
2	"	13
3	"	13
4	"	14
5	"	14
6	"	9
7	"	9
8	"	5
9	"	3
10	"	3
11	"	3
12	"	1
	1200	98

The displacement most advantageous: with 500 grammes of water I obtained 61 of extract; by maceration 520 grammes gave only 38 grammes of extract; 1200 of water by displacement gave 98 of extract, whereas 1560 by maceration afforded only 59. The water at first filtered through the liquorice powder very rapidly; when this became somewhat swelled, the operation went on very advantageously. It only required four hours to exhaust the powder in the most complete manner, whilst it took two days to exhaust it by maceration.

Senna.—After having pulverized the senna, and subjected it to the action of a seive, it was treated by displacement. At first the powder permitted the fluid to run through very rapidly, and the first result was very little charged with soluble principles; the senna, however, soon swelled greatly and developed a viscous matter; so that after affording 200 grammes of a highly charged fluid, the operation completely ceased.

I took another portion of senna, and contented myself with coarsely powdering it. On pouring water over it, it ran through with great rapidity during the whole operation; the viscous matter had not time to become developed, and the substance was exhausted in less than two hours, but it required a great quantity of water.

Maceration.		*Displacement.*		
Powder, 170 grammes.		1.	100	gave 3 extract.
Water, 340 "		2	100	3
The powder retained 2-3 of the water.		3	400	13
		4	400	11
1. 112	gave 8 extract.	5	200	3
2 188	13			
3 225	7		1200	33
525	28			

The displacement is in this case superior only in the quantity of the product.

Gentian.—The process by displacement was not advantageous with this root. The fluid passed through, but so

slowly, that in four days I obtained only 20 grammes of extract from 700 of fluid. In the last treatments the fluid flowed through with greater rapidity, from a cause observed by M. Robiquet; the mass having contracted, several fissures were formed, through which the liquid passed with such rapidity as to become but little charged, so that 108 grammes of water gave only 2 of extract.

With 300 grammes of powder, macerated in 1425 of water, I obtained 82 grammes of extract.

Let us now see the result of the third mode of operating by macerating the powder before submitting it to the process of displacement.

Liquorice.—Powder, 330 grammes, macerated for twenty-four hours in a kilogramme of water, then placed in a funnel; this permitted 400 grammes to escape, and the subsequent results were:

1.	treat.	400	grams. gave	21 extract.
2.	"	100		9
3.	"	100		9
4.	"	100		8
5.	"	100		8
6.	"	100		7
7.	"	100		6
8.	"	100		4
9.	"	100		3
10.	"	100		2
11.	"	100		2
		1400		79

The quantity of extract is less considerable than by continued displacement, but it is greater than by maceration alone, as I obtained 97 by displacement, 79 by maceration and displacement, and 59 by maceration. It is to be noted that the quantities of water employed in the formation of these extracts, were about in the same proportion, 1200 by displacement, 1400 by displacement and maceration, and 2120 by maceration.

I also treated sarsaparilla; but as I obtained results which differed greatly, I shall speak of them separately.

Sarsaparilla. No. 1.—

Maceration.		*Displacement.*		
Powder, 120 grammes.		1. treat.	100	gave 4 extract.
Water, 240 "		2. "	100	4
The powder retained 60 water.		3. "	100	3
		4. "	100	3
1. treat. 180	gave 14 extract.	5. "	100	2
2. " 180	4	6. "	100	1
3. " 180	2		600	17
540	20			

Maceration and Displacement.

The powder absorbed 600 grammes of water, of which it permitted 233 to escape.

1. treat.	233	gave 10 extract.
2. "	100	4
3. "	100	2
4. "	100	2
5. "	100	1
	633	19

By displacement.	*Maceration and displacement.*	*Maceration.*
Extract, 17.	Extract, 19	Extract, 20
Water, 600.	Water, 633	Water, 540

Sarsaparilla. No. 2.—

In this experiment, I made use of the apparatus of M. M. Boullay; as the liquid ran through with great rapidity, I was obliged to employ a large quantity of it.

Maceration.		*Displacement.*		
Powder, 300 grammes.		1. treat.	250	gave 6 extract.
Water, 600 "		2. "	300	6
The powder retained 200 water.		3. "	300	6
1. treat. 400	gave 35 extract.	4. "	300	9
2. " 400	16	5. "	300	6
3. " 400	7	6. "	300	6
		7. "	300	6
		8. "	900	9
1200	58			54

Maceration and Displacement.

1.	treat.	430	gave 17 extract.
2.	"	400	15
3.	"	300	10
4.	"	300	8
5.	"	100	2
		1530	52

By displacement.	*Maceration and displacement.*	*Maceration.*
Extract, 54.	Extract, 52.	Extract, 58
Water, 2950.	Water, 1530.	Water, 1200

Sarsaparilla. No. 3.—

Maceration.	*Maceration and Displacement.*	*Displacement.*
Extract, 29	Extract, 31	Extract, 33
Water, 900	Water, 1022	Water, 1601

The liquors obtained by maceration were filtered, which might have occasioned some loss.

SECOND SERIES. TREATMENT WITH ALCOHOL.

Digitalis.—

Maceration.

Powder, 250 grammes.
Alcohol, 500
Powder retained 100 grammes of alcohol.

1.	treat.	400	gave 48 extract.
2.		400	20
3.		400	10
		1200	78

Displacement.

1.	treat.	200	gave 30 extract.
2.	"	200	20
3.	"	200	12
4.	"	200	4
5.	"	200	4
6.	"	200	4
7.	"	200	3
		1400	77

Maceration and Displacement.

1.	treat.	350	gave 28 extract.
2.		350	24
3.		300	12
4.		300	12
5.		300	4
		1600	80

Maceration.	*Maacertion and Displacement.*	*Displacement.*
Extract, 78	Extract, 80	Extract, 77
Alcohol, 1200	Alcohol, 1700	Alcohol, 1400

Liquorice Root.—

Maceration.

Powder, 140 grammes.
Alcohol, 280
Powder retained 50 grammes.

1. treat.	240	gave 25 extract.
2.	240	10
3.	240	2
	720	37

Displacement.

1. treat.	200	gave 24 extract.
2.	200	8
3.	200	5
	600	37

Maceration and Displacement.

1. treat.	180	gave 13 extract.
2. "	300	22.5
3. "	200	3
	680	38.5

Maceration.	*Maceration and Displacement.*	*Displacement.*
Extract, 37	Extract, 38.5	Extract, 37
Alcohol, 720	Alcohol, 680	Alcohol, 600

Ratanhy.—

Maceration and Displacement.		*Displacement.*	
Powder,	130 grammes.	Powder,	130 grammes.
Extract obtained,	58	Extract,	59
Alcohol employed,	1150	Alcohol,	1950

Conium—

Maceration and Displacement.		*Displacement.*
Powder,	500 grammes.	500
Extract,	66	83
Alcohol,	2650	2700

In this case displacement offers a great advantage, hence in the treatment of conium, a previous maceration is attended with loss.

From the above it is evident that whenever this process can be used, the advantage will be incontestable, from the quality

of the products, the economy in the menstruum, and the simplicity of the operation. With the exception of a single substance, in all cases when I used water, I obtained a larger quantity of extract by displacement than by maceration. But this result cannot be generalized; that obtained with sarsaparilla leads to the supposition that other substances may be in the predicament. Different results were afforded when alcohol was used; hemlock alone furnished a larger proportion of extract by displacement, than after a previous maceration, whilst in all the other cases, equal quantities were obtained, showing that previous maceration is useless.

It results from these experiments:—

1. That this process is generally advantageous with substances containing but little mucilaginous matter, and not liable to swell when they imbibe water.

2. That it is also preferable in a treatment with alcohol, first, because organic substances are acted on by this menstruum better than by water; and also because by this process there is less waste of the alcohol.

3. Finally, that a previous maceration is useless, as has been shown by M. M. Boullay.

Another deduction to be made from these details, is, that the process of displacement is not indifferently applicable to all substances: with certain articles it is very tedious and with others almost impossible. It fails with those substances which swell on imbibing water, and the number of these is very considerable.

It must also be observed that the good results obtained in operating upon small quantities, may not be found when large masses are acted upon. In general, the operation depends for its success on the fineness of the powder and the manner in which this is placed in the funnel.

If it is too tightly compressed, the passage of the fluid will be very slow, and during summer fermentation may ensue. If it be too loose, the liquid will pass through too rapidly. Much depends on the fineness of the powder, as one degree is better with one substance, but will not succeed with another.

The next subject of M. Guilliermond's experiments was whether one portion of fluid would exactly displace another. On this head he says.

I took thirty grammes of soft extract of Rumex, dissolved it in two hundred and fifty grammes of water, after which I mixed it with an inert powder, and subjected it to displacement; it required six hundred grammes of water to do this, and even then the whole of the extract was not recovered.

I introduced an inert powder in an apparatus for displacement, and saturated it with alcohol. A layer of water was poured over it with the greatest care, according to M. M. Boullay, this would exactly displace the alcohol, let us see:

The powder weighed six hundred grammes, it absorbed thirteen hundred of alcohol. I displaced this water and divided the products in proof glasses each holding two hundred grammes. The alcohol I employed marked 81½ by the areometer of Gay Lussac.

The first glass contained alcohol at				81½
"	second	"	"	"	81½
"	third	"	"	"	81
"	fourth	"	"	"	80
"	fifth	"	"	"	72
"	sixth	"	"	"	53
"	seventh	"	"	"	40

I therefore obtained but 400 grammes of the original strength. I made another experiment with wine, with the following results:—

I took an inert powder and saturated it with wine, it imbibed 700 grammes. The first portions of the wine that passed through appeared to have undergone some modification, but I continued to add more till this action ceased, and the wine passed through unaltered, when this was accomplished, I poured in water to displace the wine. I at first collected a quantity of liquid equal to that absorbed by the powder, but was much lighter coloured than the wine. I next collected 300 grammes which was less coloured, and so on till complete exhaustion. This experiment demonstrated that the

two fluids became mingled. By this series of experiments M. Guilliermond concludes that the process of displacement may be advantageously employed in the preparation of extracts whenever the vehicle employed is only intended as a solvent and has nothing to do with the medical qualities of the article. But if the displaced fluid is intended to form a tincture, any attempt to operate its displacement by water will give rise to error, and therefore an analogous fluid should be employed.

Jour. de Phar.

ART. LXIII.—ON SPONGE.—By A. Baudrimont.

Sponge is a marine production, classed by zoologists, in the animal kingdom. That in common use is formed of an immense number of extremely delicate fibres, which are crossed and interlaced in a variety of directions, and thus form fibres of different shapes, which are perforated by an infinity of small holes in every part. Whilst alive they are covered with a viscous and tenacious slime. They are attached to rocks and the most part of those found in commerce are obtained in the Mediterranean. Several varieties are to be met with in the market, the principal are:

Fine Syrian Sponge.—This sponge is usually in the form of a conical shallow cup, with sometimes sharp and at others, rounded edges; it appears to be covered with a multitude of harsh, short hairs. Its external surface is convex, and is pierced with very fine holes, but its internal surface has large openings in many parts of its superficies. When first taken from the sea it is almost white, but after having been washed and prepared it becomes of a yellow fawn colour; it sometimes occurs in very large pieces and may be bleached with great ease. It comes packed in hair bags of different weights.

Fine Archipelago Sponge.—This is closely allied to the pre-

ceding, but has a coarser texture, and has a narrower base. It is received in bales covered with hair-cloth, and weighing from two hundred to two hundred and fifty pounds.

Fine, hard Grecian Sponge.—This is harder than the preceding, is less concave, and presents small, close set, regular openings on its sides. Its upper part is pierced with large holes which however do not traverse entirely. It becomes lighter coloured during the processes used in preparing it for sale. It also comes in bales packed in hair-cloth.

White Syrian Sponge.—This sponge is dense, compact, of a light colour, rather darker towards its lower part. It presents several openings covered with stiff and prickly hairs. These openings are deep and terminated towards the lower end of the sponge by coarse and open fibres. It becomes lighter coloured and less compact by preparation. It comes in bales of 150 to 200 lbs., covered with hair-cloth.

White Archipelago Sponge.—This sponge is of a compact texture and presents openings which either perforate it entirely or in part only. It contains much sand, which considerably increases its weight. After being properly prepared it becomes of a light fawn colour, rather darker than that of the preceding variety. It comes in bales of 150 to 250 lbs.

(*Geline*) *Sponge.*—This variety is cylindrical, straight, pierced with several large holes at the upper part, the principal of which pass through its substance. The edges of these openings are garnished with hairs. Its texture is fine, its colour is a dark fawn, becoming reddish near the root. It comes strung on ropes and packed in bales.

Brown Barbary or Marseilles Sponge.—This is in long, elliptical, hard, dense pieces of a coarse texture covered with a blackish viscous mud. It is of a dark and dull fawn colour, and becomes pyri-form on being washed. It is received in bales containing twenty strings, each weighing from twelve to fifteen pounds.

Salonica Sponge.—This is of a circular form, very much flattened, its tissue is tolerably close, but not very elastic; it is pierced with a multitude of small holes which do not traverse

its substance. Towards its root which is about half the size of the body of the sponge, the fibres are solid and of a dark red. It comes in strings packed in bales of different weights.

Bahama Sponge.—This is found of two different forms; first, in a rounded mass, surmounted by long mammillary projections, giving it the appearance of a cow's udder; second, that of a rounded mass, terminated by two curved surfaces which cross each other forming an angle in the middle of the sponge. The root is larger and of a dark red colour. This sponge has a smooth surface, its tissue is fine, but it wants tenacity.

Sponges contain many extraneous substances, as fragments of stone, sand, broken madrepores and shells. Their fibres are also covered with a layer of animal matter of different degrees of consistence of colour, from all of which they must be freed before they are fit for use.

To disembarras them from the sand, clay and animal coating, they are beaten and washed in large quantities of water, but to get rid of the other substance, they must be picked out by the hand if they are not soluble in weak hydrochloric acid. Where those bodies are calcareous, they can be cleaned by placing them in earthen vessels and adding very diluted hydrochloric acid, after the impurities have disappeared the sponge must be well washed and then dried.

Recently sulphurous acid has been employed instead of chlorine, for the purpose of bleaching them, this method has been very successful. It is used only for the finer kinds, and does not injure their texture as much as the chlorine.

Dict. de l' Industrie Manufacturiere, &c.

ART. LXIV—CHEMICAL AND PHYSICAL PROPERTIES OF SPONGY PLATINA. By J. W. Dobereiner.

Platina obtained by the wet process, which I term ethiops of platina, on account of its black color, is distinguished as is well known, by its property of transforming alcohol into acetic acid, in atmospheric air or in oxygen.

I for a long time considered this property as arising from a dynamic power, peculiar to platina, that is, an action produced by mere contact; but ulterior researches, on the manner in which this preparation acts with other oxydizable substances, have changed my opinion in a great degree. In fact, many of these afforded phenomena, which not only indicated, but positively demonstrated, that the ethiops of platina was able to act as an oxidizing body alone, that is, without the contact of air; that when its action is exhausted, and it is exposed to the air, it deprives this latter of its oxygen, and that, in oxidation or acetification of alcohol, it acts in a precisely analogous manner to nitrous gas in the formation of sulphuric acid.

If ethiops of platina be moistened with formic acid, a hissing and a slight detonation ensue, whilst the temperature of the mass is so greatly increased, that it soon appears dry. If to this an additional quantity of the acid be added, the same phenomena are again induced.

If the ethiops be placed in contact with formic acid in a graduated glass tube filled with mercury, at the moment they touch each other there will be an extrication of a considerable quantity of an elastic fluid, which will be found to be carbonic acid mixed with 5 to 7 per cent. of azote.

A comparative examination of this ethiops prepared in different ways, proved, that equal quantities of each, when placed in contact with formic acid, gave rise to very different proportions of carbonic acid.

10 grains platina precipitated by zinc gave 0.42 cubic inches.
10 " " " sugar 0.75
10 by the method of E. Davy.* 1.10

But, as the carbonic acid can only be the result of a greater oxygenation of the formic acid, the condition necessary to this oxygenation—the oxygen, must have been contained in the ethiops, hence this latter must be considered as an *oxyphorus.*

If the ethiops in this disoxygenated state be again moistened with the acid and placed in oxygen gas, carbonic acid is produced, but more slowly; and this production lasts, till all the formic acid is decomposed. The platina becomes charged with so much oxygen, that after drying it has its primary oxygenating properties. These facts prove that platina reduced by the humid process is an *oxyrrphoron*, that is an absorber of oxygen.

Platina disoxygenized by formic acid has no action on hydrogen gas, but in this opposite state absorbs this gas so rapidly, that it often becomes red hot. If this latter effect is not wished, and it is desired to ascertain the exact quantity of gas absorbed, the platina must be moistened with water. It will then be found, that it absorbs a volume of hydrogen, almost exactly corresponding to that of the carbonic acid, it had disengaged from the formic acid.

10 grs. platina precipitated by zinc absorb about 0.42 cubic in.
10 " " " sugar 0.75
10 prepared by process, E. Davy 1.10

It results from these facts, and from the action of platina on formic acid, that—

10 grs precipitated by zinc contain 0.210 cubic inches oxygen.
10 " " sugar 0.375
10 process of E. Davy 0.550

Or that if we assume, according to M. Liebig, the specific

* By treating the deuto-sulphate of platina with diluted alcohol,

gravity of platina, to = 16, a cubic inch will weigh 4608 grains, then—

1 cubic inch platina precipitated by zinc contains 96.768 cubic inches oxygen.

1 cubic inch platina precipitated by sugar contains 172.800 cubic inches oxygen.

1 cubic inch platina, process E. Davy 253.440

When we find the 253 cubic inches of oxygen condensed in a cubic inch of platina occupy only a space of 0,25 of a cubic inch, it is evident that this platina exercises a condensing power on it equal to a pressure of rather more than 1000 atmospheres.

The ethiops of platina obtained by treating the deutoxide of platina, or the combination of this deutoxide with soda, by diluted formic acid, reacts in so energetic a manner on alcohol, that this becomes ignited at the moment of contact; its inflaming powers are therefore superior to those of the platina of Davy; but it does not contain as much oxygen as this latter, for ten grains placed in contact with formic acid, afforded only 0.80 cubic inches of carbonic acid. The inflaming power with which the ethiops of platina is so eminently endowed, does not therefore solely depend on the proportion of oxygen it may contain, but has some connection with the particular form of the molecules of the platina; those of the first are not pulverulent and amorphous, but in a state of extremely fine laminæ.

If the ethiops treated with hydrogen be placed in contact with atmospheric air, it again absorbs oxygen, if during its action on the hydrogen it has undergone no change in the aggregation of its molecules, and the quantity thus absorbed will be nearly that as shown by the above calculation, it is capable of absorbing and condensing.

When the ethiops prepared by any of the above-mentioned processes is digested in tolerably concentrated hydrochloric acid, this soon assumes a yellow brown colour, and the molecules of platina unite in a mass which however has but little cohesion. When both are examined, the first will be found

to contain bi-chloride of platina in solution, and the second to be mixed with the chloride of the same metal. If the ethiops be moistened with formic acid before treating it with hydrochloric acid, neither of the chlorides are formed. It therefore, is evident, that it is the condensed oxygen that decomposes the hydrochloric acid, and disengages the chlorine, which the moment it is extricated, combines with the platina. The chloride becomes so mixed with the platina that this latter ceases to absorb oxygen. If it be treated with potash, the chloride is decomposed, and the absorbing and condensing properties of the metal are restored to it.

Oxalic acid dissolved in water, is also transformed into carbonic acid by the ethiops of platina, but with less rapidity than formic acid; and even oxalates and formiates dissolved in water deprive it of its oxygen, and are transformed into carbonates. This reaction is certainly very remarkable, and serves to prove that the oxygen in the ethiops is not chemically combined with it, but only condensed in a mechanical manner; for none of the oxides of platina act like oxydizing bodies on these salts. This fact, and the circumstance that platina disoxygenized by formic acid, hydrogen or alcohol, rapidly absorbs oxygen from the air, and condenses it to such a degree that it can chemically combine with certain organic substances, explain the continued oxydizing faculty of platina, in the apparatus for the formation of acetic acid, described by me, as well as the development of heat during the exercise of this faculty.

The other properties of the ethiops of platina, as those of oxydizing and inflaming spirit of wood, of condensing olefiant gas into acetic acid, of transforming sulphurous into sulphuric acid, &c. are all founded on this mechanical action of platina on oxygen.

I have never been able to succeed in obtaining an ethiops of platina entirely exempt from carbon, for all platina reduced by the humid process, even that precipitated by zinc, gives out on exposure to a red heat, either pure carbonic acid or a mixture of carbonic acid and oxygen. Sixty grains of this

platina, treated with nitric acid, caustic potash, &c. which according to its action on formic acid must have contained 1.26 cubic inches oxygen, gave 1.20 cubic inches of carbonic acid and a quantity of water. The carbon arises from the zinc, and has no influence on the oxyphoric properties of the platina. It may be remarked, that platina precipitated by zinc is better fitted for the acetification of alcohol, than that obtained by means of organic substances, as it has more density.—*Journ. de Pharm.*

ART. LXV.—REMARKS ON THE TREES PRODUCING CINCHONAS.

By Auguste Delondre.

Notwithstanding the important researches made to ascertain the botanical species or varieties to which the various barks introduced in commerce belong, there still exists a great confusion not only in the particulars of this interesting part of the history of drugs, but even in the fundamental facts relating to them. Thus the latest and most valuable works upon materia medica, refer the Calisaya bark, the one to *Cinchona lancifolia*, the other to *C. nitida*, &c. &c.

Impressed by these discrepancies, and with a view to throw some light upon a subject still so obscure, I present to the Pharmaceutical Society several samples of cinchonas, and sundry particulars which I have been enabled to obtain through the agency of those whom I have employed for several years in the various regions whence this drug is afforded, in collecting cinchonas for my own account.

The Calisaya bark which is now the only species that has acquired much importance in commerce, for its advantageous employment in the manufacture of sulphate of quinine, is collected in the vicinity of La Paz, a town situated at the south-east extremity of Peru, on the boundaries of Brazil, and the immense regions of La Plata.

The collecting of cinchonas was at first limited to a small district, but the great consumption of this precious bark, that has lately taken place, has compelled those employed in that trade to extend their researches to wider regions, principally in the direction of *Carnata* and *Apollobamba*.

The trees that afford Calisaya bark form thickets or clusters on the declivities of hills. The collecting of bark is performed by the neighbouring Indians, who are distributed in small tribes, and who, for a small compensation, penetrate among a thousand perils into the depths of the forest, fell the trees, separate the barks and transport them on their back to the neighbouring streams of Chulumanol, Santa Rosa and Tarbeni, whence they are directed towards the harbour of Islay, and thence to Europe.

The bark is dried in the sun; when of considerable thickness it is loaded with stones in order to prevent its curling, and in this state constitutes the fine pieces of flat bark that are occasionally found in the seroons. The trees that have been felled are apt to emit shoots from the roots; but a long time is required before they are capable of affording good barks. This circumstance, together with the natural obstacles, and the remoteness of the localities which daily increases, corroborates the apprehension already entertained, that a considerable rise in the price of this precious article will ultimately take place.

The three samples, furnished with leaves, flowers and fruit, which I have the honor of submitting to your examination, belong to very different trees, although the barks afforded by them are all introduced in commerce under the common appellation of *Calisaya bark*. This circumstance accounts in some measure for the confusion existing among different authors respecting the tree that affords the bark. No. 1, is produced by the tree called by the Indians *Cascarilla yana yana*, and by the Spaniards *Morena*, which means deep or brown yellow.

This tree resembles our common poplar, as to thickness and height, but is furnished with leaves only at the top. These

leaves are of a velvet green above, and of a purplish colour beneath. It affords the fine bark known by the name of *Tabla*, our flat bark, and grows most commonly in fertile soils, on the hills of *Tipuani*, 120 leagues from La Paz.

Our colleague, Mr. Guibourt, who has devoted a particular attention to the study of pharmaceutic drugs, accepted the charge of ascertaining the botanical species to which the sample belongs. From a careful investigation, and the comparison he has made with the specimens existing in the herbarium of Ventenat, he has come to the conclusion that this sample belongs to the *Cinchona micrantha*.

Specimen No. 2, yields the species called by the natives *Blanca* or *Amarilaza*—pale yellow. The tree that affords it resembles our apple tree. Its greatest height is from twelve to fourteen feet; its branches are circular, extending to a considerable distance so as to form a large head. Its leaves are nearly as long, but considerably narrower than the preceding species. The size of the fruit is also very different. This species is collected especially in the vicinity of *Apollobamba*, in the ravines of Peluchoaco.

No. 3, is called *Amarilla*, or yellow bark. This species grows on barren mountains, in rocky soils. Its bark is thinner, and its leaves smaller, than the preceding species.

The specimen No. 4, appertains to No. 1, and is furnished with a certain quantity of fruit. I have vainly endeavoured to cause them to germinate, although they appear to have attained a degree of perfect maturity; but we know that coffee and several other plants of the same family easily lose, and in a very short time, their germinating power. I wish, however, that some of our colleagues would be pleased to repeat my experiments. They may be more fortunate than myself, and their success is so much more desirable, that the genus cinchona has no living representative in any of the botanical gardens of Europe, although it is probable that it might easily be cultivated. With a view to fill this vacancy, I caused fifty young plants of cinchona to be sent to me from the

interior, but I have to regret that every one of them died before reaching the coast.

The other samples consist of bark of the root of species No. 1, and an extract obtained by incision from the tree, and evaporated in the air. Mr. Henry, Jr. and myself, having submitted to analysis these different products, we have ascertained:—

1st. That the leaves and seeds of the Calisaya bark do not contain the vegetable alkalies found in the bark.

2d. That the root contains them as well as the red and yellow colouring matter.

3d. That the inspissated juices obtained by incision are composed of the same principles as the aqueous extracts of the bark of the tree.*—*From the Journ. de Pharmacie, Oct.* 1835.

ART. LXVI.—ON BERBERINE.—By MM. Buchner, Senior and Junior. (Extract.)

Preparation. The root of the *B. vulgaris* is to be contused and a sufficient quantity of boiling water poured on it, it is suffered to digest for some hours, being frequently stirred; the fluid is then decanted and the operation repeated. The residue is subjected to pressure, and the whole of the decoctions filtered and evaporated to the consistence of a soft extract. This is several times treated with boiling alcohol 0.8200 and the tinctures decanted from the residue, they are then to be filtered and distilled, so as to obtain most of the alcohol, the residue is placed in a flat capsule in a cool place. In twenty-four hours, it will be found filled with small plumose crystals of a yellow colour, these are to be separated as much as possible

* The whole proceeding of the experiments made by Messrs. A. Delondre and Henry, jr. are given at full length in the Journal de Pharmacie; but, for want of time, I have contented myself with giving their conclusions. E. D.

from the brown and unctuous mass surrounding them, by expression in a fine linen cloth and washing with cold water.

There are crystals of impure berberine. This substance being but slightly soluble in water and alcohol when cold, and on the contrary very soluble in these fluids with the aid of heat, renders it easy to purify them. For this purpose the impure crystals are to be dissolved in boiling water, which as it cools permits the berberine to precipitate in a crystalline form, whilst the extractive remains in solution. If this precipitate be treated a couple of times with boiling alcohol and the hot solution be filtered, the berberine will be obtained in pure state, and needs only to be washed with cold alcohol and dried by a gentle heat.

By this process MM. Buchner obtained $\frac{z}{5}$i. $\frac{z}{3}$i. of berberine from $4\frac{1}{2}$ pounds of the bark of the fresh root.—Thence 1.3 of berberine corresponds to 100 parts of the bark.

Physical and Chemical Properties of Berberine.—In its pure state, it is a very light powder, composed of acicular crystals of a bright yellow colour. It has a highly bitter taste which is very permanent; it is inodorous. It has no action on turmeric, but changes litmus to a green colour.

It is very slightly soluble in cold water, but its colour is so intense that a very minute portion is sufficient to give a decided yellow tint to this fluid. The colour of a diluted solution is clear yellow, of a concentrated solution, brownish yellow. Five hundred parts of cold water dissolve only one of berberine at 55° F. It is also but little soluble in cold alcohol, 250 parts of this taking up but one of berberine. It however, dissolves in almost all proportions in boiling alcohol or water, but the greatest part precipitates on the cooling of these menstrua. It is but slightly soluble in the fat oils, in those of turpentine or lavender; insoluble in either, carburet of sulphur and petroleum. Alkalies change its colour to a brown; acids and other bodies having a great affinity for water, precipitate it from its aqueous solution. Concentrated sulphuric acid changes it into ulmine, and concentrated nitric acid into oxalic acid; most of the metallic salts precipitate it of different

colours. It is readily decomposed by heat. At a temperature a little more elevated than that of boiling water, it becomes reddish, but regains its original colour on cooling. Heated in a retort over an oil bath, it gives out water at 212 F., becomes brown at 266°, melts at 320° to 340°; a yellowish fluid passing over; finally at 425°, it swells and leaves as residue, a voluminous charcoal of a metallic brilliancy.

Composition.—Berberine subjected to combustion with oxide of copper in the apparatus of Liebig, to determine the proportions of carbon and hydrogen; and then in an apparatus filled with carbonic acid to ascertain the quantity of nitrogen, gave the following mean of several experiments:

Carbon	61.23
Hydrogen	5.49
Nitrogen	4.03
Oxygen	29.25

Its formula is therefore 33 C + 36 H + 2 Az + 12 O, and its atomic number 4124.

Medical Properties.—Berbery root has been much employed in different cachexias, and especially in jaundice and other hepatic affections; in large doses acting as a purgative. The authors of the present memoir have found that berberine in doses of 1 to 10 grains is an efficacious tonic or purgative, and may be successfully employed in all cases in which the root is indicated.

Jour. de Phar.

ART. LXVII.—NEW PRINCIPLES IN OPIUM.—By M. Pelletier.

The author in this memoir gives the history of two new substances discovered by him in opium, by treating this article with lime and ammonia.

Paramorphine.—This substance is white, scarcely soluble in water, very soluble in alcohol and ether, even when cold; of an acrid and styptic taste. By spontaneous evaporation, it crystallizes in needles. Weak acids dissolve it; alkalies precipitate it from its solution; an excess of alkali does not redissolve it, except when the alkaline solutions are highly concentrated; its acid solutions never afford crystals, on evaporation they only give yellowish scales. It melts at 300 F., is not volatilized at a higher temperature, but like the vegetable alkalies is decomposed giving azotised products. It differs from morphine in not reddening concentrated nitric acid, in not forming crystalline salts with the acids, and in not striking a blue colour with the salts of iron. It resembles iodine in its solubility in alcohol and ether, and by its alkalinity, but differs in never crystallizing in well defined forms, and being always precipitated from its acid solutions by ammonia. It has no analogy with narceine or meconine. The only substance with which it has much analogy is narcotine, though the differences of taste, fusibility, and solubility in alcohol are sufficient to distinguish them.

Pseudo-morphine.—It is almost soluble in water, still more so in pure alcohol and ether. Alcohol at 36° B., dissolves rather more; water of ammonia has scarcely any action in it; solutions of potash or soda dissolve it freely; in saturating these alkalies by an acid, it is precipitated. Concentrated sulphuric acid blackens and alters it. Concentrated nitric acid acts on it, as on morphine, giving it an intense red colour and finally changing it into oxalic acid. The most singular property of this substance is that of striking an intense blue colour with the per-salts of iron, and particularly with the hy-

drochlorate of the peroxide, this colour disappears on the addition of an excess of acid. The affinity of this substance for oxide of iron is so great, that whilst it resists the solvent power of sulphuric acid, and is scarcely affected by hydrochloric; the hydrochlorate of the peroxide of iron has a marked influence on it; the solution is of a beautiful blue; when heated it becomes of a dirty green; on the addition of ammonia, a slight precipitate occurs, and the solution assumes the colour of Alicant wine.

When subjected to the action of heat, pseudo-morphine is not volatilized, it does not even fuse, being decomposed at the moment this process appears to be about to take place. When distilled, it affords a little oil, some slightly acid water, and leaves a voluminous charcoal.

The following is a comparative analysis of these substances with that of morphine, by M. Liebig.

	Para-morphine.	*Pseudo-morphine.*	*Morphine.*
Carbon	72.310	52.72	72.340
Hydrogen	6.290	5.81	6.366
Nitrogen	4.408	4.08	4.995
Oxygen	17.992	37.37	16.299

Jour. de Chim. Med.

ART. LXVIII.—RESEARCHES ON PITAYA BARK, AND DISCOVERY OF A NEW VEGETABLE ALKALI, CALLED PITAYNE.
(From the Italian.)

The court of Rome having received as a present, from the republic of Columbia, a certain quantity of bark, under the name of Pitaya bark, which, in that country, is preferred to in fevers, and brings a higher price than any other bark; Messrs. Folchi and Peretti were invited to examine it separately. To the former was entrusted the care of describing

its external physical characters—to the latter, that of examining it chemically.

Folchi commences the description of the Pitaya bark by a brief historical account of that substance. He relates that professor Brera, in his *desideratum*, calls it *Pitaya china;* that it was brought to Liverpool, in 1817, from Guagaquil, under the name of *Cinchona Peruviana*, was sent from there to Hamburg, and thence to every part of Germany, where it went by the appellation of *Cinchona nuova.* He adds that some pharmacologists have mistaken it for the *Techames* and *Bicolor barks*; but the physico-chemical differences existing between these barks is so great that this supposition is entirely given up. Mr. Batka, of Prague, in an interesting memoir presented to the Royal Academy of Medicine of Paris, states that in England, the name of *Pitaya* is given only to the *Cinchona bicolor*—this also is erroneous. Mr. Guibourt, in the second edition of his history of drugs, has dwelt more than any other author upon the subject of this bark; but Folchi doubts whether the bark mentioned by him, and in which Henry, jr. found both quinine and cinchonine, is the same as the bark under consideration, because the physical characters are altogether different, and it contains none of the vegetable alkalies that are fonnd in the cinchonas.

Among the samples entrusted to Mr. Folchi, the largest pieces were half rolled upon themselves; the thinnest had the edges closely rolled as the common bark. The former were more than a foot long, one inch in diameter, and of one and a half thick. The external surface, formed of the epidermis and the cellular tissue, varied in different pieces; in some and especially in the largest pieces, it was furnished with a white epidermis, partially rubbed off by friction, and resembling the pearly cuticle of the Carthagena bark. In others, the surface was sometimes fungous, tubercular, rough, with slight fissures, and divided in some parts in small scales. The colour was ash-gray, apparently soiled; internally of a fawn colour; the *liber* composed of thin fibres of a fawn orange colour, of a deeper tint towards the internal surface.

The tree which affords the bark now under consideration, grows spontaneously on the Pitaya mountains, in the province of New Grenada. Its genus and species are not well determined. But as Peretti has ascertained that the bark contains neither quinine nor cinchonine; the tree cannot be referred to the genus *Cinchona*, especially, since a great number of plants that had been improperly placed in this genus, have been judiciously separated by Mr. Decandolle, and distributed in the new divisions he has established. Messrs. Brera and Guibourt, think that the pitaya belongs in all probability to the genus *Exostema;* the last author has been influenced in his opinion, by the great resemblance between the words *Pitaya* and *Piton*, the latter of which is commonly given to the *Exostema floribunda*, piton or St. Lucia bark. But Folchi opposes to Guibourt's opinion the following argument, which he thinks has a considerable weight.

It has been remarked that the trees affording bark, present a certain regularity as to natural localities; thus, for instance, it is well known that the *Luculia* and *Hymenodictyon*, are indigenous to the East Indies; that the *Danais* grows in southern Africa; the *Pinckneya*, in Georgia and Florida; the *Remija*, in Brazil, &c. and so it is with the whole geographical distribution. Now the genus *Exostema*, and especially the first section, *Pitonia*, to which all the true *Exostemas* belong, is peculiar to the West India Islands, a country very different from that in which we are certain our pitaya grows naturally. Mr. Folchi is inclined to think that this tree belongs to the genus *Buena*, which is constantly met with, as well as the genus *Cinchona*, on the coast of Peru and New Grenada, with a single exception, however, that of the *Buena hexandra*, which grows in Brazil.

Chemical Investigation.—The first experiments of Mr. Peretti were made with a view to ascertain whether the pitaya bark contained any of the vegetable alkalies of the cinchona; but his experiments were negatived, but whilst he was disappointed in this respect, he had on another hand, the advantage of ascertaining that it contained a peculiar alkaloid.

A second experiment on a larger quantity of the bark, fully confirmed this fact. He boiled six ounces of Pitaya bark in distilled water, and obtained two ounces of extract which he treated by alcohol of 34°. Part of it was dissolved and put aside; the undissolved part presented the characters of a gallate of lime. The alcoholic product was diluted with a little water, and submitted to distillation. The aqueous residuum left in the retort coloured litmus of a red colour; precipitated a solution of gelatin, turned green the solution of sulphate of iron, and possessed an astringent and very bitter taste. These characters indicated already that this residuum contained tannin with an excess of gallic acid, a bitter substance and colouring matter. The solution was, moreover, precipitated by ammonia, and a part of the yellowish white precipitate that was produced, was treated by ether, and afforded by evaporation the tannate of the bitter substance or new vegetable alkali, leaving behind the colouring matter.

The remaining part of the precipitate was treated with boiling water, which dissolved it partially; the solution was slightly acidulated with sulphuric acid, then dissolved with animal black, and the excess of acid saturated by lime, and afterwards evaporated to dryness. The residue well dryed was dissolved in alcohol, in the state of sulphate, and permitted to crystallize. The crystals were acicular, and in the form of a fan.

That of the residue that had not been dissolved by the boiling water, was treated by the hydrate of potassa, which produced a ruby red. The potassa having been saturated by an acid, the colouring matters were precipitated.

From these experiments on related here, Mr. Peretti inferred that the Pitaya bark contains—

1st. A bitter principle, having the characters of an alcaloid.
2d. Two different colouring matters united to gallic acid.
3d. A gallate of lime.
4th. Some gum.
5th. Some resin.
6th. A fibrous part.

Pitayne.—(Pitayna?) The characters of this new vegetable alkali, which may be called *Pitayne*, on account of its source, are principally to possess no sensible bitterness in its pure and solid state; but this character is developed, whenever, being saturated by an acid, it is dissolved in water, alcohol or ether, in which it is very soluble.

Pitayne melts at a temperature above 100° centigrade, emitting very bitter fumes, which condense in very delicate prisms, and afterwards an empyreumatic smell. Warm and concentrated nitric acid decomposes it; but its combination with sulphuric acid, in the proportions of ninety-six parts to four of acid, yields a white, bitter and crystallizable salt, in the shape of divergent prisms, and presenting the figure of a face. With acetic acid, it produces a bitter and crystallizable salt.

Journal de Pharmacie, October, 1835. E. D.

ART. LXVIII. NEW CARBURET OF HYDROGEN.

By MM. Dumas and Peligot.

In our preceding memoir on methylene and spirit of wood, we established the existence of a new alcohol. Two carburets of hydrogen C^4 H^4 and C^8 H^8 are known, each capable of forming two hydrates and a great number of ethereal combinations. A third is also known C^{16} H^{16} but its compounds have not been examined. To show the regularity of the series formed by that series of isomeric carburets of hydrogen, we announce the discovery of another C^{64} H^{64}. Thus we have four carburets of hydrogen identical in composition, but in which the condensation of atoms is as 1, 2, 4, 16 which seems to indicate the existence of intermediate compounds, yet unknown.

We obtained this new carburet of hydrogen in distilling ethal with vitreous or anhydrous phosphoric acid. It is a

colourless, oily liquid, boiling at about 500 F. It may be distilled on potassium. The analysis of this product resembles that of methylene and bi-carburetted hydrogen, but its formula is C^{64} H^{64}.

It evidently results from the preparation of this body and the analysis of ethal, that this latter must be represented by C^{64} H^{64} O^{3}, that is, equal volumes of the new carburet and water. Distilled with phosphoric acid, it loses its water and the carburet becomes free. Ethal is therefore a new alcohol, and as it is produced during the saponification of spermaceti, we shall give the name of *cetene* to the carburetted hydrogen, and ethal will become a bi-hydrate of cetene.

When a mixture of ethal and perchloride of phosphorus is distilled, a liquid, oily product is obtained, boiling at about 600 F. and burning with a green edged flame; this is a chlorhydrate of cetene C^{64} N^{64} Ch^{2} H^{2}. It is a compound of equal volumes of cetene and chlorhydric acid, exactly similar to corresponding compounds of methylene and alcohol. On adding concentrated sulphuric acid to ethal, a sulphocetic acid is formed which is solid. The sulphocetate of potash closely resembles a soap; it crystallises in alcohol. It is formed of C^{64} H^{64} SO^{3} + KO, SO^{3} × K^{2} O. This formula is precisely similar to that of the sulphovinate of potash. Finally, spermaceti is a definite compound of one atom of oleic acid, one atom of margaric acid, three atoms of cetene and three atoms of water.

These facts are sufficient to establish the theory of cetene and its various combinations; they prove that spermaceti is a body analogous to the ethers; and ethal a compound similar to alcohol and spirit of wood. The saponification of spermaceti takes place in an analogous manner, to the decomposition of the compound ethers by potash. The analogy between the fatty bodies and the ethers, already pointed out by MM. Chevreul and Dumas is verified as regards spermaceti. *Journ. de Pharm.*

ART. LIX.—ON THE PREPARATION OF SYRUPS AND MELLITES.

By M. Deschamps.

M. Deschamps has proposed, to prevent the alterations which syrups and mellites undergo, to replace the water by a liquid formed of eighty-four parts water and sixteen of absolute alcohol. By means of a displacement apparatus, he treats the various substances which enter into the composition of syrups with this diluted alcohol, and afterwards dissolves a pound of sugar in every ten ounces of the product.

For the mellites and oxymellites, he advises the use of pure mellite instead of honey which is seldom pure, then to prepare the compounds in the usual way, adding a certain proportion of alcohol to prevent fermentation.

M. Deschamps gives the result of numerous experiments on the subject of displacement; these are as follows:

1. That pressure accelerates the filtration of fluids through powders.

2. That the displacement of one fluid by another does not take place in an exact manner, and a previous maceration is sometimes useful.

He divides powders in several classes as regards displacement; according to the facility with which they permit fluids to saturate and pass through them, to the degree of their absorbing fluids and thus of enlarging, and finally according to the quantity of mucilage they contain, which is sometimes so great as to totally prevent displacement.

In the report on this paper, by MM. Chereau & Beral, they observe that the credit of first proposing the addition of alcohol to syrups to prevent their becoming spoiled, is due to one of themselves; and moreover that it cannot be adopted as a general rule, as the administration of an alcoholic syrup is often contra-indicated; and also that a mixture of alcohol and water is not precisely equivalent to the wine it is intended to replace.

To this we may add, that this alcoholic liquid, recommended instead of water, in the treatment of substances, and intended for the preparation of syrups, acts on those substances in a very different manner from pure water, and furnishes syrups of a different composition, from those made with the juices of plants or their aqueous decoctions.

Journ. de Pharm.

ART. LX.—EXPERIMENTS TO ASCERTAIN THE EXISTENCE OF LEAD IN THE ATMOSPHERE OF A WHITE LEAD MANUFACTORY. By Arthur Dunn.

Having witnessed at my manufactory, the frightful effects of white lead on the workmen employed, I was anxious to determine if it was possible for lead to exist in the atmosphere, and, through that medium, be absorbed into the system by the action of the lungs. For this purpose I made the following experiment, which certainly is important to the manufacturer, as it points out a serious evil to be guarded against. I shall now merely confine myself to the results obtained, and leave to some of your more scientific friends, any theoretical reasoning, or practical hints, the experiment may suggest, provided you consider it worthy to occupy a space in your valuable magazine, and remain, Yours, &c.

Arthur Dunn.

An evaporating dish, containing about twenty-eight pounds of moist carbonate of lead, was placed in a sand bath, and heated to about the same temperature as the drying stove commonly used, never exceeding 150° Fahr.; over this was fixed at the distance of from eight to twelve inches, a pair of common bellows, with a glass tube attached to the pipe, which pipe was introduced into a green glass bottle containing

twelve ounces of distilled water, acidulated with two drachms of nitric acid. The apparatus being thus arranged, the bellows were set in action, by which means the atmosphere, loaded with the moisture from the lead, was made to pass in a continued current through the liquid; this was continued for six hours. The whole was then transferred into a platina dish, and evaporated to perfect dryness. The residue was dissolved in one ounce of distilled water, with two drops of nitric acid, to insure the solution of the lead, should any be present. A current of sulphuretted hydrogen was next passed through the solution, which immediately gave a minute dark precipitate; this being collected on a filter, and washed, was transferred to a watch-glass, and treated in the usual manner with nitric acid to decompose the sulphuret, which gave on the application of hydriodate of potash, the most unequivocal proof of the presence of lead.

Another experiment was conducted at the same time with similar vessels, in the same room, but the current of air was not passed through the liquid. This, on the application of sulphuretted hydrogen, gave not the least indication of lead, but, on evaporating the whole to dryness, and treating the residue, in the manner before described, with hydriodate of potash, the slightest possible trace of the yellow iodide of lead was perceptible. The nitric acid and distilled water were separately tested with great care, but were found perfectly free from lead, so that, no doubt, the trace of lead must have been absorbed from the atmosphere, as the bottle containing it stood beside the one through which the current of air was passed. I ought to have mentioned before, that the temperature of the laboratory during the experiment was from 70° to 80° Fahr., and that the door was kept closely shut, that the air might be loaded as much as possible with the vapour.

Lon. and Ed. Phil. Mag. and Jour. Frank. Institute.

ART. LXI.—REMEDIAL POWERS OF THE CEANOTHUS AMERICANUS. By Dr. D. H. Hubbard.

I do not remember to have seen any reference made, (medicinally,) to the Ceanothus Americanus of Linnæus. Its sensible properties led me to use it in a case of aphthæ, and subsequently in other derangements of mucous surfaces, where I found it of some importance. Professor Bigelow describes the Ceanothus as follows: "Leaves heart ovate, acuminate, triply nerved. Panicles axillary elongated. A small white flowering shrub, not unfrequent in dry sandy soils. Leaves two or three inches long and one broad, finely serrate, and tapering into a long point. From the axils of the upper leaves come out leafless branches bearing crowded bunches of minute white flowers. These are followed by dry three seeded, and somewhat triangular berries. The leaves were used among other substitutes for tea during the American revolution." I might add that the dried leaves and seeds have an odour, when bottled, not unlike imported tea. It has a slight bitter, and somewhat astringent taste. I first used it in a case of an old lady of seventy, who had a severe thrush following typhus. The usual gargles were tried without much effect. Every second or third day a new coat of darker hue would cover the whole interior of the fauces. The mucous membrane after its discharge presented a dark florid appearance, with extreme sensibility. I had tried borax, alum, nitras argenti, vegetable astringents and tonics, as gold thread, crane's bill, hardhack, oak bark, sumach, &c. without much benefit. The Ceanothus growing near, I directed a strong tea to be made of it, which acted like a charm; the thrush soon passed off, and without relapse. Since then I have used it largely in aphteæ of children, and find it highly useful in cases following dysenteria maligna, as well as those of less debility and disease, even after other gargles have been ineffectually tried. During last March and

April, scarlatina, attended in most cases with ulceration of the fauces, was very prevalent with us; I depended almost exclusively upon the Ceanothus, with borax for a gargle, and in all but a single case of very malignant character this gargle was effectual. The form I used, and which I found best adapted for the cases as presented, was prepared by making a strong tea of the Ceanothus and flowers of Anthemis cotula, and to a gill add a piece of borax the size of a large pea. I think the borax and Mayweed rendered it in many cases more effectual. I have also used it with benefit in form of a tea in dysenteria of children, and found it fully equal in many cases to the Spirea tomentosa. The tea I used was prepared from the leaves and seeds.

Boston Med. and Surg. Journ. Sept. 30*th*, 1835.

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

June 30, 1835.—No quorum being present adjourned to August 25.

September 27, 1835.—Minutes of the Board of Trustees at a special meeting convened to accept the resignation of George B. Wood, M. D. of the chair of Materia Medica and Pharmacy, were read; also the minutes of the last stated meeting of the Board, by which the College is informed that Robert E. Griffith, M. D. was duly elected Professor of Materia Medica and Pharmacy, to fill the vacancy occasioned by the resignation of Dr. Wood.

The Society then went into an election for Trustees, in place of those whose term of service was about to expire, and the tellers reported that the following were duly elected: F. R. Smith, Thos. J. Husband, Jos. Scattergood, Jacob Bigonet, Jos. C. Turnpenny, Peter Lehman, Saml. F. Troth, and Chas. Shaffer, jr.

The resignation of Thomas Milnor was read and accepted.

A communication from J. C. Jenkins, tendering his resignation, was read and referred to the treasurer.

October 24.—The Committee on Patent Medicines were discharged at their own request, and a committee consisting of Jos. Scattergood, Saml. F. Troth, and Algernon S. Roberts appointed, with instructions to report at the next stated meeting of the College.

The resignation of J. C. Jenkins was duly accepted.

The following communication from E. Durand was read:

"I have the pleasure of presenting to the Philadelphia College of Pharmacy part of a collection of specimens of materia medica, lately received from Mr. Guibourt, an eminent Pharmaceutist of Paris. I also transmit a translation of the notes accompanying the specimens.

No. 1. *False Angustura Bark.* The Bark of the *Brucea antidysenterica* is not to be met with in commerce, what was

formerly so called and known as False Angustura is most probably the product of the Strychnos nux vomica.

No. 2. *Balsamum Tacamahaca.* This name has been given to several resinous substances, principally afforded by the genus *Amyris* or *Icica* of S. A. The specimen sent is the only variety found in our commerce. I am of opinion that it does not differ from the Cayenne incense, which is the product of the *Icica gauyanensis* or *heptaphylla,* AUBLET.

No. 3. *Canella Alba.*

No. 4. I cannot procure the bark of the *cinchona ovalifolia,* MUTIS. No specimen of it exists here, except in the cabinet of natural history.

No. 5. *Cinchona lancifolia,* MUTIS. I send the *fibrous Carthagena bark* which in all probability is the product of this species.

No. 6. True Winter Bark. *Drymis Winteri.*

No. 7. The confusion which has existed on the subject of the White Ipecacuanhas, has induced me to transmit specimens of both the *Ionidium Ipecacuanha* and the *Richardsonia Brasiliensis.*

No. 8. Seeds of the *Jatropha Curcas.* This article is scarce and only to be found in a few collections. Those sent are derived from that of Paris School of Pharmacy.

No. 9. Bark of the *Laurus Culilawan.*

No. 10. Gum resin of the *Pastinaca opoponax.*

No. 11. Root of the *Carex arenaria.*

No. 12. Seeds of the *Strychnos ignatia.*

The thanks of the College were ordered to be presented to Mr. Durand for this valuable addition to their cabinet.

Miscellany.

Safflower.—This article is imported from many different places. That from Spain is of a bright and deep colour, is well preserved, but often mixed with remains of dark coloured flowers. It is packed in a variety of modes. That from Egypt is of a dark red, and strong smell, the petals are more fringed than the Spanish. It comes in bales of three hundred and twenty, to three hundred and fifty kilogrammes, lined inside with blue cloth, and covered externally with rushes and strong bagging secured with cords, or in bags well tied with ropes which appear to be formed of some kind of bark. The article contained in this latter kind of package is not of as good quality as the first. That from India is in small, compact, flattened masses, of a faded colour externally, but of a rich rose tint within. It comes packed in gunny bags. This kind sometimes contains sand, and still more frequently yellow flowers which injure its quality.

Dict. de l'Industrie, &c.

Crucibles.—The best crucibles for general use are the Hessian, and those manufactured at Paris, by Mr. Beaufay. The first are composed of three parts of clay (containing 46 silex, 34 alumine, 3 oxide of iron to the quintal,) and one of quartoze sand; the crucibles of Beaufay are one part clay, (52 silex, 27 alumine, 2 oxide of iron,) and two parts of the same earth, baked and calcined. They are lined internally with a thin coating of raw clay. These crucibles will stand a heat of 150 Wedgewood's pyrometer.

Ibid.

Removal of grease spots.—The following composition, invented by Mr. Lenormand, has been found very useful in the removal of spots of grease from woolen clothes. Fuller's earth is to be mixed with a sufficient quantity of water to remove any sand; this will precipitate whilst the clay held in suspension in the fluid can be decanted with it. It is then permitted to settle, the water poured off, and the precipitate dried. To a kilogramme of this, is to be added 250 grammes of carbonate of soda, as much soap, and eight yolks of eggs beaten with 250 grammes of ox gall. The mixture is to be well levigated, and when the whole is perfectly homogenous, formed into balls or cakes and well dried.

Ibid.

Asparagine in extract of Belladonna.—Mr. Biltz, of Erfurt, has discovered the existence of well defined crystals resembling Asparagine in almost

all their properties, in extract of belladonna. As however, they differ somewhat in their action with acids from the true asparagine, it may be necessary to establish several species of the substance, as has been done with sugar, the gums, &c.

Journ. de Pharm.

Crystallized Oxide of Chrome.—M. Wöhler has succeeded in crystallizing the oxide of chrome by passing the vapour of perchloride of chrome through a glass tube heated to redness; the oxide is deposited in a crystalline form. Two atoms of the perchloride, or 2 (2 Cr + Cr Cl^6) furnish 3 atoms of oxide of chrome 3 (2 Cr + 30) 12 atoms of chlorine, and 3 atoms of oxygen. This oxide is black, and of a perfect metallic brilliancy. The crystals are of the same form as those of the native per oxide of iron, and are as hard as corundum. *Ibid.*

Alcohol.—Mr. Scanlan has devised a very good method of obtaining by simple distillation a spirit almost free from the oil which usually contaminates it. The pipe of the capital of the still divides into two tubes, each connected with a distinct refrigerator; at their junction is a stop cock, so situated, that by turning it, the communication between the still and either of the worms may be opened or cut off, and the vapour produced, thus directed to one or the other. The oil being much less volatile than the alcohol, does not begin to rise until the liquor in the still becomes considerably reduced in strength. By allowing the alcoholic vapours produced before this point is reached, to enter into one vessel, and then, the stop cock having been turned, receiving the impure spirit subsequently distilled in a separate condenser, he obtains an alcohol as nearly as possible free from its usual impurities.

Kane. Elements of Pharm.

Lead Colic cured by Hydrochloric acid.—Mr. Gendrin communicated to the Academy of Sciences at their sitting in December 1834, some additional observations on the treatment of colica pictotum. He has ascertained that the administration of sulphuric acid does not produce the same relief where the colic has been induced by the deutoxide of lead, as when it has been caused by the carbonate. In white lead manufactories, the use of this acid has always been attended with the happiest prophylactic effects, whilst in those of red lead, it has proved powerless. He then announces that he has found that diluted hydrochloric acid would remove the poisonous effects of the deutoxide as rapidly and certainly as the sulphuric cures those caused by the carbonate.

Journ. Hebdon.

Correctives of Opium.—According to M. Puchelt, a German physician, sulphate of soda is an excellent corrective of the unpleasant effects of opium

given in the proportion of a scruple to half a grain of opium. This dose may be repeated two or three times a day. In combination with Glauber's salt, he says that opium may be administered in cases when it would otherwise be contra-indicated. In obstinate hæmorrhages especially, this mixture will produce the happiest effects. The author also asserts that if this neutral salt prevents the congestion sometimes produced by opium, so castor prevents its narcotic effects, without diminishing its sedative powers. *Lond. Med. & Surg. Journ., & Am. Journ. Med. Sci.*

Ergot caused by an insect.—Mr. Rennie in his alphabet of Medical Botany, states that he has ascertained in numerous instances, in 1832, that the ergot of rye (*Secale cornutum,*) is a morbid enlargement of the grain, caused by the puncture of a four-winged fly, (*Aphis graminis,*) similar to the aphis of the rose, but one half smaller, and darker green with black markings, and not as has generally been supposed, a fungus.

Guthrie's ointment for the cure of Chronic Opthalmia.—

℞.	Nit. Argenti,	gr. x.
	Sub. acet. Plumbi.	gtts. xv.
	Axunge.	℥i.

The nitrate of silver and acetate of lead are to be reduced to an impalpable powder, and perfectly incorporated with the axunge. A fragment of this ointment of about the size of a grain of wheat, is to be introduced under the upper eye lid, which is to be gently rubbed with the finger, so as to spread the ointment over the diseased part. The pain is severe and lasts for about an hour.

Devergie's Depurative syrup.—

℞.	Lig. Guaiac.	
	Rad. Saponaria	
	Rumex Patient	ᵃᵃ lb. ii.
	Dulcamara	
	Arctium lappa	ᵃᵃ lb. iii.
	Fol. Senna.	℥viii.

Make two decoctions with thirty pints of water each, evaporate and add sugar and honey each thirty pounds, and form syrup.

Journ. de Chim. Med.

Eau medicinale.—Dr. Wilson of Yoxford (England,) first discovered that the celebrated gout nostrum, the Eau medicinale of Husson, was composed of the expressed juice of the flowers of the Colchicum autumnale. The formula given by Dr. Wilson is: Take two parts of the expressed juice of the flowers of meadow saffron, and one part brandy. Mix them, and permit the mixture to stand undisturbed for a few days, to al-

low any impurities to subside, then decant off the clear liquor and keep it in well stopped bottles for use. When too little spirit is added, the mixture is apt to ferment. Neither wine nor the bulbs of the plant enter into the composition as supposed by Dr. Paris, Mr. Brande, and others.

Rennie. Alphabet Med. Bot.

Oxalic acid.—M. Robiquet considers the following, as the best mode of manufacturing this acid on a large scale. Twelve kilogrammes of fecula, are to be divided among a number of tubulated retorts placed on the same sand bath; to this fecula is to be added 36 kilog. of the nitric acid of commerce, when the action has ceased, 12 additional kilog. of acid are to be added, and a slight heat employed. The fluid is to be poured into proper vessels and permitted to crystallize; the first product will be 2 kilog. 500 oxalic acid; the mother waters are to be united together, and 12 kilog. of nitric acid added at intervals. This will give 2 kilog. 250 of acid; The same operation is to be repeated a third and fourth time. The total product in purified acid will equal about half the fecula employed, requiring six times its weight of nitric acid.

Dict. de l'Industrie Manufac.

Succinic acid.—M. H. G. de Claubry states that succinic acid is often adulterated with tartaric acid or bisulphate of potash, to which a little oil of amber is added; as this is volatile, it is easy to separate it from these two bodies, and thus identify the fraud. It is also imitated with sal ammoniac and oil of amber; in this case both sublime, but by mixing the suspected mass with chalk, the ammonia will be readily detected by the smell. *Ibid.*

Pure Alcohol.—The following method of obtaining nearly absolute alcohol is said to give good results. An ox bladder is to be steeped in water well washed, cleaned from all extraneous matters, the uretes tied, turned inside out in order that the mucous lining may be removed. It is then to be inflated and dried, and one coat of fish glue given to the inside, and two to the exterior. When it is perfectly dry, it is to be filled with the alcohol to be concentrated, the neck tied, and the whole suspended over a stove or sand bath, so that it will be in a temperature of 100 to 120. If the alcohol used be 29° to 30° B., in three or four days it will become nearly anhydrous. A bladder thus prepared can be used for a great number of operations. When the alcohol marks 30° B., the outside of the bladder does not become moist, but when it is only at 16° or 18° it becomes very damp. After removing the alcohol, if it is wanted perfectly pure, it must be distilled to separate any organic matter it may have dissolved. *Ibid.*

Lead Colic.—M. Foucat has found the following formula successful in the treatment of lead colic. To a pint of water, add half an ounce of sulphuric alcohol, (elixir of vitriol,) two ounces of magnesia, and four ounces of syrup of gum ; this is to be used as a common drink, besides which, a draught composed of half an ounce of castor oil, as much lemon syrup, and a quarter of a grain of opium is to be given night and morning.

Journ. Hebdom.

Compound ointment of Ratanhy.—

R.	Pix. abiet.	8 parts.
	Terebenth venet.	2 "
	Cera. alb.	1 "
	Ext. Krameriæ.	2 "
	Sulph. alum et potas.	1 "

The pitch, turpentine, and wax are to be melted over a gentle fire, and the ratanhy and alum finely pulverised and well incorporated with the mixture. This plaster has been found beneficial when an astringent application of the kind is indicated. *Journ. de Chim. Med.*

Spontaneous crystallization of Morphine.—M. Storck mentions a spontaneous crystallization of morphine observed by him in a bottle filled about four-fifths with an anodyne tincture, which had stood for some time undisturbed. The morphine was in perfectly pure crystals, adhering to the sides of the bottle. He supposes that it had been first deposited in the form of an acetate. *Ibid.*

Paraguay Roux.—This celebrated anti-odontalgic tincture it is stated is formed as follows.

R.	Flor.	Inula bifrons	1 part.
	"	Spilanthus oleraceus	4 "
	Rad.	Anthem. pyreth	1 "
		Alcohol at 33° B.	8 "

The flowers and roots are to be contused and macerated in the alcohol for fifteen days, the fluid pressed out and filtered. The flowers of the Inula do not add in any way to the efficacy of the remedy, and might be replaced by saffron or any other aromatic. *Ibid.*

Lip salve.—

R.	Axunge	℥vii
	Butter of Cacao	℥ss
	White wax	℥ss
	Rad anchus	ʒii ℈ii
	Oil of roses	gtts. xvi

Journ. de Chim. Med.

Antidote to arsenic.—M. Blondel of Mer, (France,) has published a case in which the hydrate of the peroxide of iron was completely successful as an antidote in a case where about two drachms of arsenic had been taken. The poison was swallowed at 6, A. M. A physician saw the individual in about a quarter of an hour afterwards, and administered some glasses of sugar and water. M. Blondel visited him twenty minutes after the poison had been ingested, and ordered the hydrate of the peroxide of iron. This was made by treating the sulphate of the tritoxide with potash. As much as was furnished by six ounces of the sulphate was mixed with about forty pints of sugar and water, of this the patient took a tumbler every five minutes for three or four hours. After swallowing two or three doses, a vomiting ensued of about three ounces of fluid. Half an hour afterwards, there was copious vomiting and discharges from the bowels, which continued until 4 P. M. The patient recovered. He never experienced any pain. It should be noticed that no examination was made of the discharges. But the powder remaining in the tumbler in which the patient had mixed the dose, was ascertained to be arsenic.

Journ. de Chim. Med.

Preservative liquid.—M. Le Reboulet, conservator of the Museum of Nat. Hist. at Strasbourg, has given the following formula for a liquid for the preservation of anatomical preparations &c. This fluid is peculiarly applicable to the preservation of the brain. When any tissues kept in this solution, become hardened, as sometimes happens, they can be restored to their original flexibility by keeping them in fresh water for a short time :

R.	Water	16 parts.
	Chloride of lime	4 "
	Alum	2 "
	Nitre	1 "

Journ. de Pharm.

Action of diluted acids on sugar.—M. Malaguti, in an interesting memoir on this subject, has satisfactorily shown, that acids, whether organic or inorganic, when diluted, and with the assistance of heat, act in an identical manner on cane sugar. This is first transformed into grape sugar, then into ulmic acid, and if atmospheric air be present, into formic acid : when cane sugar is transformed into grape sugar, there is no need of any elevation of temperature, the acids acting without the aid of heat : that extremely diluted acids act in the same way, but more slowly : that the action of atmospheric air is necessary to the formation of formic acid, this change not taking place in vacuo : that the action of alkalies is identical with that of acids. *Ibid.*

Cosmetic liniment.—

R.	Ol. amyg. dulc.	℥i.
	Bals. Mecca.	ʒi.
	Sub. Carb. Potass.	ʒss.
	Aqua. Rosar.	℥iv.

mix in a mortar the balsam with the oil, add the potash, triturate for at least ten minutes, and gradually introduce the rose water.

Pharm. Elementaire.

Emetine.—M. Dumas is of opinion that pure emetine has never yet been obtained, and that what is so termed, in all probability contains a variety of different principles. *Traite de Chimie.*

Dentifrice.—The following electuary has obtained no inconsiderable reputation as a dentifrice.

R.	Bol. Armen.	61 parts.
	Pulv. Cinnamon	16 "
	Coccus Cact.	8 "
	Sulph. alum & potass	1 "
	Mel.	160 "
	Aqua.	8 "

The cochineal, water and alum are to be well triturated together, and left for a short time in a cool place to permit the colour of the cochineal to become perfectly developed; the Armenian bole, (or prepared chalk which may be substituted for it) and honey are to be added, and the whole thoroughly mixed, and afterwards scented with some essential oil.

Powder in Gonorrhea.—

R.	Pulv. Altheæ	
	" Glycirrh.	aa ʒiii
	Pulv. Nit. Potass.	ʒss
	Pulv. Camphor	ʒi

Divide into thirty powders, of which three are to be taken a day.

Foy. Cours de Pharmacologie.

Gelatine Capsules.—These are designed to render the administration of certain disagreeable medicines less repugnant to the patient, and were invented by M. M. Dublanc, Sr., and Mothes. They are formed of gelatine sweetened with a little sugar, and are made by means of an instrument consisting of a hollow, much elongated cone, bent towards its point, and terminated by a tube, to which is attached with a waxed thread, a small pouch of a round form, made of fine skin. The base of the cone is closed by a cover which screws on. To use this instrument, a sufficient quan-

tity of mercury is poured into the cone to fill the pouch; this which is now a solid ball, is plunged for a short time into a concentrated solution of sweetened gelatine, and then placed in a heated stove in a vertical position.

The first layer being dry, another is to be applied in the same manner, then a third &c. After a sufficient thickness has been attained, the cone is reversed, the mercury flows out of the pouch, and this becoming collapsed, permits the removal of the capsule. Into this can now be introduced any medicine that will not dissolve the gelatine, in doing this, care must be taken to preserve the exterior of the capsule from any contact with the contained substance.

To close the opening, a thin lamina of gelatine cut in a circular form is to be placed on it; having previously softened this cover by means of steam, to render it perfectly adherent, a solution of gelatine is to be applied to the edges with a camel's hair brush. If kept in a dry place, capsules thus prepared will keep for a long time.

Cottereau. Traite de Pharmacologie.

Nitro-sulphate of ammonia.—M. Magendie states that he has used this preparation with the following results: 6 grains dissolved in water injected into the veins of dogs, caused only a temporary affection of the brain. In doses of 12 grs. administered in the usual way, it produced no apparent result.

Whether by a fortuitous concurrence of circumstances, or from the peculiar action of this remedy, all the patients in the Hotel Dieu affected with typhoid fevers, to whom it was administered in doses of 12 grs. dissolved in water, speedily recovered. The total quantity taken by each was about one drachm. *Journ. de Pharm.*

INDEX I.

Authors of Articles in the First Volume of the American Journal of Pharmacy.

INDEX II.

Subjects of articles in First Volume of the American Journal of Pharmacy.

ERRATA.

Page 12, twelfth line from bottom, for "one-fifth," read *fifty*.
13, seventh from top, for "30," read 80.
13, fourteenth from top, after *fluid*, read, *occupying the bottom of the glass, and twenty minims of another transparent fluid.*