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TINCTURE OF OPIUM (LAUDANUM).

By MARIE O. GLOVER, A.M., S.B.

Having had occasion to collect and assay samples of tincture of opium from eight of the principal wholesale drug houses of New York, and an equal number of retail drug stores in Boston, it was thought that the results obtained might, perhaps, be interesting, as representing in some degree the strength of this preparation now in the market.

The change in the strength of opium preparations recently made in accordance with the U. S. Pharmacopoeia of 1880 would lead us to expect a greater variation than usual just at this time, although it might be supposed that samples made according to the old standard would bear upon the label some indication of the fact. This was, however, not found to be the case, as the only labels giving any information in regard to morphia strength were those from wholesale houses, which stated that the laudanum was made according to the U. S. P. 1880, or, in two instances, that it contained 6 grains to the fluidounce.

The method of assay employed was that of Flückiger, modified by E. R. Squibb ("Ephemeris," Vol. I, No. 1, p. 14; "Amer. Jour. Phar.," 1882, p. 244), and it was found necessary to introduce a slight modification of this process, in order to obtain clean, light-colored morphia.

The tincture was measured in every case at 15.6°C. (60°F.), 50 cc. being the amount used in each assay; the weight was also taken. It was then evaporated to 10 grams, 2.5 cc. of alcohol were added, and the mixture stirred, to obtain a uniform solution. This was in most cases impossible, therefore the mixture was poured gradually and with constant stirring into 100 cc. of alcohol, and the beaker covered and set aside until the supernatant fluid had become perfectly clear. The clear fluid was then decanted through a filter, the precipitate washed with alcohol, and the filtrate and washings evaporated until the alcohol was expelled, a little water being added. When the contents of the dish again weighed 10 grams, 2.5 cc. of alcohol were added, and a uniform solution was generally obtained. This was transferred to a small flask with as little additional water as possible, 2.5 cc. more alcohol added, and the flask well shaken. There were now 15 cc. of stronger ether added, the shaking repeated, and lastly 2 cc. of ammonia water (10 p. c. NH₃) were added, and the whole shaken until the crystals began to separate, the shaking after this being frequently repeated for half an hour. After standing overnight the ethereal stratum was carefully poured off on to a filter, 10 cc. more ether added, and the contents of the flask rinsed around without shaking. When the ethereal layer had separated, it was poured off through

the filter, and the latter washed with 5 cc. of ether, carefully dropped on to the edges from a pipette, and allowed to dry. The remaining contents of the flask were poured on, the flask and filter washed, Using in all only about 10 cc. of wash water. The filter and contents were then dried at 100°C. (212°F.), weighed, the morphia removed, and the weight of the filter taken and subtracted. The result was then calculated to grains to a fluidounce.

The samples were treated as nearly as possible alike, the quantities of ether, alcohol and ammonia being the same, and the time allowed for precipitation about 24 hours in all cases. It was found impossible to assay most of them successfully without the alcoholic precipitation, the morphia obtained being dark-colored and impure, and in 3 out of 4 samples where comparative tests were made, less in amount, the gummy matter separated by the alcohol apparently hindering the precipitation.

The U. S. P. process, as given by Henry B. Parsons, in his interesting report, read before the New York State Pharmaceutical Association ("Weekly Drug News and Am. Pharmacist," June 23, 1883) was tried with 4 of the samples, the results being always lower, by a varying amount (from .2 to .8 grain to the fluidounce), than those obtained by the other process. It appears also that weighing the morphia on balanced filters, when the U. S. P. process is employed, gives a higher result than that obtained by subtracting the weight of the filter on removing the morphia. As the crystals are remarkably clean and easy to remove, the latter would seem to be the more correct method. The increase in weight may possibly be due to the formation of CaCO₃ to a greater extent in the pores of the inner filter, which is more exposed to the air during filtration.

The results obtained are as follows :

No.	Per cent. of Morphia.	Grains of Morphia to the Fluidounce.
1.....	1.20.....	5.24
2.....	1.20.....	5.25
3.....	0.91.....	3.95
4.....	0.59.....	2.62
5.....	0.66.....	2.89
6.....	1.40.....	6.06
7.....	0.86.....	3.81
8.....	1.24.....	5.46
9.....	0.77.....	3.32
10.....	0.98.....	4.29
11.....	1.10.....	4.77
12.....	0.65.....	2.87
13.....	0.75.....	3.29
14.....	1.24.....	5.45
[15.....	1.31.....	5.70]
16.....	1.27.....	5.59
17.....	1.33.....	5.87

The morphia from each sample was tested for its solubility in lime water ("Ephemeris," Vol. 1, No. 1, p. 18), and in Nos. 8, 10, 11 and 16, which showed a large amount of insoluble matter (the others containing traces merely), a correction was made for this, the amount being determined by collecting the insoluble substance (narcotine ?) from about 0.5 gram on a balanced filter, drying and weighing. The use here of the balanced filter cannot well be avoided, as the precipitate is of such a nature that it would not be possible to remove it, but it is open to the same objection as above, and the amount of impurity thus found is doubtless somewhat high. Before making the reduction the figures stood: No. 8, 5.63 grains, No. 10, 4.44 grains, No. 11, 4.89 grains, No. 16, 5.72 grains, to the fluidounce.

Nos. 1, 2) 6, 8, 14, 16 and 17 are all probably intended to answer the requirements of the U. S. P., 1880. A sample of laudanum (No. 15) made from 15 per cent. opium, according to the U. S. P., substituting 40 parts each of alcohol and water for 4 as directed, yielded, after making the subtraction for impurities insoluble in lime water, only 5.70 grains to the fluidounce, 6.03 being the amount obtained before correction.

Nos. 3, 7, 10 and 11 would fulfil the requirements of the U. S. P., 1870, according to which the minimum strength would be 3.75 grains to the fluidounce. Nos. 9 and 13 are perhaps intended to conform to this.

Nos. 4, 5 and 12 agree neither with the old strength nor with the new, but come within the limits (2-3 to 3-3 grains to the fluidounce) assigned by Mr. Parsons to laudanums probably made from moist opium.

Thus, of the 16 samples of tincture of opium we have 7 answering nearly or quite the requirements of the U. S. P., 1880, 4 meeting those of the U. S. P., 1870, 2 somewhat below this standard, and 3 containing such a small percentage of morphia that they are open to the suspicion of having been intentionally made of low morphia strength.

In every case, however, where the label contained the letters U. S. P., or the statement that the laudanum was made according to the U. S. P., 1880, it was found to contain between 5 and 6 grains of morphia to the fluidounce.

The number of samples is not large, and they were obtained only from New York and Boston, therefore it is hardly safe to draw general conclusions from the assays; but as these samples were received in June, 1883, at least seven months later than those assayed by Mr. Parsons, and after sufficient time had elapsed for the new standard to be adopted, it may, perhaps, not be quite useless to give the results.

Laboratory of Dr. E. R. Squibb,

Brooklyn, N. Y., August 31, 1883.

EXTRACT OF MALT.

By J. U. LLOYD.

Read at the Sixth Session of the Thirty-first Annual Meeting of the American Pharmaceutical Association.

When substances of this kind were introduced some five years ago, we were induced by the demand created to make a preparation of malt. In looking at the matter it, then seemed to us that the desideratum was a pharmaceutical one which should embody the soluble constituents of well malted barley. We therefore arrived at the conclusion that there was little if any necessity for a deviation from the regular line of fluid extracts, although the process for making malt extract in Germany resulted in a substance of the consistence of thick honey. Our view of the subject has not been changed. The most practical and feasible process for extracting the desirable principles from malt in our opinion is that of percolation. The product represents all of the valuable constituents of malt if the menstruum is adapted to their extraction. The finished fluid extract is pleasant to the taste; it is rich in diastase.

The action of malt on warm gelatinous starch, whereby the starch is quickly changed into dextrin and sugar, has been familiar since malt liquors have been used. Payen and Persoz (1833) first gave us the name *diastase*, which they applied to the fermentation principle of germinating malt. This substance is also found in other germinating seeds, sprouting potatoes, etc. This diastase is now generally accepted as the desirable principle of malt, although the glucose certainly is useful as a food, and to us it is by no means certain that other substances than diastase are not present and valuable.

Extract of malt, as introduced into this country, and which, as far as we can learn, was first officinal in the German Pharmacopoeia, was made by bringing a decoction of malt to the boiling point, and then evaporating it to the consistence of a thick extract. Such in substance was the process, and the appearance and characteristics of the preparations sold originally in our country under this name induces us to believe that they were then made in this manner. Until one year ago we do not know that in this country particular attention had been directed to the comparison of values of malt extracts in accordance with their powers to convert gelatinized starch into dextrin and glucose. The perishable nature of diastase was well understood, and yet the makers of malt extracts seemed scarcely to consider it as a prominent factor.

An extract of malt made a few years ago, which was preserved by us in an original bottle, compared with one of recent date made by the same manufacturer, show a great difference in appearance and in properties. This preparation is that of one of the largest manufacturers. We have every reason to believe that the makers endeavor to produce an unexceptionable preparation, and we feel assured that they were as likely as any to have been among the first to consider the value of diastase. Hence it is that we may well believe Mr. Cowdrey to have first directed prominent attention in this country to the ease with which an extract of malt may be dispossessed of its diastase. In his paper read before the Association at its last meeting he stated that a temperature of boiling completely destroyed it. This statement has since been supported by our experiments and by those of others. It is true, also, that a temperature of from 160° Fah. to 180° Fah. will destroy diastase in a very short time,

and any continued application of heat at or above 130° Fah. will within a moderate period render it inactive. Hence it is that we now doubt the advisability of applying any heat to a preparation of malt, and we certainly have every reason to believe that pharmacists generally will always be debarred through want of proper facilities from preparing an active malt extract unless it be as a fluid extract.

In the paper of Mr. Cowdrey, and as illustrated. by his experiments, it was stated and shown that 4 drachms of a viscid-like extract of malt could quickly convert into dextrin and glucose 5 drachms of starch which had been boiled with water.¹ This conversion of gelatinous starch into glucose we have also easily accomplished by means of an equal bulk of fluid extract of malt, although we do not claim that it is desirable to introduce a process into the Pharmacopoeia to represent a proportion of crude material to finished product different from that of the other fluid extracts. It is for the purpose of suggesting a formula for making such a preparation (fluid extract of malt) that we have written this paper, for in the literature which we have at our command on this subject, although the fact is shown that heat will destroy diastase, and that an extract can be made to contain diastase, any reference to the method of preparing such an extract is omitted.

To prepare a fluid extract of malt which will represent as nearly as practical one part of malt to one part of the finished product we have recently followed the process adopted by us with some other substances, which will not bear the application of heat. Tall cylindrical percolators should be used, and a menstruum composed of a mixture of one part of alcohol to four parts of water.² The ground malt is moistened with this menstruum, and after one hour is packed carefully into the percolator, and not too firmly. The remainder of the menstruum is then added, and when the percolate appears the exit is closed and maceration conducted for twenty-four hours. Then the percolate is slowly withdrawn until it is equal in weight to three-fourths the amount of malt employed. This product is placed in a tall vessel, permitted to settle, and then decanted. This decanted liquid is the finished fluid extract.

The specimen which we now exhibit was prepared after this process.

In presenting this paper we trust that we will not be considered as participants in the malt controversy which has more or less agitated the pharmacists of some sections of our country during the past year. The substances offered as far as we know under the name of malt extracts, and which our Pharmacopoeia recognizes as a malt extract, are entirely different in appearance from the preparation to which we refer. Our object is simply to bring before the Association a process which can be used by pharmacists with limited conveniences. Any process embodying the application of heat which we have investigated tends, according to our late experiments, to destroy the diastase, and when, by evaporation at a gentle heat, the viscid-like extract is obtained, it will generally be found that, as far as the diastase is concerned, it is in less amount, bulk for bulk, than in the liquid before evaporation, even if it be not altogether wanting. Hence it is that we believe the simple process of percolation is best adapted to the wants of pharmacists generally, and we think such should be the officinal process for making malt extract.

¹ Mr. Cowdrey only exhibited such an extract. He did not give the process by which it was made.

² We have found during our experiments that if less amount of alcohol is used, occasional fermentation follows. Hence it is that we suggest the above-named proportion.

PETROLATUM IN THE OFFICINAL OINTMENTS.

By JOSEPH P. REMINGTON.

Read at the Sixth Session of the Thirty-first Annual Meeting of the, American Pharmaceutical Association.

Petrolatum, the new officinal ointment base, was probably the subject of more animated discussion in the long series of debates occurring in the last Committee of Revision and Publication of the Pharmacopoeia, than any other preparation. The fact that it was a mixture, being composed of hydrocarbons, of the paraffin and olefin series probably ranging from $C_{16}H_{34}$ to $C_{32}H_{66}$ and from $C_{16}H_{32}$ to $C_{27}H_{54}$, and that its physical properties depended to a considerable extent upon the relative proportion of olefin constituents, contributed to the necessity for thorough study and discussion ; but the need that was recognized for a non-oxidizable substitute for lard, and the conviction that the cosmelines, vasesines, deodorolines, saxolines, petrolines, etc., in their then condition of varying composition, would not be acceptable in a national authority, was the prime reason for fixing a standard which could be readily reached and would be essentially practical. After prolonged consideration, it was finally decided to fix the melting point but slightly above that of the best form of the commercial article, for experience had shown that excellent results had been obtained therapeutically from a petrolatum having a melting point of $40^{\circ}C.$ (or $104^{\circ}F.$), and a firmer petrolatum could be readily produced by incorporating yellow wax with it, although care is necessary in the production of this firmer ointment. To insure a homogeneous compound it must be stirred thoroughly and continuously after it has commenced to congeal, whilst upon the large scale mechanical stirrers are recommended. At the present time petrolatum can be had of excellent quality and fully up to the requirements of the Pharmacopoeia, in large quantities cheaper than good lard, and the reduction in price due to competition is still going on, and thus one practical obstacle to its general employment in ointments is overcome. It is not the intention of this paper to enter into a discussion of the therapeutical superiority of petrolatum as a base for ointments; its very extensive use in this connection, by physicians, compelled the Committee of Revision to introduce it into the Pharmacopoeia; and if at the time of the decision an adequate supply, made by different manufacturers and not proprietary in its character, could have been assured it would have probably been directed in the formulas for the ointments. The next revision will, in all probability, require its use in most of the officinal ointments. With the view of obtaining some experience in its general use, the following series of formulas was devised, in which petrolatum is substituted for lard or other animal fat in each one of the officinal cerates and ointments, and one-pound samples are herewith submitted to the Association for inspection; the formulas will be accompanied by comments when deemed necessary.

- CERATUM.—*Cerate*.—Yellow wax, thirty parts; petrolatum, seventy parts. Melt them together and stir constantly until cool. The cerate made in this way is of a light yellow color and, of course, would not be recognized as officinal simple cerate; it is nevertheless an excellent dressing, and will retain its properties unimpaired a greater length of time than officinal cerate.
- CERATUM CAMPHORÆ.—*Camphor Cerate*.—Camphor liniment, three parts;

olive oil, twelve parts; cerate (made with petrolatum), eighty-five parts. Mix the camphor liniment and the olive oil and incorporate with the cerate. This cerate was introduced as the base of cerate of sub-acetate of lead, and when made from petrolatum is more permanent than the officinal. A better and simpler formula, in some respects, is as follows: Powdered camphor, one part; petrolatum, ten parts; cerate (made from petrolatum), one hundred and eighty-nine parts. Warm the petrolatum until it liquefies, then dissolve the camphor in it and incorporate with the cerate.

- CERATUM CANTHARIDIS.—*Cantharides Cerate*.—Cantharides, in No. 60 powder, thirty-five parts; yellow wax, twenty parts; resin, twenty parts; petrolatum, twenty-five parts. Use the officinal process.
- CERATUM CETACEI.—*Spermaceti Cerate*.—Spermaceti, ten parts; yellow wax, twenty-five parts; petrolatum, sixty-five parts. Melt together the spermaceti and wax, then add the petrolatum and stir the mixture constantly until cool. Not white, but much more permanent than the officinal.
- CERATUM EXTRACTI CANTHARIDIS.—*Cerate of Extract of Cantharides*.—Cantharides, in No. 60 powder, thirty parts; resin, fifteen parts; yellow wax, thirty-five parts; petrolatum, thirty-five parts alcohol, a sufficient quantity. Use the officinal process.
- CERATUM PLUMBI SUBACETATIS.—*Goulard's Cerate*.—Solution of subacetate of lead, twenty parts; camphor cerate (made from petrolatum), eighty parts. Mix them thoroughly. This cerate is more permanent than the officinal and, in practice, will be found to be very efficient in alleviating acute, active, cutaneous inflammation, at times being successful when the officinal ointment does not afford immediate relief. It is yellowish-white in color.
- CERATUM RESINÆ.—*Resin Cerate*.—Resin, thirty-five parts; yellow wax, fifteen parts; petrolatum, fifty parts. Melt together at a moderate heat, strain through muslin, and allow it to cool without stirring. The substitution of petrolatum in this cerate is probably not much of an improvement from a therapeutic point of view, as stimulation is the object sought; it would however not be objectionable. When made without stirring, a semi-translucent handsome ointment is produced.
- CERATUM SABINÆ.—*Savine Cerate*.—Fluid extract of savine, twenty-five parts; resin cerate (made from petrolatum), ninety parts. Use the officinal process.
- UNGUENTUM.—*Ointment*.—Petrolatum, eighty parts; yellow wax, twenty parts. Melt the wax and add the petrolatum gradually, then stir the mixture constantly until cool. A yellowish-white ointment, which is firmer in consistence than the petrolatum, having the higher melting-point. It is well adapted for use in the firmer class of medicated ointments.
- UNGUENTUM ACIDI CARBOLICI.—*Ointment of Carbolic Acid*.—Carbolic acid,

ten parts; ointment (made from petrolatum), ninety parts. Mix them thoroughly. This ointment seems to have less tendency to separate than that made by the officinal process; therapeutically there can be but little difference in them.

- UNGUENTUM ACIDI GALLICI.—*Ointment of Gallic Acid*.—Gallic acid, ten parts; benzoinated petrolatum, ninety parts. Use the officinal process. Very little benefit was observed when petrolatum was treated with benzoin ; the peculiar change in the odor of petrolatum which occurs when it is long kept has been observed in benzoinated petrolatum almost to as great an extent as in simple petrolatum which was exposed for the same length of time. The odor is undoubtedly modified by the presence of the benzoin, but the petrolatum is not changed or protected by it. This ointment is undoubtedly an improvement on the officinal one.
- UNGUENTUM ACIDI TANNICI.—*Ointment of Tannic Acid*.—Tannic acid, ten parts; benzoinated petrolatum, ninety parts. Use the officinal process. This is a better ointment, therapeutically, than the officinal.
- UNGUENTUM AQUÆ ROSÆ.—*Cold Cream*.—Petrolatum, sixty parts; white wax, ten parts; rose water, thirty parts. Use the officinal process. The addition of a small quantity of oil of rose improves this ointment greatly. Although it would be probably useless to attempt to dispense this improved ointment, in ordinary counter practice, as cold cream, because of its yellowish color, there is no question of the superiority of the petrolatum cold cream as a practical dressing and emollient.
- UNGUENTUM BELLADONNÆ.—*Belladonna Ointment*.—Alcoholic extract of belladonna, ten parts; diluted alcohol, six parts; petrolatum, eighty-four parts. Rub the extract with the diluted alcohol until uniformly soft, gradually add the petrolatum and mix thoroughly. An improvement over the officinal ointment therapeutically.
- UNGUENTUM CHRYSAROBINI.—*Chrysarobin Ointment*.—Chrysarobin ten parts, petrolatum ninety parts. Rub the chrysarobin with the petrolatum, gradually added, until they are thoroughly mixed. A better ointment may be made, however, by digesting the mixture in a water-bath and stirring thoroughly as it cools.
- UNGUENTUM DIACHYLON.—*Diachylon Ointment*.—Lead plaster sixty parts, petrolatum thirty-nine parts, oil of lavender one part; melt together the lead plaster and petrolatum at a moderate heat; then, having permitted the mass to become partly cool, incorporate with it the oil of lavender, and stir constantly until cold. This ointment is a decided improvement on the officinal formula, it keeps much better, does not separate, and is not so adhesive. On account of the want of uniformity in the quality of olive oil permitted by the Pharmacopoeia, physicians often complain of the irritant effects produced by the use of this ointment as ordinarily dispensed. The use of petrolatum would undoubtedly do away with these difficulties, and a smooth, nonirritating and more permanent ointment than the officinal be produced.

- UNGUENTUM GALLÆ.—*Nutgall Ointment*.—Nutgall in No. 80, powder ten parts, petrolatum ninety parts. Rub the nutgall, with the petrolatum, gradually added, until they are thoroughly mixed. For therapeutical reasons this is preferable to the officinal.
- UNGUENTUM HYDRARGYRI.—*Mercurial Ointment*.—Mercury four hundred and fifty parts, petrolatum three hundred parts, yellow wax one hundred and fifty parts, compound tincture of benzoin forty parts, mercurial ointment one hundred parts. Mix the mercury with the tincture of benzoin in a mortar, add the mercurial ointment (which should contain fifty per cent. of mercury); and triturate the mixture until globules of mercury cease to be visible; then add the petrolatum and yellow wax, previously melted together and partially cooled, and continue the trituration until globules of mercury cease to be visible under a magnifying power of ten diameters. This is believed to be a better ointment than the officinal, for both lard and suet are dispensed with, the necessary firmness being imparted by yellow wax; the process is practically more rapid than the officinal because suet is almost granular in its character, and prolonged trituration is necessary to break down the granules; the disagreeable odor always present in suet, is of course absent in the improved preparation, whilst rancidity is effectually prevented.
- UNGUENTUM HYDRARGYRI AMMONIATI.—*Ointment of ammoniated Mercury*.—Ammoniated mercury, in very fine powder, ten parts, petrolatum ninety parts. Rub the ammoniated mercury with the petrolatum, gradually added, until they are thoroughly mixed. Preferred for therapeutical reasons.
- UNGUENTUM HYDRARGYRI NITRATIS.—*Citrine Ointment*.—The practice which has been indulged in to some extent of making citrine ointment from petrolatum is one which should be condemned. The well-recognized therapeutic effects caused by the use of this ointment are probably due not only to the presence of the acid nitrate of mercury, but to the elaidin produced by the action of nitric acid upon olein. Now it has been shown by Schorlemmer that hot nitric acid attacks octane, one of the higher members of the paraffin group, and that succinic acid is one of the products, but it is yet to be proved that the resulting compounds, if any, produced by reacting upon petrolatum with nitric acid, under the circumstances detailed by the officinal process are valuable. Indeed, it is very probable that the chemical changes are slight, and it is very fair to assume, that totally different products must result when a mixture of paraffins is treated with nitric acid than when the olein in an animal oil is so treated.

Practical results seem to verify this view, for the attempts to produce ointment of nitrate of mercury from petrolatum, which have been made by various investigators from time to time, have proved failures, a spongy yellowish mass, filled with bubbles of gases resulting from decomposition, and ultimately turning brown, is the result. The present officinal process, if strictly adhered to, gives an excellent product, and, for the reasons above given, the writer recommends it in preference to all others.

- UNGUENTUM HYDRARGYRI OXIDI FLAVI.—*Ointment of Yellow Oxide of Mercury*.—Yellow oxide of mercury, in very fine powder, ten parts; ointment (made

from petrolatum; see unguentum) ninety parts. Rub the oxide of mercury with the ointment, gradually added until they are thoroughly mixed. Preferred to the officinal from therapeutical reasons.

- UNGUENTUM HYDRARGYRI OXIDI RUBRI.—*Ointment of Red Oxide of Mercury*.—Red oxide of mercury, in very fine powder, ten parts; ointment (made from petrolatum; see unguentum), ninety parts. Rub the oxide of mercury with a small quantity of the ointment until a perfectly smooth mixture is obtained; then gradually add the remainder of the ointment, and mix thoroughly. More permanent than the officinal, and preferable therapeutically.
- UNGUENTUM IODI.—*Iodine Ointment*.—Iodine, four parts; iodide of potassium, one part; water, two parts; petrolatum, ninety-three parts; use the officinal process. A dark greenish black ointment is produced, which is probably not inferior to the officinal. The advantages of the use of petrolatum here are not so apparent as in some of the other ointments.
- UNGUENTUM IODOFORMI.—*Iodoform Ointment*.—Iodoform, in very fine powder, ten parts; petrolatum, ninety parts. Rub the iodoform with the petrolatum, gradually added until they are thoroughly mixed. Preferable on therapeutic grounds.
- UNGUENTUM MEZEREI.—*Mezereum Ointment*.—Fluid extract of mezereum, twenty-five parts; petrolatum, eighty parts; yellow wax, twelve parts. Melt together the petrolatum and wax with a moderate heat, add the fluid extract, and stir the mixture constantly until the alcohol has evaporated, then continue to stir until cool. The advantages of petrolatum in this ointment over lard are not very apparent, as it is used as a stimulating application.
- UNGUENTUM PICIS LIQUIDÆ.—*Tar Ointment*.—The use of petrolatum here is not recommended, although, if desirable, a mixture of yellow wax and petrolatum of the consistence of suet could be used.
- UNGUENTUM PLUMBI CARBONATIS.—*Ointment of Carbonate of Lead*.—Carbonate of lead, in very fine powder, ten parts; petrolatum, ninety parts. Rub the carbonate of lead with the petrolatum, gradually added until they are thoroughly mixed. Preferable therapeutically to the officinal.
- UNGUENTUM PLUMBI IODIDI.—*Ointment of Iodide of Lead*.—Iodide of lead, in very fine powder, ten parts; petrolatum, ninety parts. Rub the iodide of lead with the petrolatum gradually added until they are thoroughly mixed. A bright orange-colored ointment, which darkens on the surface when exposed.
- UNGUENTUM POTASSII IODIDI.—*Ointment of Iodide of Potassium*.—Iodide of potassium, in fine powder, twelve parts; hyposulphite of sodium, one part; boiling water, six parts; petrolatum, eighty-one parts. Dissolve the iodide of potassium and the hyposulphite of sodium in the boiling water in a warm mortar; then gradually add the petrolatum and mix thoroughly. This ointment is of a lemon yellow color, but shows a disposition to separate on keeping due to the presence of

the water; it should only be made as it is needed.

- UNGUENTUM STRAMONII.—*Stramonium Ointment*.—Extract of Stramonium, ten parts; water, five parts ; petrolatum, eighty-five parts. Rub the extract with the water until uniformly soft, then gradually add the petrolatum and mix thoroughly. Very much preferable to the officinal, in the treatment of hemorrhoids.
- UNGUENTUM SULPHURIS.—*Sulphur Ointment*.—Sublimed sulphur, thirty parts; petrolatum, seventy parts. Rub the sulphur with the petrolatum, gradually added until they are thoroughly mixed. Probably no better than the officinal.
- UNGUENTUM SULPHURIS ALKALINUM.—*Alkaline Sulphur Ointment*.—Washed sulphur, twenty parts; carbonate of potassium, ten parts; water, five parts; petrolatum, sixty-five parts. Rub the sulphur with the carbonate of potassium and the water, gradually add the petrolatum, and mix thoroughly. Preferable on therapeutic grounds, to the officinal.
- UNGUENTUM VERATRINÆ.—*Veratrine Ointment*.—Veratrine, four parts; alcohol, six parts; petrolatum, ninety-six parts. Rub the veratrine with the alcohol in a warm mortar until dissolved, then gradually add the petrolatum and mix thoroughly, This ointment is much darker in color than the ointment formerly officinal, due to the complete solution of the veratrine. When made from petrolatum it is probably more efficient than when made from lard, because of its more rapid absorption.
- UNGUENTUM ZINCI OXIDI.—*Ointment of Oxide of Zinc*.—Oxide of Zinc, twenty parts; petrolatum, eighty parts. Rub the oxide of zinc with twenty parts of petrolatum previously melted, until the mixture is perfectly smooth then add the remainder of the petrolatum and mix thoroughly. This ointment does not equal the officinal in appearance; it is not white nor does it have the pleasant balsamic odor due to the benzoin, but when used to allay irritation, as in acute eczema, the ointment made from petrolatum will frequently be preferred.

NOTES ON CINCHONA BARK.

By DAVID HOWARD.

A curious evidence of the singular scientific acumen shown by the late Mr. McIvor in working out his process for renewing cinchona bark is given by some of the samples of “renewed” *C. succirubra* bark which reach us from Ceylon.

As is well known, in Mr. McIvor's process, alternate strips of the bark were removed down to the cambium, and the tree wrapped round with moss. The bark then renews over the whole surface, the new bark consisting almost entirely of cellular tissue, the total alkaloid being increased, and the cinchonidine giving place to quinine.

The “renewed” bark to which I call attention, on the other hand, shows a totally different structure; there is a mere skin of cellular tissue, the remainder being

remarkably fibrous.

The explanation is not far to seek, the shaving process recommended by M. Moens as a substitute for Mr. McIvor's process gives good results just in proportion as it imitates the latter process. If the cut is sufficiently deep to cause the effusion of new bark, if I may so call it, the result both in quantity and quality of the renewed bark closely resembles that yielded by the stripping process.

But if, as is often now the case, the shaving is merely superficial and carried all around the tree the result is entirely different; in this case there is little or no formation of cellular tissues to replace that removed, a fresh epidermis forms, but apparently the circulation is carried on in the remaining fibrous tissue, which in fact seems to be developed further. The alteration in the composition of the alkaloid which is so characteristic of the true renewal does not take place in this case; if there is any change it is rather in the direction of an increase of the cinchonidine instead of quinine.

The subject is not merely interesting from the light it throws upon McIvor's process, but it is one of great commercial importance. Unless the shaving process is so carried on as to produce, at least in part, the beneficial results of the older process of renewal it will lead to grievous disappointment, for the trees seem to suffer more from the wrong treatment than from the right.

It is to be feared that in many cases the temptation to get a quick return from the plantation by over-frequent and unskilful shaving is risking not only the quality of the crop but the health of the trees. Some planters are even advocating a return to the barbarous system of coppicing; but it is difficult to believe that this will generally be the case, with the strong evidence before their eyes of the benefits to be obtained by the more scientific system of treatment.

I do not venture into the vexed questions of hybrids and species in red bark; but when I find that "red bark" can be obtained yielding up to 4 and 5 per cent. of quinine from natural bark, I am very sure that there is a great field for skill in the selection or cultivation of cinchonas. There is much to be learned in these matters. In the last drug sales, some samples of bark marked "hybrid" gave 4 per cent. of quinine, while others, also "hybrid," gave only 1 per cent. of quinine.

It is evidently no easy matter to distinguish by the eye the different varieties of trees which produce red bark of widely different quality. Some time ago I analyzed a number of samples of bark from individual trees, sent me by J. A. Campbell, Esq., from Ceylon. They were renewed bark from trees giving red bark of very fine quality; the plants were all from the same nurseries, and were supposed to be of identical quality.

I found, however, that they varied very widely in the richness of the bark, as will be seen from the following table:

No.	Quinine.	Cinchonidine.	Cinchonine.	Quinidine.
1.....	6·2	0·3	0·3	0·1
2.....	2·6	0·6	trace.	0·4
3.....	2·0	1·6	1·2	0·2
4.....	4·0	0·2	0·2	0·1
5.....	4·0	0·2	0·7	0·7
6.....	2·3	0·5	1·2	0·8
7.....	2·3	0·9	1·7	0·0
8.....	2·8	0·3	1·3	0·1
9.....	4·1	0·1	0·2	0·1
10.....	3·9	0·1	0·2	0·2

Mr. Campbell tells me that “notwithstanding the extraordinary difference in the analysis there is little difference to be seen between the most of the trees. Some are pubescent, however, and some are glabrous; some have rounder leaves than others and in some the flower is white, except in the centre of the corolla tube which is pink. Others, again, have pink flowers. Nos. 1, 2, 4, 9 and 10 are what we used to call hybrids; of these 4, 9 and 10 are much like officinalis in leaf and bark. No. 2 is subpubescent in leaf and only a moderate grower, the leaf being rounder than 4, 9 and 10, and lighter in color. No. 1 is exactly what we would imagine, from Mr. Cross and Colonel Beddome's description, to be a true Pâta de Gallinazo. Leaf glabrous shiny on upper surface, soft, flat, and pointed at end; a fine grower considering the soil it is in.” It is evident, therefore, that no general description will suffice to guide a planter in selecting the best sorts, but that the subject requires a minute study of individual trees of which the bark has been analyzed.

Calisaya bark shows equal variations between different trees. I have found individual trees growing together in Ceylon to vary from 3.1 per cent. to 9.2 per cent. of quinine, and individual trees similarly growing together in the Wynaad to vary from 7.6 per cent. to 0.7 per cent. of quinine.

These variations can hardly be attributed to soil; the red barks were all growing in similar soil and under similar circumstances, and the Ceylon calisayas were also apparently growing under similar conditions.

No doubt soil does influence the richness of the bark to a very great extent; samples of bark from trees grown on poor soils, as far as my experience goes, always test below similar barks on rich soils. The richest bark, both succirubra, and calisaya, that I have tested from Ceylon has been from land richly manured for coffee.

I think I have given instances enough to show how great are the possibilities of advantage in selection of the richest varieties of bark, while the study of soils, and the best mode of manuring and of preserving the bark, offer a wide field for profit to the intelligent planter. It is evident that if an 8 per cent. bark can be obtained from a tree giving an equal crop to those yielding 1 per cent. bark the increased value of the crop must be out of all proportion to the extra care in selection. Whether planters will have to adopt grafting or propagation by layers or cuttings, or whether it will prove

practicable to obtain certain results from selection of seed or plants, is a matter of experience. Everything points to a great over-production of inferior bark, but there is little fear of the better qualities bringing remunerative prices if wisely cultivated.—*Phar. Jour. and Trans.*

PSEUDO-GUTTA PERCHAS,³

OR SUBSTANCES SUPPLEMENTARY TO GUTTA PERCHA.

Foremost amongst pseudo-guttas, as we use the phrase, stands Balata gum. It is obtained from the *Mimusops Balata* of Gærtner (Nat. Ord. *Sapotaceæ*) and is synonymous with the *Sapota Mulleri* of Bleekrod, the *Achras Balata* of Aublet, etc. It is found in Demerara, Berbice, British and French Guiana, Antilles, Jamaica and Surinam. It has many vernacular names, amongst which may be mentioned, Balata, Paardenvleesch (Dutch-horse-flesh,) bullet-tree, etc.

One of the first writers on this substance was Professor Bleekrod, who communicated some information as to the plant and its product to the Society of Arts, in 1857. He, too, described the plant and named it *Sapota Multeri*. In 1860. Mr. Walker communicated samples, etc., received from Dr. Van Holst, of Berbice, to the same Society, and in 1864 Sir William Holmes also drew attention to the same subject. The tree is a large one with a trunk of about 6 feet in diameter, and furnishes a wood much liked for building purposes and of the color of horse-flesh-hence the Dutch name. The bark is thick and rough, and the fruit is of the size of a coffee berry, sweet like a plum, and with a hard white kernel which yields a bitter oil.

The leaves are glossy, oval and acuminate. The milk is drunk by the natives, in cases of diarrhoea, and when diluted with water it is used as cow's milk. The trees grow in groups and in alluvial soil.

The "Balata" gum is of a character somewhat between caoutchouc and gutta percha, combining in some degree the elasticity of the one with the ductility of the other, freely softening and becoming plastic and easily moulded like gutta percha. What small parcels arrived in England met with a ready sale and were remarkably free from adulteration. But unfortunately, through the difficulty of collection-the undertaking being so dangerous and unhealthy-the supply of this ,excellent article has fallen off. It is collected by making incisions in the bark about 7 feet from the ground, and a ring of clay placed round the tree to catch the milk as it exudes. The yield is said to be in profusion especially at the time of the full moon, and the operation can be repeated every two months in the rainy season. It takes six hours to bring about coalescence by simple atmospheric influence, but very quickly by boiling in water. A large tree is said to yield as much as 15 lb. of "dry gum." The tree in every way is well worthy of a trial by acclimating it.

In India there are several plants whose products may be classed as pseudo-guttas. First and foremost of these we have the Pauchontee or India gutta tree, the *Bassia elliptica* of Dalzell the *Isonandra acuminata* of Lindley, but now known as *Dichopsis*

³ From the *Indian Agriculturist*. Reprinted from the *Tropical Agriculturist*.

elliptica. It is found in the Wynaad, Coorg, Anamallay and Neilgherry Hills, Sholah Forest, Cochin, Sihar, and according to General Cullen, "appears to be common in all the forest tracts at all within the influences of the southwest rains." This tree, which is now placed in the same genus as the true gutta percha, is a large one—from 80 to 100 feet high and was first met with by Mr. Dalzell, in North Canara, near the falls of Goirsuppah, in 1849. Since that date General Cullen and Dr. Cleghorn have used every exertion to bring the substance prominently forward but without success. The gum is obtained by tapping, 1½ lb. being obtained from one tree by five or six incisions, a large tree yielding as much as 20 to 40 lb. of sap. Many experiments have been made with specimens of the raw milk, i.e., milk simply dried by exposure to the atmosphere. The results of these experiments have shown that for telegraphic purposes it is wanting in some essential qualities, but it has been recommended as a subaqueous cement or glue. When dissolved in ordinary gutta percha solvents, it, after the evaporation of the solvent, remains some times soft and viscid, and partakes somewhat of the character of bird-lime. When cold, it is hard and brittle. Without wishing in the slightest degree to throw doubt or discredit on the many and valuable experiments made, we would suggest that good samples be collected and treated in the same manner as recommended for gutta percha. We have no doubt that many a parcel of what would otherwise be *good* gutta percha, is spoilt through not being well boiled *immediately* after collection from the tree. At present this is the only way in which we see there is a possibility of ascertaining whether this product can be utilized, and we have the more hope from the fact that the structural character has led the plant to be placed in the same genus as the true gutta percha—structural affinity agreeing so often to chemical affinity.

There are in India other nearly allied *Sapotaceæ* which deserve attention in order to ascertain whether any of them yield a milky juice likely to be of commercial use. Amongst the *Euphorbiaceæ* there are two plants worthy of notice. The *Euphorbia Cattimandoo*, found in various parts of India, was first brought to notice by the Honorable W. Elliot, and a prize medal was awarded for this substance by the jurors of the 1851 exhibition. This spiny euphorb grows to the size of a shrub or small tree, and the milk flows out freely when a branch is cut. The natives use it as a cement to fasten knives in handles, etc. Under the influence of heat it becomes soft and viscid, and when dry, very brittle. The *Euphorbia Tirucalli*, the milk hedge or Indian tree spurge, is a succulent unarmed plant attaining a height of 20 feet, and its inspissated milk is used for various—chiefly medicinal—purposes, and has been recommended as a gutta percha substitute, but like gum Euphorbium, it has a very acrid character, and the collection is a very dangerous operation to the eyes.—*Phar. Jour.*, August 1883, p. 104.