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Botanical Medicine Monographs and Sundry

PROTEIDS OF SEEDS OF ABRUS PRECATORIUS

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The proteids of the seeds of abrus, the Indian licorice, are important physiologically, because they have been shown by Warden and Waddell to be possessed of poisonous properties. To the poisonous product extracted by these observers the name “abrin” was given; and though it was decided that abrin was closely allied to “plantalbumin,” yet no experiments were recorded to show whether the product was a mixture or a single proteid. They obtained it by making a watery extract of the crushed seeds and precipitating with alcohol, the precipitate being afterwards collected and dried.

Before proceeding to an examination of the physiological action of the jequirity, it seemed to me desirable to determine the kind of proteids present in the seeds, and the present communication embodies the results of the inquiries made with a view to such determination.

Method of extraction of the proteids.—The method used was based on the supposition that the proteids present in abrus were similar to those in other seeds, consisting chiefly of proteids of the globulin and albumose classes.

The finely ground seeds were shaken first of all with chloroform to remove the red cuticle which sinks in this liquid, so that the yellow kernel-powder could be readily removed, and obtained in the dry state by allowing the chloroform to evaporate.

The powder obtained was then extracted with 15 per cent. sodium chloride solution for twenty-four hoars, and the mixture filtered. The yellowish filtrate was distinctly acid and gave a copious precipitate on boiling. The proteids were separated from this filtrate in two ways:

1. Saturation with neutral ammonium sulphate and shaking for four hours throws down all the proteids in solution; the filtrate, after saturation, giving none of the proteid tests.

2. Saturation with sodium chloride and shaking for many hours gives only a scanty precipitate, which becomes copious on adding a large excess of glacial acetic acid. All the proteids are only with difficulty precipitated by this mode of saturation, even after prolonged shaking.

Since ammonium sulphate so readily throws down all the proteids in solution, the precipitate caused by it was used in the following manner in the examination of the

proteids: The precipitate was collected and dissolved by adding distilled water, and the solution dialyzed in running water (with thymol) for five to seven days.

Dialysis caused a copious precipitate, which was collected and washed with distilled water (previously boiled to remove carbon dioxide) until no proteid in solution was present in the washings. The precipitate was then dried over sulphuric acid. The residue was in dark brown scales. It consisted of globulin with some coloring matter.

It is not possible to remove all the globulin by dialysis, so the liquid, after dialyzing for seven days, was filtered into rectified spirit, which precipitated the remaining proteids. After standing under the alcohol six to eight weeks the globulin was coagulated, and the precipitate was collected, dried, and treated with distilled water, which dissolved out a proteid. This proteid is an albumose. The chloride of sodium method may be used instead of the ammonium sulphate; it takes a longer time, but gives products freer from coloring matter.

For chemical examination, the albumose is readily prepared by boiling and filtering an aqueous infusion of the seed. The globulin is coagulated while the albumose remains in solution.

Properties of the globulin.—1. It is insoluble in distilled water, but readily soluble in 10 to 15 per cent. sodium chloride or magnesium sulphate solution; soluble to a less extent in 5 per cent. sodium chloride solution, and scarcely at all in 0.75 per cent.

2. It is completely precipitated from solution by saturation with sodium chloride after slightly acidifying, and with ammonium sulphate, whether the solution be neutral, acid, or alkaline.

3. It is coagulated by heat in 10 per cent. magnesium sulphate solution, between 75º and 80º C., the liquid being made distinctly acid; in 10 per cent. sodium chloride, between 66º and 73º C.

4. When the solution in 10 per cent. sodium chloride is placed in the incubator at 35º to 40º C., and allowed to remain twenty-four or even forty-eight hours, no precipitation occurs; a reaction in marked contrast to that given by some vegetable globulins. In its high coagulation temperature, and in its non-precipitation from solution by prolonged exposure to a moderate heat, abrus-globulin agrees with the proteid I have described in the juice of the fruit of *Carica papaya*, which, from its resemblance to serum-globulin, I have called vegetable paraglobulin. The vegetable myosins occurring in the cereals, wheat, rye and barley, have a lower coagulation temperature than the paraglobulins, viz., 50º—55º C., and are precipitated from solution and rendered insoluble by a prolonged exposure to a temperature of 35º—40º C.

Properties of the albumose.—1. Soluble in cold or boiling distilled water. Its chemical and physical properties are not apparently altered by boiling its solution.

2. It is not precipitated from solution by saturation with sodium chloride unless a large excess of glacial acetic or phosphoric acid be added. It is readily precipitated by

saturation. with neutral ammonium sulphate.

3. It does not form an albuminate.

4. Nitric acid does not precipitate it in a watery solution; but a precipitate falls if solid sodium chloride be added nearly to saturation.

5. Acetic acid causes a cloudiness, which is increased by potassium ferrocyanide.

6. Copper sulphate and basic acetate of lead cause precipitates, soluble in excess; mercuric chloride, a precipitate insoluble in excess.

7. Copper sulphate and potash give a pink coloration (biuret reaction)

For the albumoses occurring in the vegetable kingdom I have proposed the name *phytalbumoses*, as they differ in many respects from the animal varieties.

The phytalbumose in abrus is closely allied to Kühne and Chittenden's deutero-albumose, and identical with the *a*-phytalbumose occurring in the papaw juice.

There are, therefore, two proteids in the seeds of *Abrus precatorius*, a vegetable Paragulobulin and *a*-phytalbumose. In conjunction with Dr. Wolfenden, I am now engaged in investigating the physiological action of each of these proteids, and hope soon to publish the results. For the present it will be sufficient to call to notice the close resemblance between the proteids of the papaw juice and those of jequirity, since their physiological action appears to be in many respects similar.

KEFIR, A NEW KOUMISS.

Kefir can be made from the milk of different animals, but it is generally made from cow's milk. Fermentation is excited by the presence of the kefir, which is a species of mush-room, white when fresh, and yellow when old and dry, compact, elastic, and about onefiftieth of an inch in diameter.

Chemically it is composed of water, fat, peptone, and nitrogenous material.

Examined microscopically it is composed of the rods and cells of beer-yeast.

It is found in the mountains of northern Caucasus near the snows. The natives believe that it is produced by the bushes which grow upon the mountain-tops. It is probable that the first origin is in the great number of bacteria which circulate in the atmosphere, and whose soil of development is furnished by the curds of coagulated milk.

At the beginning of the preparation of kefir the grains should be allowed to swell in tepid water for five or six hours-two teaspoonfuls to a tablespoon ful of kefir grains; they should then be washed in cold water and put in half a glass of fresh milk, which is changed every three hours. The grains, which were yellow, become white, and are then ready for the preparation of kefir.

This is done by placing the white grains in a quart of fresh cow's milk, and the whole placed in uncorked bottles and exposed to a temperature of about 45º F., and frequently shaken. The milk begins to ferment soon, and in seven or eight hours the mass is fermented. The kefir grains are removed by filtering through muslin, the liquid replaced in bottles, which are only partly filled, and carefully corked.

The milk is left at a constant temperature, and shaken every two or three hours. Fermentation continues in spite of the absence of the ferment, and in twenty-four hours the drink is ready. The grains of kefir may be washed and used indefinitely.

Kefir is richer in albumen than koumiss, less alcoholic, and less acid.

The following table of analysis shows the composition. of milk, koumiss, and kefir:

	Cow's milk.	Koumiss.	Kefir.
Albumen	48	11.2	38
Butter	38	20.5	20
Sugar of milk	41	22.0	20
Lactic acid		11.5	9
Alcohol ...		16.5	8
Water and salts	873	918.3	905

BRITISH PHARMACEUTICAL CONFERENCE

Selected Papers on Plants

Catha.—Some contributions to the knowledge of catha leaves, by Professor FIückiger and Mr. T. E. Gerock, next came under the attention of the meeting. The greater part of this lengthy paper was of the historical and antiquarian nature that characterizes many of the writings of the senior author. Only the portion recording the results of the chemical examination therefore was read by Mr. Naylor. It appears that the first scientific notice of the plant was contributed rather more than a century ago by the Swedish botanist and explorer, Forskal, who reported that the Arabs ate the leaves greedily on account of their stimulating powers and the wakefulness they promoted; also that they believed the plague would not invade a place where the tree was cultivated, and that a man carrying a twig of catha in his bosom might safely go among the infected. A number of other quotations are given in the paper, tending to show that catha leaves are used by the natives of Arabia and Abyssinia in a similar manner and for a similar purpose as coca leaves in South America. The results of the chemical examination by the authors of a sample of catha are recorded in the last two or three paragraphs of the paper. About three pounds of the leaves were exhausted with water containing oxalic acid, the liquid neutralized with lime and shaken with light petroleum; the greater part of the petroleum was distilled off and the residue shaken with dilute hydrochloric acid; the acid solution was heated with lime in excess and then shaken with ether, which on evaporation left about half a gram of a thickish oily yellowish matter that readily dissolved in acetic acid, the solution giving precipitates characteristic of alkaloids. A watery solution of the

substance reddened phenolphthalein paper, but the redness quickly disappeared, in consequence, it is supposed, of the volatilization of the alkaloid, which it is proposed to call “katine.” A crystalline acetate of katine was also stated to have been obtained. The authors confirmed previous statements as to the absence of caffeine.

lpecacuanha.—On resuming the second sitting of the Conference was commenced by the reading of a paper on the Estimation of Emetine in Ipecacuanha, by Mr. F. Ransom. The principal novelty in this paper was the suggested use for the percolation of the root of chloroform rendered alkaline by shaking it with a strong solution of ammonia. The alkaloid is removed from the percolate by means of dilute sulphuric acid, and estimated with Mayer's reagent. The author has ascertained that contact with the ammoniated chloroform does not decompose the alkaloid. Ten samples of root tested by this process yielded proportions of emetine varying from 1.3 to 2.3 per cent., the average strength being 1.66. At the conclusion of the paper, Mr. Naylor expressed some surprise at the high results obtained by Mr. Ransom, and remarked that hitherto no published process had quite satisfied him, as they all, in his hands, had yielded varying results.

Mackay bean.—The enormous bean known as the Mackay Bean, the seed of *Entada scandens*, was the subject of the next communication, by Mr. John Moss. It consisted of an account of a chemical investigation of the seed made with the object of isolating a poisonous principle that it was alleged to contain. No very definite result, however, has been arrived at, beyond establishing the probability of the occurrence of saponin in the acqueous extract, and the obtaining of three or four microscopic crystals, which it is hoped may be the beginning of a crop that will eventually be large enough to allow of their proper examination. Some question having been raised as to whether the substance occurring in the aqueous extract was really saponin, Mr. Holmes remarked that the root of the plant is used in the Philippines as a washing material.

Vesicatingbeetles —The next note, on " Two Species of Vesicating Beetles from South Africa," by Mr. J. O. Braithwaite, was another communication of practical value. It described the results of an examination of some “blistering flies”, that had recently been consigned from. South Africa. The sample consisted of two species of *Mylabris* which have been identified as *M. bifasciata* and *M. lunata*. The author reported that he had ascertained that the former of these is extremely rich in cantharidin, containing more than twice as much as *Cantharis vesicatoria*, and he suggested that as the beetle is plentiful at the Cape it might prove an economic source of the vesicant. *M. lunata* proved to be much poorer in cantharidin. After the paper had been read, Mr. Moss stated that another species of *Mylabris* is at present used as an important source of commercial cantharidin.

English-grown rhubarb.—A very brief note was then read by Mr. W. Elborne, in which he called attention to samples of English-grown roots of *Rheum officinale*, pointing out the great similarity in appearance and general characters existing between them and the dark-veined variety of the East Indian imported drug.

Oil of evodia.-The object of the next paper read, which was by Mr, H. Helbing, was to add oil of evodia to the list of deodorants of iodoform. The oil, which is derived from the fruit of the *Evodia fraxinifolia*, a rutaceous plant, native of Nepal, was described as

having an exceedingly agreeable and intense odor similar to bergamot. Its specific gravity does not exceed .840, and it is soluble in ether and alcohol and has a pungent taste. The fruit on distillation yields about 4 per cent. of the oil. Some conversation arose as to a possible supply of the oil, but this was somewhat checked by the doubt expressed by the president, after examining the samples, whether the oil answered to the claim put forward on its behalf.

Camphor oil was next brought before the Conference in a paper by Mr. P. MacEwan, who, having examined numerous samples of the oil during the last two years, has been struck with the great range of quality they exhibited. Some were almost colorless, others very dark, and their other physical characters showed great variations. Some experiments have led him to the conclusion that high specific gravity and dark color are indicative of the absence of camphor. Mr. MacEwan considers it desirable that camphor oil should be brought to approximate uniformity before it reaches the hands of the retailer, by excluding the dark and heavy oils, bulking the remainder and submitting it to distillation to get rid of all that will distil below 170º to 175º C., which would be still useful for varnish making. Mr. Moss mentioned that in the distillation of crude oil, which is carried out to a considerable extent for the sake of the camphor it contains, a fraction is obtained resembling safrol, and he believed that a great proportion of this constituent finds its way into commerce as oil of sassafras. Another portion of the distillate, he had been informed, resembled eugenol, the heavy constituent of oil of cloves, and although occurring in small relative proportion the total yield is large, as the quantity of the oil distilled is enormous.

Another spurious cubeb was the subject of a histological paper by Mr. Kirkby. It appears to agree more closely with Flückiger and Hanbury's description of *Piper crassipes* than the false cubebs described by Mr. Kirkby in this journal, which has been referred to that species. To distinguish them, therefore, he at present speaks of the earlier one as the short-stalked variety. Mr. Holmes mentioned the interesting fact that be had recently examined a sample of cubebs of the best quality he could obtain, and that he had found it to contain the different spurious “cubebs” that have been described and he was inclined to believe that the cubebs of the present day consist of mixtures of genuine and spurious fruits. Dr. Symes said that many samples of powdered cubebs when triturated with water showed a considerable separation of gritty and sandy matter, and one sample of powder yielded to him upon incineration as much as twelve per cent. of ash.

Pharmacy of logwood, by Mr. Louis Siebold. The object of this note was to deal with the questions: What is the best logwood for use in pharmacy ? What is the nature and condition in which this wood is intended by the authors of the Pharmacopoeia to be employed? Are these intentions fulfilled in practice? In reference to the first question the author thought that Campeachy or Honduras was much more suitable for use than the inferior kinds obtained from San Domingo and Jamaica. As to the condition in which the wood was to be used the Pharmacopoeia was silent, and ignored the fact that the wood in logs and that ordinarily sold in chips or in the form of a coarse powder, were most essentially different from each other from a chemical point of view, since the ground wood or chips as met with in commerce had undergone a long process of fermentation by being laid up with water in heaps and exposed to the air

for weeks. The great difference between the two was well known to those engaged in dyeing and calico-printing, and to technical chemists acquainted with these processes; but it was little known to and not at all appreciated by pharmacists. The author fully explained the difference in the chemical nature of the two woods, and expressed the opinion that the fresh or unfermented wood ought only to be used in pharmacy, the aged or fermented wood being very unsuitable for the decoction and the extract, especially for the latter, both from a pharmaceutical and from a medical point of view. He had no doubt in his mind that the framers of the Pharmacopoeia meant the unfermented wood, as this alone had the sweetish taste alluded to in the characters. The last question he answered in the negative, asserting that fermented chips were almost exclusively used by pharmacists and wholesale houses for the B. P. preparations. Unfermented chips were rarely met with in commerce, and, to his knowledge, were never sold to retailers. He thought that pharmacists or wholesale druggists should prepare their own extract, as that imported so largely from France and America was not pure enough for pharmaceutical purposes. He would recommend in the place of the extract a liquor haematoxyli, representing its own weight of wood, which after settling was an elegant and very permanent preparation. He gave full details as to how this should be made.

Quinological work in the Madras cinchona plantations.—Mr. David Hooper supplied another convenient summary of results obtained in further experiments carried out by him in his capacity of quinologist to the Madras government. The first series of twelve analyses referred to, showed that bark from trees of the same age and growing in the same situation might vary in alkaloidal strength, the figures ranging from 1.75 per cent. to 3.90 per cent. of quinine, and from none to 0.16 per cent. of quinidine. It also seems probable that there is no advantage in raising only one stem from a coppiced tree. Bark from the same twelve trees, examined in each consecutive month, showed that in the six months next following the original stripping there was a decrease of alkaloids in the bark left, as if the tree had suffered in this respect from the shock of the operation; but in the seventh month recovery had well set in, and by the twelfth the bark was richer than it had been a year before. Incidentally, it was also observed that March is the month in which cinchona bark appears to be richest in alkaloids. Some further experiments as to the effect of manuring cinchona trees, seem to show that bone manure and cattle manure are best suited for the purpose, though the improvement of the bark in quinine was in no case more than 14.58 per cent. Another experiment as to the extent to which renewal of bark can be profitably carried appears to show that the maximum in the case of a hybrid Ledger plant had been reached with the third year's renewal, although the fourth renewal still resulted in a rich bark.

AMERICAN PHARMACEUTICAL ASSOCIATION

39th annual meeting

Papers presented on plant medicine

Vanillin and Extract of Vanilla was the subject of the first paper read by Clay W. Holmes. Solutions of vanillin of European and American manufacture were made, also of coumarin, and compared with an extract of vanilla of the customary strength, one ounce to one pound. It was ascertained that vanillin will produce an artificial

extract resembling that of vanilla, but not of the strength indicated by the manufacturers. However, since the vanillin of commerce. is an artificial product, not prepared from vanilla, the author thinks that its solution should be sold under its proper name, and he states that a dealer selling it in the State of New York as extract of vanilla would be violating the adulteration of food law. During the discussion which followed, it was stated that one ounce of vanillin may be regarded as producing an equally strong flavor as one pound of vanilla, but that the former was accompanied by a foreign odor which cannot well be described, but was called " pine-odor."

Fluid Extract of Liquorice-root, by G. W. Kennedy. For sixteen troy ounces of liquorice-root a menstruum is recommended, consisting in the beginning of a mixture of alcohol, five fluidounces, glycerin, three fluidounces, water, seven, and ammonia water, 1 fluidounce; the percolation is finished with diluted alcohol; the first twelve fluidounces of percolate are reserved, the weaker percolate evaporated to four fluidounces, and this is mixed with the reserved portion. It is claimed that the above amount of ammonia is sufficient to prevent precipitation of glycyrrhizin, and that the addition of glycerin improves the appearance of the fluid-extract and contributes to its permanence.

Prof. Diehl stated that the amount of ammonia directed by the pharmacopoeia was about correct for the pharmacopoeial process, the excess being volatilized in evaporating the weak percolate. Mr. Ebert had observed that a much better fluid-extract of liquorice-root is obtained if heat be avoided; for the flavoring of tobacco a serviceable extract had been prepared by the use of lime-water, which was considered much superior to that made with ammonia. Prof. Lloyd had observed that different samples of liquorice-root required different amounts of ammonia. Prof. Remington called attention to the change in the menstruum of the completed preparation, as proposed by Mr. Kennedy, which would induce precipitation. That the pharmacopoeial fluid-extract is not clear was stated by Mr. Klie, who favored making this preparation by repercolation.

Reference was also made to wild liquorice-root of the southern States, which is used in some places to a considerable extent, and is said to be very similar to the officinal drug; it is probably obtained from *Glycyrrhiza lepidota*, and an investigation of the subject was promised by Mr. Carraway.

Irish-moss Gelatin was the title of a paper read by Prof Painter, and a number of samples were exhibited. A strong solution of the gelatinous principle of Irish-moss may be made by suspending the washed drug enclosed in a conical bag in a percolator containing water, and heating this by means of a water-jacket to the boiling temperature for about two hours; the thick mucilaginous liquid is then drawn off, and may be evaporated to dryness by placing it in shallow trays in a well-heated drying closet. The yield of gelatin is about 70 per cent., the Irish-moss not being completely exhausted. As an example for the manner in which it may be used for emulsions, the following is given:

Emulsion of Cod-Liver Oil. Dissolve Irish moss gelatin, 40 gr., in boiling water, 5 fluidounces, transfer the solution to a pint bottle, add cod liver oil, 8 fluidounces, in divided portions, shaking vigorously after each addition until a perfect emulsion is formed; then add syrup of tolu, 2 fluidounces, and lastly a solution of oil of sassafras

10 minims, oil of wintergreen 10 minims, and oil of bitter almond 2 minims, in alcohol 1 fluidounce; shake well together. The emulsion may also be made in a mortar in the usual way.

Pharmacist and Manufacturer was the subject discussed in a paper by Prof. Lloyd. The relations between the two are of such a nature that it is not easy to give a synopsis of the paper in a few lines. The advantages and disadvantages of each, in manipulating upon small and large quantities, were reviewed, and it was argued that the manufacturer should aim at producing preparations equal to those made by the skillful pharmacist, but that the latter should endeavor to make most, if not all, the pharmacopoeial preparations. A lengthy discussion followed, in which among other things, the practice prevailing to some extent, of making tinctures from commercial fluid-extracts was criticized, and the abolishment by the pharmacopceia of fluid-extracts was advocated, the latter to be replaced by fifty-per-cent. tinctures, which would ultimately take the place of the stronger and the weaker preparations, and in their manufacture did not require the use of heat.

The Medicines of Medicine was the somewhat ambiguous title of a paper read by Prof Painter, referring to the numerous proprietory articles prescribed by physicians, a practice which should be condemned for professional and scientific reasons; but unfortunately, a practical remedy for the evil was not suggested. A motion to publish this paper for general distribution to physicians was tabled.