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Botanical Medicine Monographs and Sundry

PROXIMATE ANALYSIS OF THE BARK OF PISCIDIA ERYTHRINA.

By HERMAN BERBERICH, P.D.
Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No, 178.

Piscidia erythrina, or Jamaica dogwood, belongs to the natural order Leguminosae, and is a native of the West India Islands.

A fluid extract of the bark was several years ago introduced to the notice of the medical profession, and it is stated by physicians to be a direct sedative, producing narcotic effects, which are refreshing, and not followed, as in the case of opium, by hyperaemia of the brain, nausea and general nervous disturbance. It is said to be also of value in bronchitis, asthma, spasms of the muscles, due to functional causes, chorea, tetanus, and especially in toothache, to relieve pain.

By treating the fluid extract of the bark with slaked lime, Edward Hart[1] obtained a crystalline substance which he considered to be the active principle of the bark. The crystals separated on the sides and bottom of the flask after the mixture had stood for two or three days. They were accompanied by a resinous substance. The crystals were purified by recrystallization from alcohol, and were finally obtained in a nearly colorless condition. After repeated recrystallization from alcohol, the substance was obtained in the form of small, yellowish crystals, which, under the microscope, appeared to consist of four- or six-sided prisms. The same investigator further described the crystals as “insoluble in water; slightly soluble in cold, much more in boiling alcohol; only slightly soluble in ether; easily soluble in benzene and chloroform. It is dissolved by strong hydrochloric acid and sulphuric acid, but reprecipitated apparently unchanged by dilution with water. Fehling's solution failed to detect glucose or sucrose. The alcoholic solution is neutral to litmus paper. Alcoholic lead acetate solution does not produce a precipitate.” The crystals melted at 192º C. An elementary analysis of them led to the formula, $C_{29}H_{24}O_8$. They were named *piscidia.*

The work of the present writer consists of a proximate analysis of the bark and a special search for the principle called Piscidia. The proximate analysis was conducted according to the scheme of Dragendorff. The material was used in No. 40 powder. The percentages stated are for the air-dry bark.

	Per cent.
Petroleum ether extract:	
Caoutchouc, saponifiable wax and fat, etc.	0.61
Ether extract :	
Glucose, saccharose, resin, piscidia, etc.	0.86

1 *Amer. Chem. Jour.*, 1883, P. 39; *Therapeutic Gazelle,* 1883, PP. 97, 98.

Absolute alcohol extract:	
Glucose, saccharose, resin, etc.	0.51
Water extract.	
Mucilaginous and albuminous substances, 14.78 per cent.; dextrin, 3.38 per cent.; saccharose, 1.20 per cent., etc.	22.43
Alkaline-water (2 per cent. NaOH solution) extract:	
Mucilaginous and albuminous substances, 1.28 per cent., etc.	4.40
Acidulated water (1 per cent. HCl solution) extract:	
Pararabin, 1.35 per cent.	4.00
Starch	1.34
Moisture	9.25
Ash:	
Potassium, sodium, calcium, magnesium, chlorine and phosphoric oxide	10.55
Cellulose and undetermined substances	46.05
Total	100.00

Tannin was not found. The acidulated water extract contained calcium phosphate but not calcium oxalate.

After completing the proximate analysis a special search was made for the principle Piscidia. The method used by Hart was followed. For this purpose a fluid extract was made by exhausting 500 grammes of the bark with an alcohol of 78 per cent. strength. The extract was concentrated by distilling off the alcohol until about 100 c.c. of liquid remained in the flask. This liquid was poured into a beaker containing 30 grammes of quicklime, which had been previously slaked with enough water to make a thick paste. The milk of lime and concentrated extract were intimately mixed, the mixture allowed to stand in a warm place for a half hour, then strained, and the residue pressed. The liquid was then filtered through paper to obtain it in a clear condition. Water was now added to the clear filtrate until the latter was rendered slightly turbid. The liquid was then set aside for crystallization to take place. After two or three days crystals separated upon the sides and bottom of the beaker. They were accompanied by a resinous substance, from which they were purified by recrystallization from alcohol. By adding water to the mother-liquor from these crystals, a second crop, still more impure, was obtained. These crystals possessed all of the properties assigned to *piscidia* by Hart.

COTTON ROOT BARK.

By FRANK WILLIAM MORGAN, P.D.

Cotton root bark was first introduced to the attention of the medical profession by Dr. Bouchelle, of Mississippi, who, in an article in the *Western Journal of Medicine and Surgery*, August, 1840, stated it to be, in his opinion, an excellent emmenagogue, and not inferior to ergot in promoting uterine contraction. He stated that it is habitually resorted to by the slaves of the South for producing abortion, and thinks it acts in this way without injury to the general health. To assist labor he used a decoction (4 ounces to a pint) the dose of which was a wineglassful.

In the *Nashville Journal of Medicine and Surgery*, July, 1855, Dr. J. T. Shaw stated that he esteemed it as superior to any other emmenagogue, and equal to ergot as a parturient, while attended with less danger. He used a tincture made by macerating 8 ounces of the dried bark in 2 pounds of diluted alcohol for two weeks. Of this he used a drachm three or four times daily.

Mr. Weatherby (AMER. JOUR. PHARM., May, 1861) denies the statement that this bark is used as an abortificant by the slaves of the South. He states that for about a year he was in one of the finest cotton-growing districts of the South, and that he asked some twenty physicians, and also the overseers of some large plantations, as to their having heard of this use, but found nothing to corroborate the statement.

The bark was examined chemically by Professor Wayne (AMER. JOUR. PHARM., 1872, p. 289), W. C. Stahle (*Ibid*., 1875, P. 457) and C. P. Drueding (*Ibid*., 1877, P. 3 86).

Both Wayne and Stahle confined themselves principally to the investigation of the resin. Wayne found a yellow resin, turning red on exposure, which he considered insoluble in chloroform, ether, benzol and aqua ammonia, but found it soluble in alcohol. Stahle obtained a resin under several different conditions which was invariably of a red color, and the solubility he found to be as follows: In alcohol, 14 parts; in ether, 25 parts; in chloroform, 15 parts; in benzol, 122 parts. The difference in the color of the resin found by the two investigators appears to be due to the fact that Professor Wayne used fresh bark, while Mr. Stahle used a dried product. It is well known that the fresh bark contains a substance which is yellow, and which, on exposure to light and air, becomes red.

Mr. Drueding found the constituents of the bark to be: Of inorganic substances K, Na, Ca, Mn, Fe, H_2SO_4, and H_3PO_4; of organic: red and yellow resin, resinous coloring matter, fixed oil, gum, sugar, tannin and chlorophyl. About 1 ounce of fixed oil was obtained from 5 pounds of root.

The material used in this investigation was fresh and gathered during the winter months. The dried bark is from 2 to 4 lines in thickness (when fresh from 2 to 4 mm.), with very thin cork, which is easily removable. The color, when fresh, is yellow, and, after exposure to the air and light, changes to a reddish-brown. The outer sur face is reticulately wrinkled, possesses numerous small, round, black dots of a fungus or lichen; occasionally round scars and transverse warts appear which are fissured in the middle along their whole length (being lenticels). The inner surface is yellowish-white, reticulate and shining, the bast being easily separable from the rest of the bark in thin, transparent, porous, reticulately-marked plates. After peeling off the bast the inner bark is whiter in appearance and contains numerous small, round dots.

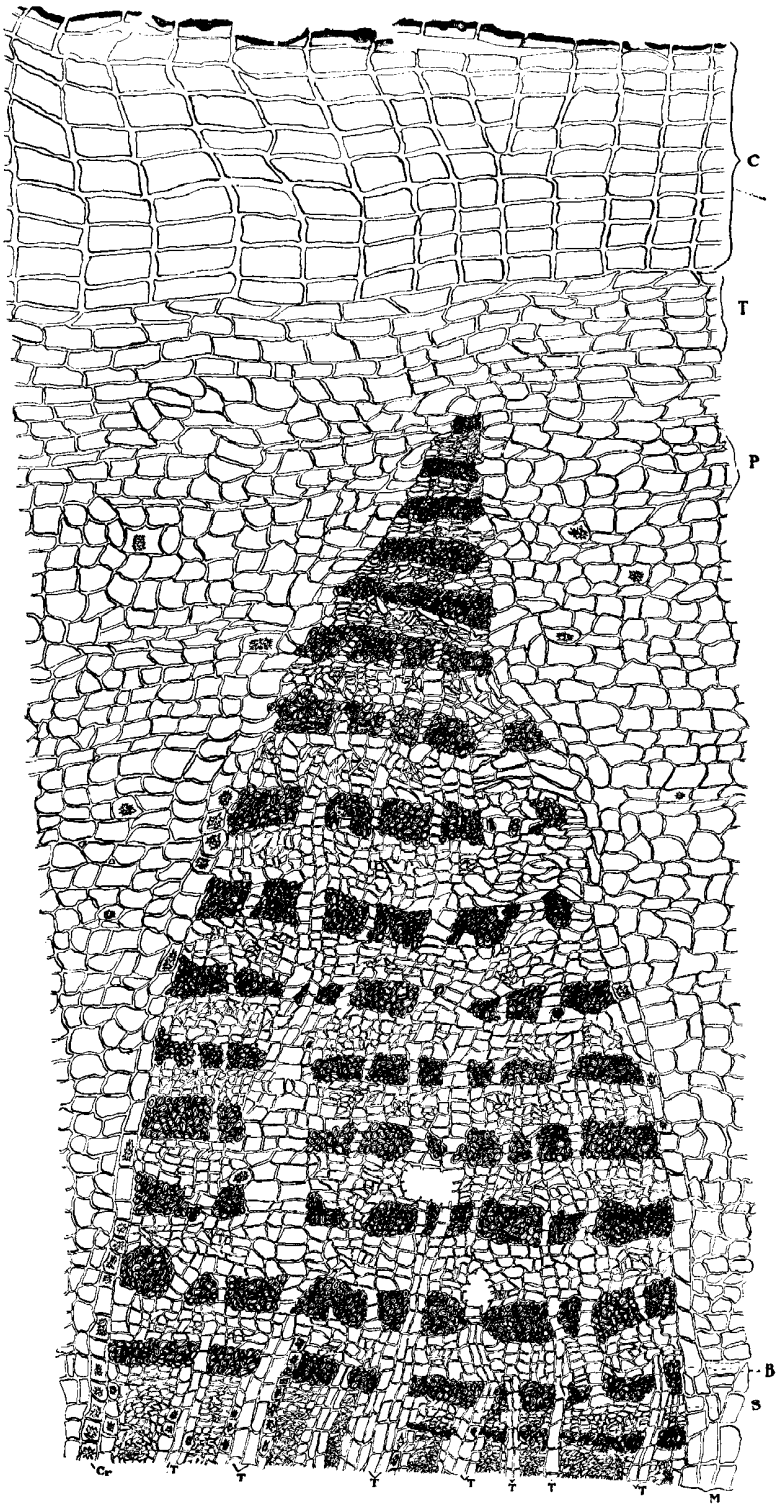

FIG. 1.—Transverse section of Cotton Root Bark. (*c*) cork; (*cr*) crystals of calcium oxalate; (*b*) bast; (*m*) medullary rays; (*T*) cells containing tannin; (*s*) sieve. (About 180 diameters.)

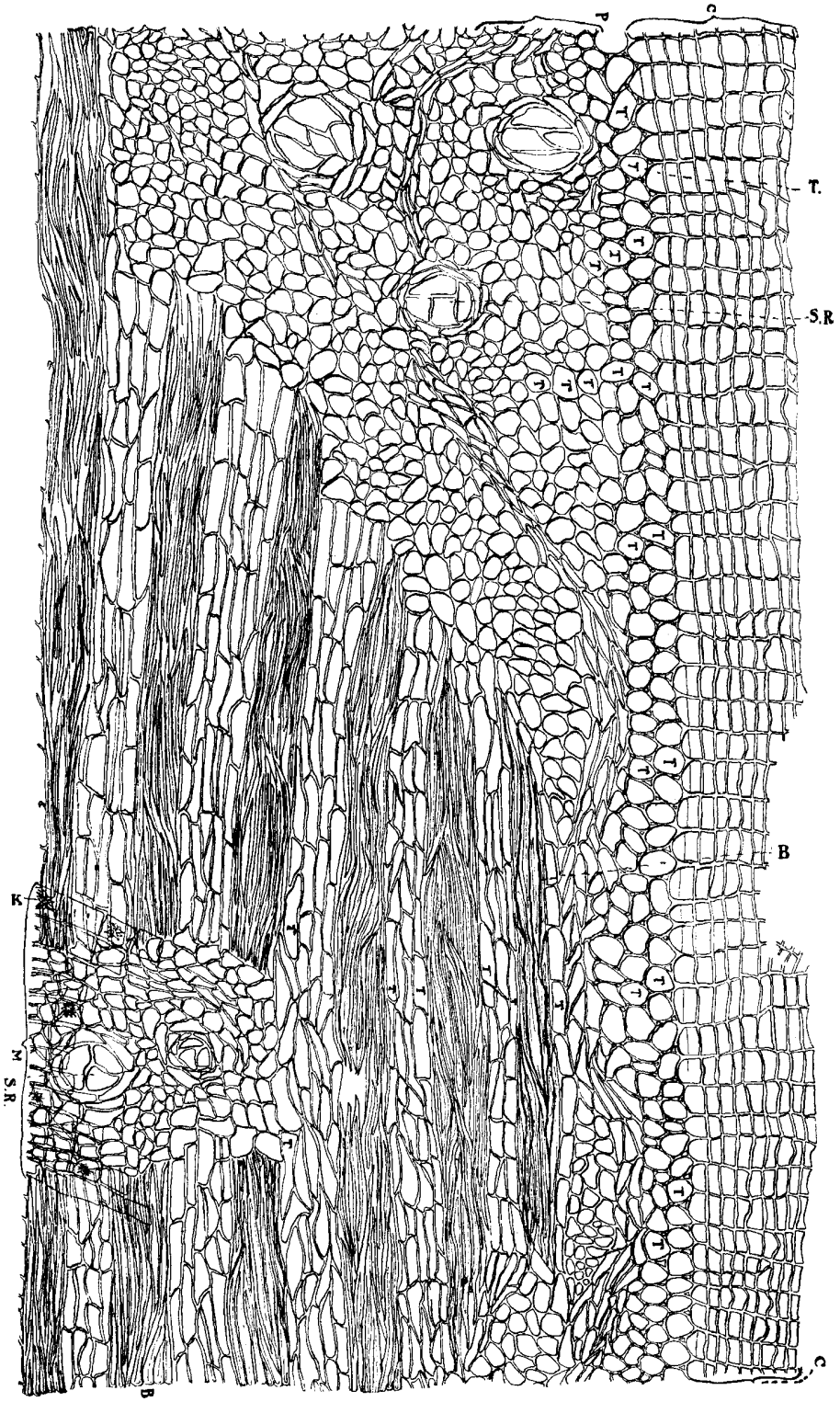

FIG. 2.—Longitudinal section of Cotton Root Bark. (*c*) cork cells; (*p*) parenchyma; (*b*) bast fibres; (*S. R.*) secretion reservoirs; (*m*) medullary rays; (*t*) cells containing tannin; (*cr*) crystals of calcium oxalate.

The bark (Figs. 1 and 2) Consists of from 8 to 12 layers of tabular, tangentially-elongated cork cells (c), generally very much broken and eroded on the outer surface, and containing in the outer layer tannin and coloring matter. Underneath this corky layer lies a parenchymatous tissue (p) consisting of a number of layers of thin-walled cells. Into this latter extends a wedge-shaped mass of bast fibres (b). The latter is arranged in layers, separated from one another by layers of parenchyma (p) and sieve cells (s), the lower layers being very much broken by short medullary rays (m). There also occur secretion reservoirs (s), and cells containing starch, tannin and oxalate of calcium crystals. The latter are rosette-shaped and relatively numerous in the inner bark. Frequently the secretion reservoirs can be seen by the naked eye, especially if the soft material is freshly sectioned.

In making a micro-chemical examination of the bark for tannin, some of it was macerated for two weeks in an aqueous solution of copper acetate (method employed and suggested by Professor Kraemer), which has the effect of precipitating tannin as reddish masses in the cells containing it. On sectioning and examining with a magnification of twenty- five diameters, tannin was identified in the outer row of cork cells, but it occurs most abundantly, however, in the first layers of parenchyma just beneath this cork layer. This tannin-containing parenchyma tissue is from one to five cells in width. Tannin also occurs in isolated parenchyma cells throughout the bark, especially lying between the wedge-shaped groups of bast fibres and in the cells lying adjacent to the groups of bast. Of the latter, generally only those cells contain tannin which are arranged on the outer and inner tangential surfaces of the bast bundles. It is also found in the secondary medullary ray cells.

Calcium oxalate crystals are found occurring frequently in the primary medullary rays, and in the cells lying on either side of the cells of the smaller rays; occasionally in the parenchymatous tissue of the outer bark.

Secretion reservoirs (s), containing oil and resin, occur frequently in among the parenchymatous tissue lying near the phloem. These are large enough to be distinguished (in fresh bark) by the naked eye. The reservoirs are apparently of lysigenous origin. The contents were found to be soluble (on maceration); in acetone and alcohol very soluble; in chloroform and dilute alcohol slightly soluble; insoluble in water. The bark, macerated in alcohol and acetone, became lighter in color; that macerated in chloroform developed a purplish-brown color.

The secretion reservoirs in cotton root bark appear not to have been mentioned heretofore, and as it is not unlikely but that it is in the products secreted here that the value of this drug depends, further botanical and especially micro-chemical study on these reservoirs or glands is desired. Furthermore, a detailed study of the origin of these secretion reservoirs is desirable.

GLEANINGS FROM THE MEDICAL JOURNALS.

Clement B. Lowe, M.D.

THE RENEWAL OF PRESCRIPTIONS, ETC., IN GERMANY.

A recent decision of the Ministry of Public Worship, of Education and of Medical Affairs in Germany, is of interest. Prescriptions for internal use in Germany may not be repeated for the patient by an apothecary unless the physician signifies his approval in writing. External remedies, however, may be repeated. Substances prescribed as eye-washes, for inhalation, for subcutaneous injection, or for clysters and suppositories are, by this recent decision, classed among internal remedies as regards their repetition, though the regulations as to bottles and labels that hold external remedies still apply to them.—*Phila. Med. Jour.*, July, 1898.

ANALYSES OF SAMPLES OF GROUND COFFEES.

Secretary Edge, of the Department of Agriculture, has recently received from Professor Cochrane a report of his analyses of a large number of samples of "ground coffee" and "ground coffee compounds," selected in Eastern Pennsylvania. The report, in part, is as follows :

"Composed of bran, cracked wheat and a little caramel; chiefly wheat bran, sweetened and roasted."

"Sample bears about the same relation to coffee as wheat screenings do to wheat."

"Roasted sweetened wheat, 75 per cent., coffee, 25 per cent."

"Composed of the roasted and rather finely broken grains of wheat and barley."

"Sample is composed chiefly of wheat bran."

"Composed of roasted cereals and husks of coca-beans."

"Coffee about 64 per cent.; pea hulls, 13 per cent.; and chicory, 23 per cent."

"Sample is roasted rye."

"Sample is roasted barley."

"Sample is composed of wheat, chicory, coffee and peas, coarsely ground."

"Composed of peas about 69 per cent.; grains, 29 per cent.; and chicory about 2 per cent."

"Sample is composed of bran, cracked wheat, chaff and caramel."

"Sample is composed of wheat, chicory, coffee and peas all coarsely ground."

Of all the samples examined, but four were found to be composed of pure coffee, and of these three were pronounced to be of "very inferior quality."—*Phila. Med. Jour.*, July 30, 1898.

ADULTERATION OF WHEAT FLOUR.

This seems to be a frequent and growing evil. When the adul-terant employed is corn, this though an imposition on the public, is not harmful, and does not especially affect the food value of the product. The Maine Board of Agriculture has discovered that a business concern is extensively advertising a substance called "mineraline," which is

asserted to make the flour "whiter and nicer," and not to injure it in any way, and to be not at all injurious to health. It is supplied in various grades, from $8 to $20 per ton, and is asserted to net the dealer from $400 to $1,600 per carload. Upon examination, mineraline is found to be ground soap-stone, a substance absolutely valueless as food, and whose use may be quite prejudicial to health.—*Phila. Med. Jour.*, July 23, 1898.

THE OLEANDER AS A DRUG.

In the *Indian Medical Record* for May 1 st, Assistant Surgeon, H. D. Pant, of Gonda, reports a case of poisoning with the leaves of the oleander (*Nerium odorum*). A Mussulman coachman pounded seven leaves of the plant with water and sugar candy, and drank the sherbet, having been advised by a quack to take it as a diuretic for gonorrhea. Severe vomiting set in, with violent retching and slight pain in the stomach. The pulse was extremely slow, only thirty-six to the minute, and feeble. The man recovered in the course of a day or two. The author likens the action of oleander on the heart to that of digitalis, and suggests the medicinal use of a mild tincture on account of its rapid action and its sustained effect.

RECENT LITERATURE RELATING TO PHARMACY.

PRESERVATION OF GRAPE JUICE.

The process of preparing unfermented grape juice is described by J. Craig (*Canada Expt. Farm's Rpts.*, 1896, p. 165), and sixteen experiments on the preservation of the juice are reported. The results indicate "that the natural flavor of the grape juice may be preserved intact by raising the temperature of the juice gradually to 170º F., keeping it at this point for ten minutes, and then quickly bottling it, taking care to use absolutely air-tight and thoroughly sterilized vessels. . . . The addition of sugar in the proportion of 4 ounces to each quart of liquid will improve the quality and palatability of the juice of the more acid varieties of grapes. . . . The use of antiseptics, such as salicylic acid, should not be encouraged."

CASHEW (Mesquite) POISONING.

In an article by Williams in *Jour. Jamaica Agric. Soc.*, 1897, P. 319, on cashew (mesquite) poisoning, the author says that when animals are fed with this legume (*Prosopis juliflora*) they become slick, glossy, and look well. The animals seem very fond of it. But when it is damaged by rains, heavy dews, etc., it is poisonous. Animals that eat it when it is in the poisonous condition become distended with gas, and rupture of the digestive system may result. Clots of blood have been found in the cerebellum. The first symptoms are colicky pains with abdominal distension; the animal paws, lies down and rises frequently, and shows an inclination to thrust its head into corners. It may lie on its back with feet doubled up and groan with pain. Cold sweats occur, breathing becomes thick and labored, and there are frequent attempts at micturition. Urine is voided in small quantities. The remedy is puncturing the abdomen and drawing off the gases, together with hot fomentations to abdomen and loins, and the administration of oil and hot-water enemas. The animal may finally

die from collapse.

PECTIN OF GENTIAN.

Bourquelot and Hérissey have succeeded in isolating the pectin of gentian. They exhaust the drug with alcohol, removing the alcohol and dissolving the residue in ten times its volume of water in an autoclave (110º). The pectin is obtained from the latter by precipitation with alcohol containing hydrochloric acid. The precipitate, purified by washing with alcohol and then ether, and dried, is soluble 1 part in. 100 of water, and is easily oxidized by nitric acid to mucic acid.—*Jour. Pharm. Chim.*, 1898, p. 8; abs. in *Pharm. Zeit.*, 1898, P. 339.

BRITISH PHARMACEUTICAL CONFERENCE

GLUTEN FLOUR.

VICTOR G. L. FELDEN.

A sample of so-called gluten flour, having been found to contain abundance of starch and but a small amount of gluten, the author subjected five commercial samples to detailed examination. With one exception, all but one proved to contain a large proportion of gluten, ranging from 60 to 76 per cent. The fifth sample-of American origin contained 8.5 per cent. only. As regards starch and sugar, the four samples rich in gluten yielded from 7.6 to 16.7 per cent., whilst the one containing little gluten consisted of starch and sugar to the extent of 68.8 per cent., so that diabetic patients would gain little by using it instead of good wheaten flour. Since the proportion of gluten in flour is readily determined by simply washing a sample in a muslin bag and drying, the author suggests that all chemists who sell gluten flour should occasionally test their stock.

SOME COMMERCIAL VARIETIES OF DILL FRUITS AND THEIR ESSENTIAL OILS.

By JOHN C. UMNEY.

The dill fruits obtained from different countries by J. C. Umney do not show such marked difference in appearance as the fennel fruits from different parts

of the world, but the differences are probably of greater medicinal importance. English, Indian, German and Japanese dill fruits are described, and analytical data given concerning their oils., The use of English or German fruits is recommended for the preparation of dill water, and preference for pharmaceutical purposes is given to the oils of the same varieties.

NOTES ON EXTRACT OF GINGER.

By T. H. W. IDRIS

It is well known that alcoholic extract of ginger, commercially known as “gingerine,” does not contain all the aromatic principles of the root, as most of the essential oil is carried over with the recovered alcohol.

In the course of experiments to produce extract of ginger that would contain the whole of the flavoring and odorous principle, it was found that acetone was the most suitable solvent, boiling as it does at 56º C. and being miscible with water in all proportions. The apparatus used consists of a modification of a Soxhlet on a manufacturing scale. If some powdered ginger be exhausted in a Soxhlet with acetone, and afterwards with alcohol, we find that the whole of the aromatic and pungent principles have been removed by the acetone, showing that it compares favorably with alcohol as a solvent. The acetone extract does not appear to have lost any of its volatile oil in the process of recovery, as is so markedly the case when using alcohol, while the last trace of acetone is easily removed by agitation with a little water. This acetone extract is a dark-brown substance of a treacly consistency, intensely pungent and at the same time possessing a full ginger aroma, the quality of which largely depends on the variety of ginger used.

It is readily soluble in alcohol, forming a deep-brown liquid. If steam be passed through the extract and then condensed, it carries over a quantity of the volatile oil with it. This oil floats on the surface of the condensed water, forming a yellow layer, and can be easily removed. The difference in aroma of the various kinds of ginger, though noticeable enough when examining the rhizome, is much more apparent when dealing with the oils themselves, and in this way a method of distinguishing the variety of ginger used is obtained. The various tinctures and essences of ginger may be very conveniently and readily prepared from this extract without the usual loss of alcohol, and syrup may be flavored with it by proper diffusion at a suitable temperature without the use of any spirit, and a further saving may be thus effected in manufacturing ginger-flavored beverages.