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Botanical Medicine Monographs and Sundry

CIMICIFUGA RACEMOSA.

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From an Inaugural Essay.

Description.—The rhizome is (25 mm.—15 cm.) 1 to 6 inches or more in length, and from (5—25 mm.) $\frac{1}{5}$ to 1 inch in thickness, horizontal, rather hard, after drying brownish-black externally, yellowish-white internally, with stout upright or curved branches. These branches are annulated and slightly wrinkled, and are marked above by cup-shaped scars left by the decay of the overground stems of previous years. Attached to the lower side of the rhizomes are numerous brittle, irregularly rounded, wiry rootlets, about (3 mm.) $\frac{1}{8}$ inch thick, or less, of a blackish-brown color externally, white internally, and longitudinally wrinkled. The drug has a rather heavy disagreeable odor when fresh, but is nearly inodorous when dried. The taste (at first mucilaginous) becomes persistently bitter and acrid. The drug when dry and old has these qualities less evident, which point to the fact that it is less active than when recently dried, or when in a fresh state, and this is fully carried out by the more satisfactory results obtained by the administration of the latter as remedial agents. It should be collected in the latter part of August and early part of September, as at this time of the year the drug is most fully developed. The odor and taste of the rootlets resemble that of the rhizome. As met with in commerce, the rootlets and often the rhizomes are much broken, and quite frequently the former are altogether wanting.

Histology.—The rhizome breaks with a smooth fracture, and exhibits upon a transverse section a large central pith made up of about twenty-one rows of colorless, thin-walled, parenchymatous cells. Surrounding this central cell-structure is a circle of wood-tissue, about as wide as the pith, consisting of flattened prosenchymatous cells smaller than the cells of the pith and circularly arranged in more or less distinctly wedge-shaped masses, and, of large thicker walled cells, which upon examining a longitudinal section proved to be pitted ducts. The woody-tissue has

about thirty to forty medullary rays radiating through it from the pith to the bark. These rays are made up of ten to twelve rows of elongated parenchymatous cells and two to three rows of pitted ducts. The pleurenchymatous tissue is separated from the prosenchymatous tissue of the bark by a cambium layer made up of a single row of rectangular-shaped cells about one-fourth the size of the surrounding cell-structure. The bark is made up of two layers. The outer bark consists of three to five rows of loose thin walled parenchyma, containing a yellowish-brown coloring matter. The inner bark consists of about thirty rows of horizontally flattened prosenchymatous cells larger than the cells of the woody tissue or pith.

The rootlets have a short, smooth fracture; and upon a transverse section show an outer and inner bark, a cambium layer, and a medullium. The outer bark consists of one to two rows of parenchymatous cells loosely placed together containing a brownish coloring matter. The inner bark consists of ten to twelve circular rows of flattened prosenchymatous cells. The bark is separated from the medullium by a cambium layer of a single line of rectangular cells smaller than the surrounding tissues. The medullium is made up of complete parenchymatous cells, with lighter colored rectangular pleurenchyma tissue radiating through it in a triangular, cross-like or stellate manner according to the number of wood-bundles. Around the outer sides of the medullium and at the ends of the wood-rays the parenchyma tissue is crowded in dense masses and elongated, as if pushed out of place by the wood-bundles. The arrangement of the woody tissue in the rootlets, representing a maltese cross, is the characteristic distinguishing mark of the drug.

Medical History.—The early history of this drug, and the time when it was first used as a remedial agent to the human race is not known. Considerable variance of opinion has existed with regard to the influence this drug is capable of exciting upon the animal economy.

Linnæus, in his *Materia Medica* published in 1771, called it *Actaea racemosa*, and classed it among the sudorifics and anodynes. The first mention of the drug by the profession was made by Benjamin Smith Barton in his *Collections for an Essay towards a Materia Medica of the United States*, in which he says: "The *Actaea racemosa* or Black Snakeroot, is also a valuable medicine. The root of the plant is considered astringent. In a putrid sore-throat which prevailed in Jersey,

many years ago, a strong decoction of the root was used as a gargle with great success. The Indians called it squaw-root, and set an high value on it as a medicine. A decoction cures the itch.”

The author then notes from various journals and standard works the observations and recommendations by Drs. Garden, of Wyliesburg, Va., (1823), C. C. Hildreth, Chapman (1831), Jesse Young, Davis, Physicks, Wood and many others, and afterward discusses the introduction of the drug into the United States Pharmacopoeia and the various preparations made from it since 1860.

Chemical Analysis.—Two portions, 5 grams each of the fresh rhizome and rootlets were dried: one spontaneously, the other in a desiccator. That portion dried spontaneously lost 52.5 per cent., that in the desiccator 54.5 per cent. of moisture. One gram of the powdered air-dried drug at 100° C. lost 7.8 per cent. of moisture. This upon being incinerated at a low heat, yielded 6.8 per cent. of a grayish-white ash ; of this ash, 1.3 per cent. was soluble in water, consisting of potassium and sodium as chlorides and sulphates; 3.6 per cent. soluble in hydrochloric acid, consisting of calcium, iron, and magnesium as carbonates and phosphates; 4 per cent. soluble in sodium hydrate, consisting of combined silica, and 1.5 was insoluble in water, hydrochloric acid and sodium hydrate.

An infusion of the drug upon evaporating and cooling became slightly gelatinous. The infusion yielded, precipitates with nitric acid, copper sulphate, lead acetate, silver nitrate, mercuric chloride, ammonium moyalate and gelatin; it became blue with iodine and reduced Trommer's solution.

The percolate, made with cold water, was of a yellowish-brown color, at first clear, soon became cloudy and upon evaporating yielded 23.5 per cent. of a brownish-black extract. The alcoholic percolate was of a clear golden yellow color, and upon evaporating yielded 12.5 per cent. of uniform yellowish-brown extract.

Wax was found in small quantities, by treating the resin exhausted by alcohol, with chloroform. Resin was obtained by exhausting the drug with alcohol, evaporating and pouring the concentrated tincture into water, collecting the precipitate washing and drying. The resin had a brownish-yellow color, was without odor, but had a slight taste, was

soluble in alcohol, ether and chloroform, partly soluble in cold and hot solutions of potassa, and insoluble in benzin, hot and cold water. After treatment with animal charcoal the resin was of a yellowish-green color, and when incinerated left a grayish-white ash.

The distillate obtained by cohobation from 26 pounds of the fresh drug, was milky and had the odor of the drug, but no separation of volatile oil occurred, though the top of the bottle which contained the distillate, appeared greasy when the water was shaken. Portions of this distillate were then agitated with ether, chloroform and deodorized benzin, and set aside. After twenty-four hours that agitated with benzin had a whitish snow-like substance floating upon the top, while that which had been agitated with chloroform had separated the substance at the bottom of the vessel, and no similar separation was observed in the portion of the distillate agitated with ether.

The floating mass, collected from the distillate agitated with benzin, appeared like minute globules, and after freeing it as much as possible from benzin and water, and evaporating it to dryness, the residue weighed .025 grams and was a fine grayish-white powder without odor or taste, soluble in alcohol, slightly soluble in benzin, benzol and stronger ether, insoluble in water.

Ten pounds (avoir.) of the fresh drug was placed in an hydraulic press (power 4,000 pounds to the square inch). From this pressure there resulted one pint and a half of dirty-brown colored liquid, which after filtering was blackish-brown, and on evaporating yielded 4.252 grams of brownish-black extract. Treated in the manner stated by T. E. Conard, "Am. Jour. Phar., 1871, p. 152" the crystalline substance described by him, was obtained, the properties of which differed in the following particulars: It was insoluble in hydrochloric acid, but soluble in sulphuric and dilute sulphuric acids. Strong sulphuric acid, when in contact with it for a little time, gave it a brown color, which upon the addition of a few drops of solution of bichromate of potassium was changed to a permanent yellow. An alcoholic solution was neutral, or if anything slightly alkaline to test paper, and when concentrated and poured into water gave a white precipitate which was insoluble in the alkalies. The fumes from the substance when fused with pure potassa, in a test tube, colored red litmus-paper blue, and gave rise to white fumes when a rod moistened with hydrochloric acid was passed partly into and over the top of the tube. The substance fuses at a moderate

heat, and is entirely dissipated at a red heat. A precipitate was obtained when a solution of the substance in alcohol was treated with an alcoholic solution of chloride of gold and sodium, also when an acid solution was treated with an aqueous solution of chloride of gold and sodium. An acid solution when treated with phosphomolybdic acid gave a precipitate. An acid solution (the acid solutions all made with dilute sulphuric acid) gave with solution of iodo-hydrargyrate of potassium a precipitate. A precipitate was gotten from an alcoholic solution by adding an aqueous solution of tannin, care must be taken not to add sufficient to get a precipitate with water in the test solution. From the above tests and the examination with the microscope which I have made of this substance, isolated from *cimicifuga racemosa*, I judge it to be an alkaloid.

SANICULA MARILANDICA, LINNÉ.

BY CALVIN JEROME HOUCK, PH.G.

From an Inaugural Essay.

This species, which is known in the neighborhood of Lebanon, Pa., by the name of Black Sanicle Root, or Pool Root, is a perennial plant growing to the height of about two feet. The stem is slender, finely grooved, and dichotomously branched above. The stem-leaves are 5—7 parted, the divisions ranging in shape from obovate to lanceolate, and being doubly serrate. The flowers (some of which are sterile) are arranged in nearly simple umbels. The fertile flowers are sessile, and produce a round orthospermous cremocarp which is covered with prickles. The plant grows in abundance in the interior of Pennsylvania, in shady and rocky woods, and flowers in June or July. The root which is the part employed, is short and thick, with many rootlets, has a slight odor when fresh, which becomes more persistent by long keeping, and is light brown in color, but becomes black after drying. It is collected during the month of August, and loses one-fourth (?) of its weight by drying. When boiled the bark is detached exposing the thin white inner root. The root when chewed is strongly acrid, and pungent, and quite aromatic, but leaves a very unpleasant sickening sensation on the tongue and paucis, remaining for a long time. It is an expectorant, diaphoretic; sometimes used in intermittent fever, also in chorea. In the interior of Pennsylvania, it is extensively used in domestic practice for pulmonary affections, with satisfactory results.

Owing to the oily nature of the root, an ethereal extract was first prepared from four ounces of the root in fine powder by exhausting it with ether; the extract was oily, resinous, very aromatic, dark in color, with a burning acrid, and nauseous taste, insoluble in water, partly soluble in alcohol and chloroform. A portion of this extract dissolved in an alkaline solution, was precipitated by the addition of a small quantity of acid ; upon drying this precipitate and subjecting it to a flame it burns emitting dense smoke.

Four ounces of the root in No. 40 powder, exhausted with dilute alcohol, yielded a soft extract weighing 2¹/₂ drachms; only slightly pungent, not very aromatic, but dark in color, containing only a slight trace of oil and no resin, but considerable coloring matter. Eight ounces of the powdered root in (No. 50 powder) were exhausted, first with ether, then with alcohol, and lastly with dilute alcohol. The ethereal tincture had scarcely any color, but contained considerable oil and resin. The alcoholic tincture was of a pale straw color, and contained resin and extractive. The dilute alcoholic tincture was dark brown in color and contained tannin, extractive and coloring matters. These tinctures being evaporated to extracts and testing as before, gave results similar to those mentioned before.

The four ounces of root which had been exhausted by dilute alcohol alone, were boiled with water, giving a decoction which was dark brown in color, with but slight odor. By testing it was found to contain gum, starch, coloring matter and extractive.

One ounce of the root was carefully reduced to ashes, weighing 43 grains, and containing phosphate and carbonate of potassium, calcium, magnesium and iron.

The virtues of the root probably depend mainly on the volatile oil and resin; the alcoholic tincture seems to contain all the desirable constituents in solution.

CHEMICAL AND PHARMACOGNOSTICAL NOTES.

Euphorbia pilulifera.—Dr. C. C. Baker, of New Mexico, reports in the "Therapeutic Gazette," for January, 1884, his use of this plant in two

cases of asthma. The results in both were very prompt and satisfactory. This tropical weed has been long used in aphthae and as an alterative. As far as may be judged from the sensible properties, the virtues of the plant are probably not superior to those of the closely allied indigenous weeds *Euph. maculata* and *hypericifolia*. A western species, *Euph. humistrata*, Engelmann, appears to be in popular use in some localities as a remedy for bowel complaints.

Hazigne.—In the “Journal de Pharmacie” for June (p. 456) Professor H. Baillon describes a Malagasy plant called “hazigne,” the fruits of which yield an oil, and the stem a resin, which are used by the natives as a remedy in certain skin diseases, such as leprosy, the itch and ulcers. The oil obtained from the seeds is also used as food and for lamps. The hazigne is a handsome tree belonging to the Guttiferse, and is named *Symphonia fasciculata*. The fruit is known to the natives by the name of “voa-sou-vouara.” Some of the seeds are now being submitted to chemical analysis by Messrs. N. J. Regnaud and Villejean.—*Phar. Jour. and Trans.*, June, p. 1048.

Phaseolus limatus, Lin.—In the “Practitioner”(p. 435) it is pointed out that the *Pois d'Achery*, a sort of kidney bean (*Phaseolus limatus*, L.), cultivated in the Mauritius and used there as an occasional article of diet by the Creoles, exists in the form of two varieties; the one white, which is generally esteemed wholesome, and the other very prettily variegated, which is regarded as poisonous. The poisonous character of the latter is due, according to Drs. Davidson and Stevenson, to hydrocyanic acid, which is formed when the beans are macerated in water by a similar process to that by which it is produced in certain plants of the Rosaceae, such as the almond and cherry laurel. The reason why two varieties of a plant which cannot be distinguished from each other by any definite botanical characters should produce different chemical compounds is a most interesting problem, and seems to deserve further investigation.—*Ibid.*

Croton morifolius.—A Mexican plant, by name “palillo,” has recently been the subject of experiment in France, by Messrs. Dugees and Armendaris (“Bull. Soc. Eot.” [2], v., p. 233). Two or three drops of the oil contained in the seeds act like a moderate dose of castor oil. The natives of Mexico use the leaves of the plant in the form of infusion as a remedy for gasfrcalgia and atony of stomach. The tincture of the leaves is said by the above-named experimentalists to give excellent results in

neuralgia, especially when occurring in the face, either when used as liniment, or dropped into the ears, or taken in the dose of 10 or 15 drops in orange-flower water.—*Ibid.*

Sizygium jambolanum is an East Indian plant belonging to the natural order Myrtaceae, the fruit of which has recently been somewhat in demand on the Continent for use in the treatment of diabetes. M. Banatrala ("Repertoire de Pharmacie," p. 169) has found, in three cases in which he has tried it, that its use led to a diminution in the amount of urine secreted, and that it caused the disappearance of the sugar. These results were manifested in forty-eight hours after taking the medicine. During the time that the patients were submitted to the action of the drug they could take amylaceous food with impunity. The astringent rind of the fruit appears to be the active part.

Matico-camphor.—A specimen of matico-camphor (from *Piper angustifolium*), examined by K. Kügler ("Ber." [16], pp. 2841-2843, had the odor and taste of matico-leaves, and melted between 89° and 103°. After repeated crystallizations, it melted at 94°, the mother-liquors containing a yellow amorphous resin. Matico-camphor exhibits a rotatory motion on the surface of water; it is not attacked by aqueous alkalies, is readily soluble in alcohol, ether, chloroform, benzin, and light petroleum. The pure substance lacks both taste and odor. In contact with hydrochloric acid, it assumes an intense violet color, which changes to blue and then to green, the compound yielding brown crystals from ether, showing green fluorescence, and having an ethereal odor. With sulphuric acid, it becomes yellow, then red, and finally violet. With sulphuric and nitric acids, it assumes first a yellow, then a violet, and finally a blue color. Matico-camphor has the formula $C_{12}H_{20}O$; it is, perhaps the ethyl-derivative of ordinary camphor.—*Ibid.*

Mannitol in the ananas.—In the course of the analysis of ananas from Pernambuco and Brazil, L. Lindet ("Bull Soc. Chim." [40], pp. 65-66) isolated crystals of mannitol; the quantity obtained was equal to more than 1 per cent. of the fresh fruit. The identity of the crystals with mannitol was established by combustion, crystalline form, solubility, and absence of rotatory and cupric oxide reducing power.