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SOME REMARKS ON GRAPE CULTURE.

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(From an Inaugural Essay).

It is well known that in some localities many of the best varieties do not succeed solely on account of their foliage being destroyed more or less by mildew, and the criterion of a useful grape depends solely upon its freedom from mildew on the leaves, and not on account of the flavor or other good qualities of the fruit; so we find that the most popular varieties are not those of the highest merit in flavor, but those that are least affected with mildew on the foliage and fruit. The most prevalent form of mildew on the leaves of our native grapes is known as *Peronospora viticola*, Berk. This is always found on the under surface of the leaf; it commences in small spots of a brownish color which adhere closely to the leaf ribs, and when the conditions are favorable it spreads rapidly and destroys the vitality of the part attacked. Its presence is made apparent by a yellowish tinge which may be seen on the upper surface of the foliage, and in clear weather these spots become brown-colored, afterwards crisp and dry, and ultimately the leaf is more or less destroyed. This appearance on the foliage is sometimes termed sun-scald, but it hardly need be stated that the leaves would not be injured by the sun were it not that their vitality is impaired by mildew; yet we frequently meet with cultivators who maintain that their vines are free from mildew, while they admit the foliage is scalded by the sun and drying off.

By the time its effects are thus visible the mildew is not so easily discerned, or it may have run its course and left but little evidence of its presence in an active state, and this may be the reason why many grape-growers show so little knowledge of the disease. Hence the origin of so many seemingly conflicting opinions relative to the exemption of varieties of grape from mildew, owing to the effects produced by this disease being attributed to other supposed causes.

It is a disputed question whether or not mildew will attack perfectly healthy vegetation. By many persons it is held that fungoid growths only appear on disorganized vegetable or animal matters; that, previous to the appearance of the mildew on leaves, some disturbing cause has been at work on the plant, and the partial decomposition which has resulted from the unhealthy state forms proper conditions for the development of the fungus. From this reasoning it follows that, previous to the appearance of mildew, there must exist a disorganization of vegetable tissue; and before a remedy can be suggested we must first endeavor to discover the

cause of the incipient disease which allows the development of the fungoid growths.

The peronospora is never found on grape-leaves which are always dry. The predisposing cause of this particular species of fungus is an excess of retained moisture on the foliage, either from continued wet and damp weather, or from heavy night dews succeeded by calm days. Grape-vines trained on trellises protected by a covering at top, so as to prevent the radiation of heat from, and the consequent deposition of dew upon, the surfaces of the leaves are never troubled by this fungus.

It is also a common observation that grape-vines growing through and over trees are never seriously injured by mildew, the protection afforded by the leaves of the tree preventing it. Branches from the same root, some of which are allowed to ramble over a tree, and others trained upon an ordinary trellis, will afford good examples as to the benefits, of protection in preventing mildew. Hence it may be inferred that a good locality for vineyards is one where there is exemption from late spring frosts, from late dews during summer nights, and from early frosts in autumn; and the best results will be found where all these conditions exist, and failures will follow in proportion to their deficiency. So far as concerns entire freedom from the mildew under consideration, the conditions are found on sloping hillsides contiguous to well-defined valleys. It has long been observed that in clear, still nights during summer, dews are less frequent upon the sides of hills than they are in the neighboring valleys.

The appearance of hoar-frost in valleys during the early winter and spring seasons is produced by conditions of temperature similar to those which cause the heavier deposition of dews in these localities. During clear nights currents of cool air run downwards on the inclined lands to the bottom of the valleys. These currents are the result of the sudden depression of temperatures sustained by the surface of the earth in consequence of rapid radiation, by which the stratum of air in immediate contact with that surface becomes specifically heavier by condensation, and descends into the valley, which then rapidly cools, while the warm air of the valley is lifted up, and impinges on the sides of the hills, and so far as this warm stratum extends there is no condensation of moisture such as occurs in the low grounds in the form of heavy dews in summer, and which in cool weather freezes and becomes hoar-frost. The effects of this stratum of warm air upon vegetation on hillsides is very well defined where early autumn frosts have destroyed the foliage of the trees below a certain line, which is sometimes called the vernal line, or line of no frost; above this line, and within the limits of the extent of the warm stratum or zone, vegetation is unharmed. The altitude to which this line reaches above the bottom of the valley is dependent upon the mean temperature of the day and night, or rather upon their comparative difference at the time of its occurrence; when the temperatures of both are high, the lower places only are affected by the frost, but when low, the frost will extend higher up on the hills. If we consider the climate conditions of localities where grapes do well, we will find that they are those which are nearly exempt from dews, and, as a consequence, all varieties of grapes retain their foliage during summer. In other words, the distinguishing peculiarity of a good grape climate is that of the entire absence of mildew on the foliage of the grape, and this is entirely independent of cultural processes of manipulation or training, or of the quality of the soil in which they are planted, although the latter may sometimes exert an auxiliary influence.

In illustration of the conditions which constitute a good grape climate mention may be made of the high lands bordering Keuka Lake, in Steuben County) New York. These steep hillsides are covered with vineyards which extend for several hundred feet above the level of the lake; the soil is shaly, and in many places the surface is very thickly covered with loose stones. On these hillsides mildew is comparatively unknown, the Catawba, Iona, Delaware, and indeed all varieties of native grapes, except those which require a longer season than the climate affords, mature to a degree of perfection which they fail to attain in more southern but less favorably situated localities. The influence of the lake is also well illustrated in the freedom from mildew on the vines which are planted quite close to the water. Higher up the valley beyond the lake, while the vines are equally as healthy on the hills there as they are on those in the near neighborhood of the lake, the plants suffer from mildew on the lower grounds, showing that the radiation of heat from the water during night has the effect of preventing dews even on low grounds near the lake. Here we have two factors, both of which are favorable to a healthy condition of vines, or rather they prevent mildew, which is the prime result, if not the cause of unhealthiness, so far as atmospheric influences are concerned. The first of these is owing to the elevation above the valley; during the day heat accumulates in the valley, and forms a stratum of warm air, which is lifted up as the colder air rushes down the slope after sundown, and wherever this warm air strikes the hillsides dews are not found.

The second important factor is the influence of the water in effecting a healthy condition of local climate. The ameliorating influence of an extensive body of water is well understood, and a noted illustration of its value is found on the shores and on the islands of Lake Erie, which have long been popular for the extent and excellence of the vineyards and the superior qualities of the fruit which they produce. This success is fairly attributable to the modifying effect of the body of water upon the atmosphere, which secures a comparative immunity from heavy night dews during the season when vegetation is most active. The heat which the water accumulates during summer has the further effect of warding off the frosts of autumn and early winter, thus virtually lengthening the season to an equality with the climates of latitudes several degrees southward, so that grapes which ripen perfectly in the vicinity of the lake fail to mature in localities immediately beyond its influence.

For all cultural purposes it is sufficiently accurate to assume that the hardiness of a grape simply depends upon its immunity from mildew. On the other hand, when a variety of our northern native grapes is said to be too tender for our winters, it simply means that it is so subject to mildew that the growths fail to ripen, as all of our native grapes of the Northern States, and indeed foreign grapes also will stand the winters, provided their young yearly growths become thoroughly matured; the summer climate rather than the winter climate decides the question of hardiness, so that when a seedling grape is announced as being perfectly hardy and exempt from rot in the berry, it may be true as far as hardiness is concerned, in the climate where it originated, if it happened to be a specially good climate, but it does not follow that it would be hardy in other parts of the country, as hundreds who have purchased such plants can abundantly testify.

Another form of mildew that may sometimes be seen on grape leaves is a species of *Erysiphe*. This form appears on the upper surface of the leaves, also on the surface of

the fruit, its appearance being somewhat similar to a dusting of fine flour, and may be brushed off without leaving any apparent marks of injury, but its effects are to retard growth. Young, green shoots once covered with this fungus cease to grow, and will remain green until the frosts of winter destroy them. When the fruit becomes severely attacked it cracks open, and the seeds will protrude. Green shoots will also crack if the mildew attacks them severely. Unlike the peronospora it abounds mostly in the early part of the growing season. Sudden changes of the weather from heat to cold will produce it, but our native grapes do not suffer materially at any time from this kind of mildew.

ABSTRACTS FROM THE FRENCH JOURNALS.

[Translated for the AMERICAN JOURNAL OF PHARMACY.]

RADIX HELLEBORI VIRIDIS has been studied by Tschistowitsch (*Nowosti Ther*, No. 3,1887; *Bull. Gén. de Thérap.*, July 15th, 1887), to ascertain its value in various cardiac affections during the period of noncompensation. His conclusions are as follows: In six cases the medicament (15 drops of a solution of 1 to 100 of the aqueous extract every two hours), produced a diminution in the frequence and an augmentation of the force of the cardiac pulsations; increase in the quantity of urine eliminated, and a prompt disappearance of the symptoms of non-compensation. In two cases the amelioration was obtained by the simultaneous administration of the infusion of helleborus viridis and that of adonis vernalis, though neither of these, given separately, produced the desired effect. In three complicated cases, two with nephritis and one with pleurisy, the medication gave negative results.

PEGANUM HARMALA, LIN. (*Nouv. Rem.*, July 8th) is described as an "African drug," although it grows as well in the sands of Spain, the Crimea and Siberia, as in Egypt. The entire plant is regarded as sudorific and emmenagogue. Dr. Pandurel, of Bombay, who prescribed it in infusion and tincture, regarded it a powerful emmenagogue, determining slight toxic effects similar to those of Cannabis indica. The dose in amenorrhea is given at two drachms of the tincture. Egasse, who thinks the drug merits careful study, says that "the energetic action of the aqueous or alcoholic preparations is explained by the fact that the red, resinous coloring matter is a secondary product formed by the oxidization of the harmaline."

SOLANINE.—In a long study (*Bull. Gén. de Thérap.*, July 15th, 1887), Dr. Gaignard arrives at the following conclusions: 1. Solanine is a glucoside which does not combine with acids to form salts; under the influence of acids it decomposes into solanidine and glucose. 2. It is absolutely insoluble in water, without it be strongly acidulated, and is sparingly soluble in alcohol, ether and the oils. 3. Solanine cannot be used in hypodermic injections, the acid solutions being too caustic. Maintained in suspension in a convenient vehicle, its own action is still more caustic. It is therefore necessary to use pills, and these should contain 10 to 20 centigrammes. The daily dose of 30 to 40 centigrammes is very well supported by patients. 4. Despite the opinion of writers who have studied this substance, we believe that it should not be classed among our best analgesics. 5. Its high price, its want of uniformity of action, and the high doses that it is necessary to prescribe do not permit us to counsel its use as an analgesic.

GLEANINGS IN MATERIA MEDICA.

By THE EDITOR.

Ustilagine is the name of an alkaloid which Dr. C. J. Rademaker and J. L. Fischer, Ph. G., have isolated from Ustilago maydis (*Med. Herald*, April 1887, p. 775). The cornsmut is exhausted with dilute alcohol; after the alcohol has been spontaneously evaporated from the tincture, a little sulphuric acid is added, the mixture is dialyzed, the dialysate evaporated to dryness, the residue washed with absolute alcohol, dissolved in water, rendered alkaline by potassa in excess, agitated with ether, and the ethereal solution evaporated spontaneously. The crystalline alkaloid is white, bitter, of an alkaline reaction, and soluble in ether, alcohol and water; sulphuric acid produces a maroon color changing to green; ferric chloride colors yellow. The salts are crystallizable and soluble in water.

The other constituents found were: fixed oil, 6.5, resin, 8.0, and wax, 5.5, soluble in petroleum-benzin; trimethylamine, 1.5, sclerotic or maisenic acid, 2.0, wax, 6.25, and resin, 4.5, soluble in ether; sclerotic acid, 0.5, and resin, 3.5, soluble in alcohol; sugar, 3.75, pectin, 2.25, salts, 4.5, and extractive, 9.5, soluble in water. The authors believe trimethylamine not to be a product of decomposition of the albuminoids. Another alkaline body, but non-crystallizable, was obtained, which will be further investigated.

The acid called sclerotic acid is described as crystallizing in needles, to be soluble in water, alcohol and ether, and to yield crystallizable salts. It does not appear to be identical with Dragendorff's sclerotic acid.

Drosera Whittakeri grows plentifully on the hills near Adelaide, South Australia, and is conspicuous in the spring time by its pretty white flowers, resembling those of oxalis. From the tubers of this plant Mr. Francis extracted, by means of carbon bisulphide, a volatile red-coloring matter, which produced on silk beautiful tints with various mordants.

Prof. E. H. Rennie (*Jour. Chem. Soc.*, 1887, p. 371,) prepared the coloring matter by exhausting the crushed tubers with hot alcohol, distilling the tincture, adding water and subliming the precipitate. The sublimate, by repeated recrystallization from alcohol or acetic acid, was separated into brilliant red plates, $C_{11}H_8O_5$, and into more freely soluble orange-colored needles, $C_{11}H_8O_4$, both being, in all probability, derivatives of methylnaphthaquinone.

Heritiera littoralis, Aiton, nat. ord. Sterculiacece, is a tree growing in Eastern Africa, India, the Philippines and Australia. All parts of it are astringent, and the red brown seeds have also a bitter taste. Heckel and Schlagdenhauffen (*Nouv, Rem.*, 1887, p. 123,) have observed these seeds as an adulteration of kola nuts. They are readily distinguished from the latter by their nearly orbicular and flattened shape, with a diameter of about 4 cm. and a thickness of 10 to 12 mm., and by one of the fleshy-white cotyledons being only of about half the size of the other. The starch grains are polygonal, and only one half the size of those of the kola nut. These false kola nuts do not yield any caffeine; they contain fixed oil, 4.4 per cent.; tannin and coloring matters, 5 per cent.; sugar, 5.7 per cent.; cellulose and starch, 56 per cent ;

lignin, 12.4 per cent.; albuminoids, 13.5 per cent., and salts, about 3 per cent.

Cali nuts are described by E. Merck (*Chem. Centrabl.*, 1887, p. 343). They come from the west coast of Africa, are the seeds of a papilionaceous plant, and have a more circular shape than Calabar, beans, but otherwise agree with the latter in all essential external characters. These cali nuts contain an alkaloid which closely resembles physostigmine in chemical properties and physiological action.

Acacia delibrata, A. Cunn.-Dr. T. L. Bancroft observed (*Australian Jour. Phar.*, March, 1887, P. 103) that the pod has not an astringent, but a disagreeable acrid taste. The acrid principle when isolated, was dirty-white, not crystalline, had a faint odor and an extremely nasty taste, and was soluble in water and alcohol, the aqueous solution frothing on agitation; it is a glucoside and by its chemical and physiological behavior related to, or identical with, saponin.

Aristolochia cymbifera, Martius.—The root of this plant has again appeared in the European drug market, and consists of pieces about 10 cm. (4 inches) long, gray-brown, longitudinally wrinkled, the thickest roots being split; the transverse section shows a rather thick bark, and a ligneous cylinder, which is distinctly radiating, and contains wide dotted ducts and wood-fibres; the bark and medullary rays contain much starch, and in numerous but slightly enlarged cells, a mixture of yellow resin and volatile oil.—*Chemiker Ztg.*, 1887, p. 379.

The root is known in Brazil as *milhomem*, also as *jarra* and *jarrinha* and has a camphoraceous odor, resembling that of serpentaria, and a bitter and pungent taste. The roots of a number of other species of Aristolochia have similar properties and are also used under the same names as the preceding, the medical properties being analogous to those of serpentaria. The drug has been repeatedly used in Europe during the last century and more recently, but does not appear to be superior to other well known remedies.

Cryptocarya australis, Bentham; nat. ord. Lauraceae.—In a paper read before the Royal Society of Queensland, Dr. T. L. Bancroft states (*Austral. Jour. Phar.*, March 1887, p. 103) that the bark is persistently bitter and has a toxic action, due to the presence of an alkaloid crystallizing in stellately arranged needles. When given to warm blooded animals respiratory difficulty is produced, ending in asphyxial convulsions and death. It has also a poisonous action on reptilia.

Daphnandra repandula is a new species found by Dr. Bancroft near the Johnstone river. All parts of this species have a peculiar transient bitter taste; the inner surface of the fresh bark is white, but becomes metallic black on exposure to the air, and again loses this color on drying. The aqueous extract is very poisonous, 10 grains being a fatal dose for warm-blooded animals, and is very rich in alkaloids, all of which, Dr. Bancroft states, are colorless and crystalline. The active alkaloid is soluble in water and to some extent is antagonistic to strychnine. Daphnandra retards the development of bacteria, deodorizes putrid meat, checks the growth of the yeast plant, and kills some water plants.

Daphnandra micrantha, Bentham, has similar properties; it is a shrub growing in the neighborhood of Brisbane.

MEXICAN LIGN ALOES.

By E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

Although the essential oil bearing the above name has been a commercial article for many years, and was noticed in the columns of this journal by Mr. J. Collins as long ago as 1869, yet nothing definite has been ascertained concerning its botanical source until quite lately. Three years ago a description of the tree yielding the oil was published by M. Poisson in the *Bull. de l'Assoc. Franc. pour l'Avancement des Sciences*, xiii., p. 305, pl. x. (Blois, 1884), but in consequence of the difficulty of access to this publication it has been overlooked even by the authors of the 'Biologia Centrali-Americana,' and it was only during a recent visit of Professor Baillon to the Museum of the Pharmaceutical Society that my attention was called by him to the article in question. It seems desirable, therefore, to place on record in this Journal an abstract of that paper.

M. Poisson was led to inquire into the botanical source of the product through seeing specimens of the wood and oil at the Paris Exhibition of 1878, where these products were exhibited by Messrs. Ollivier and Rousseau, of Paris. These gentlemen obtained specimens of the leaves, flowers and fruit from their correspondent in Mexico, M. Delpech, in whose honor the tree has been named by M. Poisson. The description he gives of the tree is as follows:

"*Bursera Delpechiana*.—Foliis apice ramulorum congestis, tenuibus novellis utrinque, imprimis subtus, costis et nervis tenuiter pilosis, 3 jugis; foliolis ellipticis, utrinque acutis, crenato-serratis; interstitiis inter juga anguste alatis; paniculis folia æquantibus breviter pilosis, compositis, laxifloris, bracteolis angustissime linearibus, pedicellis tenuissimis, calycis lobis brevibus deltoideis atque petalis oblongis 5 poll. longioribus, sparse et longe pilosis, staminibus quam petala paullo brevioribus, filamentis quam antheræ oblongo-ovatæ 4 poll. longioribus; drupis ovoideis glabris."

"Folia 5-6 cent. longa, interstitiis interjugalibus 7-8 mill. longis, 1-1½ mill. latis; foliola 1½-2 cent. longa, 8-10 mill. lata, nervis lateralibus 1½-2 mill. distantibus. Paniculæ (e eymis compositæ) axillares numerosæ 5-7 cent. longæ, ramulis secundariis 1½-2 cent. longis, pedicellis 3-4 mill. æquantibus, bracteolis tenuissimis 2-4 mill longis. Calycis lobi vix 1 Mill. longi. Petala (æstivatione valvata) 4 mill. longa, 1 mill. lata. Staminum filamenta 3 m. longa, antheræ vix 1 mill. æquantes. Drupæ fere 1 cent. longæ. Mexico circa urb. diet. Cuantla Morelos."

The species is characterized by the excessive brevity of the calyx, of which the lobes are not well marked. It belongs to the set of species peculiar to Mexico, including *B. Aloexylon*, Engl., and *B. penicillata*, Engl. The tree is of medium height. According to M. Delpech, the wood in a fresh and healthy state is almost devoid of odor, and it is only where a branch has been broken off or insects have pierced the wood that the oil becomes developed. He states that old trunks may afford as much as 10 to 12 per cent. of oil. This difference in the wood is not recognized by the native Indians who collect it, and consequently the tree is felled in a reckless manner, so that it has

almost disappeared from Cuantla Morelos, where it formerly abounded. The pure oil is obtained by M. Delpech by distillation by steam, heat, and costs 20 to 25 francs per kilogram; an inferior oil prepared by the natives is sold for a lower price.

The structure of the wood presents the following characters. The fibres are of medium length with the walls only slightly thickened; each is divided transversely by numerous thin walls constituting a kind of ligneous parenchyma, of which the whole wood is formed. On transverse section the fibres are seen to be all of equal thickness, so that it is not easy to distinguish the zones of growth of the wood.

The vessels are of large size, with numerous transverse trabeculæ, which on longitudinal section are seen to give a moniliform. appearance to the vessels; they are dotted all over, the dots being surrounded with areolae.

The medullary rays are thin, and have two to four courses of cells in thickness. It is chiefly in the fibres and medullary rays that the nearly solid odorous substance occurs. It is of a yellowish resinoid aspect under the microscope, and fills them either wholly or partially. All the fibres, however, do not contain it, and it is most abundant where the wood is streaked with dark veins. This matter is soluble in alcohol, so that the wood treated with spirit becomes transparent under the microscope. In the green and healthy state the wood presents the same appearance, without any trace of oil, although at the same time the oil may be perceived in the fruits and bark by rubbing them. In M. Léon Marchaud's memoir on the "*Organization of the Burseraceae*," a somewhat similar occurrence is mentioned. The resinous and perfumed matter of *Balsamodendron Myrrha, B. africanum* and *Protium obtusifolium* is localized in the pith of the young branches to some degree, but is abundant in the bark and pericarp of the fruits of these plants.

The oil of lign aloes has been examined by Messrs. Verneuil and Poisson. Their experiments show that the wood cut into shavings readily yields the oil by distillation with steam, 7 to 9 per cent. being thus obtained, and the wood when dry is then found to be free from odor.

When the oil is dried over chloride of calcium, it distils over almost entirely between 189º and 192º, a small quantity of a resinous body of a much less volatile character remaining in the still. It is an oxygenated body having the formula 2 ($C_{10}H_8$) 5 H_2O, this formula answering to that of a hydrate of terebenthene or of an insomer. The oil slowly absorbs oxygen and becomes resinified. It does not combine with bisulphite of sodium. The red-brown coloration which it takes under concentrated sulphuric acid is analogous to that which turpentine produces with the same acid. The odor of the oil is likened by M. Poisson to a mixture of lemon and jasmin. The specimens that I have seen have more resemblance to bergamot in odor.

It is difficult to say whether other species of Bursera yield this oil or no. M. Poisson suggests that it is probably obtained also from *Bursera, Aloexylon,* Engl. (*Elaphrium Aloexylon*, Sebiede).

The new Mexican Pharmacopoeia (1884), p. 75, also gives *Amyris linaloe,* La Llave, which is a synonym of *Bursera Aloexylon,* Engl., as the source of the oil.

Schlechtendal, however, in 'Linnaea' (1843), xviii., p. 303, remarks that this species has a fennel-like odor. A specimen in the Kew Herbarium, presented by Mr. Piesse as the Lignaloe plant, is labelled "*Elaphrium graveolens,* K.," from the West coast of N. Mexico. This identification is, however, according to Professor Oliver, somewhat uncertain. Several other species of Bursera grow in the same district, as *B. Delpechiana,* including *B. bicolor,* Engl., *B. Schiedeana,* Engl., and *B. jorullensis,* Engl., but nothing appears to be known about the oil of these trees. Schlechtendal mentions, *l. c.,* that *Elaphrium glabrifolium* (=*Bursera penicillata,* Engl.) has a strong aromatic odor, and that *Amyris ventricosa* (=*Bursera fagaroides,* Engl. var.) has an odor of caraways. The Mexican species of the genus appear to be very numerous, and require further examination as to their economic products. It is , however, satisfactory to be able to refer Mexican oil of lign aloes with certainty to one species, for there can be no doubt that *B. Delpechiana,* is one of the principal sources of it.–*Phar. Jour. and Trans.,* Aug. 13, 1887, p. 132.