

XXII.—*Note on an Alkaloid contained in the Seeds of the Ricinus communis, or Castor-oil Plant.*

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IT is well known that certain parts of several plants belonging to the natural order *Euphorbiaceæ*, as well as various pharmaceutical preparations obtained therefrom, have been long employed in medicine; and that, notwithstanding this circumstance, we are still but most imperfectly acquainted with the chemical constitution and physiological actions of the proximate principles upon which depend the therapeutic powers of such bodies. With the view of endeavouring to contribute information upon this subject, I have devoted much of the spare time which I could snatch from that devoted to my ordinary professional pursuits, to the isolation, if possible, of the active constituents of castor and croton seeds, and of the oils expressed from them, of gum-euphorbium and of cascarilla bark, *i. e.* the bark of *Croton cascarilla* or *Croton eleuteria*. Now although my essays in this particular direction have not at present been crowned with success, I have nevertheless discovered several substances in Euphorbiaceous plants which possess more or less chemical interest, and an account of which I hope shortly to publish. On some future occasion I intend furnishing the Society with a complete description of these bodies; but I take the present opportunity of partially describing an alkaloid provisionally named ricinine, which I have discovered in the seeds of the *Ricinus communis* or castor-oil plant.

*Preparation of Ricinine.*—Crushed castor-seeds are boiled with, and exhausted by, successive quantities of water. The aqueous solutions thus obtained, after being passed through a wet calico filter to remove as much oil as possible, are evaporated over a water-bath to the consistence of an extract. This extract is exhausted by boiling alcohol, and the spirituous solution thus produced is filtered while hot. The filtrate on cooling deposits a small amount of resinoid matters, which are separated by filtration. The filtered liquid is then deprived of its excess of alcohol by distillation, and allowed to stand all night. The next morning an almost white crystalline substance is found adhering to the sides and bottom of the vessel containing the above-named concentrated spirituous solution. This crystalline body is ricinine, and in order to obtain it in a pure state it is only necessary to crystallize it from alcohol several times, and decolorize it with animal charcoal.

*Properties of Ricinine.*—Ricinine crystallizes in rectangular prisms and plates. When placed on the tongue it slowly manifests a feebly bitter taste, somewhat resembling that of bitter almonds. Cautiously heated on a glass plate, it melts and forms a colourless and mobile liquid, which, on cooling, solidifies into a whorl of acicular crystals. On heating it between two watch-glasses, a sublimate is obtained which appears to be unaltered ricinine. Strongly heated on platinum-foil, the alkaloid first melts, and subsequently burns with a highly luminous and fuliginous flame.

Ricinine is pretty readily dissolved by water and by alcohol, but is only slightly soluble in ether and in benzol.

When ricinine is heated with solid hydrate of potassium, ammonia is evolved, proving that the alkaloid contains nitrogen.

Concentrated sulphuric acid dissolves ricinine without colouring it, and the addition of bichromate of potassium to the solution simply causes the development of a greenish hue.

Iodic acid appears to undergo no change when brought in contact with ricinine, even though the mixture be warmed.

Both hot and cold concentrated nitric acid dissolve ricinine without evolving red vapours; and on evaporating the solution thus produced to a small bulk and allowing it to cool, groups of transparent and colourless acicular crystals form. These crystals are rendered opaque by the addition of water.

Concentrated hydrochloric acid dissolves ricinine, and the hydrochlorate of the base, which is doubtless produced in this reaction, appears to be easily decomposed, both by evaporation

and by dilution. A solution of ricinine in concentrated hydrochloric acid does not give a precipitate with a concentrated aqueous solution of bichloride of platinum, but if a mixture of these compounds be evaporated more or less, well defined orange octahedrons of the chloroplatinate of ricinine crystallize out.

On mixing together cold saturated solutions of ricinine and mercuric chloride no change is at first observed; but if the mixture be allowed to stand for a few minutes, a mass of beautiful silky crystals, arranged in fasciculi, forms, which is so solid that the vessel in which the experiment is performed may be inverted without any fear of its contents falling out. This mercurial compound of ricinine is purified by crystallization from water or alcohol.

If ordinary castor-oil be shaken up with water, and the water afterwards separated from the oil, and evaporated to dryness over a water-bath, a small quantity of a resinous residue is left, which, when digested with boiling benzol, partly dissolves; and if this benzoic solution be allowed to evaporate spontaneously, crystals are obtained which, so far as one can judge from their physical qualities, consist of ricinine.

Neither ricinine nor the risinoid body which falls when the alcoholic solution of the aqueous extract is allowed to cool, constitutes the purgative principle of castor-seeds; for I gave two grains of each of these substances (which are equivalent to several pounds of seed) to a rabbit about a month ago, and the animal has not evinced the slightest inconvenience.

By a process precisely similar to that which was employed in the isolation of ricinine, I have obtained an alkaloid analogous to, possibly identical with, that base, from croton-seeds and oil.

It may be interesting and important to mention that Brandes, many years ago, announced the existence of an alkaloid named cascarella, in cascarilla bark, *i. e.*, the bark of *Croton eleuteria*, or *Croton cascarilla*, both belonging to the natural order *Euphorbiaceæ*. This alkaloid, if we may judge from the published account of its properties, possesses similar physical qualities to those of ricinine, but the action of sulphuric and hydrochloric acids on the two alkaloids is very different.

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