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ON SYRUP OF TOLU.

BY E. CLAASSEN.

The beautiful yellow color and the fine appearance of the Syrup of Tolu prepared according to the formula of the old Pharmacopoeia are, without doubt, the reason that many apothecaries continue, without making any tests, to prefer this syrup to that made as the new Pharmacopoeia directs. An exact answer to the question, "Which of these two syrups has more strength, and is the best one?" seemed to be, therefore, both interesting and useful. For this purpose I took equal quantities of the syrup prepared from the Tincture of Tolu by means of magnesium carbonate and of the syrup made directly from the balsam. It is well known, as I may state here, that all the effect and power of the Syrup of Tolu is lying in the presence in it of the benzoic and cinnamic acids. These two acids are easily soluble in ether; ether will extract them readily from the syrup, leaving of them behind but a small balance. Each one of these two samples of syrup was therefore shaken with an equal volume of ether, and the ether, after separation from the syrup, evaporated in a glass dish in the open air. The ether taken from the syrup made directly from the balsam left a considerable quantity of a yellowish white residue having the characteristic smell and properties of the two acids, while the ether shaken with the syrup made from the tincture of Tolu left behind a small amount of resinous matter only. After addition, however, of some hydrochloric acid, enough to acidulate the syrup, and after shaking with ether, the last one left, when evaporated, a good deal of the acids. By this experiment it was evidently demonstrated, that in this syrup the acids in question were not present in a free state, but were liberated by the hydrochloric acid added. If any doubt could be sustained that they were combined with magnesium in the syrup, this doubt was at once destroyed by the chemical test made, viz., by the white crystalline precipitate resulting after the addition of sodium-ammonium phosphate. The magnesium carbonate used for

preparing the syrup may be regarded as insoluble in water; its presence in the syrup is therefore due to the acids, which dissolve a corresponding part of it forming magnesium salts. The determination of the quantity of magnesium found present in any sample of syrup of Tolu, that was shaken after addition of water with magnesium carbonate, and afterwards filtered, will certainly furnish a good means for finding the approximate amount of the acids present. The above experiments prove, I think, evidently, that the formula, as given by the new Pharmacopoeia, for making syrup of Tolu is by far the best. Every apothecary will do well to follow the same, and not allow the substitution of an almost worthless syrup, the syrup of the old Pharmacopoeia. Cleveland, O., June, 1884.

BAYCURU ROOT.

BY FREDERICK AUGUSTUS DALPE, PH.G.

From an Inaugural Essay.

Baycuru is the vernacular name given to a plant, indigenous to Brazil, natural order, Plumbaginaceæ, and probably derived from the genus *Statice*. Mr. E. M. Holmes, London, believes it to be *Statice brasiliensis*. Although the Plumbaginaceæ do not generally inhabit tropical countries, some do exist there, and Dr. Symes gives some further information in regard to the origin of the plant. "It grows on the shores of the Rio Grande, and imbeds itself more or less in the sand, a number of radical leaves rising from above, and being some five to seven inches in length, by one and a half to two inches in breadth. The flower resembles that of the London pride (*Saxifraga serratifolia*). The whole plant is sometimes covered by the sea, for days and even weeks at a time, dependent on the direction of the winds, there being no tides in that locality. The natives have an unlimited amount of faith in its virtues as an astringent and discutient. remedy, in all kinds of enlargements and glandular swellings; externally as a fomentation, and frequently as a vapor. It is also prescribed by the resident physicians, not as a specific, for Dr. Landell has found it to fail utterly, but as a rule it is reliable, both externally and internally, and forms a valuable astringent gargle. The root is used both in the fresh and dry states." As seen in commerce the root is sub-cylindrical, from six to eight inches in length, and from a half to an inch in width. It has a blackish brown bark externally, is quite knotty and very rough from minute transverse

fissures, and also from the removal of the cork in some places. There are also numerous depressions, probably due to shrinkage. For these reasons the root has rather a granular appearance externally. Internally it is reddish brown, and in a section cut transversely shows a rather thick bark, prominent wood-wedges, forming a circle with alternate layers of medullary tissue. The pith occupies about one-fourth of the whole diameter, and shows a few compact cells in its tissue; fracture rough, taste astringent.

Under the microscope the ordinary tissues of the dicotyledonous plants are seen. On a transverse section are seen, first the corky envelope, then the cellular envelope, consisting of six or eight layers of cells; to this is connected the liber or inner layer of bast tissue. The cambium layer follows. The wood appears on the transverse section pentangular. The medullary rays are much broader than the adjoining wood bundles. The shape of the cells of the medullium varies from irregular quadrangular to pentangular. Air passages are also visible within the wood bundles. On the longitudinal section the elongated wood cells are noticeable, as also cells of the medullary rays. The most characteristic microscopical feature, however, is what appears to be sclerogen cells resulting from secondary deposits. In some cases they seem to be composed of a group of cells and are crystalline in appearance. They are found in the pith and in the inner bark.

The material for the following analysis was kindly furnished by Messrs. Parke, Davis & Co. The plan of analysis, essentially that of Mr. H. B. Parsons, was as follows :

Moisture.—6.48 Gm. of the finely powdered drug were dried in a suitable vessel at a temperature of about 90°C. until it ceased to lose weight. 5.93 Gm. remained, showing a loss equivalent to 8.5 per cent. of the drug.

Ash.—3 Gm. of the drug by gradual incineration, in a weighed porcelain crucible, yielded an ash weighing .290 Gm., equivalent to 9.66 per cent. of the drug, and containing potassium, magnesium, sodium, and calcium, in the form of sulphates, phosphates, and chlorides, principally sodium chloride.

Benzol Extract.—100 Gm. of the finely powdered drug were placed in a suitable percolator, and after saturating the powder with a portion of

the menstrum, and closing tightly, it was allowed to macerate for three days; at the expiration of this time the percolation was allowed to proceed until the drug was completely exhausted. The percolate measured 296 cc., and on evaporation yielded an extract weighing .388 Gm., equivalent to .388 per cent. of the drug. The extract was soft, of a dark green color, and consisted of a soft resin, a trace of wax and coloring matter. It was treated with warm water, filtered, and cooled. A portion of the filtrate tested by Mayer's solution, phospho-molybdic acid, platinic chloride, and other reagents for alkaloids gave negative results. Another portion boiled with dilute hydrochloric acid, and then neutralized with potassa, gave negative result with Fehling's solution, as a test for glucosides.

Alcohol Extract.—The drug remaining after treatment with benzol was dried, and after maceration exhausted with 80 per cent. alcohol. The percolate measured 620 Cc. An aliquot portion yielded an extract equivalent to 16.4 Gm. of the whole, or 16.4 per cent. of the drug. The extract was treated with water, and a portion of the filtrate was estimated for tannin with a freshly prepared solution of gelatin and alum. The weight of the tanno-gelatin precipitate was equivalent to 27 Gm. of the whole, and estimating 45 per cent. of this as tannin, shows a net result of 12.15 per cent. This tannin produced a green color with iron salts, was readily precipitable with solution of morphine and tartrate of antimony and potassium, in each case a white precipitate forming. The filtrate recovered from the tannin estimate was acidulated with sulphuric acid, an equal volume of alcohol added, allowed to stand for a time, filtered, washed, evaporated clear of all alcohol, and the acid solution tested for alkaloids and glucosides, with negative results for the latter. With Mayer's solution and phospho-molybdic acid precipitates were obtained. The remaining acid solution was then neutralized with ammonia, and the resulting precipitate shaken with ether in a test tube. The ethereal solution was filtered, evaporated to a small quantity, and failing to show any crystalline products, after standing for a few hours, the evaporation was continued to dryness on a watch-glass. The result, as seen under the microscope, was small feathery crystals. Several efforts were made to isolate an additional quantity of these crystals, and the following process proved successful; An alcoholic tincture was evaporated to a syrupy consistence, potassa added, and the whole shaken with chloroform. The chloroformic solution was evaporated, the residue treated with a weak acid, filtered, precipitated by ammonia, treated with ether and then with chloroform. The crystals obtained in

both cases are completely dissipated on ignition, and gave a red color with sulphuric acid, which disappeared on heating, and left a tarry-colored liquid remaining. From these evidences I take this principle to be an alkaloid, for which I propose the name *baycurine*.

The portion of the alcoholic extract insoluble in water, was found to be principally resin. A separate investigation of the resinous bodies was conducted as follows: An aliquot portion of an alcoholic fluid extract, made from another portion of the drug, was poured into water and allowed to stand for a short time, when two resins were observed, one lighter, the other heavier than water. Their respective weights were in the proportion of .5 to 1.5, and together yielded an amount equivalent to 3.66 per cent. of the drug. The lighter resin was partly soluble in ether and alcohol, and readily soluble in cold solution of potassa. The heavier resin was sparingly soluble in alcohol, soluble in ether, partly soluble in cold solution of potassa, entirely soluble in hot solution of the same. Both resins were precipitated by normal and by subacetate of lead. Their solutions were amber-colored, and in each the color was immediately discharged on the addition of mineral acids.

Cold Water Extract.—The remainder of drug left after the alcohol treatment was dried, and then macerated with water. The nitrate was wine-colored, and a portion yielded an extract equivalent to 3.66 per cent. of the drug, and was found to be gum principally, and to be precipitated by strong alcohol. No albumen was present.

Boiling Water.—The drug left from the previous treatment was boiled with water for eight hours; the volume of water was kept unchanged. The decoction was dark colored, had a disagreeable odor, and yielded an extract equivalent to 9.39 Gm. of the whole, or 9.39 per cent. of the drug. Fehling's test proved the presence of glucose. Gum was found. Negative results were obtained for starch by the usual tests.

Volatile Principles.—150 Gm. of the powdered drug were placed in a retort and macerated for some days with water, then distilled. The distillate was neutral, dark colored, astringent, and possessed a very strong, disagreeable odor, so much so that it permeated the whole building in which the operation was conducted. On the surface of the distillate was found a trace of volatile oil, but not in sufficient amount to be collected and examined. The distillate tested for alkaloids gave negative result.

The residue in the retort was then treated with potassa and water, and after standing for some days, was again subjected to distillation. The distillate was lighter in color, not so astringent (after neutralization), and the odor was less penetrating and not as disagreeable as the first distillate. What odor it possessed entirely disappeared on allowing the distillate to stand exposed to the air.

SUMMARY.

1. Moisture.....8·5 per cent.
2. Ash.....9·66 per cent. sulphates, chlorides and phosphates of sodium, potassium, magnesium and calcium.
3. Benzol extract.....·388 per cent. resin, wax and coloring matter.
4. Alcoholic extract.....16·4 per cent. alkaloid, tannin (12·15 per cent.), Resin (1·66 per cent.)
5. Aqueous extracts... } Infusion 8·66 per cent. gum.
 } Decoction 9·39 per cent. glucose, gum.
6. Volatile principle.....Volatile oil (trace).

CONSTITUENTS OF WHITE AGARIC.

BY E. JAHNS.

Although the larch agaric (*Polyporus officinalis*) has been investigated by more than one chemist, conflicting statements concerning its constituents still exist. The author, with the view of clearing up the question, has re-investigated this plant. By extraction with hot strong alcohol it yielded about 18 per cent. of a crystalline acid melting at about 139°, and easily soluble in alcohol, glacial acetic acid, and turpentine; less soluble in ether, and nearly insoluble in chloroform, benzene and cold water. The acid is dibasic, forming normal salts with the alkali metals, which are easily soluble in water, and acid salts which are only slightly soluble; with the majority of the metals, it forms insoluble salts, which are precipitated in the amorphous state from aqueous solutions. Analysis showed that *agaricic acid* was a homologue of malic acid, represented by the formula $C_{16}H_{30}O_5H_{20}$. On oxidation with nitric acid, it is converted into succinic and butyric acids. The principal salts are described in the paper. This acid is identical with the “agaricic acid” of Fleury, the “laricin” of Martius; and the substances named by

Schoonbroodt "agaricin" and "pseudo-wax" by Trommsdorff are probably the same acid in an impure state. The original alcoholic extract of the fungus also yields a substance which crystallizes in needles from a solution in absolute alcohol. It is insoluble in water, and nearly so in ether, chloroform and cold alcohol, but dissolves in potash solution. It melts at about 272°, and sublimes in white needles. This substance, which is probably an alcohol, exists to the extent of about 5 per cent. in the plant. The alcoholic mother-liquors from this substance contain a white amorphous body, which is deposited in a colloidal form from its solution in chloroform. It appears to be an acid, and occurs to the extent of about 4 per cent. in the fungus. Finally a red amorphous resin was obtained from the original alcoholic extract, in which it was very soluble. This is the bitter purgative constituent of the fungus, and is present to the extent of about 30 per cent.—*Jour. Chem. Soc.*, March, 1884, p. 353, from *Arch. Pharm.*, vol. 21.

ALKALOIDS OF ANGUSTURA BARK.

BY KOEKNER AND C. BÖHRINGER.

In this preliminary notice the authors, after some historical details as to the introduction of the bark, state that it contains aromatic substances and several alkaloids, the amount of the latter varying in different specimens from 0.8 to 1 per cent. The alkaloids are mostly in the free state, and may be extracted directly from the bark by means of ether. After the ethereal extract has been washed with dilute potash solution, the addition of oxalic acid or dilute sulphuric acid gives a yellow crystalline precipitate of the corresponding salt of one of the alkaloids, cusparine, whilst other alkaloidal salts remain in solution.

The precipitated cusparine salt is moderately soluble in boiling alcohol, and, on cooling, crystallizes out in slender needles of a magnificent greenish yellow; this color is not removed by repeated crystallization, or by treatment with animal charcoal, and other salts of the alkaloid, obtained from the yellow precipitate by decomposition, are also intensely yellow. If, however, the free cusparine, $C_{19}H_{17}NO_3$, obtained from these colored salts, is crystallized several times from light petroleum, and then reconverted into the salt, this is found to be colorless. The author has been unable to ascertain the cause of this yellow coloration. The alkaloid crystallizes from light petroleum in tufts of slender needles melting at

92°; it is moderately soluble in ether, more readily in alcohol. The sulphate, oxalate and hydrochloride of the base are but sparingly soluble in water; the acetate is much more soluble, but the solution is decomposed if largely diluted; the tartrate dissolves readily. The platinochloride was obtained as an orange-yellow crystalline precipitate.

When treated with potassium hydroxide, cusparine splits up, yielding a new alkaloid and the potassium salt of an acid which seems to be an aromatic derivative; the acid is sparingly soluble and crystallizes readily. The alkaloid crystallizes from alcohol, in which it is very sparingly soluble, in minute, very brilliant, colorless needles; it decomposes at 250° without melting. An attempt to decompose the cusparine in a similar manner by the action of hydrochloric acid failed, as it began to carbonize even at 100°.

In the mother-liquors from which the cusparine was originally precipitated as sulphate or oxalate, another alkaloid is found, to which the authors have given the name *galipeine*, $C_{20}H_{21}NO_3$. The free base crystallizes from light petroleum in white needles melting at 115.5°. It may be obtained in well-formed transparent prisms from its solution in ether or alcohol. All the salts of this alkaloid are more soluble than those of cusparine; several of them are of a magnificent greenish yellow like uranium salts. The sulphate crystallizes in large prisms with 7 mols. H_2O , which it loses in part on exposure to the air; it melts at 15°, and at 100° undergoes decomposition, yielding the sulphate of another alkaloid and a crystalline nitrogenous substance which melts at 196°. The platinochloride crystallizes in prisms with a triangular base.

Besides cusparine and galipeine, the authors have found another alkaloid which melts at 180°, and is very sparingly soluble in ether. It crystallizes from alcohol and furnishes salts, the solutions of which have a blue fluorescence.

The property these alkaloids have of being transformed into other alkaloids with simultaneous formation of acids, is interesting, and may throw some light on the constitution of vegetable alkaloids in general. —*Jour. Chem. Soc.*, March, 1884, p. 341, from *Gazzetta*, vol. 13.

THE ESSENTIAL OILS OF *BLUMEA LACERA*, DC., AND *SPHÆRANTHUS INDICUS*, LINN.

BY W. DYMOCK.

These two plants attract attention in India during the cold weather by their abundance on waste ground and in fields after the harvesting of the rice crop. The *Blumea* has a powerful camphoraceous odor, and *Sphæranthus indicus* a rose-like perfume.

B. lacera is a perennial plant, with obovate, deeply serrated leaves and yellow groundsel-like flowers, the whole plant being thickly clothed with long silky hairs. The natives of the Concan, near Bombay, call it Nimurdi, and make use of it to drive away fleas and other insects. One hundred and fifty lbs. of the fresh herb in flower was submitted to distillation in the usual manner with water, and yielded about 2 ounces of a light yellow essential oil, having a specific gravity of 0.9144 at 80°F., and an extraordinary rotating power, 100 mm. turning the ray 66° to the left. Mr. D. S. Kemp, who made the observation, checked it by examining a 10 percent, solution in alcohol, which gave 6.6.

This *Blumea* is of interest as the possible source of an insect powder. I am forwarding a supply of the plant and a specimen of the oil to Mr. Holmes for experiment and also for identification, as the genus is a difficult one.

Sphæranthus indicus is an annual with sessile, decurrent, obovate, bristly serrate, downy, glutinous leaves, and globular heads of purple flowers. It is a well-known Indian medicine, under the names of *Múndi*, *Gorakhmúndi*, *Munditika*, *Murmuria* and *Kottak-karandai*, and is reputed to be a general tonic, deobstruent, alterative and aphrodisiac. The distilled water is recommended for use and also the root. One hundred and fifty lbs. of the fresh herb was distilled with water in the usual manner and yielded a very deep sherry colored, viscid essential oil, very soluble in water, and clinging to the side of the vessel, so that only half an ounce could be collected. The oil does not appear to have any rotatory power, but it is difficult to examine on account of its opacity.— *Parm. Jour. and Trans.*, June, 7, 1884, p. 985.

Bombay, May 1, 1884.

OLIVE OIL AND ITS PRODUCTION.

The following particulars with regard to the production of olive oil in Tuscany have been furnished to Mr. Consul Inglis by one of the principal exporters in Leghorn:

The olive oil produced in Tuscany from the first pressing of the fruit is intended for consumption as an article of food. Hence, great attention is paid both to the culture of the olive tree and the process of making oil.

The olive crop is subject to many vicissitudes, and is an uncertain one. It may be taken as a rule that a good crop does not occur more frequently than once in three years. A prolonged drought in summer may cause the greater part of the small fruit to fall off the trees. A warm and wet autumn will subject the fruit to the ravages of a maggot or worm, which eats its way into it. Fruit thus injured falls to the ground prematurely, and the oil made from it is of very bad quality, being nauseous in taste and somewhat thick and viscous. Frost following immediately on a fall of snow or sleet, when the trees are still wet, will irretrievably damage the fruit, causing it to shrivel up and greatly diminishing the yield of oil, while the oil itself has a dark color, and loses its delicate flavor.

The olive tree in Tuscany generally blossoms in April. By November the fruit has attained its full size, though not full maturity, and the olive harvest generally commences then. The fruit, generally speaking is gathered as it falls to the ground, either from ripeness or in windy weather. In some districts, however, and when the crop is short, the practice is to strip the fruit from the trees early in the season. When there is a full crop the harvest lasts many months, and may not be finished till the end of May, as the fruit does not all ripen simultaneously. Oil made early in the season has a deeper color, and is distinguished by a fruity flavor, with a certain degree of pungency; while as the season advances it becomes lighter in color, thinner in body, and milder and sweeter in taste. Oil made towards the close of the harvest in April or May from extremely ripe fruit is of a very pale straw color, mild and sweet to the taste, though sometimes, if the fruit has remained too long on the trees, it may be slightly rancid. Oil very light in color is much prized in certain countries, notably France; and hence, if it also possesses good quality, commands a higher price in the Tuscan markets.

The fruit of the olive tree varies just as much in quality as does the grape, according to the species of the tree itself, the nature of the soil, exposure, and climate of the locality where it grows. Some varieties of the olive tree largely grown, because thought to be better suited to the special conditions of some districts, yield a fruit which imparts a bitter taste to the oil made from it; such oil, even when otherwise perfect, ranks as a second rate quality. The highest quality of oil can only be obtained when the fruit is perfectly and uniformly sound, well ripened, gathered as soon as it has dropped from the trees, and crushed immediately with great attention. Should the fruit remain any time on the ground, particularly during wet, weather, it deteriorates fast and gets an earthy taste; while if allowed remain an undue length of time in the garners it heats, begins to decompose, and will yield only bad oil.

The process of making oil is as follows: The fruit is crushed in a stone mill, generally moved by water power; the pulp is then put into bags made of fibre, and a certain number of these bags, piled one upon another, are placed in a press, most frequently worked by hand; when pressure is applied, the oil flows down into a channel by which it is conveyed to a receptacle or tank. When oil ceases to flow, tepid water is poured upon the bags to carry off oil retained by the bags. The pulp is then removed from the bags, ground again in the mill, then replaced in the bags and pressed a second time. The water used in the process of making oil must be quite pure; the mill, press, bags and vessels sweet and clean, as the least taint would ruin the quality of the oil produced. The oil which has collected in the tank or receptacle just mentioned is removed day by day, and the water also drained off, as oil would suffer in quality if left in contact with water; the water also, which necessarily contains some oil mingled with it, is sent to a deposit outside, and at some distance from the crushing house, which is called the "Inferno," where it is allowed to accumulate, and the oil which comes to the surface is skimmed off from time to time. It is fit only for manufacturing purposes. After the second pressing the olive pulp is not yet done with; it is beaten up with water by mechanical agitators moved by water power, and then the whole discharged into open-air tanks adjoining the crushing-house. There the crushed olive kernels sink to the bottom, are gathered up and sold for fuel, fetching about 2 francs per 1,000 kilos., while the debris of the pulp is skimmed off the surface of the tank and again pressed in bags, yielding a considerable quantity of inferior oil, called "Olio lavato," or washed oil, which, if freshly made, is even used

for food by the poorer classes. The pulp then remaining has still a further use. It is sold for treatment in factories by the sulphide of carbon process, and by this method yields from 7 to 9 per cent. of oil; of course suitable only for manufacturing purposes. Only the first two pressings yield oil which ranks as first quality, subject of course to the condition of the fruit being unexceptionable. New oil is allowed to rest awhile in order to get rid of sediment; it is then clarified by passing through clean cotton wool, when it is fit for use.

The highest quality of olive oil for eating purposes should not only be free from the least taint in taste or smell, but possessed of a delicate appetizing flavor. When so many favorable conditions are needed as to growth, maturity and soundness of the fruit, coupled with great attention during the process of oil making, it is not to be wondered at that by no means all or even the greater part of the oil produced in the most favored districts of Tuscany is of the highest quality. On the contrary, the bulk is inferior and defective. These defective oils are largely dealt in, both for home consumption and export, when price and not quality is the object.

In foreign countries there is always a market for inferior defective olive oil for cooking purposes, etc., provided the price be low. Price and not quality is the object, so much so that when olive oil is dear, cotton-seed, ground-nut and other oils are substituted, which bear the same relation to good olive oil that butterin and similar preparations do to real butter.

The very choicest qualities of pure olive oil are largely shipped from Leghorn to England along with the very lowest qualities, often also adulterated.

The oil put into Florence flasks is of the latter kind. Many years back this was not the case, but now it is a recognized fact that nothing but the lowest quality of oil is put into these flasks ; oil utterly unfit for food, and so bad that it is a mystery to what use it is applied in England. Importers in England of oil in these flasks care nothing, however, about quality; cheapness is the only desideratum.

The best quality of Tuscan olive oil is imported in London in casks, bottled there, and bears the name of the importers alone on the label. There is no difficulty in procuring in England the best Tuscan oil, which nothing produced elsewhere can surpass; but consumers who wish to

get, and are willing to pay for the best article, must look to the name and reputation of the importers and the general excellence of all the articles they sell, which is the best guarantee they can have of quality.—*Phar. Jour. and Trans.*, May 17, 1884, p. 923.