

oil from the plant before maturity. It is, however, as shown above, impracticable to bring the "western" oil up to standard, due to the waste involved.

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A SKETCH OF THE MEDICAL HISTORY OF DRAGON'S BLOOD."

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"Dragon's Blood," Resina Draconis, receives very scant mention in modern works. Schmiedeberg refers to it as slightly astringent. The U. S. Dispensatory states that it was formerly employed in medicine as astringent, but that it is nearly or quite inert. The British Pharmaceutical Codex describes it as used mainly for coloring lacquers and varnishes. These statements refer to the East Indian or Sumatran resin.

It is evident that the "Dragon's blood" is now used solely as a coloring matter, and that it has lost whatever reputation it may once have possessed as a drug. The vicissitudes in the reputation of Dragon's blood are, perhaps, explained by the fact that the name "Dragon's blood" has been applied to a variety of red resins; and as the 1790 edition of the Edinburgh Dispensatory states:

"For even supposing some of these red-colored resins sold under this name to possess medical properties, yet it can hardly be imagined that all resins of this color have the same properties."

Different Drugs Named Dragon's Blood.

The following sources of distinct varieties of the drug are compiled from the U. S. Dispensatory, British Pharmaceutical Codex, Hager, and Flueckiger and Hanbury.

1. *East Indian Dragon's Blood.*—This is the ordinary variety of commerce; a resinous exudation from the surface of the fruit of a number of small palms of the genus *Daemonorops*, formerly *Calamus*; growing in the East Indies, Malays, Sumatra and Borneo. The species differ with the localities. It occurs in commerce as "tears," of the size of a hazelnut to that of a walnut; as the familiar "sticks" or "reeds;" and as large "lumps."

2. *Socotran or Zanzibar Dragon's Blood.*—Derived from *Dracaena Cinnabari* or *schizantha*, a large tree of Somaliland. Occurs as tears. Only small quantities reach the markets.

3. *Canary Dragon's Blood.*—Derived from *Dracaena Draco*, a liliaceous tree resembling the *Yucca*. Gathered from incisions of the trunk. Not found in commerce.

4. *West Indian Dragon's Blood.*—Exudation from *Pterocarpus Draco* (Papilionaceae?).

5. *Mexican Dragon's Blood.*—From *Croton Draco*.

6. *Venezuelan Dragon's Blood.*—From *Croton gossypifolium*.

The East Indian varieties are practically alone in the market, at this time; but they were unknown until the 16th century.

Dragon's Blood up to that time was the African and Canary variety. During the 18th and early 19th centuries, the medical descriptions often apply to the American varieties.

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Ancient and Antiquated References to the Sources of Dragon's Blood.—Flueckiger and Hanbury state that the Kinnabari of Dioscorides and Pliny was the Socotrine dragon's blood.

Rhaenodaeus, in his Dispensatory, published between 1600 and 1657, gives the following interesting account. He dismisses the notion, apparently still current, that the drug is the "Blood of a Dragon animate, smitten by an Elephant;" and accepts the statement of one Cadamustus, that it is the resin exuding from incisions in a tree of the Canaries, *i. e.*, the typical Canarian Dragon's Blood.

"Of Dragons-Blood.

"The pervestigation of Dragons-Blood hath exercised many wits; for some following the erroneous opinion of Pliny, think that it is the Blood of a Dragon animate, smitten by an Elephant, which error Solinus doth not only embrace, but holds that Cinnabaris is that same which Apothecaries call Dragons-Blood. Serapio writes, that it is the succe of a certaine Plant, which he calls Sydrichis and Egilos, which our Herbalists think is the fourth species of Wallfage, some ignorant Apothecaries are imposed upon by circulators, and buy a kind of busnesse tinted with red Earth, and the juice of Madder, and such things, convolved into lumps, for Dragous-Blood.

"Brassavolus foolishly constitutes three sorts of Dragons-Blood: the first factitious of pseudobole; the second the lacrymae of certaine Tree; the third Gumme. But as the adulterate is no species of Dragons-Blood; so neither can there be two sorts, the one a Lacryma, the other a Gumme of the same Tree, for all Gumms lacrymously distilling from any Tree, are called generally lacrymae.

"Aloysius Cadamustus a noble Venetian, expresses its Originall better; There is (saith he) in an Island called Pontus Sanctus, which is one of the Canaryes, Dragons-Blood, which is the Lachryma of a certaine Tree; which at a certaine season the incolists sauciate, out of which incisions the next years Gumme will emanate, which they coct in kettles, and defaecate making thereof Dragous-Blood. That Tree beares fruits like Cheryes in March, which are of an eximious sapour, and Venetian colour.

"Nic. Monardus seems to assent to this opinion, and asserts that Dragons-Blood is the lacryma of some Tree, and not the Goare of any animall; for (saith he) a few days agoe, a Carthaginian Bishop brought hither, from the continent of the new World, some of the fruit of that Tree, which emits that Lacryma we call Dragons-Blood.

"The fruit is very admirable; for the skin wherewith it is covered being taken away, a little Dragon appeares of such artificial yet naturall fabricature, that the most perite artist cannot better engrave it in Marble; it is conspicuous with an oblong neck, a gaping mouth, an aculeated back-bone, a long tayle and feet.

"From this fruit both the Tree and its Lacryma derived their names, that is best which is brought from Carthage.

"The Tree is tall, with a thin barke, and easily vulnerable, whose name being unknown to the ancients, they wrote no certainty of the nature and originall of its Lacryma, Clusius saw the Tree and described it accurately.

"Dragons-Blood then, is the name both of an exoticall Tree, and the hard purpureous Gumme concreted on its boughs.

"It is collective and agglutinatory, and, therefore fitt to conjoyn wounds, and astringe and roborate laxe parts: it may easily be dissolved in water."

The failure of Rhaenodaeus to mention the East Indian variety bears out the statement of Flueckiger and Hanbury that this drug was apparently unknown at the time. They quote the first clear description of the East Indian variety as of 1747.

This is antedated by the Mexican drug, for this is the variety described in Strother's *Materia Medica* of 1727. Strother considers this as the Cinnabar of Dioscorides; but forgets to explain how Dioscorides had access to the Mexican drug.

"Sanguis Draconis, Dragons Blood,

"Is of a vicious and gently astringent Taste. It flows from the Trunk of a Mexican Tree call'd Draco, which they wound. It is as red as Cinnabar.

"As to its Virtues it binds and is yet heating, because it will flame when a Candle is put to it. It agrees in Fluxes of the Belly, and it is also vulnerary both inwardly and outwardly.

"It is a resinous, gummy, red Substance, reduc'd into a Mass: It cures all Fluxes of Blood beyond Expectation in a very short time; it is reckon'd the Cinnabar of the Ancients, and the Cinnabar is reckon'd the Minium we now have, according to Dioscorides.

"It is us'd by the Moderns, namely, by Goldsmiths and Jewellers, to make Jewels and Stones look cleaner and more shining, in Powder.

"N. B. It is taken from the Trunk of the Draco, wounded during the heat of the Dog-Days, and it drops out like Blood, and hardens. It hardly communicates its Colour to Water, but to Oil and Spirit of Wine it gives an elegant Tincture. It is us'd in Vomiting of Blood or any Fluxes; it may be prescribed thus,

"Take Plantane Water four Ounces, Cinnamon Water six Drams, Spirit of Vinegar half an ounce, red Coral prepar'd half a Dram, Balaustine Flowers and Dragons Blood of each half a Scruple, Laudanum Opiatum two Grains, Syrup of Mirtles one Ounce; mix and make a Mixture, of which a Spoonful often in Spittings or Vomiting, or Stools of Blood.

"Some affirm it will give Glass a Crimson Colour.

"Its Preparations are a Tincture with Spirit of Wine, which is good in either the simple or virulent Gonorrhoea, in Fluxes, a Bloody Flux and in all Fluxes whatever, whether of Blood or Humors, and in healing Wounds. Its Dose is a Scruple to a Dram.

"It does not agree in Clisters, because it settles to the Bottom."

The East Indian variety evidently established itself rapidly, once it had been introduced; for the Edinburgh New Dispensatory of 1790 states it as the main variety; but mentions other sources for instance *pterocarpus draco* (the West Indian variety). It also points out the existence of "articles of artificial composition," some of which were soluble in water.

Coxe's American Dispensatory of 1818 describes first the West Indian (*Pterocarpus Draco*); but mentions that most comes from the East Indies. He also makes the illuminating statement that Kino was first imported as "the finest dragon's blood."

Murray, 1821, describes only the *Pterocarpus* variety.

Older Statements as to Actions and Uses.

The quotation from Rhaenodaeus shows that in the 16th century Dragon's Blood was reputed to be astringent; but from his further statement that "it may easily be dissolved in water," it is very evident that his statement could not be applied to the East Indian drug.

Strother (1727), according to the quotation, describes Mexican Dragon's Blood as a gentle astringent and styptic; useful against "vomiting of blood or any other fluxes," bloody stools; gonorrhoea, etc. As he prescribes it by mouth, against all of these conditions, his interpretation of its efficiency must be viewed with some skepticism. However, he states that it (the *Mexican* drug) has a "gently astringent taste," which is quite lacking in the East Indian drug. It is conceivable that the Mexican drug was somewhat astringent. At that time, and till much later, it was assumed that astringent actions extended also to tissues at a distance; a deduction that was quite natural in view of the difficulties of interpreting the efficiency of drugs in arresting hemorrhage, or "other fluxes."

From about this time, however, its reputation appears to have waned markedly. The Edinburgh New Dispensatory (1790) states "it is sometimes, but without foundation, looked upon as a gentle astringent" and was used in gleet, etc.

These indications agree evidently with those ascribed by Strother to the Mexican drug; although the Dispensatory describes chiefly the East Indian drug.

Wm. Cullen, 1799, enumerates Dragon's Blood (variety not stated) among the astringents; but in view of its insolubility in watery fluids, he considers that it must be inert. He concludes "We are therefore, upon the whole, clear that it should be expunged from our materia medica list."

Coxe in his American Dispensatory (1818) quotes Duncan that neither the Calamus nor the Pterocarpus drugs precipitate gelatin, nor do they color with iron, and for these reasons cannot be astringent. He mentions Proust as the principal advocate of its astringent action; but points out that Proust's drug was water-soluble, and therefore not Dragon's blood at all. It may possibly have been a variety of Kino, which was first brought to the attention of Fothergill as "the finest variety of Dragon's Blood."

Murray, 1821, describes the West Indian (Pterocarpus) drug as entirely discredited.

"Though it has been considered an astringent, it has no such power, nor is it now applied to any medical use."

The drug does not seem to have attained any reputation among the Eclectics; for King and Newton in their Dispensatory of 1852 state of Calamus Draco: "Formerly considered an astringent and used in doses from 10 to 30 grains in passive hemorrhage, diarrhea, etc."

BIBLIOGRAPHY, IN CHRONOLOGICAL ORDER.

1657. Rhaenodaeus, Johannes: Medicinal Dispensatory. Tomlinson's Translation. John Garfield, London, page 398.
1727. Strother, Edward: *Materia Medica*. Charles Rivington, London, Vol. 2, page 107.
1790. Edinburgh New Dispensatory. Thomas Dobson, Philadelphia, page 274.
1799. Cullen, Wm.: *Materia Medica*. Luke White, Dublin, Vol. 2, page 35.
1818. Coxe, John Redman: American Dispensatory. H. C. Carey and I. Lea, Philadelphia, page 465.
1821. Murray, J.: *Materia Medica*. Samuel Wood and Sons, New York, page 235.
1852. King and Newton: Eclectic Dispensatory. H. W. Derby and Co., Cincinnati, page 385.
1879. Flueckiger and Hanbury: *Pharmacographia*. Macmillan, London, page 672.
1902. Hager: *Handbuch der pharmaceutical Praxis*. Fischer und Hartwich, Springer, Berlin, 1902, Vol. 2, page 818.
1909. Schmiedeberg: *Pharmakologie*. Vogel, Leipzig, page 400.
1911. British Pharmaceutical Codex. Pharmaceutical Press, London, page 911.
1918. United States Dispensatory. Lippincott, Philadelphia, page 1364.

THE MICROSCOPICAL IDENTIFICATION OF MOWRAH MEAL (BASSIA) IN INSECTICIDES.*

BY GEO. L. KEENAN.

I. INTRODUCTION.

In the course of the microscopical examination of various insecticides for the Insecticide and Fungicide Board it was observed that Mowrah Meal was being employed in products designated as ant and worm eradicators. As this is the first time that this material has been detected in insecticides or substances repre-

* Contribution from Insecticide and Fungicide Board and Bureau of Chemistry, Department of Agriculture, Washington, D. C.