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Botanical Medicine Monographs and Sundry

EXTRACTUM PRUNI VIRGINIANÆ FLUIDUM.

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Perhaps no other drug in the pharmacopoeia has been investigated as much and written upon as often as Wild Cherry Bark.

While many valuable additions have from time to time been made to our knowledge concerning it, yet its preparations remain for the most part unsatisfactory.

The design of this paper is the discussion of its fluid-extract; the chief objects to be attained in making this are:

1. To develop all the hydrocyanic acid the bark is capable of yielding.

2. To have as little tannic acid present when finished as possible.

3. To have it free from a precipitate—The U. S. Pharmacopeia process fulfils none of these requirements; why does it not?

1. Because the time allowed for maceration is too short.

2. The addition of glycerin hinders the development of prussic acid during maceration.

3. The drug is not moistened sufficiently to develop all the acid.

Experience has proven that sixty hours at least must be allowed for the full development of the acid and that seventy-two hours is not too long.

The viscidity and therefore the immobility of a liquid materially affects the rapidity of chemical action ; the advantage to be gained from the addition of glycerin to the macerate is therefore not apparent and experience has shown its influence to be inimical in this process.

The hydrocyanic acid does not develop well when the bark is not moistened sufficiently, any more than it does when made too wet; actual practice has shown that the U. S. Pharmacopeia process does not allow sufficent moistening. Just here it

may be remarked that after the addition of the macerate the bark should not be packed at all but put loosely into a percolator until it is time to pack it for the percolation.

The matter of tannic acid has puzzled a great many persons and it is quite enough to say that the addition of a large quantity of glycerin to the formula has not reduced the amount dissolved, even if it has helped to hold it in solution; seeing that the acid is freely soluble in both, water and alcohol them is little hope that very much can be accomplished in the direction of ridding the product of this constituent of the drug, unless indeed we should have resort to an expedient of perhaps questionable propriety and add to the macerate a small quantity of some acid, thus rendering the tannin less soluble; experiments in this direction have however not been made.

The presence of a precipitate is due to the fact that the menstruum of dilute alcohol is not allowed to thoroughly mix with the macerate before percolation begins, thus the first part of the percolate differs from the last part ; this must naturally cause a precipitate.

The following formula has yielded excellent results and develops all the prussic acid ; there is no precipitate nor does any form on standing as will be seen from the specimen which is seven months old and has never been filtered; and I had a specimen, which has unfortunately been mislaid, which was over a year old and is identical in appearance and odor with this:

Take of Ground Wild Cherry Bark	16 ounces.
Water and Alcohol, each	10 fl. ounces.
Glycerin	4 fl. ounces

Moisten the bark with 10 ounces of water and put loosely in the percolator, close tightly and allow it to macerate sixty hours; then pack very firmly, mix the ten fluidounces of alcohol and four of glycerin and pour it upon the bark, now cork up the percolator tightly and macerate twenty-four hours longer; at the expiration of this time remove the cork and about twelve fluidounces of percolate will come through; water should now be poured on to force the other four fluidounces out when the percolation should be stopped and the product will be finished. After an extended experience the conclusion was reached that to continue the percolation beyond this point is worse than useless as it necessitates subsequent evaporation; nor does it add any medicinal strength to the preparation. It does add quite a considerable quantity of tannin and gallic acid, which latter results from the conversion of the tannin by heat.

SOME CONSTITUENTS OF YERBA SANTA.

By R. ROTHER.

A syrup prepared from Eriodictyon leaves is extensively used for the administration of quinine in a bitterless form. It also affords the further advantage of extinguishing the bitter taste of quinine when taken immediately after the use of mixtures in which it would otherwise be chemically incompatible. In order to disguise the bitterness of quinine when given in a fluid state, it has been variously exhibited in the condition of

insoluble salts. The great objection to this mode of procedure is that these quinium compounds remain partially insoluble, and hence inoperative, in both alkaline and acidine contacts. Some of these combinations, although remarkably insoluble in the main, are by no means destitute of the nauseous bitter taint.

The important advantage possessed by Yerba Santa consists not only in the phenomenal suppression of the bitterness of quinine, but also in its presentation in a readily assimilable state.

A certain resinous component of Eriodictyon leaves is characterized by the property of forming in contact with some bases very soluble seemingly saline compacts. These, when merged with quinium salt generate by double decomposition an ordinarily insoluble quinium-resin salt. This compound is promptly decomposed by the stronger acids, and is peculiarly soluble in ammonia.

When coarsely ground Eriodictyon leaves are percolated with water, a moderately dark brown colored and somewhat bitter percolate is obtained. On evaporating this to a syrupy consistence and treating this residue with alcohol, a light brown liquor and dark brown pasty residue results. The alcoholic solution has acquired all of the peculiar bitterness of the percolate whilst the pasty mass is practically tasteless. On treating this residue, or the original one resulting from the percolate, with potassium carbonate, an ammoniacal odor becomes quite pronounced. The addition of an acid to the dark brown mass, separated by alcohol, yields a profuse precipitate which is wholly but slowly dissolved to a dark brown solution by a large volume of water.

When the residuary leaves in the percolator are treated with water rendered strongly alkaline with ammonia, the first portion of the new percolate is very turbid, but becomes clear as the free ammonia descends into the precipitate. A considerable proportion of alkaline menstruum is needed to extract the color-giving substance wholly. Evaporation of the percolate to a syrupy residue and treatment of this with alcohol, yields a brown red bitter solution, and a profuse dark brown precipitate. The solution and precipitate are in all respects identical to those obtained in the first percolation. The alcoholic solution contains the quinine precipitant in union with ammonia as an acidic salt. The addition of water causes a dense milkiness, and acidulation with a strong acid precipitates the acidic resin in curdy flakes. Excess of ammonia added to the alcoholic solution causes no precipitate, but the color is very perceptibly deepened. On exposure of this mixture the excess of ammonia and much of the alcohol is dissipated, whilst a red-brown tarry acidic ammonium salt deposits.

The precipitate given by alcohol appears to be an acidic ammonium salt of the tasteless and nor-quinine precipitating acidic component of the leaves. When treated with water an inconsiderable proportion dissolves, leaving a large residue. Addition of ammonia or potassium carbonate and much water dissolves this wholly to a deep red-brown solution. The tinctorial power of this body is its most remarkable property. In its natural condition it is very probably in great part an acidic anhydrate, which is dissolved by aqueous solutions of alkalis and their carbonates. Under these circumstances no perceptible effervescence occurs, when carbonates are employed. With the use of monocarbonates the solution contains bicarbonate, showing that the reaction is like to that resulting in similar cases with analogous matter from other

plants. On adding ferric chloride to such a solution, no precipitate at first appears. The continued addition of it, however, causes an abundant brown-black precipitate soluble to a great, extent in an excess of the reagent. It is also partially soluble in ammonia with a deep red-brown color. The addition of ammonia to a mixture containing excess of ferric chloride gives a precipitate utterly insoluble in ammonia. These results show that the various proportions of the tinctorial body appended to basic radicles determine the degree of solubility and insolubility of the compound. As already stated, strong acids occasion a precipitate when added to alkaline solutions of this substance. Boiling of the mixture with dilute sulphuric acid appears to generate a new insoluble substance readily soluble in alcohol and in ammonia, with intense red-brown color. The solutions are characteristically tasteless.

The tarry acidic ammonium salt of the quinine precipitant is readily and perfectly soluble in a sufficiency of alcohol. It is also readily and completely soluble in excess of ammonia. When treated with ether, a portion of the acidic component is dissolved. A correspondingly less acidic salt, however, remains undissolved. The action of chloroform is precisely similar in this. The acidic resin thus separated has an all-proportional solubility in these menstrua. It remains as a green-yellow transparent mass after the spontaneous volatilization of the respective solvents. It reacts with monad monocarbonates, converting them into bicarbonates. It is readily soluble in bicarbonates, evolving no carbonic anhydrate except on heating. When the solution obtained with sodium bicarbonate, for instance, is evaporated, a portion of the resin separates and is readily taken up by ether or chloroform. Alcohol, however, dissolves an acidic sodium salt of the resin.

Treatment of Eriodictyon leaves with alcohol, dilute or strong, wholly removes the quinine precipitant. But this method of isolating it is neither economical nor practical.

A fluid extract of Yerba Santa limpidly miscible with simple syrup is a desideratum. The writer has heretofore employed ammonia as a part menstruum in preparing syrup of Yerba Santa. In order to secure an effective extraction an excess of ammonia is essential. It is difficult, however, to adjust a proper proportion, and hence the ammonia may preponderate in the finished syrup. The writer would suggest a fluid extract of Yerba Santa for preparing the syrup to be used in the proportion of one fluidounce for one pint of the syrup. This fluid extract is merely an alcoholic solution of normal potassium eriodictyonate uncontaminated by the dark colored non-quinine precipitant. The following is the process recommended:

Yerba Santa leaves, coarsely ground	16 Troy ounces.
Potassium carbonate	3 “
Ammonia water.	
Alcohol.	
Water. Of each sufficient to make one pint.	

Mix ammonia water and water in the proportion of me measure of the first and seven measures of the second. Mix the Yerba Santa with eight fluidounces of this mixture and pack it firmly into a cylindrical glass percolator. After due maceration pour on menstruum until 3 pints of percolate has slowly passed. To this add the potassium carbonate and evaporate it until a pasty residue is left. Stir this well with 8

fluidounces of alcohol, gradually added; let the pasty precipitate subside and decant the supernatant liquor. To the residue gradually add 8 fluidounces of alcohol, as before, pour this mixture upon a strainer and force the liquid out. Should this second extraction measure more than is needed to complete the intended volume of fluid extract, dissipate the excess of alcohol by appropriate means; unite the residue with the first extraction, set the mixture aside for twenty four hours, and decant the clear fluid extract from the scant crystalline deposit meanwhile formed.

CONSTITUENTS OF SOME AMERICAN PLANTS.

ABSTRACTS FROM THESES

Mitchella repens, Lin.—An analysis of this plant was made by Edgar Breneiser, Ph. G., with the following results: Volatile oil was found to be absent. Petroleum-benzin dissolved 1.180 per cent., consisting of chlorophyll and wax, the latter saponifiable by alcoholic potassa solution. Ether took up 1.400, of which .240 was soluble in water, and .940 soluble in alcohol. The aqueous solution contained a principle precipitated by tannin and by picric acid, but neither alkaloid nor glucoside. The resin taken up by alcohol was soluble in potassa and this solution yielded nothing to benzin, benzol or chloroform; the liquid obtained on treating the resin with acidulated water, gave precipitates with tannin and picric acid, but yielded nothing to benzin, benzol or chloroform. The alcoholic extract of the plant, amounted to 3.800 per cent., of which 3.440 was soluble in water, and this contained 1.630 glucose, estimated by Fehling's solution. Water now dissolved from the plant 20.699 per cent., from which alcohol precipitated 5.440 mucilaginous matter and .636 inorganic compounds; the further addition of alcohol precipitated 3.679 dextrin and allied carbohydrates; 6.009 glucose was found; also a saponin-like principle (precipitated by baryta, and frothing in aqueous solution.) Dilute soda solution dissolved 2.360 albumin, 1.840 other organic matter and .120 inorganic matter; total, 4.320 per cent. Dilute hydrochloric acid took up 4.418 organic and 2.820 inorganic matter, total 7.238. Treatment with chlorine occasioned a loss of 11.784 per cent. ; the residue now weighed 33.460, and after deducting 11.240 for moisture in the drug, the loss not accounted for by the analysis, amounts to 4.879 per cent. The ash of the air dry plant weighed 5.440 per cent., only .360 of which was soluble in water; the ash consisted of carbonates, chlorides, sulphates and phosphates of sodium, potassium, calcium, magnesium and iron.

Eupatorium perfoliatum, Lin.—The percentages of extract obtained from this plant by the successive treatment with different solvents, has been ascertained by Oscar F. Dana, Jr., Ph. G. The results are as follows: moisture 10.50, extract by petroleum benzin 3.80, by ether 4.60, by alcohol 33.80, by water 24.80, by alkali 5.80, cellulin 11.70; loss by treatment with chlorine, &c. 5.00. The ash amounted to 8.3 per cent. Crystals were observed in the benzin extract, and were prepared in larger quantity, by exhausting the plant with alcohol, treating this extract with ether and the ethereal extract with benzin. Thus obtained the crystals were still impure and were not further examined.

By the same process these crystals were obtained by G. Latin, (AM. JOUR. PHAR. 1880, p. 392,) who succeeded in obtaining them white and showed them to be wax or possibly resin. The bitter principle has been obtained by Latin in a pure or nearly

pure condition and found to be a glucoside; he states it to be soluble in ether, while according to M. Parsons (AM. J. PH., 1879; p. 342,) it is insoluble in the menstruum named.

Leptandra virginica, Nutall.—To obtain the bitter principle, Gust. Steinmann, Ph. G., poured the concentrated tincture into water, and agitated the acidulated, aqueous solution with petroleum benzin, benzol and chloroform; only the benzol liquid yielded a residue which was crystalline. 500 gm. of the drug yielded only 0.5 gm. of the crystals, which after recrystallizing from ether, were of a pale lemon-yellow color, of a peculiar agreeable odor, and of a very bitter taste. They were found to be insoluble in petroleum benzin, soluble in alcohol, ether and benzol, less freely soluble in cold water, not precipitated by Mayer's solution or by tannin, and not yielding glucose on being boiled with dilute sulphuric acid. The resinous matter precipitated by water from the alcoholic extract, loses the bitter taste almost completely by repeated solution and precipitation.

Catalpa bignonioides, Walter.—The seeds were examined by Fred. K. Brown, Ph. G., who demonstrated the presence of resin, fixed oil, tannin and sugar, and on distilling with water, obtained a distillate having somewhat of a rancid odor. Two crystalline bodies were obtained by treating the powdered seeds with a mixture of ether, alcohol and ammonia, acidulating the concentrated filtrate, removing oil and other impurities with ether, neutralizing with ammonia, and agitating with a mixture of ether and chloroform; on evaporating the ethereal solution, needles were left, which were soluble in alcohol, ether and chloroform, insoluble in water, almost tasteless and after boiling with dilute sulphuric acid did not reduce Fehling's solution. The aqueous liquid, left after treatment with ether and chloroform, yielded crystals, which must have contained ammonia sulphate, and possibly also a glucoside, since after boiling with sulphuric acid, a reaction with Fehling's solution was obtained.

Ilex opaca, Aiton.—On treating the leaves with benzin, Walter A. Smith, Ph. G., obtained 1.2 per cent. extract, of which .088 was volatile and had an acrid mustard like odor ; the remainder consisted of fat and .152 wax. Ether extracted 4.5 per cent, .5 of which was, soluble in water, the remainder being resin soluble in alcohol; the aqueous solution had a bitter taste, and from its behavior to Fehling's liquid appears to contain a glucoside. Tannin and chlorophyll were found in the alcoholic tincture. The leaves yielded 4.5 per cent. of ash.

Gymnocladus canadensis, Lamarck.-Samuel S. Mell, Ph. G., observed that the seeds weigh on the average 30 grains, contain 8.5 per cent. of moisture, and yield 2.75 per cent. of ash. Petroleum benzin extracts about 10 per cent. of fixed oil, which is yellowish, saponifiable, and of the spec. grav. .919. Ether extracts a little wax, fat and resin. The alcoholic extract amounts to 3.25 per cent. and contains a little tannin and a small quantity of glucoside which can be removed from the aqueous solution by chloroform, and which appears to b. present also in the immature fruit; it has a peculiar odor and an acrid burning taste. The seeds contain also mucilage, starch and albuminoids.

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Asparagin is lævorotatory and its crystals have left-handed hemihedral faces. A. Piutti (*Cmpt. Rend*., vol. 103, p. 134) has obtained from the mother-liquor of crude asparagin an isomeride with righthanded crystals and dextrorotatory power, and of a much sweeter taste. The derivatives of the two varieties of asparagin are chemically identical, but differ optically, and the two aspartic acids combine in equal proportions to asparagenic acid, which is inactive and gives monoclinic crystals.

Euphorbia Drummondi, Boissier, a native of West Australia, is stated to possess valuable anesthetic properties, and to contain an alkaloid which Dr. John Reid, of Port Germain, South Australia, called *drumine* (*Austral. Med. Gaz*., Oct., 1886). A tincture is prepared of the plant or milk juice with alcohol containing hydrochloric acid, then concentrated by distillation, precipitated by ammonia, and filtered; the residue is dissolved in dilute hydrochloric acid, decolorized by animal charcoal and evaporated when boat-shaped colorless crystals are obtained. The alkaloid is stated to be almost insoluble in ether, but freely soluble in chloroform; also in water. A 4 per cent. solution of the alkaloid dropped into the eye produced local insensibility without appreciably dilating the pupil. A subcutaneous injection of 3 grains showed no effect in a cat beyond local anesthesia; but a larger dose by the month caused paralysis of the limbs and difficult breathing, and strychnine failed to produce muscular contraction. Applied to the tongue or nostrils, loss of taste was observed, but small doses swallowed were not followed by any perceptible constitutional symptoms. Dr. Reid recommends the alkaloid more particularly in small operations, sprains and local irritation.

More recent experiments made by Dr. A. Ogston (*Brit. Med. Jour.* Feb. 26th. 1887.) demonstrate that drumine has little if any effect as an anesthetic. Instilled into the conjunctiva it produced no anesthesia and had no perceptible effect on the pupil. Used hypodermically on four persons in doses of 4 and 6 minims of a 4 per cent. solution, a sharp and aching pain, followed by swelling and tenderness of the spot was produced, but no anesthesia. The material employed has been received directly from Dr. Reid.

Euphorbia helioscopia, Lin.—A case of severe ulceration is reported by Dr. Baudry (*Bull. méd. du Nord*,) resulting from the application of a poultice of the bruised plant. The milk juice is stated to be employed by peasants as a cure for warts.

This annual, which belongs to the group of *Tithymalus*, is indigenous to Europe and naturalized in some parts of the United States, in fields and waste places, and is characterized by its terminal umbellike infloresence, its obovate, finely serrate and more or less wedgeshaped leaves, and its smooth, almost three-lobed fruit containing coarsely reticulated, brownish seeds. With some botanically allied species it was formerly employed as a hydragogue cathartic and is regarded as being less acrid than many other species of the same genus.

Euphorbia Peplis, Lin., is said to be used as a domestic remedy in hydrophobia, and has been used successfully by Dr. Afonsky (*Russk. Meditz*., 1886), as a preventive, the drug being given in the form of powder after cauterizing the wound with

hydrochloric acid, and using also pilocarpine hypodermically.

This species is likewise an annual, has thickish, obliquely oval entire leaves, axillary flowers and smooth fruits with smooth seeds and grows in southern Europe. It is used as a cathartic like *Euphorbia Peplus*, Lin., which is also an annual, but has roundish, entire and somewhat petiolate leaves, a corymbose inflorescence, the capsule-lobes two-keeled on the back, and grayish pitted seeds; the latter species has established itself in some parts of the United States.

Olea fragrans, Thunberg, and ***Forsythia suspensa***, Vahl, two Japanese oleaceæ, according to J. F. Eykman, contain a new glucoside, $C_{26}H_{32}O_{11}$, which crystallizes in colorless silky needles, is insoluble in ether and petroleum, and sparingly soluble in cold water, from which solution it is not precipitated by lead and other mineral salts. By oxidation with chromic acid it yields a compound having the odor of vanillin, and by boiling with acids it is decomposed into glucose and a substance of phenolic properties, the latter being readily soluble in alcohol and ether, sparingly soluble in water and insoluble in petroleum benzin.—*Jour. Chem. Soc.*, 1886, p. 1040.

In its physical properties the new glucoside resembles *phillyrin*, $C_{27}H_{34}O_{11}$, the composition and properties of which were investigated by Bertagnini in 1860, but which had been used by Carboncini since 1825 as a febrifuge. The latter had at first regarded it as an alkaloid; in 1836 he published the process by which he obtained it from the bark of the South-European species of *Phillyrea*. This process consists essentially in preparing a decoction, adding lime, exhausting the sediment with alcohol, decolorizing and crystallizing.

Rubus Chamaemorus, Lin., known as *cloudberry*, is indigenous to Canada and the White Mountains, to Northern Asia and Northern Europe. The amber-colored fruit is of a pleasant acidulous taste. The pubescent and wrinkled leaves are about 1 1/2, inch long and 2 inches broad, reniform in shape, roundish five-lobed and crenately dentate, have an unpleasant sweet, afterwards bitter taste, and are popularly used in Siberia in various urinary complaints. Recently (*Russk. Med.*, 1886) the leaves have been recommended by Dr. Ivan Troitzky, of Smolensk, as an excellent diuretic in dropsies, in the form of infusion prepared from a drachm of the bruised leaves by digestion with a cupful of boiling water; this quantity is taken morning and evening for about a month; the taste is stated to be not very unpleasant, and the patient to become habituated to this tea.

Cassia alata, Lin.—The leaves we recommended by Conillebault (Thèse, Paris, 1886) for giving prompt relief in ringworm; they are moistened with water and the affected parts are then rubbed: or an acetic extract of the leaves may be used.

In India the plant is regarded as a cure for poisonous bites and for venereal eruptions, and the leaves have long been used for curing ringworm. Lindley describes the leaves as being 2 feet long, abruptly pinnate. Leaflets opposite, from 8 to 14 pairs, the exterior largest, linear-oblong, obtuse or emarginate, with a point, smooth, entire, veined; 3 to 6 inches long, 2 to 2 1/2 inches broad; the lower pair somewhat distant, newly round and reflexed back on the stem or branches. Petioles channelled, the channel large and formed by two thin firm yellow borders. There is a cross-bar

between each pair of leaflets, covered with small dark-colored bristles, and them is no other gland. Stipules auriculate, rigid, pointed, persistent, appearing like prickles.

The plant is shrubby like *Cassia Sophora*, Lin., the leaves of which are similarly employed. *Cassia Tora*, Lin., an annual of Southern Asia, is reputed to have similar antiherpetic properties; likewise *Cassia occidentallis*, Lin., which is common throughout the tropics, has been naturalized in the Southern United States as far north as Virginia, and is known in some localities as styptic weed.

Astringent qualities of Heuchera and Mitella.—F. W. Anderson reports (*Botan. Gaz*., 1887, p. 65,) that the roots of *Heuchera hispida*, Pursh, *H. cylindrica*, Douglas, and *H. parvifolia*, Nuttall, are much used in the west by hunters, prospectors and others as astringents, particularly in cases of troublesome diarrhea caused by the drinking of water in alkali regions. *H. parvifolia* is the commonest species in Northern Montana. Of milder and somewhat slower action is the root of *Mitella pentandra*, Hooker, which contains also a bitter principle, and is not likely to cause sudden constipation like the heucheras.