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Botanical Medicine Monographs and Sundry

EXAMINATION OF ERICACEOUS PLANTS.

BY EDWARD N. SMITH, PH.G.

From an Inaugural Essay.

Specimens of *Chimaphila maculata*, Pursh, *Pyrola elliptica*, Nuttall, *P. chlorantha*, Swartz, and *P. rotundifolia*, var. *asarifolia*, Michaux, were collected by myself during the months of June and July, 1880, carefully dried and powdered. With a view of ascertaining if they contained the same constituents as found in other ericaceous plants, I followed the process of Julius Jungmann ("Amer. Jour. Phar.," 1875, p. 202), by which he isolated the constituents of *Uva ursi*.

The coarsely powdered leaves were exhausted with water by percolation, the infusion heated to the boiling point and strained, when a flocculent coagulum of albumen was left on the strainer. The infusion was then concentrated and treated with freshly prepared hydrated oxide of lead. The precipitate was separated by a filter and the filtrate still more concentrated and divided into two portions; the first was set aside in a warm place to evaporate spontaneously, the second was treated with strong alcohol which produced a bulky precipitate.

The precipitate was separated by a filter and the alcoholic filtrate was divided into two portions; the first was set aside in a warm place to evaporate spontaneously, the second was evaporated to a syrupy consistence, then treated with ether and the ethereal solution evaporated at ordinary temperature. The residue consisted of a small quantity of crystals in prismatic needles mixed with a considerable quantity of resinous matter.

The alcoholic solution, after evaporation, yielded a dark colored extract which was re-dissolved in alcohol, then treated with animal charcoal, filtered and again evaporated at ordinary temperature. The residue contained a small quantity of acicular crystals.

The aqueous solution, after evaporation, yielded a soft extractive mass which was treated with a mixture of alcohol and ether; the solution was evaporated at ordinary temperature and yielded crystals in prismatic needles having a silky lustre.

All the crystals thus far obtained proved to be arbutin.

A second quantity of coarsely powdered leaves was boiled with water, the decoction strained and then treated with a concentrated cold aqueous solution of acetate of lead as long as a precipitate was thereby produced. The precipitate was separated by a filter and the filtrate treated with a solution of subacetate of lead until it no longer produced a precipitate; this was also separated by a filter and the filtrate freed from the lead by sulphuretted hydrogen, the sulphide of lead separated by a filter and the excess of sulphuretted hydrogen expelled by heating the filtrate. The filtrate was then evaporated to a syrupy consistence, re-dissolved in water and treated with animal charcoal, then filtered and again concentrated and while hot set aside. The solution, on standing, deposited crystals of arbutin in small bunches of needles of a white color.

Concentrated sulphuric or hydrochloric acid added to the crystals gradually dissolved them without change of color.

With nitric acid the crystals first turned black and then slowly dissolved, the acid assuming a yellow color and giving off fumes of nitrous acid.

A dilute aqueous solution of the crystals also produced the characteristic blue color with Jungmann's phosphomolybdic acid and ammonia test.

This test will also produce a blue color with solutions of morphia, aconitia, atropia and berberina, but not in such dilute solutions as is the case with arbutin, of which—according to Jungmann—1 part is distinctly indicated in 140,000 parts of water. The color is (in each case) dissipated by heat.

With a view to ascertain the value of this test, for detecting the presence of arbutin in plants without isolating it, experiments were made with the infusions of belladonna, aconite, berberis, digitalis, senna, lobelia, toxicodendron, absinthium, sabina and others. The infusions were diluted with sufficient water to make them perfectly colorless, then rendered alkaline with ammonia; but on the addition of

phosphomolybdic acid they did not produce the characteristic blue color which is produced with infusions of the ericaceous plants known to contain arbutin.

EXAMINATION OF THE PRECIPITATES.

1. The precipitate obtained on adding hydrated oxide of lead to the infusion of the leaves, and separating by a filter, was well washed and dried, then suspended in water and decomposed by sulphuretted hydrogen; the sulphide of lead was separated by a filter and the excess of sulphuretted hydrogen expelled by heating the filtrate. The filtrate was then concentrated and divided into two parts.

Part first was treated with a solution of gelatin, which produced a precipitate denoting the presence of tannin; the precipitate was separated by a filter and the filtrate treated with a neutral solution of ferric salts, which produced a bluish-black precipitate which disappeared on heating the solution, thus indicating the probable presence of gallic acid.

Part second, treated with a solution of calcium chloride and lime water, produced no precipitate, thus denoting the absence of tartaric acid; but, on heating the solution to the boiling point, a precipitate of calcium citrate was thrown down from the solution obtained from *Chimaphila maculata*, but no precipitate was produced with the solutions obtained from the plants of the genus *Pyrola*.

The solutions were then concentrated and treated with strong alcohol, which produced a precipitate of calcium malate in the solutions obtained from the plants of the genus *Pyrola*, but none in the solution which was separated from the citrate of calcium precipitate.

The organic acids as obtained by these investigations, therefore, are: In the plants of the genus *Pyrola*, tannic, gallic and malic acids, and in *Chimaphila maculata*, tannic, gallic and citric acids.

2. The precipitate obtained by treating the concentrated infusion with strong alcohol was then treated with water in which it mostly dissolved; the solution was filtered and found to contain glucose by Trommels test.

The filtrate was then concentrated and again precipitated with strong

alcohol; the precipitate was completely soluble in water and found to consist of gum and coloring matter.

3. The precipitate obtained on adding a solution of acetate of lead to a decoction of the leaves, and separating by a filter, was well washed, then suspended in water and decomposed with sulphuretted hydrogen, the sulphide of lead separated by a filter and the excess of sulphuretted hydrogen expelled by heating the filtrate. The filtrate gave a precipitate with gelatin; a dark green color with ferric salts; a reddish color with caustic alkalies, and a precipitate by Trommer's test.

4. The sulphide of lead obtained on removing the excess of lead from the aqueous decoction of the leaves by sulphuretted hydrogen was first treated with hot water and then with hot alcohol, the solutions filtered and concentrated in a water-bath and, while hot, set aside. The aqueous solution, on standing, deposited a small amount of crystals of arbutin in small bunches of needles, but no crystals were obtained from the alcoholic solution.

On heating the mother liquors from arbutin with dilute sulphuric acid some ericolin was obtained as a brown-yellow resinous mass. It was stated by Jungmann to be soluble in alcohol but insoluble in water and could be purified by dissolving it in the former and precipitating by the latter. In experimenting with it, I found it to be soluble in both alcohol and water.

The leaves previously exhausted with water and dried were then exhausted with strong alcohol by maceration and percolation, and the dark green tincture thus obtained was evaporated, then treated with water and the residue washed with ether and dissolved in hot alcohol which, on cooling, deposited urson as an apparently amorphous mass, but on dissolving in hot alcohol microscopic needles were obtained.

Concentrated sulphuric acid turns the crystals black, the acid assuming a red color.

Concentrated nitric acid turns them yellow, giving off fumes of nitrous acid.

On distilling a quantity of the leaves with water, a distillate was obtained which was neutral to test paper and had a tea-like odor,

probably due to a small amount of volatile oil.

These investigations were performed with specimens of each of the plants, with nearly the same results.

The organic constituents of these plants, as obtained by these investigations, are therefore:

Arbutin, ericolin, urson, tannic, gallic and malic acids (in *Chimaphila maculata*, tannic, gallic and citric acids), gum, sugar, albumen, a small amount of volatile oil and some coloring matter.

THE ROOTS OF APOCYNUM ANDROSÆMIFOLIUM AND APOC. CANNABINUM.

BY EDWARD ADOLPHUS MANHEIMER, PH.G.

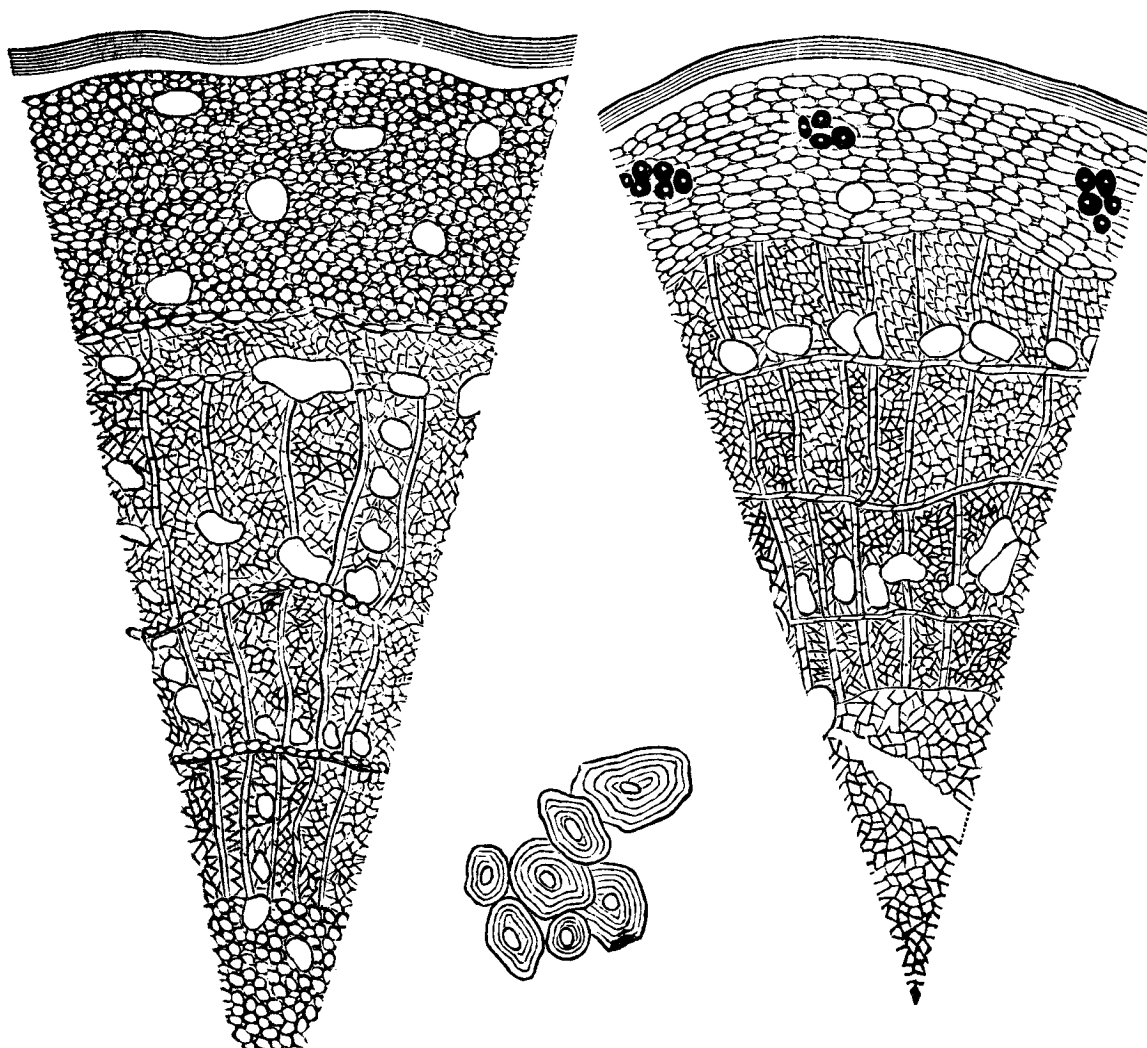
From an Inaugural Essay.

The close botanical relation of the two plants named suggested a microscopic examination of their roots, both of which are recognized by the pharmacopoeia as medicinal agents. The root of *Apocynum cannabinum* was easily procured in commerce and identified by Prof. Maisch. A number of wholesale drug houses were applied to for the root of *Apoc. androsæmifolium*, but invariably a substitute was furnished, proving to be the root of *Apoc. cannabinum* or of a plant closely allied to it. A genuine specimen, however, was procured from the collection of Prof. Maisch.

The two plants, which resemble each other, are indigenous to the United States; but the *Apoc. androsæmifolium*, or dog's-bane, grows chiefly in the northern part, while the other species, called Indian Hemp, is common in the southern part of the country.

The root of dog's-bane is long, about $\frac{1}{8}$ or $\frac{1}{4}$ inch thick, somewhat branched, externally dark brown, internally white. The bark is thin, longitudinally wrinkled, somewhat fissured transversely and is readily separated from the wood; the cambium line in the dry root is quite indistinct. The wood is fibrous and tenacious and encloses a pith of the same width as the bark, or even broader, and surrounded by a distinct medullary sheath. The wood is almost tasteless, while the bark has an

unpleasant taste.



APOC. CANNABINUM.

Bast cells.

APOC. ANDROSÆMIFOLIUM.

Transverse sections.

The root of Indian hemp is horizontal, several feet long and appears in the market in pieces varying in thickness from $\frac{1}{8}$ to about $\frac{3}{4}$ inch. The bark is brown-gray, deeply wrinkled and transversely fissured, about one-fifth the width of the root, and in the dry state has an indistinct cambium line. The wood is yellowish, soft, porous, more particularly in the outer portion, breaks readily with a smooth even fracture, and has no, or only a minute pith. Both bark and wood have a bitter taste, but that of the former is more persistent. The stems, which are sometimes mixed with the root, have a smooth red-brown bark, which is not very

thick, and a pith which has generally disappeared, leaving the stem hollow; they have a slight sweetish taste.

Under the microscope, the dog's-bane shows in the pith a few vessels and much starch; the cells are largest near the centre and are more or less compressed towards the wood, which is traversed by many medullary rays and contains, chiefly in the outer portion, a number of vessels. The bark is composed of oblong cells, differing in size and containing starch; a few laticiferous vessels are seen and several groups of thick-walled bast cells, arranged somewhat in a circle near the middle of the bark.

The root of *Apoc. cannabinum* shows, in the transverse section, in the centre a few small round cells. Then follows the wood, showing about three annual layers, vessels somewhat arranged in rows, and many medullary rays running into the bark. The cells of the bark are roundish, contain an abundance of starch and also numerous laticiferous vessels.

The author also examined microscopically the root that had been sold to him as that of *Ap. androsæmifoliurn*, and found it in most respects to agree physically and microscopically with the root of *Apoc. cannabinum* examined by him, the differences observed (two circles of wood, curved medullary rays, etc.) being of no importance. It is quite likely that nearly all the fluid extract of *Apoc. androsæmifolium* which is sold in our market has been made of this substitute or of *Apocynum cannabinum*.

PHARMACEUTICAL NOTES.

BY ROBERT F. FAIRTHORNE, PH.G.

Unguentum Aquæ Rosæ.—The ointment of rose-water of the U. S. Pharmacopoeia prepared according to the directions given in that work is, in most respects, justly regarded as a satisfactory preparation. It is not, however, entirely unobjectionable, and the directions can be so modified that those engaged in the manufacture of it will be assisted thereby. The length of time required to produce an ointment such as the apothecary desires is often quite a serious tax upon his patience, and in order to lessen this I would recommend it to be made in the following

manner: All the ingredients employed are put into a wide-mouthed bottle, placed in a hot water-bath, and allowed to remain until the solid portion is melted, then the bottle is taken out, and, having tightly corked or stoppered it, the mixture is thoroughly shaken; a uniform emulsion will result, which is to be agitated until solid.

The resulting ointment will be found smoother and more uniform than that produced by stirring, and the operator will find less exertion required, and will have also the advantage of knowing exactly the right moment when it is proper to stop agitation by solidification taking place. If in making it, three times the quantity of the ingredients ordered by the Pharmacopoeia are used, an ordinary preserving jar, with a cover that screws on, will be found a very convenient vessel to use.

Syrups for Soda Water—Orange and Lemon.—Very superior syrups can be made in the following manner: Take the peels of six oranges or lemons; cut them very thin; make a tincture of them by macerating in 6 fluidounces of alcohol for three days. Having filtered it, pour it on 1 pound (avoirdupois weight) of sugar contained in an evaporating dish or other suitable vessel, and allow the alcohol to evaporate spontaneously. When dry dissolve in $\frac{1}{2}$ pint of water in which, if orange syrup is to be made, $1\frac{1}{2}$ ounce of citric acid, if lemon, 2 ounces of the acid and 2 drachms, are to be dissolved. This mixture, added to 11 pints of simple syrup, will produce fine flavored syrups, which keep well.

VARIETIES

LEMON JUICE IN DIPHTHERIA.—Dr. J. R. Page, of Baltimore, in the New York "Medical Record," May 7th, 1881, invites the attention of the profession to the topical use of fresh lemon juice as a most efficient means for the removal of membrane from the throat, tonsils, etc., in diphtheria. In his hands (and he has heard several of his professional brethren say the same) it has proved by far the best agent he has yet tried for the purpose. He applies the juice of the lemon, by means of a camel's hair probang, to the affected parts every two or three hours, and in eighteen cases in which he has used it the effect has been all he could wish.—*Med. and Surg. Rep.*

CANNABIS INDICA IN MIGRAINE.—What the bromides and belladonna are to epilepsy, cannabis indica is to migraine. The principle of treatment laid down is to maintain, by the use of small doses of the agent, a constant influence upon the nervous system for a long time, the same as is required in epilepsy by the use of the bromides. At first, as a matter of course, no appreciable effect is observed, and not until the use of the remedy is persevered in for many weeks, and the nervous system kept under its influence for a considerable time, will the patient find an appreciable diminution in the severity and frequency of the attacks. It is well to commence with one-fourth grain of the extract, before each meal, for the first fortnight; the dose may be increased to the third of a grain for the second fortnight, to be augmented to a half grain at the end of four weeks. This amount will generally be sufficient, and should be faithfully continued for several months. Success here is only obtained by persevering effort.—*Chicago Med. Jour. and Exam.*, from *Ohio Med. Jour.*, Sept.

A NEW ANTISEPTIC.—Dr. C. F. Kingzett (London “Lancet”) claims that the product obtained by forcing air through oil of turpentine during a period of from one to two hundred hours, has an antiseptic quality superior to any hitherto known. The oil of turpentine so treated loses its volatile character, and, although not soluble in water, it forms in contact with this, or any moist surface, strongly antiseptic principles.—*Chic. Med. Rev.*, Sept. 5.

SKUNK PERFUME AS AN ANAESTHETIC.—Dr. W. B. Conway (“Virginia Medical Monthly,” Aug., 1881) reports a case where roguish school boys caused one of their number to inhale from a two-ounce phial an unknown quantity of skunk perfume. The effects produced were total unconsciousness, muscular relaxation, a temperature of 94° and pulse of 65, together with cool extremities. The respiration and pupils were normal. The patient soon recovered under hot pediluvia and stimulants. The skunk perfume is rather an unpleasant substance to experiment with, still those endowed with anosmia might obtain results of value from similar experiments with it.—*Chic. Med. Review.*

CONVALLARIA MAJALIS.—Clinical and physiological experiments with this herb are reported (“Centralblatt für Klinische Medicin,” No. 1, 1881) by Drs. Bojowawlensky and Troitzky. In organic cardiac disease its effects were found equal to those of digitalis; the urine was increased; serous exudations were rapidly absorbed; nervous excitability was

diminished. Cumulative effects were not observed.—*Chic. Med. Review*,
Sept. 5.