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PREPARATION OF SYRUPS BY PERCOLATION.

BY G. H. CHAS. KLIE.

The Pharmacopoeia gives formulae for twenty-three syrups. They are not all finished by the same process, but to dissolve the sugar different degrees of temperature are used. A few are finished by dissolving the sugar at a boiling heat, a portion by effecting solution with a gentle heat (90° to 100°F.), another portion by agitating a previously prepared tincture, from which the alcohol has been evaporated, with the sugar occasionally until solution is effected, and still another portion by mixing a fluid extract, solution or tincture with simple syrup. So we see that four different methods are directed, and it is striking that, except in a few only, the use of a high temperature appears to be avoided as much as possible. It seems that in these preparations the Pharmacopoeia would have dispensed with heat altogether, if it had been sure that by adopting the cold process for all unexceptionable products would be obtained.

In the following the writer proposes to give some of his experience in regard to percolation (cold) of syrups, which has been practised in his establishment for about nine years with uniform good results.

Percolation, fifteen or twenty years ago, was among pharmacists a comparatively novel process; a good many even to this day regard it with aversion and suspicion because they think it more troublesome than the old process, and because they do not believe that by it as good and strong a product can be obtained. It is doubtful whether percolation was practised by a half dozen pharmacists of our city at the time mentioned above. Still, since its adoption by the Pharmacopoeia, it has gained ground steadily, and those who practise it sufficiently long to find out its merits, especially for the preparation of fluid extracts, will not return to the old process for any consideration. To make a fluid extract the Pharmacopoeia directs to exhaust some root, herb, etc., of a prescribed degree of fineness, by percolation. To accomplish this so as to

secure an unexceptional preparation requires not only the careful and judicious selection of the drug, but also due care in manipulation; in fact, it requires a considerable amount of experience. To make syrups by percolation successfully requires not nearly so much experience. If certain conditions in the construction of the apparatus are attended to the rapidity of the solution of sugar by the process varies only in so much as the menstruum may be more or less viscid. Since the Pharmacopoeia directs to exhaust roots, herbs, gums, etc., by percolation, requiring quite an amount of care, attention and experience, why should not the simple solution of sugar be effected by the same process, since this, in comparison, requires little attention, furnishes a product unexceptional in appearance and superior in flavor (in such as have volatile ingredients) to those made by heat? Syrups are also made by agitating or shaking together the sugar and menstruum. But, in the first place, it takes longer to dissolve sugar by this process than by percolation, and, secondly, if any quantity of air is incorporated the tendency to spoil is accelerated. When syrups are prepared by boiling they, or at least quite a number, need constant supervision to prevent waste by boiling over; with ever so much attention to cleanliness, the straining cloths will still often be found defective, and when the hot syrup is strained into a glass vessel too much care can hardly be exercised to prevent breakage. Straining through even close cloth does not furnish an absolutely clear syrup. In percolation breakage of vessels by heat is out of the question, and the product has (when the process has been properly conducted) the perfect clearness attained by filtering through paper. When the simplicity and cleanliness of the process is contemplated, the conclusion is irresistible that it ought to have been adopted by the Pharmacopoeia. Furthermore, it would be but consistent to direct the process by which the soluble parts of substances, apparently difficult of solution, are extracted, for the mere solution of sugar, which is not at all difficult to dissolve. Percolation is also illustrated to perfection when sugar is dissolved by the process.

Percolation of roots, herbs, etc., with an aqueous, spirituous or ethereal menstruum, and that of sugar by water, an infusion, decoction, a partly spirituous or otherwise tincture, cannot be conducted in the same manner in every particular. Undoubtedly, because this has often been attempted failure was the result. Writer of this, about nine years ago, read in some pharmaceutical journal (I believe it was the "Pharmacist," of Chicago) about the preparation of syrups by percolation, and thought the idea capital. The process was tried at the first opportunity with

simple syrup. The percolator was charged, as usual, with a wad of cotton in the neck, a cork in the orifice, loaf sugar and water, adjusted on a filtering stand, and set aside until the sugar had all been disintegrated and settled. The cork was then removed, and it was expected that percolation would proceed without any trouble; but it did not. Having obtained 2 fluidounces of syrup in 12 hours the process was discontinued and the syrup finished by boiling. Using cotton wads for the percolation of syrups was found an utter failure. In subsequent operations sponge wads were substituted, and with entire success. A piece of common close, soft sponge is trimmed to a cone shape, $\frac{1}{2}$, 1 inch or longer, and $\frac{1}{2}$, 1, 2 or more inches diameter. The sponge is thoroughly washed and while still moist placed in position in the neck of a percolator, funnel or other suitable vessel by slightly compressing it. Sponges with small pores need little and such with large pores need more compression in adjusting. If it is placed too loose the syrup will pass too fast and not sufficiently clear, if placed too tight the syrup will pass too slow or not at all. The proper amount of compression is reached when the pores of a close sponge 1 inch long and $\frac{1}{2}$ inch in diameter are closed in such a manner by adjustment in a $\frac{3}{8}$ inch necked common half-gallon glass percolator that one pint of syrup will percolate in an hour. According to the size of the sponge, its compression, the size of the neck of the percolator, and its capacity, less or a great deal more may be obtained. When definite quantities of syrups are made, towards the end of the process the sugar must be heaped towards the centre of the percolator, because, since the process of displacement progresses faster in the centre over the orifice than at the circumference of the percolator, the sugar is dissolved fastest there, and when dissolved down to the sponge allows the menstruum to pass without dissolving the balance. In a continuous process this precaution is unnecessary. By percolation, when properly conducted, syrups are obtained absolutely clear, just as if filtered through paper.

Some of the syrups of the Pharmacopoeia cannot be prepared by any other than the cold process, for instance *syrupus allii*, *syrupus pruni virginianæ*, and with these, as also with fruit syrups, percolation may be considered the *ne plus ultra* of perfection. In most of the syrups of the Pharmacopoeia filtration can be combined with percolation. For instance: It is not necessary to filter the aqueous tincture of orange peel when *syrupus aurantii corticis* is prepared, but after adding water to the evaporated portion, as directed, the turbid liquid may be immediately percolated with the sugar; or, for *syrupus ipecacuanhæ*,

two fluidounces of fluid extract of ipecacuanha are diluted with 12 fluidounces of water and, without filtering, may be percolated with 26 troyounces of sugar for 32 fluid-ounces of syrup. In each case a transparent syrup results. *Syrupus scillæ compositus* may be prepared in two ways. The tincture of seneka and squill is prepared by percolation, then evaporated to half a pint and 14 ounces of water added, just as the Pharmacopoeia directs. To this the tartrate of antimony and potassium is added, or the latter can also be dissolved in the water before mixing with the evaporated solution; the mixed solution is then percolated with 42 troyounces of sugar, and sufficient water is added through the percolator until the percolate measures three pints. Another method is to use the fluid extract of squill and seneka, and proceed the same as above. Both methods furnish good products, only the latter contains some alcohol from the fluid extracts which the former does not.

Syrupus Ferri Iodidi.—The filtered solution of iodide of iron, prepared from 2 troyounces iodine, quant, sat. of iron and water, measuring 10 fluidounces, is percolated with 16 troyounces of sugar, and, if necessary, sufficient distilled water is added to make the product measure 20 fluidounces. In this instance a filtered solution is preferable, although one not filtered could be used.

The other syrups of the Pharmacopoeia can be made in the same manner, using for each the tincture or aqueous solution, as directed, and then percolating with sugar, either the quantity prescribed or as much as the syrup ought to contain.

A goodly number of physicians prescribe *fruit syrups*, such as raspberry, strawberry, etc. The exquisite flavor of these is preserved to the possibly fullest degree by percolation. It is inexcusable for an apothecary to dispense, in prescriptions, the artificial preparations. During the respective seasons of the fruits any convenient quantity of fresh, ripe fruit is expressed, the expressed juice is allowed to ferment and percolated with sugar quant, sat. Strawberry syrup was prepared as follows.: A gallon of fresh, plump fruit, after being pounded into a pulp of uniform consistency, in a porcelain mortar, was put into a glass covered vessel and allowed to ferment. This, according to the estate of temperature, may take from 3 to 5 days. To accelerate and complete the process of fermentation the vessel ought to be shaken once or twice a day, to reincorporate the mass which gathers on the surface of the juice.

When fermentation has been completed this mass will generally settle to the bottom of the vessel. When the expressed fruit juice is fermented no shaking is necessary; but the work of gaining the juice by pressure is exceedingly tedious, on account of the gelatinous consistence (pectin) of the fruit, which allows the pressure to be but very slowly and gradually applied. If the pressure is applied sudden and powerfully, the press bag or cloth will be torn invariably. On account of this drawback it is more expedient to ferment the crushed fruit and then express. Fermentation can be observed and its cessation determined to a nicety if a glass bent tube inserted air tight in the cork of the vessel containing the fruit and its free arm is made to dip about one-half inch into water contained in a small glass vial, when the finishing of fermentation is indicated by cessation of evolution of carbonic acid gas escaping through the glass tube under water in small bubbles. The expressed, fermented juice from the gallon of strawberries measured $2\frac{3}{4}$ pints. This was percolated with 72 troyounces loaf sugar. The resulting syrup measured 5 pints. Raspberry syrup was prepared in the same manner. Of both syrups, prepared in the summers of '78 and '79, I have some on hand now, which, in the summer gone by, was exposed to a temperature of between 80° to 85° Fahr. without spoiling. To insure the keeping qualities of syrups prepared by percolation from fermented fruit juices, it is of paramount necessity to use only such juices in which fermentation has been complete. They (the syrups) ought also to hold in solution a sufficient quantity of sugar. Percolation regulates this to a nicety; by it as much sugar will pass into solution as can be conveniently held, and this is the best criterion of how much sugar a syrup ought to contain. Percolated syrups will not deposit any crystalized sugar in the bottles, except if they are exposed to a continuous low temperature.

The German Pharmacopoeia directs heating to the boiling point for most of its syrups. It is asserted by some that syrups ought to be boiled, or heated to the boiling point, to effect precipitation of impurities. Our Pharmacopoeia does not seem to be of the same opinion, since, with the exception of only a few, it either employs a gentle heat (90° to 100° F.) or none at all. Furthermore, it is obvious that the use of heat would, in some of the syrups, totally destroy the medicinal properties for which they are generally prescribed, and in some which have flavors of extreme volatility these would be more or less impaired.

Lowell, N. St. Louis, Mo., Dec., 1880.

EXTRACTION OF COLCHICIA FROM THE SEED.

BY LEMUEL I. MORRIS.

Read at the Pharmaceutical Meeting, December 21st.

The powdering or grinding of colchicum seed has always been a source of much labor and annoyance to the pharmacist, and to overcome the difficulty, the purchasing of seed already ground has often been resorted to, a practice which does not commend itself to the profession, for the reasons that the powder is more expensive and can be very easily adulterated.

Dannenberg ("Phar. Ztg." Oct. 30, 1880) has recently, in answer to an article by Dr. Molz ("Deutsch. Amer. Phar. Ztg."), shown that he obtained results contradicting the conclusions of the latter, who stated that colchicum seed, when more than a year old, was nearly worthless, and that colchicia could be extracted only by a strong alcoholic or acidulated menstruum, while he (Dannenberg) obtained the alkaloid reaction after boiling the seed, which was not less than five years old, for only a few moments in pure water. These different statements have led to some discussions on the subject and a desire to further investigate the matter.

To Dr. Hübler ("Arch. der Pharm.," 1865), it seems, belongs the credit of making the first statement that colchicia could be wholly extracted without powdering the seeds, by digesting them for some time in a hot 90 per cent. alcoholic menstruum. When afterwards powdered, and treated like the whole seed, it was found that the alkaloid had been entirely removed, and that very little if any soluble matter was extracted by the menstruum from such powdered seed.

Mr. Rosenwasser, in 1877 ("Amer. Jour. Phar."), after some experiments, found that only one-third of the colchicia was removed by macerating the whole seed, in officinal menstrua, for some time. Had he employed a hot menstruum, he would have obtained different results.

Some of the whole seeds were obtained from a cabinet specimen of Prof. Maisch's, which has been in his possession for over ten years. Of this sample, 50 grams were macerated in cold dilute alcohol (sp. gr. .941) for three days; a portion of the tincture was then evaporated to dryness, the

residue treated with alcohol, again evaporated to dryness, treated with water, and filtered. The filtered liquid was tested with Mayer's test, after the addition of a few drops of nitric acid, when a yellow precipitate was immediately produced. The seeds were then well drained, and treated again with a fresh portion of the menstruum, when an additional amount of alkaloid was obtained. On treating them in a like manner for the third time, no more alkaloid was obtained.

They were then digested in dilute alcohol, with a moderate heat, for three hours, and on applying the usual tests a considerable amount of colchicia was found to be present. After well draining, they were again subjected to the action of heat and dilute alcohol, but no alkaloid was found present on testing the filtered liquid.

The seeds were now well drained, powdered and macerated in cold dilute alcohol for three days, when on testing a portion of the menstruum none of the alkaloid was found present, and the result was not altered by digesting in the same menstruum, with a moderate heat, for three hours, although a considerable amount of soluble matter was extracted. The tincture obtained from the cold maceration was evaporated to the consistence of an extract, and weighed 4.806 grams — 9.61 per cent. It was treated with alcohol until all the soluble matter was dissolved, the alcoholic solution was evaporated to dryness, the residue treated with water, the aqueous solution filtered, and the alkaloid precipitated by Mayor's test; the precipitate, carefully washed and dried, weighed .093 gram — .18 per cent.

The decoction obtained from digesting the seeds with hot dilute alcohol was then evaporated to the consistence of an extract, and weighed 2.0006 grams — 4.01 per cent. The extract was treated in a similar manner as the preceding, and the colchicia precipitate was found to weigh .161 gram — 0.32 per cent., showing that nearly two-thirds of the active principle was extracted by the hot, and only one-third by the cold menstruum, the latter being the proportion also obtained by Mr. Rosenwasser. In all cases, the extracts and precipitates containing the alkaloid gave the characteristic colchicia reaction with sulphuric acid and potassium nitrate.

Some of the whole seeds were then boiled in pure water; on testing the filtered liquid, colchicia was found present. The seeds were then powdered, again boiled in water, when, on testing the filtered liquid, the

alkaloid reaction was not obtained, showing that the active principle was entirely dissolved from the whole seed by boiling water.

Statements have been advanced at various times to the effect that colchicia was precipitated along with the sediment that deposits from liquid colchicum preparations. The precipitated deposit was obtained from ten gallons of fluid extract of the seed, which had stood for six months. This sediment was carefully dried, washed with water containing about one-fifth its volume of alcohol until the washings passed tasteless, and then treated in the following manner: One-half of the washed residue was boiled with water acidulated with acetic acid, filtered, evaporated to dryness, treated with alcohol and water in the usual way, when, on adding the alkaloid test, not a trace of colchicia could be detected.

The balance of the residue was boiled in strong alcohol, filtered, the filtrate treated in the usual way; again no traces of colchicia could be observed.

The results of the different experiments lead to the following conclusions:

1st. That it is a waste of time and useless operation to powder colchicum seed, as the active principle can be wholly extracted by digesting them in the ordinary menstrua for a few hours, at a temperature of about 80°C.

2d. That alcohol stronger than dilute (sp. gr. .941) is unnecessary for any of the liquid preparations of colchicum seed, since the whole of the alkaloid can be extracted with that menstruum, or even with water.

3d. That the active principle is so soluble in the menstrua directed in the different officinal preparations, that it is impossible for it to be precipitated from such solutions, either as colchicia or in the modified condition of colchicein.

NOTES ON PATCHOULI.

BY J. CH. SAWER.

The identity of the plant furnishing this perfume has been the subject of articles in this journal since the year 1844 ("Phar. Journ.," [I], vol. iv., p. 80; vol. vi., p. 432; vol. viii., p. 574; vol. ix., p. 282, and iv. [3d series], p.

362), but the first mention of it in a pharmaceutical paper seems to be in the "Journal de Pharmacie," 1826, (vol. xii., p. 61). The first parcel of the leaf offered at public sale in London was in 1844, and it was bought in at 6s. per lb. Since that date the trade in these leaves and the oil has enormously increased, the number of bales imported into London during the last twelve months having been from 300 to 400 bales of 2 cwt. each. It is stated by Dr. Piesse that "its consumption in the perfumery trade of Europe is something beyond belief" ("Garden," Nov. 24th, 1877), and in the last edition of his work on perfumery he says that "were the otto cheaper its consumption could be increased tenfold." This book is dated 1879; the average price, first-hand, during that year was 3s. per oz. in London ; it is now only 1s. 7d., and leaves have been sold at from 3.5d. to 9d. per lb., according to the quality.

The bulk of the enormous quantity of leaves harvested and of the oil goes direct from its place of production to Mecca, the Arabs believing in its health-giving properties and in its power of warding off fever and sickness. During the last five years China and Japan have adopted it for similar reasons. As a perfume it has much more popularity amongst Orientals than amongst Europeans; still, if the European consumption alone increases in the ratio predicted by Dr. Piesse, consumers will naturally inquire into the causes which influence so large a market, held in a few hands and based on the supply of a plant of which very little is known in Europe.

The generally accepted name, "*Pogostemon patchouly*," originated by Pelletier-Sautelet ("Mem. de la Soc. Roy. des Sciences d'Orleans," V. n. 6, 1845, and Benth. in De Cand. "Prodr.," xii., p. 153; also Hooker's "Journ of Bot. and Kew Mis.," i., pp. 22 and 328), and the minute botanical description of that plant given by him in vol. viii. of this Journal, may apply to a variety of the true plant yielding a somewhat similar perfume, but the plant as it grows wild in Province Wellesly does not flower; neither does the variety which is cultivated at Singapore. Still Bentham was of opinion that Pelletier's plant was identical, or not really specifically distinct from his *Pogostemon intermedius* ("Wal. Cat.," 2327), of Silhet, Penang and the opposite shore of the Malay peninsula, or from *P. parviflorus* of Silhet, Assam and Saharunpur, or even from *P. Heyneanus* of Ceylon, Java, etc., which Drury describes as "probably merely a variety with larger spikes and more drooping in habit," and says that it is found wild in the Concans, and that it is probably Rheede's synonym "cottam," ("Hort. Mal.," x., t. 77).

Apparently there are several varieties of this plant. It is found in many other places than those above named; in Ceylon, China, Java, Mauritius, etc. Its native locality may not have so wide a range, but it has most likely been introduced for cultivation at many of those places. The plant does not grow to any extent on the island of Penang, but a plant said to have been obtained from thence was introduced into the botanic garden at Calcutta, and during ten years showed no disposition to blossom. Other specimens flowered in the stoves at Kew and Orleans; others received from Louis Van Houtte of Ghent, and grown in the moist stove here, have not attempted to flower, although they otherwise thrive exceedingly and agreed in the structure of leaf and stalk with the figure of the Kew plant. The only variety known to flower (if really it be a variety of the same plant) grows on one of the islands near Sourabaya, south-east of Sumatra; the leaf is odorous, though not so broadly ovate and with shorter pedicels, and it is grown simply for the flowers, which are sold in large quantities for medicinal purpose in the various markets of Java, and fetch a high price.

The difficulty of obtaining accurate botanical details of these plants is great, but there are no doubt many varieties, and all labiate plants, especially the mints, are apt to take a character and habit not true to the original plant, when transplanted to a climate or soil other than is natural to them; and under such conditions the development of odorous properties is as much changed as is the development of medicinal properties in many drug-yielding plants. To instance the former I may mention the lavender and the peppermint, and regarding the latter, Dr. Hooker observes, in the introductory essay to his "Flora Indica," that the most conspicuous Indian examples are presented by the opium poppy, mudar (*Calotropis*) and the *Cannabis sativa* or common hemp of England, which yields "bhang" and "chirris" in varying quantities and of different quality very much in proportion to the humidity of the soil and climate it grows in. The digitalis grown in the Himalaya is said to have proved almost inert, and so with other plants which have been cultivated for medicinal and economic purposes. The wood of the English-grown Lebanon cedars differs greatly in color, hardness and odor, and the wood of the English oak grown at the Cape of Good Hope is worthless. The patchouli plant cultivated at Singapore is of course not propagated by seed, as it never flowers. It may be a hybrid, and if its difference of odor be not attributable to this cause it may be to the drying, fermenting and distilling processes being carried on in a

different way to that adopted in Province Wellesley. These reasons may also account in some measure for the differences observed in the Chinese oil of peppermint.

Inquiring into the causes which influence the price of any volatile oil, we find that besides supply and demand, quality is considered, depending on freedom from adulteration and careful manufacture, whether derived from stale or recent plants, and particularly on the variety of the plant from which it is produced. Whether in the case of patchouli there are plants differing specifically or not, it is certain that there are varieties, arising perhaps from hybridization, cultivation or climatic influence, and there are still greater differences in the aroma of the oil, arising either from method of production or adulteration. The bales which now arrive in London are mostly from Province Wellesley, and consist of leaves and woody stalks (too large a proportion of the latter) of the wild variety known as "*Doun Tilâm Utan*," *Doun* signifying leaf, *Tilâm* bed or mattress, also including the idea "health-giving," and *outan* "wild," meaning that the natives stuff their beds and pillows with the leaf and believe in its health-giving and life prolonging virtues. Now, even assuming that these bales consist of this plant alone, unadulterated with leaves of any other plant, that they really have been properly cured and dried, and do not turn mouldy or rancid in transit and arrive sound and un-sea-damaged, and that during the time they are stored in warehouse in London they escape dampness (which the leaf is remarkably apt to absorb), the oil which is afterwards distilled from these leaves differs in aroma from that distilled from the leaves on the spot immediately after the final drying process. The majority of the bales imported are re-shipped to a German port and the oil distilled from them is said to be often adulterated to the extent of even 60 per cent., with cheaper oils, mostly with those of cedar and cubebs. [It is remarkable that these have been selected as adulterants, as the camphor of patchouli is isomeric with that of cubebs and with the concrete oil of cedar.] ("Comptes Rendus," January 8, 1877.)

The method of cultivation of the plant and preparation of the oil, as practised by Mr. Fisher of Singapore, is as follows: The variety selected for cultivation is known locally as *Tilâm Wangi* (meaning "fragrant"), obtained from the island of Rhio, near Singapore, in the Straits Settlements. The soil most suitable is a rather stiff clay with only a small percentage of silica, and land of this description found near the coast (containing traces of marine deposits) is planted in rows about 4 or 5

feet apart. The plants are propagated by cuttings struck in the open air, which until rooted, are sheltered from the sun by pieces of cocoa-nut shell. The harvest is made in dry weather and when the sun has drawn up the dew from the leaves; the tops and green parts of the plant are broken off by hand, rejecting all yellow or decayed leaves and all the woody stems. The selected parts are then dried in the shade under large sheds (as the sun would draw out the perfume), and to ensure evenness in drying, they are spread on bamboo racks, allowing the air to penetrate from beneath. During this process they are frequently turned over, and when so far dried as to leave just sufficient moisture to permit a slight fermentation, they are piled in heaps and allowed to heat gently; after this they are again spread out and dried—but not to absolute dryness—and are immediately distilled. The addition of about 25 per cent. of the wild herb "*Tilâm outan*" is said to increase the fragrance of the distillate. The distillation is effected by passing steam generated in a boiler apart through the leaves in the stills. The pressure of steam is not allowed to rise above 30 lbs. The yield, under these conditions, being about $\frac{1}{4}$ oz. per lb. of leaves; by high pressure steam the yield would be greater but more rank in quality. The stills are sometimes jacketted, and by passing a separate current of steam into the jacket condensation in the body of the still is avoided. Operating on specimens of leaf recently imported into London, I have observed that at the commencement of the distillation a small portion of pale colored oil passes over, lighter than water, and of a more delicate aroma than the heavy oil; but the heavy oil was rank. The Singapore oil is sent to London in cases of twelve bottles containing 22 ounces in each bottle, labeled with the manufacturers' name and guaranteed by him to be pure. From London it is sent to merchants and manufacturing perfumers in all parts. Obviously such oil is more likely to be pure and of better quality than an oil distilled in England, France or Germany from the baled leaves and without a reliable pedigree. The oil described as "French" oil has a different odor to the genuine leaf, and has not the peculiar olive-brown tint of the Singapore oil.

An examination of oil of patchouli was made in 1864, by Dr. Gladstone ("Journ. Chem. Soc.," series 2, vol. iii.), on a specimen obtained from Dr. Piessse, and believed to be quite genuine; also on a specimen obtained from India. Both specimens were brownish-yellow and slightly viscid. They began to boil at 257 °C., at which temperature nearly all distilled over, and was found to be a hydrocarbon analogous to that from cubeb, but towards the end the thermometer rose much higher, and the

distillate became of a deep blue color, owing to the presence of an intensely blue matter termed "azulene" or "coerulein," which is also found in the oils of *Calamus aromaticus*, *Matricaria chamomilla*, *Artemisia absinthium*, *Achillea millefolium*, and in small quantity in the oils of bergamot and Ceylon lemon-grass. The analysis of this remarkable fluid shows its formula to be $C_{16}H_{13}O$ (and not $C_{12}H_{13}O$, as stated by Piesse at page 58 of his last edition). Its boiling point is $576^{\circ}F.$, and its sp. gr. .930. There are but few liquids which give a colored vapor when boiled, but azulene is one of them. Like itself its vapor is blue. It is soluble in and imparts its color to fatty and volatile oils, alcohol and many other liquids, but not water. It is very permanent, and bears a temperature of 700° to 800° F. in a sealed tube without alteration, and none but the strongest acids aided by heat will break up its constitution. It is most intensely blue, appearing almost black when in a concentrated state. It is not decolorized by sulphurous acid, sulphuretted hydrogen, or bromine water. It does not attach itself to animal charcoal, nor does it dye wool, cotton or silk. It has been found to exist to the extent of 6 per cent. in the pure oil.

When left at rest oil of patchouli deposits a crystalline body, known as camphor of patchouli, in regular hexagonal and pyramidal prisms. The composition of this camphor has been stated as $C_{30}H_{28}O_2$ by Gal ("Bul. de la Soc. Chim.," 1869, p. 304), but by Montgolfier ("Comptes Rendus," January 8, 1877, p. 88), as $C_{36}H_{28}O_2$, which would constitute it an isomer of camphor of cubebs and of concrete essence of cedar. The conditions most favorable to the formation of this body are little known, but it has been remarked that it forms more rapidly in samples of oil which have been desiccated by chloride of calcium. This camphor not having any commercial value its formation is undesirable, but as it results from a simple molecular change it may be difficult to prevent it; however, it is possible that the presence of a small quantity of water in the oil may, at least retard it.

The difference of the boiling point of oil of patchouli from that of oil of cedar and of oil of cubebs may serve as a guide in testing a suspected sample; so also may the percentage of azulene.

Volatile oils exhibit great diversity in their action on polarized light, some being dextro-, others Isevorotatory in various degrees. According to Gladstone ("Journ. Chem. Soc.," xvii., p. 3) the rotatory power

(determined for a column of liquid 10 inches long) of the so-called "Penang" oil of patchouli is -120° , the same for cedar wood oil being $+3^{\circ}$. The hydrocarbon of patchouli oil—patchoulene—deviates the polarized ray -90° ; the rotatory power of cubebs is recorded as $+55^{\circ}$.

The same authority gives the sp. gr. of the three sorts of commercial oil of patchouli as follows: Indian, .9554; Penang, .9592; French, 1.0119; all taken at 60°F. , and for their hydrocarbons:

	Sp. gr. at 20°C.	Boiling point.
Indian	.9211	254 C.
Penang	.9278	257.
French	.9255	260

Of course the addition of oil of turpentine would have the effect of lowering the sp. gr. and so counterbalance the adulteration of ol. copaibæ, but the application of Professor Dragendorff's test should detect this ("Pharmaceutical Journal," [3d series], vi., p. 541).—*Phar. Jour. and Trans.*, Nov. 20, p. 409.

INDIAN HENBANE.

BY W. DYMCK.

Henbane, though a native of the Himalayas, was probably unknown as a medicine to the ancient Hindu physicians. "Parasika-yamani" and "khorasam-yamani," the names which it bears in some recent Hindu books, indicate its foreign source. Mahometan writers call it "banj," an Arabic corruption of the Persian "bang." They say it is the "afeekoon" of the Greeks, the "azmalus" of the Syrians, and the "katfeet" or "iskeeras" of the Moors. They also add that in the Deilami dialect it is called "keerchak," because the capsules resemble a little basket with a cover, such as the Arabs make out of date leaves and call "kafeer." Meer Muhammed Husain's description of "banj" in the "Makhzan-ul-adwiya" agrees well with the genus *Hyoscyamus*. He says there are three kinds, white, black and red, and that the white is to be preferred. He mentions the preparation of a sun-dried extract from the juice of the fresh leaves, and says that the leaves are also pounded and made into a paste with flour, out of which small cakes are formed, which when dry retain their medicinal properties for some time.

Henbane is described by eastern writers on materia medica as intoxicating, narcotic and anodyne. Amongst the many uses to which it is put the following may be mentioned as peculiar to the East: A poultice of the juice with barley flour is used to relieve the pain of inflammatory swellings; the seeds in wine are applied to gouty enlargements, inflamed breasts and swelled testicles. About $\frac{1}{2}$ drachm of the seeds with 1 drachm of poppy seeds are made into a mixture with honey and water and given as an anodyne in cough, gout, etc. Equal parts of the seed and opium are used as a powerful narcotic. A mixture of the powdered seeds with pitch is used to stop hollow teeth which are painful, and also as a pessary in painful affections of the uterus. The juice or a strong infusion of the seeds is dropped into the eye to relieve pain. Ainslie and other European writers upon Indian materia medica notice the use of hyoscyamus seeds in India and attribute them to *H. niger*, but I have not heard of anyone who has raised this plant from the bazaar seed. In the "Mufaridat-i-Nasari" it is distinctly stated that the officinal article should be the seed of white henbane (bazr-ul-banj-abiad).

Henbane seed is the only part of the plant used in native practice in India; it is known in Hindostan as "khorasani ajwain," in Bombay as "khorasain owa," and in Madras as "khorasain omam."

For the purpose of supplying government hospitals with extract and leaves the *Hyoscyamus niger* has been cultivated at Saharunpore in the Bengal presidency, at Hoonsoor in Mysore and at Hewra, near Poonah in the Deccan. The quantity grown is limited to the requirements of government. It is a cold weather crop. If sown in October, the plants will produce ripe seed in March, or even earlier. As regards medicinal qualities, the experience of medical men in India is that the plant cultivated for government yields preparations in every respect equal to those obtained from Europe. Dr. O'Shaughnessy found that 3 grains of the sun-dried extract produced marked soporific and anodyne effects.

At present henbane leaves are not an article of commerce in India, but the superintendents of the government gardens are, I believe, allowed to grow any profitable crops of medicinal plants for sale. The price charged by the Hewra gardens to the medical department this year for dried leaves is Rs 1.5 per lb., and for extract Rs 4 per lb.

The price of the imported seed in the Bombay market is usually Rs

7 per maund of 37.5 lbs.—*Phar. Jour. and Trans.*, Nov. 6, 1880.

THE BARK OF *ALSTONIA SPECTABILIS*.

BY O. HESSE.

Alstonia bark, the “cortex *Alstoniæ*” of pharmacognosists, is nearly allied to dita bark. This bark, which in Java is called “poelé” comes from the *Alstonia spectabilis*, R.Br., a species which from its characteristic properties has been named by De Candolle, *Blaberopus venenatus*. This *Alstonia* grows in Timor, the Moluccas, and in the eastern parts of Java, especially in the neighborhood of Malang.

Wiggers, on his “Pharmacognosie,” (“Pharmakognosie,” 5th edit. 1864, p. 358), gives an extremely true description of this bark, to which I would refer.

Poelé bark differs from dita bark not alone by its extraordinarily bitter taste, but also in its anatomical structure. For comparison a specimen of dita bark was obtained, which was apparently stem bark, and a branch bark of the other kind. Herr Professor Ahles, who has examined both barks microscopically, kindly tells me that the difference in the structure of the two barks does not depend alone upon their age, but also upon the peculiarities of the respective plants.

Formerly the poelé bark was used in Java against fever with favorable results, and in Batavia especially it came much into use for this purpose. Apothecary Scharlee (“Geneeskundige Tijdschrift voor Nederl. Indie,” vol. x, p. 209, 1863,) there examined this bark and found in it a special alkaloid, which he named “alstonine.” This was occasionally prepared in Batavia, but does not appear to have ever come into use either in the hospitals or in private practice.

As the name “alstonine” had already been given to a substance obtained from the Australian *Alstonia*, I have before proposed that Scharlee’s alkaloid might be named “alstonamine.” In the following remarks I shall use this name for the alkaloid in question.

Scharlee obtained the alkaloid by extracting the coarsely powdered bark with alcohol, and after previous filtration precipitating the tincture with

tannic acid. The white flocculent tannate was washed with water, suspended in alcohol, and decomposed with freshly precipitated lead hydrate. The alcoholic solution, upon evaporation over sulphuric acid, yielded the alkaloid in brilliant oblique rhombs and prisms. In its reactions it presented relatively great similarity to ditamine. But from this alkaloid it differs, as also from echitenine, by its power of easily crystallizing.

Further, that it cannot be echitammoniumhydroxide is evident from the following experiment. Freshly precipitated echitammonium tannate in alcoholic solution was treated with freshly precipitated lead hydrate, but was not decomposed by it. This result is not surprising, as it is known that echitammoniumhydroxide separates lead hydrate from its combinations.

Consequently, there is in alstonamine an alkaloid differing from the alkaloids of dita bark (this Journal, 1880, p. 620). In order to obtain further information upon the nature of this alkaloid, I undertook an investigation of poele bark. I am indebted for a specimen to Professor Wiggers, who had obtained it some time ago direct from Batavia, possibly from Scharlée himself.

I first prepared an alcoholic extract from 50 grams of powdered bark. This was treated with dilute acetic acid, when a resinous mass was left which contained a considerable quantity of echicerin (this Journal, 1876, p. 370). The clear filtered acetic solution was then supersaturated with soda, shaken with ether, and this treated with acetic acid. After supersaturating this solution with ammonia the base removed from it by pure ether weighed 0.066 gram. It was found to be identical with ditamine.

The liquid left after treatment with ether was next supersaturated with potassium hydrate and shaken with chloroform. Upon evaporation of the chloroform solution, after washing with water, there remained a brown amorphous residue, which after treatment with hydrochloric acid gave 0.423 gram of echitammonium chloride.

The mother liquor was then again supersaturated with potassium hydrate and shaken with chloroform, which now upon evaporation yielded 0.042 gram of a mixed residue, consisting of an amorphous alkaloid and one crystallizing readily from chloroform. The crystals were

concentrically grouped prisms and behaved towards nitric acid like ditamine. The substance was repeatedly dissolved in chloroform and upon evaporation of the solution obtained again unaltered. The small quantity of this substance which I thus obtained, though not sufficient for further experiment, was sufficient to ascertain that it was not ditamine, echitenine or echitammoniumhydroxide. As besides tills no other crystallizable alkaloid could be observed in this alstonia bark, I assume that these crystals were actually Scharlée's alstonamine.

As to the amorphous portion, in which these crystals were imbedded, it corresponded in its behavior with echitenine.

The quantity of bases present in 100 parts poelé bark accordingly amounted to

0.132 Ditamine.
0.808 Echitammoniumhydroxide.
0.080 Echitenine and Alstonamine.

In order, therefore, to obtain a sufficient quantity of alstonamine for a thorough investigation a considerable quantity of poele bark would be required. Unfortunately I have not been able to procure such a quantity, so that I must desist from the further examination of this alkaloid.

One result of especial interest is that the bark in question contains more than six times as much echitammoniumhydroxide as does dita bark, in which I found 0.13 per cent. It may be observed that the action of this alkaloid and its chloride upon the animal organism is similar to that of curare, so that it probably follows that persons who are treated with this bark for the relief of intermittent fever would undergo a more or less powerful poisoning.—*Pharm. Jour. and Trans.*, Nov. 6, 1880, from *Ann. d. Chem.*

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Tinctura Rusci.—A correspondent inquires for a formula for this tincture, which is recommended for ringworm, by Prof. Kaposi, in Hebra's work on skin diseases.

Of the genus *Ruscus*, which is classed with the smilaceae or liliaceae,

three species have been employed medicinally, all of which are indigenous to Southern Europe, one, *R. aculeatus*, Lin., or butcher's broom, being also found in England. The rhizome, known as *radix rusci* or *brusci*, possesses aperient and diuretic properties, and was formerly much used in visceral diseases. This is doubtless the species employed for the above tincture, but we have been unable to find a formula in old and recent works, though several give directions for decoctions. Since the dose was from 10 to 30 grains in powder, the tincture is, perhaps, best made of 20 parts of the powdered drug, exhausted with sufficient dilute alcohol to obtain 100 parts. The taste is disagreeable, sweetish and bitter.

The other two species referred to are *Ruscus hypophyllum* and *R. hypoglossum*, Lin., the former of which was known as *laurus alexandrina*, the latter as *bislingua*, *uvularia* and *laurus alexandrina angustifolia*. The root and evergreen leaves were employed in diseases of the uterus and bladder.

J. M. M.

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Tinctura Stillingiae.—I send you an excellent formula for this tincture. Take of stillingia root (fresh) *eight ounces*, diluted alcohol *two pints*, nitric acid *half fluidounce*. Mix. Macerate fourteen days; express and filter. Dose, five drops in water, three times a day, gradually increased. As nitrates are soluble, the addition of a small quantity of nitric acid to all tinctures made by maceration greatly increases their value.

J. DABNEY PALMER.

Monticello. Fla.