PRELIMINARY NOTES ON THE PHARMACOLOGY OF SOME NEW POISONOUS PLANTS.

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(Communicated by J. H. Maiden, F.L.S.)

Laurelia Novæ-Zelandiæ, A. Cunn., N.O. Monimiaceæ.

In a bush at Waipu, province of Auckland, N.Z., June 1887, whilst in search of poisonous plants, I found the bark of the tree called by the Maoris "Pukatea" had a rather agreeable aromatic bitter taste, a little of which was gathered for experiment.

Whilst at Christchurch some months later opportunity presented itself of investigating the physiological action of this and several other plants.

An alcoholic extract was made, which when injected into frogs, "the introduced frog from Australia, *Litoria aurea*," caused rapid death. A few spasmodic jerks of the hind limbs were noticed before the animal became flaccid. The muscles, motor nerves, and heart were apparently uninfluenced. A solution of the extract in water gave the reactions of an alkaloid.

Mr. Cheeseman of the Auckland Museum kindly told me the scientific name of the plant. There is only one other known species of *Laurelia* and that is indigenous to Chili.

Laurelia is related closely to the genera *Atherosperma* and *Daphnandra*, all the species of which genera possess active properties.

Myoporum lætum, Forst., N.O., Myoporineæ.

Preparations of this plant are poisonous to frogs. The bark contains an oil and a wax; whether or not any other substance I did not decide. The oil, at any rate, is poisonous to frogs.

Melicytus ramiflorus, Forst., N.O. Violarieæ.

This is a small tree with a peculiar tasting bark. An extract of it is slightly poisonous to frogs, and causes in them a good deal of secretion of the skin.

VERONICA SALICIFOLIA, Forst.
DYSOXYLUM SPECTABILE, Hook.
GENIOSTOMA LIGUSTRIFOLIUM, A. Cunn.
SOPHORA TETRAPTERA, Aiton.

} Also New Zealand plants were examined but found inert.

MARLEA VITIENSIS, Benth., N.O. Cornaceæ.

In May, 1888, through the courtesy of Messrs. F. M. Bailey and Carl Madsen, I had an opportunity to examine the Queensland collection of woods prepared for the Melbourne Exhibition.

A dozen or more bitter barks, not previously known, were found, but only that of *Marlea vitiensis* proved to be poisonous.

Preparations of this plant apparently kill frogs by bringing the heart to a standstill in diastole. Motor nerves and muscles are unaffected if death takes place rapidly, but if delayed they are found in a state of paralysis. This paralysis is due, in part at any rate, to stasis of blood circulation, for the heart beats very feebly from an early period of the poisoning. Vomiting is a remarkable symptom.

Frogs when poisoned with this substance become less irritable to a stimulus of any kind. The active principle is an alkaloid, easy of preparation. It is insoluble in chloroform, ether, benzine and turpentine, slightly soluble in water and in aqueous alcohol.

So far I have not been successful in getting it or any of its salts in a crystalline form.

It appears not to be emetine, although it probably belongs to the group of poisons of which emetine is the type.

LUFFA ÆGYPTIACA, Mill., N.O. Cucurbitaceæ.

This plant is a native of Northern Queensland, and was pointed out to me by Mr. Bailey as possessing an extremely bitter fruit.

Upon tasting the fruit there is experienced an intensely bitter sensation, which in a few minutes disappears but leaves a distressing acridity in the throat, which is not at its worst until several hours afterwards.

An extract is very poisonous and contains two principles, a bitter substance and a saponin.

PAPAVER HORRIDUM, DC., N.O. Papaveraceæ.

I have for some years past been anxious to ascertain whether the native poppy contained morphine, but it was not until last August that I was enabled, through the kindness of Mr. J. H. Simmonds, to obtain a supply of the plant.

All parts of the plant have a slightly bitter acrid taste. An extract is very poisonous to frogs, *Hyla cærulea*, *Chiroleptes australis*, and *Limnodynastes salminii*, but in none of these frogs are there any tetanic spasms developed. *Hylas* develop tetanus after poisoning with morphine. I endeavoured to prepare morphine from an extract of this plant according to the method prescribed by the British Pharmacopœia, but failed to get even a trace of that substance, or indeed of any other substance. Judging from this and from the physiological effect on frogs it would appear that the active principle is not morphine. It is, however, quite as poisonous as morphine.

I have to thank Mr. Chas. De Vis, M.A., for the scientific names of the frogs.

SOLANUM VERBASCIFOLIUM, Ait., N.O. Solanaceæ.

A large shrub, often twenty feet high, with a bitter bark. An extract of the bark is only slightly poisonous to frogs.

An alkaloid can be prepared in a pure state from this plant in the following manner. Pulverise the bark, exhaust by boiling aqueous alcohol, distil off the alcohol, dissolve the extract in water, filter, precipitate with carbonate of soda. It seems to be insoluble in ether and chloroform, but very soluble in alcohol. It is not mydriatic. In these particulars it agrees with Solanine.*

STEPHANIA HERNANDIÆFOLIA, Walp., N.O. Menispermaceæ.

The root of this plant is bitter. An extract of it is extremely poisonous to frogs. These animals are affected by it in a most remarkable manner. After they have had the poison injected into a lymph-sac, they remain perfectly quiet until suddenly they are attacked with violent convulsions, which last one or two

* Since the above was written I have discovered that Solanine has been found in the fruit of this plant. (Wittstein's Organic Constituents of Plants, translated by Baron von Mueller, pp. 204 and 257.)

minutes, after which they become flaccid and have spasmodic contractions of all the limbs every moment or so, the contractions getting weaker and weaker until they cease. The heart continues to beat regularly for many hours and stops in full diastole.

There is a great increase of secretion of the skin.

Frogs that have had less than a lethal dose become very irritable; there is a marked increase of reflex excitability. It is difficult, however, to make them jump ; when one does so it lands upon its belly and this causes a spasm. There is a loss of co-ordination of muscular movement.

If the brain of a frog be destroyed previous to poisoning with this substance, some convulsions appear but they are not of so violent a kind as when the brain is intact.

The physiological action of this substance appears identical with that of picrotoxin, the active principle of *Cocculus*, a genus of the same order as *Stephania*.

As picrotoxin is an easy substance to separate I shall ascertain whether it is present in this plant, and add the result of the chemical investigation as this paper passes through the press.

Note.—I failed to obtain picrotoxin from this plant, but found that the active principle was a totally different substance. It appears to be an alkaloid, and may be separated in the following manner :—Bruise the rhizome in an iron mortar, macerate for several days in rectified spirit of wine, decant the tincture and allow it to evaporate. Treat the extract with water, filter, add some neutral lead acetate, digest ten minutes and set aside for several hours, filter, remove excess of lead with sulphuretted hydrogen and evaporate to a syrup, add a very little liquor potassæ, and shake out the active principle with anhydrous ether.

It is thus left as a colourless, non-crystalline substance, like bits of gum arabic. It has a peculiar smell and is bitter, neutral to litmus, slightly soluble in water but very soluble in alcohol, easily soluble in acidulated water, and the resulting salts are apparently non-crystalline ; they set as varnishes.

It is exceedingly poisonous, and the symptoms produced are those of the crude extract.