AMERICAN JOURNAL OF PHARMACY
Volume 56, #1, January, 1884

Botanical Medicine Monographs and Sundry

CANELLA ALBA.

BY JOHN P. FREY, PH.G.
From an Inaugural Essay.

After a detailed botanical description of the plant, and a histological description of the bark, accompanied by micro-photographs of the transverse and longitudinal section, the author states the result of his analysis thus: volatile oil 1.28, resin 8.2, mannit 6 to 8, ash 8.9 per cent., starch in considerable quantity, bitter principle, albumen and cellulose.

Ten pounds of well-selected bark was carefully distilled, and from the distillate 896 grains (1.28 per cent.) of volatile oil was collected, only a minute quantity being wasted. The oil was in two portions, one heavier and the other lighter than water; the former was .70 per cent. and the latter .58 per cent. Both oils have a very strong, fragrant, somewhat camphoraceous odor, and a pungent, aromatic taste, the heavy oil being stronger in taste and odor. The odor of the bark is due to these volatile oils. The specific gravity of the heavy oil is 1.012; it is reddish-brown, begins to boil at 200°F., and the temperature gradually rises to 420°F., when it remains constant. It congeals at 38°F. The light oil has the specific gravity .988, is of a light straw color, begins to boil at 185°F.; congealing point about 22°F. Both oils have a strong acid reaction, citric acid acts upon them violently, producing a red resinous mass which is insoluble in alcohol, ether and potassium hydrate. Sulphuric acid produces a deep blood-red color. Iodine dissolves in both oils slowly and quietly. Ferric chloride produces a deep blue color, showing the presence of eugenic acid or eugenol. By neutralizing the oils with potassium hydrate and distilling, the residue is a crystalline mass of potassium eugenate, from which, with sulphuric acid and distilling, eugenol is obtained as a colorless oily liquid, having a pleasant odor. The distillate of the oils with excess of potassium hydrate contained two colorless oils, one heavier and the other lighter than water. The latter is neutral to litmus, and when treated with sulphuric acid turns to blood-red, but nitric acid and ferric chloride do not'affect it. The heavy oil was in such small quantities that enough could not be obtained to ascertain its

nature.

The *resin*, which was obtained by exhausting the drug with alcohol, evaporating and pouring the concentrated tincture into water, is of a pale yellowish color, destitute of odor and taste, soluble in ether and chloroform, slightly soluble in cold, more so in boiling solution of potassa; insoluble in turpentine or cold and hot water. The solution in potassa is precipitated on the addition of hydrochloric acid, and the alcoholic solution is precipitated by triplumbic acetate, but not by normal acetate. Both chloroform and ether solutions have a distinct acid reaction. When incinerated it yields a pale yellowish ash.

A crystalline principle was obtained by exhausting the bark with hot water, evaporating the solution to a very small bulk, and allowing this to stand in a warm place for a few days, when the whole mass became crystalline; it was then recrystallized from hot alcohol, the solution being filtered warm through animal charcoal; on the slow evaporation of the alcoholic solution rather large crystals will form. It crystallizes from water in colorless rhombic prisms, and from hot alcohol in fine needle-like crystals. They are freely soluble in cold and hot water; sparingly in cold, but readily in boiling alcohol, again crystallizing out upon cooling; insoluble in ether, and when heated on a platinum dish wholly volatilize. This is the crystalline principle which was called by some of the older writers “Canellin,” but which Mayer and Von Reiche, in 1843, showed to be mannit. By a series of tests made in comparison with mannit from manna, I have found the two to be identical.

Wax was found in small quantities by treating the residue exhausted with alcohol with chloroform. Starch is present in considerable quantities, as was shown by the iodine test. The presence of gum was shown by a solution of triplumbic acetate and ammonium oxalate. Albumen is present and can be detected with mercuric chloride, or by coagulating with heat. The bitter principle is isolated with much difficulty; it is soluble in water and alcohol, and is not precipitated by triplumbic nor normal acetate. The bark is entirely free frm tannin.

Water extracts 22 per cent. and alcohol 10 per cent. of the constituents of the bark. A tincture and fluid extract prepared some time ago remain perfectly clear. The tincture represents 10 per cent. of the drug with a menstruum of alcohol 3 parts, water 1 part. The fluid extract was made with alcohol, and every cubic centimeter represents a gram of the drug.

A solid extract was also prepared by exhausting the drug with alcohol 95 parts and glycerin 5 parts. The ash was analyzed with the following results:

Calcium carbonate	83·00	Insoluble in water.	88·40
Magnesium carbonate	1·70		
Aluminum and ferric oxides	2·60		
Calcium phosphate	1·10		
Potassium chloride	1·30	Soluble in water.	13·10
Sodium carbonate	4·50		
Sodium sulphate	1·30		
Sodium chloride	6·00		
	101·50		101·50

THE FRUIT OF OPUNTIA VULGARIS, LIN.

BY WILLIAM W. LIGHT, PH.G.

From an Inaugural Essay.

The fruit begins to appear in July and ripens about the middle of October. It is about an inch in length, one-half to three-fourths of an inch in thickness, roundish pear-shaped, marked at the apex with concentric rings, and beset with rudimentary bristles in spiral rows. It is crimson externally, and internally of a still brighter color and frosty, sparkling appearance, it is covered with a thin tough skin, underlying which is a thickish pulpy rind. The berry-like fruit is filled with seeds arranged in longitudinal rows imbedded in and surrounded by a fleshy mucilaginous pulp and separated by white dissepiments. The seeds are from eight to twenty in number, in five rows alternately arranged with one capping-seed, to which the tough epidermis, in the centre of the umbilicated apex of the fruit, is attached. The seeds are flattish, circular and uneven, one-eighth to three-sixteenths of an inch in diameter and fully one-eighth of an inch through the thickest part. The seed is anatropous. The rhaphe forms a prominent bony margin nearly around the entire seed. The testa is cartilaginous, of uneven thickness and of a whitish color. The portion immediately surrounding the chalaza is very thin and is translucent. The membraneous tegmen of the seed is of a shining blackish brown color, which is plainly visible through the thin portion of the testa and gives that part of the seed a bluish black

appearance. The embryo is imbedded in the oily albumen and has the cotyledons set contrary to the sides of the seed. It forms a little more than a complete circle and encloses a white, starchy centre. The fruit has an agreeable, slightly acid and very mucilaginous taste and a refreshing odor. It is frequently eaten, the seeds of necessity swallowed whole as it would be almost impossible to crush their shell-like testa between the teeth, or to separate them from their mucilaginous envelope.

The ripe fruit contains 68.2 per cent. of moisture. The ash amounted to 1.76.per cent. of the entire fresh fruit. It consists largely of silica, besides carbonates, chlorides, sulphates and phosphates, with potassium, sodium, aluminium, iron, magnesium and calcium. The seeds are about one-sixth the weight of the entire fruit.

The seeds and enveloping pulp were placed in a coarse linen bag to remove the mucilaginous matter by maceration in water. The mucilage had an acid reaction and possessed a beautiful light crimson color which was completely discharged by heating on a water-bath or by the addition of an alkali.

The mucilage was not affected by oxalate of ammonium or concentrated solutions of ferric chloride or of sodium borate, but a precipitate was formed with both the normal and the basic lead acetate. The mucilage was precipitated by alcohol, obtained on a filter, dried in scales over a water-bath and preserved for further examination. The filtrate from the mucilage responded clearly to tests for glucose and pectous compounds but contained no tannin. The skins with a portion of the pulp left after the removal of the seed, were macerated in alcohol for several days the filtered product being a wine-red tincture of a pleasant fruit-like odor and acid reaction to litmus. This tincture was diluted with water and the alcohol distilled off on a water-bath. In this operation the wine-red color was discharged, the liquid assuming a green and then a light straw color. After removing the coloring-matter from the solution with benzin, a portion was precipitated by lead acetate. The precipitate did not behave as lead malate when heated under water, but was mostly soluble in solution of ammonium chloride. Another portion of the solution gave no precipitate with calcium sulphate, but with an excess of calcium hydrate, a white precipitate was produced. This precipitate was soluble in a solution of potassium hydrate, and the solution formed a gelatinous precipitate on boiling which was partially dissolved again

after the solution was pooled, thus proving the presence of tartaric acid. The precipitate was also soluble in acetic acid.

The filtrate from the lime precipitate was boiled, when a slight precipitate was formed insoluble in solution of potassium hydrate, showing the presence of citric acid. On adding solution of potassium permanganate it was not decolorized until upon the addition of potassium hydrate when the color was slowly changed to green.

The seeds, after having been dried, were reduced to powder, and macerated with benzin at a warm temperature for several days, then packed in a percolator and exhausted with benzin. The powder was dried and a portion of it was digested for several days in alcohol, packed in a percolator and exhausted with alcohol. In like manner they were successively exhausted with water, with a very dilute solution of potassium hydrate and with water acidulated with sulphuric acid.

The benzin product from the seeds was an amber-colored oil, which oil was purified by washing with water and afterwards with chloroform. It was then found to weigh 7.25 per cent. of the weight of tlie seed extracted, and to be of specific gravity .926. It possessed a slight disagreeable odor and insipid taste, insoluble in alcohol or chloroform, soluble in benzin and ether.

Treated with 25 per cent. nitric acid and a strip of copper turnings, the mixture assumed a red-brown color, but after a day became partly solidified and lighter brown. A quantity of the oil was saponified by potassium hydrate; the solution precipitated by and washed with sodium chloride, and the soda soap decomposed with hydrochloric acid. The fat acid was odorless and tasteless, of a translucent milky color and with slight acid reaction. Its lead salt seemed to be but slowly soluble in alcohol and insoluble in ether. The mother liquor of the soap contained glycerin.

The alcoholic percolate of the seeds was nearly colorless and inodorous and of but slight taste foreign to alcohol and gave evidence of the presence of glucose. It was evaporated to dryness, thoroughly washed with water, and with chloroform to remove a greenish extractive matter, when a red-brown resinous residue was left having a slight disagreeable odor, a slight nauseous, disgusting taste, fusible at 100°C., insoluble in benzin, chloroform or ether, but soluble in alcohol, diluted

alcohol and carbon disulphide.

The percolates with cold and hot water contained glucose, starch, and albumen; but neither a glucoside nor an alkaloid could be detected.

The dried gum was found to be entirely insoluble in water or alcohol, but in the presence of an alkali it became soluble.

Of the powdered seeds extracted with benzin 75 grams were boiled with several portions of water until the water from them gave no coloration with iodine; the starch was converted into sugar; this was estimated by Fehling's solution, and the starch calculated from it giving 3.95 gram or 5.268 per cent.

The residuary powder was now boiled with diluted sulphuric acid for several hours, when the liquid contained glucose and on concentrating it transparent rhombic crystals were formed, which were insoluble in alcohol or ether, readily soluble in boiling water, and this solution was not precipitated by ammonium oxalate.

In reviewing the results of my work we find in this unpretending and unnoticed plant, not only a remarkable and peculiar histology, but interesting constituents which surely seem to possess sufficient individuality to deserve a closer investigation.

LUFFA AEGYPTIACA.

BY REINHARD J. WEBER, PH.G.

From an Inaugural Essay.

Description.—Luffa ægyptiaca, nat. ord. cucurbitaceæ, is indigenous to Egypt and Arabia, and is a large climbing vine, with a thin, but very tough light green succulent stem, attaining a length of from ten to thirty feet. The leaves are alternate and palmately lobed, of a light green color and almost destitute of taste. The flowers are monoecious; petals five, united below into a bell-shaped corolla; anthers cohering in a mass; ovary two-celled, style slender, stigmas three. The fruit is elliptical ovate, fleshy and indehiscent, with a green epidermis, longitudinally marked with black lines, varying from ten to fifteen in number; under each of these lines is found a tough woody fibre. The

fruit attains a length of from six to twenty-five inches. I have seen a specimen of the fruit, grown in Allentown, Pa., which measured thirty-four and a half inches in length, and nine inches in diameter. When the epidermis is removed it presents a layer of interwoven woody fibres, which may be used like a sponge, being hard and rough when dry, and soft when soaked in warm or cold water; they absorb the latter with the same facility as the ordinary sponge, and have the advantage over the sponge not to wear out by ordinary use for a number of years; hence, the name of "Vegetable Sponge," or "Wash Rag," and its use as a flesh glove. The seeds are numerous, and are almost flat, broadly ovate, three-eighths of an inch long. The testa is of a blackish brown color and rough, cotyledons almost flat, of a yellowish brown color and oily.

Analysis.—An infusion of the epidermis of the fruit (1 to 10) was made and tested for tannin, with tincture of chloride of iron, with sulphate of iron, and Russian isinglass, whereby a trace of tannin was shown, 100 grains of the epidermis thoroughly dried, yielded fifty-four per cent. of residue; on being incinerated at a low heat, the epidermis (dry ?) yielded twelve per cent. of a dark gray ash, one half of which was soluble in water; the ash consisted of silica, carbonates and sulphates of potassium and calcium. The fibrous portion, after being incinerated, yielded sixteen per cent. of ash, partly soluble in water.

The fruit contains a large amount of mucilaginous substance, which yields a white precipitate with solution of subacetate of lead.

An infusion of the fibrous portion, when evaporated to a syrupy consistence, became gelatinous on cooling. The gelatinous mass had all the properties of bassorin, and was free from starch. One troy ounce of the epidermis was powdered, and successively exhausted with benzin, alcohol and water. The benzin solution yielded a small quantity of yellow coloring matter; the alcoholic tincture left chlorophyll and a little extractive, and the infusion gave twenty per cent. of slightly bitter extract.

One troy ounce of the powdered seeds was treated with boiling benzol; the green solution, on being evaporated, yielded two and a half per cent. of a brown, fatty oil, and twelve per cent. of a green mass. The latter, on being treated with very dilute hydrochloric acid, and evaporating the liquid, yielded a minute amount of crystals. Similar crystals were also obtained from the green alcoholic extract of the seeds previously

exhausted with benzol. Water afterwards took up nothing of note.

Mode of preparing the fibrous portion.—The fruit is cut longitudinally on one side, stripped of the epidermis, the seeds are then removed, and the net work of fibres is washed thoroughly to get rid of the mucilaginous substance and dried. It is then ready for use. This fibrous portion is the only part of the plant, as far as I know, that has ever been in use.

VEGETABLE TALLOW FROM SINGAPORE.

BY E. M. HOLMES, F.L.S.,
Curator of the Museum of the Pharmaceutical Society.

Mr. E,. Jamie of Singapore, in a letter accompanying some interesting donations lately presented by him to the Museum, has called my attention to this substance as possessing the valuable property of not readily turning rancid. He remarks concerning it: “The vegetable tallow never turns acid, and when the white kind is got, which is seldom, it makes very good ointment, simply with the addition of olive oil.” At the ordinary temperature this tallow is a white friable solid, softening into a pasty condition when rubbed between the fingers and ultimately melting sufficiently to be rubbed in without leaving the hand very greasy. It has a very slight nutty odor and taste. It would seem therefore to be peculiarly suitable for camphor balls, suppositories and pessaries; for the latter its slowness in melting seems to peculiarly fit it.

Mr. E. Fielding at my request has made a few preliminary experiments as to its melting point and solubility in various solvents. He reports as follows: “At 65°F. it remains a little solid; between 82° and 104° F. it has the consistence of flour paste; it fuses at about 118° F., but remains transparent and liquid at 112° F. It is soluble in about an equal weight of cold ether; it is sparingly soluble in cold acetic ether and acetone, but very soluble in these liquids when heated, the greater part being precipitated on cooling; it dissolves in half its weight of cold chloroform, but mixes with one third of its weight of the same liquid when heated. In bisulphide of carbon, either cold or hot, it is extremely soluble. In cold benzol it is soluble to the extent of about 1 in 4. In hot benzol and petroleum spirit (hexane or heptane) it dissolves in all proportions, but the solution gelatinizes on cooling. It is very soluble in cold turpentine

and dissolves in it when heated in all proportions. In alcohol it is soluble to the extent of about 1 in 30 when cold or 1 in 20 when hot, and in isopropyl alcohol it dissolves to the extent of about 1 part in 25 when cold, and 1 part in 4 when hot." Mr. Fielding thinks it may be compared in many respect with the fat of *Pentadesma butyracea* (Clusiaceæ), which should, however, judging from its natural order, be more nearly allied to kokum butter (*Garcinia purpurea*.)

According to a cutting from the *Java Bode* newspaper, sent to me by Mr. Jamie, the vegetable tallow, known as Minyak Tangkawang, or Minyak Sangkawang, is obtained from the seeds of one or more trees of the genus *Hopea*, found in the S. and E. division of Borneo, chiefly in the neighborhood of Qualla Kapuas, and on the west coast in the districts of Sambas and Mampawa. The Dyaks call the fat Kakawang and the tree which yields it Upu Kakawang. This tree is one of the giants of the forest. Several species of the genus appear to be used. Of these *Hopea splendida*, the Tougkawang Tonggul, is also called by the natives Dammar Tangkawang (because the bark yields a dammar.) The timber is used by the Dyaks for making their prahus, as it is proof against the influence of water. The bark also yields a red dye. This tree grows on alluvial fat clayey ground on the banks of great rivers. *Hopea aspera* grows on the higher mountain tracts, principally on the declivities of Mampawa, and is distinguished by the hairiness of the stems.

The preparation of the fat is very simple. When the ripe fruit falls on the ground, it is collected and allowed to germinate a little in a moist place. It is then dried in the sun until it becomes brittle. The fruit is then deprived of its shell and put into a rattan or bamboo basket suspended over boiling water. When it has been well steamed, the fruit becomes soft and plastic like dough. The fat is then expressed by squeezing the doughy mass in a cloth and is poured into joints of bamboos, by which it receives the cylindrical form in which it is met with in commerce. Some Dyak tribes press the fruit by means of two beams. But it is probable that by neither of these processes is all the fat obtained.

The trees begin to yield when they are about eight or ten years old and the crops are somewhat irregular, but every four or five years an extraordinarily large crop may be counted upon, the fruit being ripe in December and January. According to "Spon's Encyclopaedia" (p. 1413), about ten species of *Hopea*, yielding oil seeds differing much in size, are recognized by the natives of Borneo, three of these being common in

Sarawak. The fat is also prepared in Java and Sumatra. By the natives the tallow is used for culinary and lighting purposes.

Although the tallow has not as yet been turned to account in pharmacy in this country, there is no reason why its fitness for medical purposes should not be experimented upon, the fat being a regular article of commerce. As far back as 1856, 651,586 kilos were imported into Singapore, and now several thousands of piculs go yearly to Singapore and are exported thence to England for use as a lubricating agent. For this purpose it has proved most valuable, especially for steam machinery, far surpassing even olive oil. In Manilla it has been employed in the manufacture of candles and found to be very valuable for this purpose. There are doubtless many other purposes in the arts to which the fat might be applied. It contains glycerin and about 95 per cent. of saponifiable matter which has less olein in it than animal fat. The tree is certainly also worthy of the attention of colonial planters since it yields fat, dye, timber and probably also resin, and the demand for the fat alone, when it is better known and prepared in a pure state, will probably far exceed the native supply.— *Phar. Jour. ænd Trans.*, November, 1883, p. 401.

CONTRIBUTION TO THE PHARMACY OF THE POMEGRANATE.

BY LOUIS SlEBOLD.
Read before the British Pharmaceutical Conference.

The great value of the root-bark of *Punica Granatum* as a remedy for tapeworm is so well established as to need no comment. It is well known, however, that the administration of this drug often results in failure on account of the extremely nauseous astringent taste of its decoction and its consequent rejection by the stomach, a fact which renders it almost useless for ladies and children. The usual way of meeting similar objections in other cases, by substituting the active principles for the crude drug, does not seem to promise well in this instance, owing to the difficulties attending the isolation of these principles in a pure state and their proneness to decomposition (see C. Tanret's researches on pelletierine and the other alkaloids of the pomegranate, abstracted in thet “Year-Book of Pharmacy,” 1878, p. 43; 1879, p. 38; and 1880, p. 64.) The question then arises, whether it is possible to produce, by a

comparatively simple process, a pharmaceutical preparation of this bark, which, while possessing the full activity of the drug, is at the same time free from the nauseous taste and the unpleasant effects alluded to. Such a preparation, I believe I have succeeded in making. I do not wish to trouble the meeting with the various steps taken in working out the problem, nor with particulars of unsuccessful experiments in the direction indicated, but will at once lay before you the details of the process finally adopted.

Six ounces of the coarsely powered root-bank are digested three successive times with 48 fluidounces of water at 160° F., previously acidified with a few drops of acetic acid, each time for about twelve hours, during which the mixture should be frequently agitated and the temperature maintained at or near the point given. The strained infusions, measuring in all nearly 140 fluidounces, are united, and gradually mixed with solution of sugar of lead until no further precipitate is formed on testing filtered portions; the whole is then filtered, the slight excess of lead removed from the filtrate by a current of washed sulphuretted hydrogen, the mixture warmed for some time to expel the excess of the gas and again filtered, and the perfectly clear liquor evaporated on a water-bath to the consistence of a syrup, at a temperature not exceeding 140°F. Evaporation in vacua would probably be better still; but this I have not tried. Finally the small quantity of residue left is mixed with syrup of orange peel sufficient to produce a draught of about 2 fluidounces. This draught represents a dose for an adult, and should be taken at once, first thing in the morning, the patient abstaining from food and keeping quiet for about four hours after the administration. A diet of meat and fish, without bread or farinaceous food of any kind, should be observed for the two days preceding the cure, and on the last day no food whatever should be taken after dinner. During this afternoon it is also advisable to clear the bowels by means of a mild purgative; if then the draught be taken at about two or three o'clock the following morning and sleep again resorted to after its administration, the patient will have done all he can to ensure success.

In eight out of nine cases in which the efficacy of this preparation was tested, the entire tapeworm was expelled within five hours after the consumption of the draught, and in one case only success was not complete. The eight cases comprise three of *Tænia solium*, and five of *T. mediocannellata*. In one of the latter instances not the slightest care as

regards diet was observed, and, contrary to all instructions, the patient took a heavy supper the night before the administration of the draught, and yet the entire worm was expelled. In all the eight cases, various tapeworm remedies had been tried previously, decoction of pomegranate root-bark being also among those employed without success, the head of the worm remaining, although the decoction in the cases alluded to was retained by the patient. It would thus appear that the preparation I have described, in addition to being free from all objectionable taste, may also be superior to the decoction of the bark in point of activity, owing, probably, to the entire absence of astringent principles, the abundant presence of which in the decoction is not unlikely to counteract the effect of the anthelmintic constituents.

The preparation obtained as above has a pleasant fruity flavor and is readily borne by the stomach. The most fastidious patient would take it without the slightest difficulty. The value of such a preparation appears to me the greater from the fact that all tapeworm remedies of repute share the nauseous taste and sickening effects of the decoction of pomegranate bark.

While admitting that the cases in which this new preparation has thus far been put to the test are yet not great in number, I think I am justified by the results in inviting the best attention of medical practitioners on the one hand, and of pharmacists on the other, to this subject. Those who are fully acquainted with the numerous failures in the treatment of cases of tapeworm by even the most renowned remedies, must long since have felt the want of a preparation combining efficacy with freedom from all unpleasant taste.—*Phar. Jour. Trans.*, November 17, 1883.

VARIETIES.

ARBUTIN.—Dr. H. Meuche, in "Centralblatt für. Klin. Med.," finds that it acts in many cases as a valuable diuretic. Large doses may be taken without any ill effects. It passes in the urine partly in the form of hydrochinon, which is closely allied chemically to phenol. Urine containing hydrochinon becomes, by standing, of an olive-green color, just as happens in carboluria. Arbutin is of service in urethritis even of a specific nature. Brieger has employed a solution of hydrochinon as an injection in gonorrhoea, but the internal administration would seem to

answer the same purpose. Arbutin is a glucoside, and occurs as fine white stable acicular crystals, soluble in water, of neutral reaction, odorless, and of slightly bitter taste. The best mode of administration is in the form of powder dissolved in a tablespoonful of water. Patients do not complain of its taste.—*Louisv. Med. News.*

THE ACTION OF QUEBRACHO.—A number of experiments, chiefly by Italian and Spanish physicians, which we find recorded in our foreign exchanges, satisfactorily show that quebracho and its alkaloids aspidospermine and quebrachine act with positive effect in reducing the action of the heart and relieving many cases of dyspnœa. Mariani considers it the only agent known which exerts a specifically anti-dyspnoeic action by itself. He finds its exhibition very beneficial both in asthmatic and nervous dyspnoea and that which accompanies inflammatory pulmonic affections. Its action on the heart is decided enough to reduce its pulsations twenty in the minute.—*Med. and Surg. Reporter*, Dec. 8, 1883.