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Botanical Medicine Monographs and Sundry

CANAIGRE.

By HENRY TRIMBLE.
Contribution from the Chemical Laboratory of the
Philadelphia College of Pharmacy.—No. 56.

The following account of a tanning material, which has several times in the past few years been mentioned as new, or as a possibility for the tanner, is undertaken with a view of relating what has been done toward developing this source, and at the same time calling attention to the fact that if we encourage home production we have in canaigre a material which gives promise of superseding the uncertain and much adulterated gambier.

Canaigre is found in large quantity in the sandy soil on both sides of the Rio Grande and northward over a large portion of Western Texas and New Mexico.

Its history is briefly as follows:—It is said to have been used in tanning by the Mexicans for over two centuries. Our first information, however, dates from July 9th, 1868, when a package of these roots was forwarded for Mr. John James, of San Antonio, Texas, top the Agricultural Department at Washington, together with a letter stating that Mr. F. Kalteyer, chemist in San Antonio, had found them to contain thirty-two per cent. of tannin. This sample was mislaid or overlooked until 1878, when it was reported on by the chemist.[1] It was then found to yield 23-45 per cent. of tannin. A fresh sample was also procured and the tannin estimated in the still fresh root with almost identical results, after making due allowance for difference in moisture. The other constituents reported at that time need not claim our attention at present further than to notice a considerable amount of starch, 18.00 per cent.

Previous to this publication by the Government, Mr. Rudolph Voelcker, of Galveston, Texas, published[2] an analysis of roots gathered in July, 1874. He found 23.16 per cent. tannin, and proved the presence of chrysophanic acid and aporetin. He was not aware of the botanical origin of the plant, but supposed it to belong to the natural order Polygonaceoe.

In 1879, Mr. Wm. Saunders[3] in his report on canaigre stated it was the *Rumex hymenosepalum* of Torrey, and furnished a lithographic plate of the plant in bloom.

At the New Orleans Exposition, 1885-86, in one corner of the section devoted to products from New Mexico were some of these roots, above which was the inscription,

[1] Report of the Commissioner of Agriculture, 1878, p. 119.
[2] An Analysis of Raiz del Indio. AMERICAN JOURNAL OF PHARMACY, 1876, p. 49.
[3] Report of the Commissioner of Agriculture, 1879, p. 364.

"A new tanning material."

As will be shown later, this exhibit, insignificant as it appeared, attracted the attention of at least one person.

In 1886[4], a sample of a root sent to me from San Antonio, Texas, under the name of "Indian Root," was analyzed and the results published under the title of "Yerba del Indio," from the impression it was the *Aristolochia foetida* of the Mexican Pharmacopoeia. This impression, however, was corrected by Professor J. M. Maisch in the same issue, page 115. He suggested, and it has since been found to be correct, that this "Raiz del Indio" was the canaigre root. That analysis fixed the amount of tannin at 11.66 per cent., but it was found that the root, which was not analyzed as soon as received, had commenced to decay and, later, it was completely riddled by insects. In this respect my experience differed from that of the Government chemist, who found no change after ten years.

Soon after the New Orleans Exposition samples of two or three hundred pounds were sent to Chicago for experiments in a number of tanneries there. Mr. E. C. Denig of that city has devoted much time since then to studying this material, from its source in Texas and New Mexico to its application in the tanning of hides.

Canaigre consists of heavy globular and fusiform pieces from two to six inches long and one to three inches in diameter. Externally it is of a dark, reddish-brown color, becoming, by age, almost black; internally it is from a bright to a brownish-yellow according to age and amount of exposure to atmosphere. When collected the roots consist of clusters resembling sweet potatoes. They are found near the surface or sometimes on top of the ground, are rapidly dried and, at a certain stage, cut into small pieces. If allowed to get very dry they become so hard as to resist any ordinary method of cutting. From samples of the whole and clipped root, kindly furnished me by Mr. Denig, I have found 17.33 per cent. of tannin. This figure is rather lower than that obtained by other investigators, but the deficiency may be explained by my sample containing more moisture. Dr. H. E. Sturcke[5] has found a total of 28.57 per cent. tannin.

The ground root is at present used in a number of tanneries and has been found to more closely resemble gambier in its action than any other tannin material. An extract has also been prepared and used which contains from forty to sixty per cent. tannin, and it is thought that in this form it will probably replace gambier. Should the hopes and efforts of those who are engaged in the development of this material be realized, we will have a source of tannin which is said to be inexhaustible, and which will be the means of either bringing a better gambier into this market or of driving it entirely out of use here. It is said that the dried and ground root can be delivered in any part of the United States at a price not exceeding three cents per pound.

Thus after a delay of twenty years this root has reached that stage of practical application when a useful future may be predicted for it, and the persistent efforts of the past four years have every prospect of being rewarded.

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[4] An Analysis of Aristolochia foetida. AMERICAN JOURNAL OF PHARMACY, 1886, p. 113.

[5] *Shoe and Leather Reporter,* Oct. 27th, 1887, p. 862

The presence of so much starch in a tanning material is, perhaps, without precedent, and there are good reasons why this is no disadvantage. The properties of the pure tannin have not been investigated, and it is not known whether canaigre red or gallic acid is the product of its decomposition. Crystals have been obtained by agitating an aqueous extract of the root with ether, which do not resemble either gallic acid or catechin.

This crystalline compound and the pure tannin are under investigation by me at the present time.

FABIANA IMBRICATA.

By GEORGE A. DEITZ, JR., PH. G.
Contribution from the Chemical Laboratory of the
Philadelphia College of Pharmacy.—No. 58.

Pichi, as this drug is commonly called, was introduced into the United States a few years ago by Parke, Davis & Co., of Detroit. It belongs to the natural order Solanaceae, sub-order Curvembria, and to the tribe Nicotianeae. Its habitat is South America, principally Chile. It is said to be especially useful in diseases of the urinary organs, acting as a diuretic as well as a solvent for calcareous deposits.

A full description will be found in the AMERICAN JOURNAL OF PHARMACY, February, 1886, together with a proximate analysis by Dr. A. B. Lyons. The following results do not in all respects agree with those of Dr. Lyons, which may in part be accounted for by my using a sample of the woody portion and bark ground together, which reduced the percentages of extract obtained by the various solvents. It may be here explained that the part used for analysis was the woody branches, it being claimed that both wood and bark possess medicinal virtues, although it is probable that the latter is the more active of the two.

Petroleum ether dissolved 1.15 per cent. of the drug, which consisted of a trace of volatile oil, a fat melting at 40° C., a wax melting at 45° C., and a caoutchouc-like body soluble in chloroform, insoluble in the other usual solvents and melting at 65°C. No odor of burning rubber, however, was developed when the petroleum ether extract or any of its constituents were ignited, as noticed by Dr. Lyons.

Stronger ether extracted 1.41 per cent. of the drug, and from this ethereal extract warm distilled water dissolved a small percentage of a fluorescent glucoside, which fluorescence was much intensified on the addition of dilute sodium hydrate solution. On agitating this aqueous solution with ether the glucoside was absorbed by the latter solvent, which deposited it in stellate groups of crystals. These crystals were soluble in water, alcohol, chloroform and ether. With concentrated sulphuric acid and potassium bichromate a dark-green color was developed, with nitric or hydrochloric acid a yellow color with some fluorescence, and with potassium or ammonium hydrate a deep yellow with bluish fluorescence.

That portion of the ethereal extract insoluble in water was soluble in absolute alcohol

which solution on concentrating and setting aside deposited crystals. These on re-solution and treatment with animal charcoal were obtained of a pure white color. They were entirely insoluble in water, but soluble in boiling 95 per cent. alcohol, absolute alcohol, chloroform and ether, They gave a dark-blue color with sulphuric acid and potassium bichromate, but they were insoluble in and unaffected by concentrated solutions of the alkaline hydrates. They did not melt, but became brown from decomposition at 270˚C., the highest temperature to which they were subjected.

Absolute alcohol extracted 1.13 per cent., which was found to consist of an additional quantity of the fluorescent glucoside and resin, but no tannin. The remainder of the drug was found to contain 2.13 per cent. mucilage, 2.04 per cent. albumen and a number of the usual constituents, but only traces of sugar and no starch.

The amount of moisture in the original drug was 7.75 per cent. and the ash 10 per cent.

Finally it may be noticed that no trace of alkaloid was found, although Dr. Lyons thought he detected a small quantity.

Recently an analysis has been made by MM. Niviere and Liotard[6], who found the fluorescent glucoside, but failed to notice the neutral crystalline compound in the ethereal extract as above described, or to detect any trace of alkaloid.

POISONOUS PLANTS AND THE SYMPTOMS THEY PRODUCE.[7]

By F. W. ANDERSON.

When horses, cattle or sheep in Montana, die from unknown causes, which have produced more or less marked cerebral disturbance within a few days or hours before dissolution, accompanied by one or more minor symptoms, they are said to have been "locoed," that is poisoned by some usually mysterious unknown plant. The general symptoms are here given in the order they usually appear:

The animal wanders alone, has unnaturally bright eyes and slight frothing at the mouth or even extreme salivation occurs and the creature goes about with a stream of clear saliva trickling from its chin to the ground, or else the lips are dry, a little swollen and the whole mouth very hot. The appetite becomes notably impaired; large quantities of offensive gas are belched forth frequently accompanied by a greenish froth mixed with finely chewed food. The brain now becomes plainly affected, control of limbs partially or wholly lost-sometimes muscles of one side of the neck are contracted in a pitiable manner. In a few days, hours or minutes as the case may be, after proper limb-control is lost, the staggering animal refuses to eat or drink at all, becomes stupid, reels and falls, seldom rising again. Stupor increases, eyes become dull and staring, perfect stupor comes on. Limbs and neck may become quite rigid and extended, or else in natural position and easily moved by the band. Abdomen usually

[6] *Jour. de Pharm. et de Chimie*, xvi, p. 389
[7] From the *Botanical Gazette* condensed by G. M. Beringer.

swells to enormous size. Victim may lie in this condition a week or death may come in a few hours, there is rarely any struggle at that time.

Post-mortem examination.—The intestines with their surrounding fat are already green, although the creature may have just died. The arteries and smaller vessels in the limbs are gorged with thick, black blood. The lining of the first stomach is worn and ulcerated in patches and in some cases seems to have commenced decomposition, is, very soft and can be peeled off the muscular layer with thumb and forefinger in big pieces. Lungs and heart almost bloodless, but the brain, particularly the cerebellum, is purplish, soft and pulpy.

The symptoms vary considerably and it seems unlikely that one poison causes them all. Four common plants are here said to"loco" stock, viz: *Oxytropis Lamberti*, *Leucocrinum montanum*, *Fritillaria pudica* and *Zygadenuselegans*. The first is now known to produce no evil effects except when eaten in large quantities for days together. *Leucocrinum montanum* is said to be very fatal to sheep after the fruit has developed. It grows close in the grass and its narrow grasslike leaves are not easily avoided by stock. *Fritillaria pudica* is almost the first plant to flower in spring. Before the grass is green horses and sheep often nip off the leaves. The scaly bulb is somewhat acrid to the taste. *Zygadenuselegans* does not flower so early, but sends up its long grassy leaves at the same time. Sheep eat much of this plant, even nipping off the panicles when they appear. The whole plant is acrid, but the deep-set bulb is strongly so.

NOTE By ABSTRACTOR.—F. D. Kelsey writing from Montana to the same journal (*Botanical Gazette*, 1889, 20) states that be had recently received specimens of a root and plant from a ranchman, with the declaration that "it was a 'loco' weed and that it was killing horses." The specimen proved to be *Oxytropis lagopus*, Nutt.

The writer of the above article, it will be observed, does not mention any plants of the genus Astragalus, although several species, notably the *A. mollissimus*, Torr., have been credited with this peculiar toxic action. In fact, the latter plant and the nearly related *Oxytropis Lamberti*, Pursh, were those to which were originally assigned the name and poisonous properties of loco weeds.

The author adds three new species Leucocrinum, Fritillaria and Zygadenus to the list of loco weeds. We are not surprised that these three liliaceous plants, the last-named being botanically closely related to Veratrum, should have a poisonous action when eaten by cattle, and it seems not unlikely that the eating of these plants by cattle in other localities may have escaped notice. It seems not improbable that this action has been erroneously credited to the milder leguminous plants.

The poisonous character of the plants of the genus Zygadenus has long been recognized. J. U. and C. G. Lloyd, some two years ago, called attention to the extremely poisonous character of *Zygadenus Nuttallii*, Gray[8] , stating "that specimens of the plant bad been received from Dr. H. S. Goodell who had met with several cases of accidental poisoning therefrom." The Doctor wrote: "I find it to be a powerful narcotic poison. One of my patients, a girl 9 years old, claimed that she only

[8] *Amer. Druggist*, Aug., 1889.

broke a stem of the plant and rubbed the juice over her lips and lapped it off with her tongue. Severe convulsions followed, lasting one and a half hours, the most violent it has been my lot to witness in a practice of 35 years. Twenty-four hours later she had one of an hour's duration." Messrs. Lloyd then stated that "the plant is now being physiologically investigated by Prof. Roberts Bartholow and its constituents are being investigated by us." We believe that no report has yet been published.

In 1879 Sereno Watson, in reviewing "Our North American Liliaceae," distinguished a new species in what had been classed as *Z. Nuttallii*, Gray. The new species he named *Zygadenus venenosus*, Watson, the specific name signifying its poisonous characters.

In the "Botany of California" the same writer states of this plant: "The bulb is poisonous and is known among the Northern tribes of Indians as 'Death Camass.' Dr. Bolander states, however, that in Sonoma county it is eagerly eaten by bogs and that hence it is called 'Hog's Potatoes' by the farmers." G. M. B.

WALNUT OIL.

By THOMAS T. P. BRUCE WARREN.

This oil, which I obtained from the fully ripened nut of the *Juglansregia* has so many excellent properties especially for mixing with artists' colors for fine art work, that I am surprised at the small amount of information available on this interesting oil.

Walnut oil is largely used for adulterating olive oil, and to compensate for its high iodine absorption it is mixed with pure lard oil olein, which also retards the thickening effect due to oxidation. The marc left on expression of the oil is said to be largely used in the manufacture of chocolate. Many people, I am told, prefer walnut oil to olive oil for cooking purposes.

The value of this oil for out-door work has been given me by a friend who used it for painting the verandas and jalousies of his house (near Como, Italy) some twenty years ago, and which have not required painting since. In this country at least, walnut oil is beyond the reach of the general painter, and I do not know that the pure oil is to be obtained as a commercial article, even on a small scale.

It was in examining the properties of this and other oils, used as adulterants of olive oil, that I was obliged to prepare them so as to be sure of getting them in a reliable condition as regards purity. The walnuts were harvested in the autumn of 1887, and kept in a dry airy room until the following March. The kernels had shrunk and contracted a disagreeable acrid taste, so familiar with old olive oil, in which this has been used as an adulterant. Most oxidized oils, especially cotton-seed oil, reveal a similar acrid taste, but walnut oil has, in addition, an unmistakable increase in viscosity. The nuts were opened and the kernels thrown into warm water, so as to loosen the epidermis; they were then rubbed in a coarse towel, so as to blanch them. The decorticated nuts were wiped dry and rubbed to a smooth paste in a marble mortar. The paste was first digested in CS_2, then placed in a percolator and

exhausted with the same solvent, which was evaporated off. The yield of oil was small, but probably, if the nuts had been left to fully ripen on the trees without knocking them off the yield might have been greater. It is by no means improbable that oxidation may have rendered a portion of the oil insoluble. The decorticated kernels gave a perfectly sweet, inodorous, and almost colorless oil, which rapidly thickens to an almost colorless, transparent, and perfectly elastic skin or film, which does not darken or crack easily by age. These are properties which for fine art painting, might be of great value in preserving the tinctorial purity and freshness of pigments.

Sulphur chloride gives a perfectly white product with the fresh oil, but, when oxidized, the product is very dark, almost black. The iodine absorption of the fresh oil thus obtained is very high, but falls rapidly by oxidation or blowing. A. curious fact has been disclosed With reference to the oxidation of this and similar oils. If such an oil be mixed with lard oil, olive oil, or sperm oil, it thickens by oxidation, but is perfectly soluble. Such a mixture is largely used in weaving or spinning. Commercial samples of linseed oil, when cold drawn, have a much higher iodine absorption, probably due to the same cause. Oils extracted by CS_2 are very much higher than the same oils, especially if hot pressed.—*Chem News,* June 14, p. 279.