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Botanical Medicine Monographs and Sundry

SIZE OF DROPS.

By PROFESSOR CHARLES F. HIMES, PH.D., Carlisle, Pa.¹

In the recent edition, the 15th, of the U. S. Dispensatory, among other modes of approximate measurement, in the administration of medicines given, is that by drops, and in calling attention to the conditions affecting the size of drops, the statement is made, that "the drops from a full bottle should be less than from one more or less emptied." There is no indication that the statement rests upon direct tests, and it is so decidedly at variance with the results of experiment, that it seems but proper that attention should be called to it. Other conditions remaining the same, drops diminish in size as the bottle is emptied, and to such a degree that any one can satisfy himself of the fact in a few minutes. The circumstance which first directed my attention to the subject will illustrate also the degree of variation in size. It was assigned to a student in the laboratory, as an exercise, to ascertain how far drops might be substituted for more precisely measured quantities of liquids in making comparative determinations for domestic or even commercial purposes. As a preliminary test of the degree of uniformity of results, the hardness of a constant quantity of the same sample of water was destroyed by dropping into it standard soap solution, from the same bottle, and the same portion of the lip. The number of drops of course varied, but, after some skill had been acquired in using the method, in a series of experiments, the number of drops reported as required, indicated regularly increasing hardness for four experiments, then a sudden diminution, succeeded by regular increase. Upon watching the procedure of the student, there seemed to be no condition varying with the same regularity except the amount of liquid in the bottle, and consequent size of the drops; and upon performing the experiments by filling the bottle up to the same mark for each trial, the previous periodicity disappeared, and the uniformity of results was greater than had been anticipated. Subsequent experiments with different bottles, and different liquids, demonstrated that the differences in size of drops occasioned by the variation in the amount of liquid in a bottle were not such as might in all cases be overlooked with prudence in the administration of medicines, and that the method of drops, untrustworthy at best, was rendered much more so from this fact. Upon reference to an older edition of the Dispensatory, on hand at that time, no allusion to the effect upon the size of the drops of the amount of liquid in the bottle was made, and it seemed hardly necessary to call attention to a fact presumably known to any who had employed the method.

Since sending the preceding hastily prepared note upon the size of drops I have taken the opportunity to run over the literature of the subject as given in the AMERICAN JOURNAL OF PHARMACY, not then at my command, and am surprised that, with the painstaking character of the investigation of the conditions affecting the size of

¹ Reprint from the "Journal of the Franklin Institute," July, 1883, communicated by the author.

drops, this one of the degree of fullness of the bottle is practically uninvestigated, and left among the undetermined conditions.

In 1830, Durand² called attention to a series of experiments by Dr. Shuttleworth, and their appreciation by the College of Physicians of London, and gave as the conclusion from experiments of his own, "that the practice of prescribing fluid medicines by drops is altogether objectionable," and that ignorance of the conditions affecting size of drops may lead to serious consequences. After summing up the usual conditions of density of liquid, cohesion of particles, shape of the mouth of the vessel, etc., he remarks, "besides, in every instance, the first drops poured from any vase are always smaller than those subsequently obtained." There is no indication whatever that he, in the most indirect manner, intends to allude to the condition of the bottle as to fullness, but simply to a fact, which the author has not verified, that the few drops first passing over the lip of the vessel are smaller than the subsequent ones.

In 1858, Bernoulli³ gave results of investigations with great accuracy, "keeping in view the nature of the vessel, the temperature, the rapidity of dropping, and other circumstances calculated to affect the weight."

In 1860, Proctor⁴ calls attention to the well-established variation in size of drops, with form and size of vessel, with density and viscosity of liquids, "and according to some other of its qualities not yet well understood."

In 1864, Quin, in the *Druggist and Chemist*,⁵ prefaces an abstract of very careful and exhaustive investigations by Guthrie of the conditions affecting the size of drops by a remark upon "the difficulty of obtaining a standard drop, a difficulty which is still more increased by the knowledge that even when the same vessel and liquid are used the differences are almost as great as those already cited."

Parrish, on experimenting with ounce vials of water, found, in seven trials, the drops required for a fluidrachm to vary between thirty-two and sixty-five.

Guthrie investigates most fully "the physical relations existing between the matter on which the drop is formed, the liquid constituting the drop itself, and the medium through which it passes," a condition not clearly expressed before; but, after enumeration of the other usual conditions, as given by Guthrie, Quin remarks: "The condition, however, which has the greatest effect upon the size of the drop is the interval which takes place between the successive drops, and called by Prof. Guthrie the growth-time."

The careful experiments by Prof. Guthrie upon the influence of this condition are quoted, with his conclusion that, "on the whole, the law seems to be, the slower the dropping the smaller the drop." This was regarded as a most interesting fact to the pharmacist, as showing "the influence of rate in dispensing drops."

The paper of Prof. Guthrie is highly commended for its exhibition of talents and

2 "American Journal of Pharmacy," vol. i, p. 165.

3 "Schweizer. Zeitschr. f. Pharm.," 1858, pp. 97-100; AM. JOUR. PHAR., vol. xxxi, p. 441.

4 "Lon. Pharm. Jour.," July 2, 1860; AM. PHARM JOUR., Vol. XXXII, p. 428.

5 AM. JOUR. PHAR., vol. xxxvi, p. 522.

patience in investigation, and this “enormous and evidently most fruitful field” of investigation commended to him. But although growth-time may in some way be involved in the degree of fullness of the bottle, in not the remotest manner is the latter condition alluded to.

In an editorial of the AMERICAN JOURNAL OF PHARMACY, Feb., 1877, vol. 49, differences in size of drops, of from 30 to 100 per cent., from the same vessel, is remarked upon, and the experiments of Durand, before mentioned, are alluded to.

In 1880, Talbot⁶ gives an account of experiments upon this subject, alludes to those of Durand and Bernoulli, and, in summing up his results, gives the opinion that “the administration of powerful medicines by drops is always dangerous,” that “a single bottle is inconstant” as to size of drops, that “cohesion exerts the greatest influence upon the bulk of drops, temperature very little effect, and rapidity of dropping almost none,”—the last conclusion being at variance with that of Guthrie, previously given.

In none of these papers has the condition mentioned and illustrated in my note, been alluded to.

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

Essential Oils and Distilled Waters.—Percy Wells recommends the addition of a small quantity of potassium permanganate to the water sufficient to make it a faint pink color, and states that volatile oils as well as medicated waters are thereby much improved in odor and quality. Even waters partly spoiled will, on being redistilled in this manner, recover their odor and not again change. $\frac{1}{2}$ to 1 grain per ounce of oil will be sufficient.—*Phar. Jour. and Trans.*, May 12, 1883, P. 91-8.

Temperature of Ice Cream.—In a paper read before the Pennsylvania Pharmaceutical Association Mr. Gustavus Pile explains the fact that the seeming warmth of ice water as compared with ice cream is due to the considerable difference of temperature, that of ice cream being about 12°F., and if frozen good and hard, even as low as 8°F., while it is difficult to get the ice water even as low as the freezing point.

Tinctura Digitalis, which had been kept in a glass-stoppered bottle for about two years, had lost by evaporation about one ounce, and deposited a compact precipitate. This was microscopically examined by Dr. H. Stieren and consisted of chlorophyll, red-brown waxy extractive and of a yellowish, more or less crystalline substance, supposed to be digitalin. The precipitate was dissolved in one ounce of alcohol sp. gr. 0.88, filtered and mixed with the remaining 15 oz. of the tincture, the red-brown color of which being thus changed to the dark greenish-brown of the fresh tincture. Dr. Stieren directs particular attention to the partial separation of active principles, likely to, occur with the deposition of precipitates in tinctures.—*D. Am. Apoth. Ztg.*, May, 1883, p. 122.

Tincture and fluid extract of Colombo.—G. W. Kennedy reported to the Pennsylvania Pharmaceutical Association, that the best menstruum for exhausting Colombo is a mixture composed of alcohol 70 parts, glycerin and water each 15 parts; the percolation for the fluid extract is finished by a mixture of alcohol 7 and water 3 parts.

Fluid Extract Of Ipecacuanha.—In a paper read before the Pennsylvania Pharmaceutical Association, J. A. Weaver states that, having had uniform good results in preparing syrup of ipecac by the formula of Mr. J. B. Moore (“Amer. Jour. Phar.,” 1870, page 129), he prepared the fluid extract by essentially the same formula, preserving the preparation by one-fourth volume each of glycerin and alcohol. This fluid extract, mixed with simple syrup, yielded a syrup which was perfectly clear, and remained so for several weeks, when it separated a deposit, which, however, is redissolved (suspended) on shaking. The author thinks that the fluid extract of the present pharmacopoeial process would have the same objection, and that, therefore, only small quantities of the syrup should be made at a time.

Fluid Extract of Vanilla.—Another modification of the formulas heretofore published in this journal (1854, p. 300, 1872, p. 63, 1876, p. 342, 1882, pp. 65 and 281) is suggested by J. F. Patton in a paper read before the Pennsylvania Pharmaceutical Association: Reduce 8 troyounces of vanilla bean to a moderately fine powder with the aid of 8 troyounces of sugar, add 2 pints of deodorized alcohol, macerate for 30 or 60 days, then add a mixture of 3 $\frac{1}{2}$ pints of deodorized alcohol and 2 $\frac{1}{2}$ pints of water, again macerate for 30 days and filter. Extract of vanilla made by this simple process, like wine, improves with age.

THE CULTIVATION OF THE POPPY IN EUROPEAN TURKEY.

The following is a translation of instructions as to the cultivation of the poppy and the method of extracting and preparing opium, which have been drawn up under the authority of the Turkish Government, and distributed throughout the agricultural districts of Macedonia, with a view to promote the development of the opium industry in that province:

“If we take into consideration the fact that poppy seed is capable of yielding 6 okes (22 $\frac{1}{2}$ lbs.)⁷ of opium and 10 kilos of seed to every dunum (100 sq. metres) of land sown ; that an oke of opium realizes 400 pias (£3 12s), and a kilogram. of poppy seed 40 pias, and therefore that altogether a dunum of land sown with poppy seed may be worth as much as 2,640 pias (£23 15s); if at the same time we bear in mind that a dunum of land sown with wheat seed yields at most 10 kilos of wheat and 2,000 okes of straw, and that with wheat realizing 25 pias the kilogram, and with straw being only worth 30 pias per 200 okes, the total possible value of a dunum. of land sown with wheat is 280 pias (£2 10s.), we see at once that in comparison with wheat and other similar products the cultivation of the opium poppy is a most lucrative industry.

“Seeing then how productive of wealth the cultivation of the opium poppy has been to the agricultural population of the sandjak of Broussa the following is a short treatise

⁷ The figures between parentheses are inserted as approximately correct, ED. PH. J

supplying information on this point.

“The Various Species of Poppy Seed and the Proper Season for Sowing.—Poppy seed is also sometimes styled 'Khashkash' seed. It is very small and it is of two kinds. One is white and the other is of a darker hue, both being contained within shells or pods, which are sometimes termed cocoons. These cocoons are globular in shape, and of the size of a Jerusalem artichoke, having on the upper side a roundish mark which is termed the 'comb.'

The darker-hued seed is of two species. The outer shells or cocoons of the first species are small, and may be distinguished by a row of small holes, through which, if great attention be not paid, as soon as the outer shells are fully matured and ready to receive the produce of the seed the latter drops and is lost. The flowers of this first species are generally of a red or purple hue. So also are the flowers of the second species; but the outer shells of the latter are larger and of an oval shape, and they have no holes in their combs.

“The white poppy seed is also of two kinds, of which though one is white the other is yellow. In other respects there is very little difference between these two kinds, both having large oval-shaped outer shells, with no holes under their combs, the flower, like the seed, being white. The opium extracted from this species of poppy is more abundant and of a superior quality to that which is the produce of the first-named species.

“Although in some localities the 'Khashkash' or poppy seed is sown, as a rule it is only utilized by yielding an oil which is extracted from it. From 100 okes (275 lbs.) of seed may be obtained a yield of 30 or 40 okes (82½ or 110 lbs.) of oil, which is of two kinds, of which one is obtained by first pounding the seed, then heating it and extracting the juice while the seed is still hot. This oil is used in Europe in the composition of water-color paint and oil paint, and is also burnt in lamps. It is also used in the manufacture of glass shades.

“The other kind of oil is obtained without heating the crushed seed, and having a pleasant taste, is used in the preparation of food.

“Arkara-Hissar Sahib ('Afion Kara Hissar').—The seed is first heated before the oil is extracted, which is then universally used by the inhabitants in the preparation of food.

“The oil extracted from the yellow poppy seed, like the opium so extracted, is of a superior quality to the others. In localities where there is no hoar frost in spring and autumn, poppy seed is sown from the month of September up to March; but in places where there is hoar frost the seed must without fail be sown in the month of September and in the spring after the chilly weather is passed. However, seeing that in most places there is hoar frost both in spring and autumn and that in spring, even in the month of April, there is usually some hoar frost, and that after the month of April seed time is already passed, in this country the seed should be sown in September, or at latest in the beginning of October; if the seed be sown at the season mentioned the yield both of opium and of poppy seed is more plentiful than if that

operation be performed when the weather is chilly.

“Description of the Kind of Soil most suitable to the Poppy.—The poppy seed must be sown in light, rich and yielding soils. If it be sown in cold clayey soil or in damp localities the yield will be small and the opium of an inferior quality.

“Ground which is to be sown with poppy seed, of whatever kind it be (i. e., the seed), should be well-manured, sheep's dung being of course preferable. Experience has proved that if a field which has just yielded a crop of opium be immediately sown with wheat, the crop resulting from this last sowing will be remarkably good.

“The Method to be adopted in sowing and the necessary subsequent Treatment.—The soil of a field which is to be sown with poppy seed should be ploughed two or three times and well turned up. The seed should then be scattered about with the hand, just as flax seed is. After this the soil must be thoroughly stirred up and mixed by a rake or a row of bushes bound to the back of a barrow.

If 100 drachms (i. e., Turkish drachms) of poppy seed be sown on every dunum. of land, or on such an extent of land as will take a kilogram of wheat seed, it is sufficient. As soon as ever the young poppy plants begin to appear above the surface of the soil and to bear three or four leaves, in those places where they are too close together they must be taken up and planted again in such a manner as to leave a space of a span between each plant. In order to remove any weeds that may make their appearance in these spaces the soil must be hoed once or twice. This use of the hoe must never be omitted, for if there be many weeds in the field they stunt the proper and healthy growth of the plants, and cause a considerable diminution in the amount of the crop. Moreover, if the seeds of such weeds remain in the soil it becomes subsequently impossible to rid the field altogether of them.

“The course of treatment to be observed at Harvest Time.—Opium, being a substance which is extracted from the pods or outer shells described above, as soon as these pods become green in color and have reached their full growth the green hue changes to yellow. A few days before this change of color takes place there forms over the pods a very thin watery film of a light-green hue, though somewhat indistinct in appearance. This film is called 'cougak.' If it be wiped away with the finger its place remains quite visible. If at about this, time the pod be squeezed between the thumb and forefinger, it becomes so far strengthened that it cannot be easily crushed. It is then that the juice which forms the opium must be gathered.

“In order to gather the juice or paste, the first step is to take a knife, made especially for this purpose, being small and as sharp-pointed as, the end of a penknife, and with it to cut a semi-circular line in the pod beginning from the middle and going round the edges, at the same time leaving a space of about a finger's breadth. Immediately after this is done there appears a white milk-like fluid of a bitter taste, and there forms. This fluid little by little increases in consistency, and its color becomes darker and darker, until in twenty-four hours it becomes coffee-colored and as thick as paste. This is opium. This must be scraped off with the edge of a somewhat large and blunt knife and put into a poppy leaf, and so on until as much as 20 or 30 drachms of opium have been collected on one leaf, the edges of which must be turned in so as to prevent

its being spilled. If, while the opium is being collected, the film above described be mixed with it, it has a beneficial effect.

“At Karahissar the work of cutting lines in the pods of the poppies is generally begun early in the afternoon and continued until nightfall. As the opium must be collected twenty-four hours after the above operation has been concluded, the following day also, soon after twelve o'clock, they begin on the one hand to collect the opium from the pods which were cut the day before, and also to cut lines in other pods, which work occupies them until the evening. But should they come across pods which are not quite ripe, they leave them alone, and five or six days afterwards they again visit them, and after cutting lines in them collect their juice.

In order that the exact season for collecting the juice may not be missed, the whole work must be gone through and finished in five or ten days. Moreover, the proper time for marking the pods must be accurately ascertained, for if the pods be cut say ten days before or after they are quite ripe, there is no yield of opium. As an instance of this it may be mentioned that in the plain of Broussa the experiment was made. Although the plants had reached their full growth, the pods were marked or cut both before and after the exact time when the operation should have been performed, and consequently there was no yield of opium. Sometimes it happens that a dry wind begins to blow at the very time when the poppy pods should be cut, and the atmosphere becomes chilly in consequence. During such weather the yield of opium is very small. The pods also should not be cut when it is raining, for the rain washes away and destroys the juice as fast as it exudes from the seams that have been cut for it.

After the opium crop has been gathered in, the pods change their previous hue of either green or yellow to rose color; when this change takes place the poppy plants should be taken up by the roots one by one and collected into small bundles. Each bundle should then be bound by a young green withe, and then so placed upright in the ground that the roots of the plants be covered, in which position they should remain for a few days until the seed contained within the pods shall have become thoroughly matured and dry. Then the pods should be threshed with a stick until they break open, when the seed may be collected.

“Another method is to sever the stem of the plant at the knot which is to be found close up to the pod, with the finger and thumb, and after collecting the ends so severed to spread them out to dry in some open place, and then to break them open by threshing, or else to pull them to pieces, and, after sifting the seed until it is quite free from extraneous matter, to collect it.

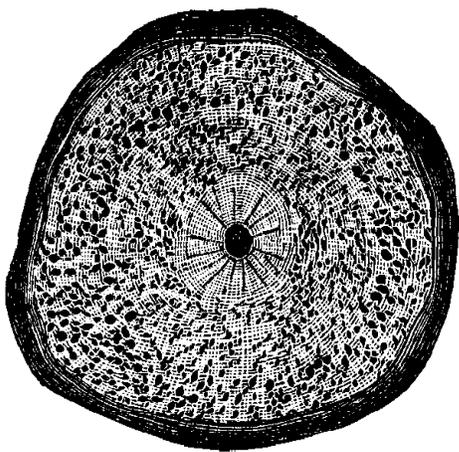
“At Karahissar they purposely burn most of the pods and reduce them to ashes, a fluid extracted from which they use to bleach cotton, on the ground that it is more effective than the water strained off from ordinary ashes.

“After extracting the oil from the poppy seed, there remains a sediment technically called “kyusebe,” on which buffalo, cows, and black kine generally are fed, on the ground that such diet increases the amount of milk, and so of 'caimak' (cream).”—*Phar. Jour. and Trans.* May 18, 1883, p. 918.

GLEANINGS IN MATERIA MEDICA.

By THE EDITOR.

Gouania domingensis, Lin.; Chew-stick.—The cylindrical stems are 8 to 16 mm. ($\frac{1}{3}$ to $\frac{2}{3}$ inch) thick; the dingy grey-brown bark is 1 mm. ($\frac{1}{25}$ inch) thick, longitudinally wrinkled and with difficulty separated from the wood. The very thin cork consists of somewhat flattened cells, with mostly the inner wall thickened and containing a red-brown mass. The middle bark contains chlorophyll, and in many cells single monoclinic crystals of calcium oxalate, the primary bast bundles in small groups, the fibres broad, usually roundish and with distinct layers, occasionally groups of small, lemon-yellow stone cells inclosing crystals. The inner bark consists of extended bast bundles divided by the delicately-celled medullary rays and surrounded by rows of crystal cells. The bast fibres are long, thin, and characterized by the sharply defined primary membrane.



Chewstick, magnified 3 diameters.

The sieve tubes in the inner layer are prominent from their large apertures, and in the older layers appear shrunken in branching cords forming the so-called horn bast. The joints of the sieve tubes are about .4 mm. long and have the transverse membrane horizontal, coarsely porous, and mostly covered with thick callus. The bark is free from starch.

Zinc chloride with iodine imparts a violet color to the entire primary bast fibres, and with considerable swelling to the secondary layers of the secondary bast fibres and to the sieve-tube walls. All other cell membranes are colored yellow, and the contents of tangential groups of parenchyma cells in the soft bast brown. These contents are insoluble in cold water and potassa solution, almost completely soluble in boiling water, and are colored black by ferric salts. Other parts of the bark are free from tannin. The bast parenchyma is thin walled; the cells of the medullary rays become sclerotic only in old stems.

The wood is in circular layers, the early ducts of each year often larger, the several layers varying in thickness, occasionally rather compact, frequently very porous, the wood cells not numerous. The ducts are usually imbedded in parenchyma, appear transversely round or roundish, are sometimes .3 mm. in diameters and upon the walls dotted. The parenchyma contains rows of crystal cells; the pith has the cell walls somewhat thickened and contains scattered crystals.

The bark has a bitter taste. The yellow coloring matter is contained in the membrane, and yields with hot water a tasteless solution which does not react with ferric chloride or alkalis.—*Phar. Centralhalle*, 1883, No. 14.

Catha edulis, Forskal, natural order Celastraceae, is a shrub about 10 feet high, with smooth, elliptical, serrate, either opposite or alternate leaves, two or more inches long, and about an inch wide. It is largely cultivated in the interior of Arabia, and furnishes the *khat*, *cafta* or *Arabian tea*. The slender twigs with the leaves attached are gathered, carefully dried, and made up into closely pressed bundles, each containing about 40 twigs, tied together by strips of bark, the quality being known by the form and size of the bundles. The use of this tea in Arabia, is said to antedate that of coffee; the effects of its use are said to be similar to those of strong Chinese green tea. The Arabs also chew the leaves, both in the green and the dried state, the effect of which is to increase the flow of hilarity and mirth, and to produce extreme wakefulness and watchfulness, an effect somewhat similar to that produced by coca.—*Phar. Jour. and Trans.*, 1883, April 14; *Ind. Agriculturist*.

*Sulamita vitulus*⁸, a plant of the natural order Melastomaceae, grows in Colombia, where it is used in neuralgic affections. The flowers have a strong and somewhat rose-like odor, and yield 1½ to 4 per cent. of volatile oil, which is heavier than water, and appears to be useful in perfumery.—*Rundschau, Leitn.*, April 10, 1883.

Opium Assays.—Four cases of Yerli, Karahissar, and Bogaditch opium assayed by Dr. Squibb, gave the following results: water 18.40 to 21.77 per cent., residue 29.40 to 34.83 per cent., morphine 12.15 to 13.27 per cent., morphine in powder 15.5 to 16.5 per cent.

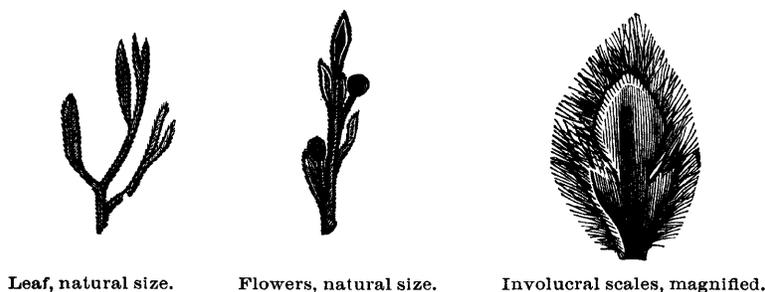
Dr. Squibb also examined nine cases of Persian opium, each of the cases containing 160 plano-convex lumps, weighing 130 pounds. When assayed by his process ("Am. Jour. Phar." 1882, p. 244), it was noticed that although the ether extracted an unusual amount of narcotine, yet the morphine had retained about 4 per cent. of this alkaloid, which could not be removed by ether, but remained behind on dissolving the morphine with lime water. The opium contained much of a glucose-like substance, and comparatively little insoluble matter, one sample yielding 8.7 per cent. water, 24.3 per cent. residue, and 13 per cent. morphine. Calculated for dry opium the morphine varied between 12 and 14.3 per cent. —*Ephemeris*, No. 9, p. 290-283.

Hymenodictyon excelsum, Wallich; Natural order Rubiaceae.—The bitter bark of this East Indian tree was examined in 1870 by Broughton, who found the fresh bark to contain aesculin, which in the dry bark was converted into aesculetin, the bark being almost tasteless. Recently W. A. H. Naylor isolated from the dry bark an alkaloid which seems to be closely allied to paricine, differing chiefly in containing more hydrogen. The bark was mixed with milk of lime, the mixture dried, exhausted by alcohol, the tincture acidified with sulphuric acid and the alcohol recovered by distillation. The residue was treated with hot water, filtered, and the filtrate precipitated with caustic soda. The precipitate, amounting to 1.75 per cent., was digested in a limited quantity of ether, the ether residue dissolved in acetic acid, and the solution submitted to partial precipitation with ammonia or soda. The white gelatinous precipitate became yellow on drying, dissolved readily in ether, alcohol and chloroform, had no action on polarized light, and formed, with acids, amorphous salts. The solution in hydrochloric acid gave precipitates varying from grey to brownish

⁸ I can find no record of this genus - MM

yellow, with mercuric chloride, potassium, ferro- and ferridoyanide, potassium iodide, sodium phosphate, sodium and ammonium chloride, and sodium nitrate. The alkaloid differs from quinoidine in optical behavior, and in its platinum double salt containing less platinum; and from beberine in containing more carbon, and the double compound more platinum.—*Phar. Jour. and Trans.*, April 7, 1883.

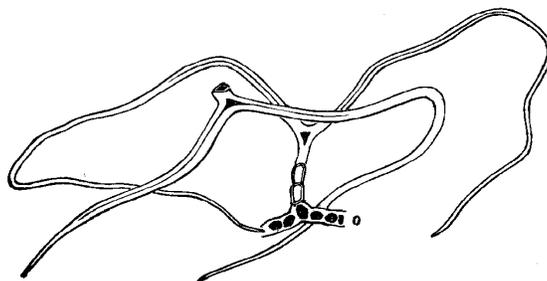
Mountain Sage; Sierra Salvia.—J. Moeller gives the following description of this bitter aromatic drug; the stems attain about the thickness of a quill, are somewhat angular woody and with leafy branches. The leaves are short, petiolate, divided antler-like, the upper ones lanceolate or spatulate, sessile, scarcely 5 mm. ($\frac{1}{2}$ inch) long and 1 mm. ($\frac{1}{25}$ inch) broad. The erect, nearly globular small flowerheads are on short pedicels in the axils of the leaves, either single or in small racemes. The outer involucrel scales resemble the leaves, the inner ones are broader, ovate, three-cleft, membranous and long-ciliate. The receptacle is flat, long-villose, and bears a small number of yellow tubular florets.



Leaf, natural size.

Flowers, natural size.

Involucrel scales, magnified.



Hairs, magnified 125 diameter.

The hairs are quite characteristic, T-shaped; the basal cell projects somewhat above the dense cuticle, and is surmounted by two thinwalled stipitate cells and a terminal cell which is forked, thick-walled, and shows an internal cavity only at the fork. The hairs are colored faintly yellow by aniline sulphate. The author doubts the identity of the plant with *Artemisia frigida*, Willdenow, which is indigenous to Siberia.—*Phar. Centralhalle*, No. 17.

Phoradendron flavescens, Nuttall, mistletoe.—The drug consisting of dried stems, leaves and flowers, has been examined by J. Moeller. The stem fragments are of the thickness of a quill and about the length of a finger, varying in color between gamboge-yellow and blackish brown, wrinkled and with opposite leafscars. The cuticle is thick, on the youngest branches beset with short conical thickened hairs, frequently in pairs; the bark is relatively thick, contains groups of stone cells and lighter colored bast bundles arranged in a circle, and is free from starch; the wood

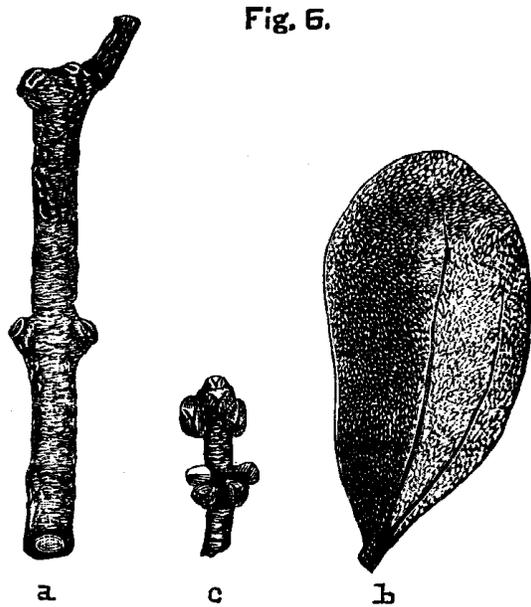


Fig. 6.

Phoradendron flavescens, Nuttall.
a stem, b leaf, c pistillate spike.

contains starch in the pith, in the medullary rays and in the scattered wood parenchyma cells. The leaves are smooth, when full grown, oblong or roundish elliptic, about 6 cm. long, sometimes spatulate, short petiolate, leathery, with the margin entire, the upper surface finely wrinkled and without visible nervation, the lower surface distinctly three-nerved and the nerves sparingly branched. The cuticle is thick. the epidermis consists of polygonal cells, and has on the lower surface numerous stomata; there is no distinct palissade layer, the mesophyll consisting of thin walled, loosely united cells with a few intercellular spaces, and containing tannin, mostly also yellow resin, and in scattered cells near the fibrovascular bundles, also crystalline groups of calcium oxalate.

The flowers are axillary, in whorled spikes, quite small, somewhat imbedded in the axis, three cleft, the pistillate ones in two or three whorls, with a hypogynous one-celled ovary and a two-lobed stigma; the staminate flowers longer and denser with three stamens united to the base of the perianth.—*Phar. Centralhalle*, 1883, No. 14.

Ricinus communis as an insecticide.—Mr. Rafford, a member of the Société d'Horticulture at Limoges, has observed that flies disappear from a room in which a castor oil plant has been placed, the flies either being found dead under the plant, or their bodies clinging to the under surface of the leaves. It would, therefore, appear that these leaves exhale a principle, possessing strong insecticide qualities.—*Brit. Med. Jour.*

Geum album is regarded by Dr. W. A. Spurgeon as a valuable antiemetic, relieving gastric irritation and headache. He uses it in the form of a tincture, made with 8 troyounces of the plant to the pint; the dose is a teaspoonful or more.—*Virg. Med. Monthly.*

Agaricus albus.—E. Jahns has again examined this fungus, and compared his results with those obtained by previous investigators. It was exhausted with hot 90 per cent. alcohol, the tincture concentrated. to the weight of the drug and cooled, when agaric acid separated in indistinct crystals mixed with white resins, the red bitter resin remaining in solution. The precipitate was collected, pressed, mixed with 10 times its weight of 60 per cent. alcohol, warmed in the water bath until the crystals were dissolved, and filtered while hot; the solution was evaporated, the residue repeatedly recrystallized from absolute alcohol, to separate the resin, until it was perfectly soluble in water. A little lime and magnesia was removed by recrystallization in presence of hydrochloric acid, and an amorphous body was separated by dissolving in

hot 30 per ct. alcohol and cooling to 50°C., when pure agaric acid crystallized in delicate silvery plates. It crystallizes from alcohol in groups of prisms, is inodorous and tasteless, melts at 138° to 139°C., requires. at 15°C. 126 p. of 90 per cent. alcohol for solution, is readily soluble in warm alcohol, glacial acetic acid and oil of turpentine, less soluble in ether, and nearly insoluble in chloroform, benzol and cold water. In boiling water it swells to a jelly-like mass, and dissolves finally to a strongly acid, somewhat ropy liquid. Its composition is $C_{16}H_{30}O_5 \cdot H_2O$, the water being partly given off over sulphuric acid, and entirely at 100°C. It is a bibasic triatomic acid, and homologous with malic acid. Its neutral alkali salts are easily soluble in water and precipitated by alcohol in an amorphous condition the sodium salt hardening to a radiating crystalline mass; the other salts are amorphous. The acid salts are little soluble in water, and with difficulty obtained pure. When boiled with nitric acid, agaric acid yields succinic acid and volatile fatty acids, among which butyric acid seen-is to predominate.

The white resins could be separated by treatment with boiling absolute alcohol into white needles and an amorphous body, the latter being freely soluble in strong alcohol.

The results are summarized thus: Hot alcohol dissolves from white agaric—

1.—16 to 18 per cent. of agaric acid, so named by Fleury (1870), and identical with the laricin of Martins (1845), in the main also with the agaricin of Schoonbroodt (1863), and possibly with the pseudowax of Trommsdorff; it forms a part of the white resin of Masing insoluble in chloroform (see "Am. Jour. Phar.," 1875, p. 208).

2.—3 to 5 per cent. of an indifferent body crystallizing in needles, fusible at 271° to 272°C. and sublimable; it forms part of Masing's white resin alluded to.

3.—3 to 4 per cent. of an amorphous white body separating from its solutions in form of a jelly, and identical with Masing's white resin soluble in chloroform.

4.—25 to 30 per cent. of an amorphous red resin-like mixture, having an acid reaction, a bitter taste, a purgative action, and easily soluble in alcohol and ether.—*Archiv d. Phar.*, April, 1883, pp. 260-271.

Cantharides contain, according to Eug. Dietrich, notable quantities of formic acid. This acid is the best solvent for cantharidin, the solubility increasing with the strength of the acid. Cantharidin dissolved in diluted formic acid, may be distilled.—*Phar. Post*, 1883, No. 18.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*Elixirs, their History, Formulae and Methods of Preparation*⁹, including practical processes for making the popular elixirs of the present day and those which have been officinal in the Old Pharmacopoeias; together with a resumé of unofficinal elixirs from the days of Paracelsus By J. U. Lloyd, Professor of Pharmacy in the Cincinnati College of Pharmacy, etc. Cincinnati: Robert Clarke & Co., 1883, pp. 187.

This little book opens with a letter from Dr. Charles Rice, explaining the derivation of the word "elixir" from the Arabic, being composed of the article *al* or *el* and the word *iksîr*, the latter being the Greek *xîrion*, which in medical works means any "dry powder," and in alchemy was used to denote the "magical transformation powder, so

⁹ available online at <http://www.swsbm.com/ManualsOther/ManOther.html>

much sought after, a pinch of which would convert a whole mass of base metal into gold." In this sense *iksîr* is identical with the Arabic term *kînziyâ*, which is also derived from the Greek and from which the word "chemistry" originated. Later the word "elixir" was used as synonymous with "liquid tincture," the first step in the preparation of the philosopher's stone, or it designated any compound preparation of supposed "sublime" properties, reputed to prolong life and to ward off disease. Prof. Lloyd shows that the elixirs formerly used in medicine and those which are still recognized by European pharmacopeias, are with very few exceptions not sweetened; that the idea accepted in our country at the present time regarding what should be the attributes of an elixir is strictly an Americanism, and that these American elixirs would be better defined by the term cordial.

It was not an easy task for the author to collect and critically examine the numerous formulas for elixirs which are scattered through the journals and other publications during the past 24 years; but it has been accomplished, and the author's own experience with this class of preparations. has been added, introducing improvements and practical useful suggestions. Of the old-fashioned elixirs, all the important ones have been selected, mostly with the more or less modernized formulas.

The book gives full, and what is better, reliable information about the numerous elixirs more or less in use, and as long as physicians will continue to prescribe these "ready made" somewhat medicated preparations, it will be of great practical usefulness. With the admission into the new Pharmacopoeia of the Elixir Aurantii as an agreeable vehicle, it may be hoped that the prescriber will gradually learn to order the extemporaneous preparation of elixirs suited to each case, instead of suiting the case to the ready made elixir; and when the numerous formulas for special elixirs shall have become things of the past, Professor Lloyd's book may then not be as frequently consulted for the practical use to be made of it, but it will retain a permanent value as a good work on a line of preparations, which, for a time, had been permitted to assume greater importance than they deserved.