

## EMETINE.

In a memoir presented to the Académie des Sciences in 1817, by M. Pelletier and myself, we demonstrated by a series of chemical and physiological experiments, that the various species of ipecacuanha owe their emetic power to a peculiar principle, denominated by M. Pelletier *emetine*; and as it is much more active than, and does not possess the nauseating taste and odour of, ipecacuanha itself, we considered that it might be advantageously substituted for that substance. The disagreeable smell of ipecacuanha resides in a fatty matter unconnected with its emetic virtue; for M. Caventou took six grains of it with impunity.

M. Boullay has since discovered emetine in the root of the *viola odorata*; and has denominated it *violine*, or indigenous emetine. M. Torreri has also found emetine in the root of the *iris florentina*.

*Preparation of coloured Emetine.*

Reduce ipecacuanha to powder and digest it in ether at 60°, in order to dissolve the odorous fatty matter. When the ether takes no more up from the powder, digest it with alcohol several times. Collect all the spirituous tinctures in a water bath, and re-dissolve the residue in cold water, by which it is made to yield some wax, and the fatty matter it had still retained. Finally, macerate it with carbonate of magnesia, re-dissolve in alcohol, and evaporate to dryness.

Emetine thus procured is not pure, though sufficiently so for medical purposes. (See the following article.) It presents itself in the form of transparent reddish-brown scales; it has scarcely any smell, has a bitter, but not sickly taste. It supports a degree of heat equal to that of boiling water without changing; it is highly deliquescent, and soluble in water, and uncrystallizable.

*Physiological Properties of Emetine.*

Half a grain to two or three grains of emetine, given to dogs and cats, produces vomiting, followed sometimes by long-continued sleep: a large dose (ten grains) induced frequent vomiting in dogs, succeeded by stupors, from which the animal does not recover, as when the substance has been given in a small dose, but in which it dies for the most part within twenty-four hours. On inspecting the body, death appears to have been caused by an intense inflammation of the pulmonary tissue and mucous membrane of the digestive canal, from the cardiac orifice of the stomach to the anus. I have described very closely analogous phenomena, as arising from tartar emetic. (*De l'Influence de l'Emetine sur l'Homme et les Animaux.*) The effects are the same when emetine has been injected into the jugular vein, or absorbed from any surface of the body.

*Action of Emetine on the healthy system.*

Two grains, taken fasting, gave rise to long-continued vomiting, succeeded by disposition to sleep. A quarter of a grain is sometimes sufficient to excite nausea and vomiting.

*Action on the diseased system.*

It resembles in every particular that on the healthy body. Besides producing vomiting and purging, it has a marked and beneficial influence in catarrhal affections, especially such as are chronic. (See *Recherches Chimiques et Physiologiques sur l'Ipécacuanha*; par Magendie et Pelletier.)

*Action of Violine.*

M. Orfila has ascertained by experiments that this substance has the same physiological properties as emetine.

M. Chomel gave from 6 to 12 grains, in three doses, to nine patients. In six of them vomiting was produced: in two a slight purging. Three grains and a half given in three doses to two patients, caused no vomiting, but only two liquid motions in one; and the second only vomited once; while a third dose of two grains produced neither vomiting nor purging.

*Cases in which Emetine is applicable.*

These are the same as for the employment of ipecacuanha.

To procure vomiting, four grains dissolved in any vehicle, and given in divided doses, will excite vomiting. Were it given in one full dose, a single effort of vomiting would be made that would expel it from the stomach, without any further effect. The following mixture may be used.

*Emetic Mixture.*

Coloured emetine .....	4 grains
Weak orange flower water.....	2 ounces
Syrup of orange flowers .....	$\frac{1}{2}$ ounce.

A table spoonful may be given every half hour, until vomiting is produced.

In chronic pulmonary catarrhs, hooping cough, and long continued diarrhœa, I frequently prescribe the following lozenges.

*Pectoral Emetine Lozenges.*

Sugar .....	4 ounces
Coloured emetine .....	32 grains.

Divide into lozenges of 9 grains each. It is usual to colour these lozenges with some carmine, in order to distinguish them from the common ipecacuanha lozenges. One of these may be given every hour: more than this would excite nausea.

*Emetic Lozenges of Emetine.*

Sugar ..... 2 ounces  
 Coloured emetine ..... 32 grains.

Divide into lozenges of 18 grains each. A single one taken fasting is generally sufficient to induce vomiting in children. Three or four do the same in adults.

The following is a substitute for the ipecacuanha syrup.

*Emetine Syrup.*

Simple syrup..... 1 livre  
 Coloured emetine ..... 16 grains.

## PURE EMETINE.

The emetine of the preceding article is not in a state of purity. M. Pelletier has however succeeded in totally separating the active matter of the ipecacuanhas, and finds it to be a new alkali, possessing the properties and requiring the preparation as follow :

*Preparation of Pure Emetine.*

To obtain pure emetine, calcined magnesia must be substituted for the carbonate, (see the preceding article,) in sufficient quantity to take up the free acid that exists in the liquor, and that which is combined with the emetine. The emetine, thus separated and rendered less soluble, precipitates and mixes with the excess of magnesia. The magnesian precipitate washed with a little cold water, which takes up the colouring matter that is not combined with the magnesia, should be carefully dried and treated with alcohol, which dissolves the emetine. This being obtained by the evaporation of the alcohol, must be re-dissolved in a weak acid, and treated with pure animal charcoal; after which the emetine is precipitated by some salifiable

base. The waters that have served to wash the magnesian precipitate still contain some emetine, which may be procured by a series of operations, though, after all, emetine is retained with the magnesia.

M. Calloud's process for obtaining pure emetine, (see *Mem. de la Société Académique de Savoie*, t. i.) which is very similar to that of M. Henry for procuring sulphate of quinia, is as follows: Mix 125 grammes of the cortical part of ipecacuanha in powder with 800 grammes of water, acidulated, with 16 grains of sulphuric acid; boil the mixture, and keep it a little below that point of heat for half an hour, stirring it constantly with a wooden spatula; then pour the whole into an earthen dish, presenting as great a surface as possible.

The acidulated decoction is left to cool, and 125 grammes of powdered lime are added, and the whole dried in a stove, at a temperature not exceeding 50° of Reaumur.

This mass, which is composed of sulphate of lime, gallate of lime, fatty and colouring matters combined with an excess of lime, free emetine, fecula, and ligneous matter, is then pulverized. On submitting it to the action of boiling alcohol, the emetine, with a very small portion of foreign matter, is dissolved and may be subsequently obtained by evaporating the alcohol.

In order entirely to separate and blanch the emetine it must be dissolved in slightly acidulated water, then heated with purified animal charcoal, and the solution filtered and concentrated. Saturate the acid with weak ammonia: filter: wash with a little distilled water, and allow the residue to dry on the filter at the ordinary temperature, and in the dark; this will be pure emetine.

Emetine is procured, according to M. Calloud, from the mother-waters and washings, according to the methods already described.

The following are the proportions of emetine in dif-

ferent parts of the same species of ipecacuanha, and in different species:—

*Cephalis Ipecacuanha*, Grey Ipec. of M. Merat, contains in the cortical part of the root 16 parts of emetine in 100; the ligneous part of the root contains only 1.15. Deprived of the ligneous part, M. Pelletier found it to contain 14 parts of emetine in 100. The striated ipec. of M. Merat, (*radix psychotriæ*,) gives 9 parts: the *viola ipecacuanha* only 5 parts in the hundred.

#### *Physical and Chemical Properties.*

Pure emetine is white, not unfrequently a little coloured, pulverulent, not changed by the atmosphere: whereas coloured emetine is deliquescent. This substance is slightly soluble in cold water, more so in hot; very much so in ether and alcohol. It has a slightly bitter taste. It is very fusible, melting at about 50° of the centigrade thermometer. It restores the blue of reddened turnsol, and dissolves in all the acids, diminishing without extinguishing their acid properties, at the same time that it forms with them salts that are readily crystallizable,—in this resembling veratria. It is precipitated from its combinations by gall-nuts, like the cinchonic alkalis: hence gall-nuts would prove the only antidote in cases of poisoning by emetine. M. Caventou swallowed a dose of emetine, more than sufficient to cause violent vomiting, but he neutralized its effects by a decoction of gall-nuts.

According to MM. Dumas and Pelletier, the composition of pure emetine from the *cephalis ipecacuanha* is

	At. comp.
Carbon .....	64.57 = 37
Azote .....	4.00 = 2
Hydrogen .....	7.77 = 54
Oxygen .....	22.95 = 10

*Action of Emetine on the Animal System.*

It is the same as that of coloured emetine, but much more energetic. Two grains are sufficient to kill a large dog. I have seen vomiting produced by the sixteenth of a grain, in a man 85 years of age, in whom, however, vomiting was readily excited.

*Mode of administering Pure Emetine.*

I have long given these lozenges :

Sugar ..... 4 ounces.  
Pure emetine..... 8 grains.

Divide into lozenges of 9 grains each.

If it is desired to excite vomiting, a grain of pure emetine previously dissolved in a little acetic or sulphuric acid should be mixed with some compatible vehicle, as in the following formula :

*Emetic Mixture.*

Infusion of lime flowers..... 3 ounces.  
Pure emetine dissolved in acetic acid 1 grain.  
Syrup of marsh mallows ..... 1 ounce.

Give five grammes every quarter of an hour, until vomiting is produced.

*Syrup of Emetine.*

Clarified syrup ..... 1 livre.  
Pure emetine ..... 4 grains.

Dose, a tea spoonful.

[Looking impartially on the history and properties of emetine, I must confess that I do not see in it any of those qualities which render many of the other alkaloids in their isolated condition, preferable to the same, in combination with the other constituents of the vegeta-

ble to which they belong. Besides, there are many substitutes in case of failure with ipecacuanha powder, as tartar emetic, sulphate of copper, &c. &c. The emetic lozenges of emetine may, however, be valuable where it is desired to produce vomiting in children, without trouble to the attendants or disgust to the child.—*Tr.*]

---

### FEBRIFUGE ALKALIS.

Some years ago, MM. Laubert, Rheuss of Moscow, and Gomez of Lisbon published very interesting works on the cinchonas; but they were not agreed as to the principle in which the febrifuge virtue resided. MM. Pelletier and Caventou, led by former researches to believe in the existence of such a principle, and, conducting their inquiries on the plan which had led to the discovery of strychnia, emetine, &c. obtained a substance which they recognised as identical with the *cinchonia* already described by M. Gomez, and which they ascertained to be alkaline, a fact which had escaped previous notice. It was from the grey bark, (*cinchona condaminea*,) that they obtained the cinchonia. The yellow bark (*cinchona cordifolia*) afforded an alkali which, though similar to the cinchonia in many properties, differed too widely in others to be confounded with it; they therefore called it *quinia*. The red bark (*cinchona oblongifolia*) was next made the subject of analysis, and it became an interesting question whether this species, considered by many as the strongest febrifuge of all, contained cinchonia, quinia, or some third variety of alkali. The result was unexpected; the red bark afforded *cinchonia* precisely similar to that of the grey, but in three times the quantity, and *quinia* in nearly double the proportion found in the yellow bark. This quinia, with the exception of its somewhat greater fusibility, and a slight difference in the appearance of the sulphate, presented the same