

Action of Narceine on the Animal System.

I have several times injected 2 grains of it in the jugular vein of dogs, but no appreciable effects were produced.

Chemical properties of Meconine.

It is white, and crystallizes in six-sided prisms, fuses at 90°, when it resembles a colourless liquid. It requires 18 parts of boiling and 265 parts of cold water for its solution. It is also soluble in alcohol and ether. Alkalis have no remarkable effect on it. Cold sulphuric acid dissolves it without change of colour, but heated, it changes to the green of chlorophylle. Nitric acid does not change it to oxalic. Chlorine at the fusing point of meconine causes a blood-red colour, and transforms it into an acid, to which the name of *mechloic* has been given.

Meconine is composed of

	Atoms.
Carbon.....	60.247 = 9
Hydrogen	4.756 = 9
Oxygen	34.997 = 3

Action on Animals.

Repeated injections of a grain into the veins of dogs have no effect whatever. I have never tried its action on man.

CODEINE.

Codeine was discovered in 1832 by M. Robiquet. In treating solution of opium with muriate of lime a muriate of morphia is precipitated, in combination,

however, as M. Robiquet had reason to suspect, with some other substance. This substance is codeine, and forms with the acid and morphia *Gregory's salt*, or the *double muriate of morphia and codeine*. From this the latter is separated by ammonia, the major part of the morphia precipitating. The supernatant solution of codeine and ammonia with some non-precipitated morphia is concentrated until the chlorohydrate of ammonia begins to crystallize, and with it the double salt of morphia and codeine. The crystals are to be dissolved in water, filtered through charcoal, and a slight excess of caustic potass added, by which means the codeine alone is precipitated, and is then taken up by alcohol or ether.

M. Berthemot precipitates the double muriate by magnesia, and finds the codeine with the appearance of an oil, which becomes an hydrate, and forms crystals in the magnesian water.

Chemical properties of Codeine.

Codeine is insoluble in alkaline solutions, combines with acids, which it saturates, and with which it forms salts that are decomposed by tannin. Nitric acid does not redden it, nor is muriate of iron changed by it. Its geometrical forms are remarkable: according to M. Robiquet its atomic constitution is,

Carbon 31, azote 2, hydrogen 40, oxygen 5, or in 100 parts,

Carbon.....	71.339
Azote	5.353
Hydrogen	7.585
Oxygen	15.723

Physiological properties of Codeine.

The injection of a grain of codeine into the jugular vein of a middle-sized dog caused almost instantaneously

a deep sleep, which however was easily interrupted, again to be renewed and to continue for several hours, after which the animal was perfectly well. But on making the same experiment with the hydrochlorate of codeine, the animal, after sleeping five or six hours, died.

M. Barbier says, that codeine is peculiar by its specific action on the ganglionic nerves; and particularly those of the epigastrium. (*Gaz. Médicale*, April, 1834.) If this be established as a fact, it may lead to most important results as regards our knowledge of the functions of those nerves.

Action of Codeine in Disease.

A whole year's experience of its use has shown me that a single grain of codeine, given in two doses, in general produces a calm sleep, not succeeded, as is often the case with morphia, by lassitude and heaviness of the head. I have reason to think that a grain of codeine is equivalent in action to half a grain of pure morphia.

Two grains of codeine cause nausea; and even one grain cannot be long continued in with convenience.

Salts of Codeine:

The hydrochlorate I have found more active than simple codeine. Two grains induce vertigo, nausea, and vomiting. But I have found most obstinate facial and ischiatic neuralgiæ yield to it when all else had been tried.

Medicinal employment of Codeine.

As with morphia, codeine is applicable when pain is to be reduced and sleep procured. Being less active than morphia, it should always precede it as a remedy.

Mode of prescribing Codeine.

I generally mix one, two, or three grains with some julep, and not unfrequently give it in pills, which, however, never contain more than a grain in each.

Mode of prescribing the Salts of Codeine.

They may be given in the same forms as codeine itself, but being more active than it, the doses must be somewhat smaller. Hitherto I have only employed the hydrochlorate and the nitrate.

Many of my patients, who had ceased to be affected by morphia and its salts, received great benefit from the alternate employment of codeine and its salts.

DOUBLE MURIATE OF MORPHIA AND CODEINE, OR GREGORY'S SALT.

I have already shown under the head of Codeine that this salt is procured by decomposing the meconate of morphia and codeine in infusion of opium by solution of muriate of lime. The whole is filtered in order to separate the meconate of lime; the clear liquor is passed through animal charcoal, and needle crystals obtained by concentration.

Medicinal employment of Gregory's Salt.

It may at any time be used as a substitute for morphia and codeine, and in the same cases.