

duces severe poisoning, as does the herbage. The tree closely resembles our *R. vernix* L. Species which quite closely resemble *R. radicans* are *R. microcarpa* (Mx.)

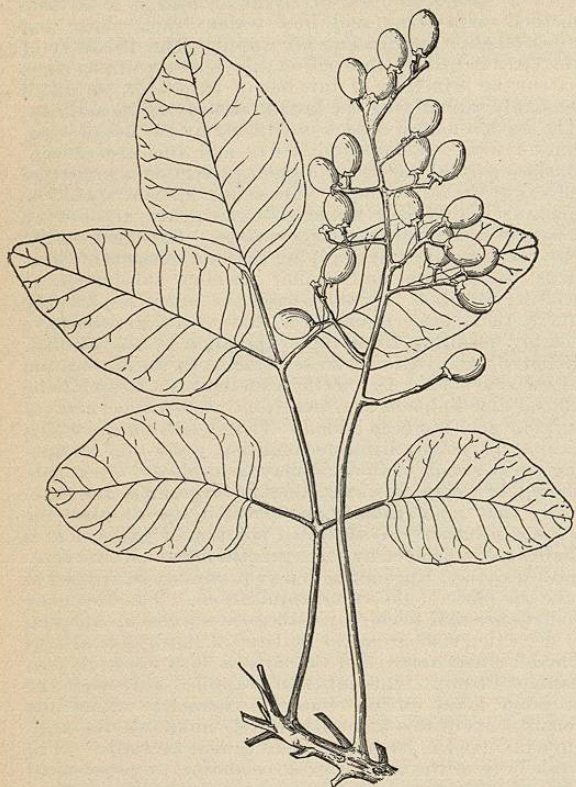


FIG. 3842.—Metopium. (One-half natural size.)

Stued. (*R. Toxicodendron microcarpa* Mx.) of our North Central States, *R. Michauxii* Sargent (*R. pumila* Mx.) of the Eastern United States, and, in the West, *R. Rydbergii* Small and *R. diversiloba* T. et G. (*R. lobata* Hook.), the

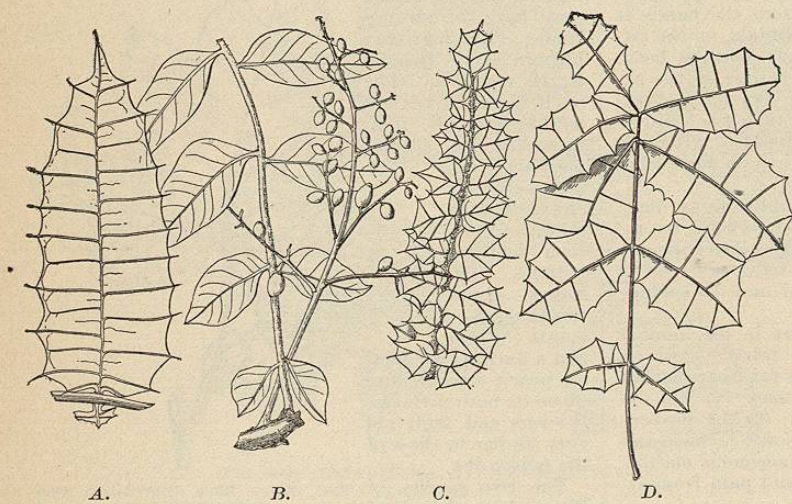


FIG. 3843.—Comocladia. (Reduced one-half.) A, Leaflet of *C. glabra*; B, base of leaf and fruit cluster of *C. dentata*; C, upper portion of leaf of *C. filicifolia*; D, leaf of *C. platyphylla*.

Californian or Pacific Poison Oak (see Fig. 3841). The celebrated Coral Sumac, Mountain Manchineel or Bumwood of Florida and tropical America, has been referred

to this genus as *R. metopium* L. or *R. oxymetopium* Griseb., but is now called *Metopium Linnæa* Engl. (see Fig. 3842). Its close relative in Cuba, *M. venosum* (Griseb.) Engl. has similar poisonous properties. These are small trees or large shrubs, and their fruits are reddish instead of greenish-white like the others named.



FIG. 3844.—Lithrea caustica. (Two-thirds natural size.)

The genus *Comocladia* P. Browne (*Dodonæa* Plum.) represents shrubs and trees of the central portion of tropical America, including the West Indies, which are violently poisonous. Several species are known as *Guao*, and a number are here illustrated (see Fig. 3843). Poisoning by these species has been successfully treated with an application of collodion. The following possess,

in their respective localities, histories of poisoning similar to those of the *Venenate* and *Comocladia* described above: in Chili the *Lithi* (*Lithrea caustica* Miers (*Rhus c.* Hook.) (see Fig. 3844); in Mexico, the *Copalote*, *Chajote* or *C. Blanco*, *Guajilote* or *Stinking Wood* (*Pseudomodogium perniciosum* (H. B. K.) Engl. (*Rhus p.* H. B. K.); in Eastern Asia, *Melanorrhoe laccifera* Pierre; in the East Indies, *Holigarna ferruginea* March.; in Southeastern Asia, *Gluta Renghas* L.

The fixed oil of the cashew or caju nut, the ripened ovary of *Anacardium occidentale* L., a small tree, native of tropical America and largely cultivated and naturalized in other tropical countries, yields the vesicating principle *cardol*, evidently very similar to the poisonous element of *Rhus*. This substance exists in specially large amount in the middle layer of the pericarp, and the fatty substance there exuding frequently causes poisoning. *Cardol* (C₂₁H₃₆O₂) is soluble in alcohol and ether. In the crude condition it varies from yellow to reddish or brownish, but can be decolorized. Poisoning

by it, and its treatment, are practically identical with those pertaining to *Rhus*.

The only other cutaneous poisons important enough to require consideration here are certain acrid juices of the Euphorbiaceæ. Types of this class are *Alveol* and *Euphorbium* (which see). Others are referred to in our article on *Euphorbiaceæ*. In most of these cases the poisoning agent appears to be resinous. In croton oil and some others they are apparently fat acids. In the former class the saponification treatment offers little promise. In both cases protective and soothing applications are equally efficacious as in *Rhus* poisoning. Manchineel is the large tropical American (chiefly West Indian) tree *Hippomane Mancinella* L. It bears large, thick, ovate, acute, finely serrate leaves and an apple-like fruit containing several silvery seeds. Its milky juice is abundant and is the poisoning agent, its active constituent being apparently volatile. Treatment is much like that applicable to *Rhus* poisoning.

INTERNAL POISONS.

In considering the poisonous plants which act through the entrance of their constituents into the circulation or into the alimentary canal, the primary requirement appears to be their identification. This, in a majority of cases, is most readily effected by reference to the objects themselves, rather than to the symptoms as in cases of poisoning by chemical substances. This fact has determined the following classification of these objects as plant parts.

To discuss all poisonous plants would require a large volume, and it has been deemed wise to treat the subject from the standpoint of a North American work, considering all plants of importance, or likely to become so, as poisoning agents in our own region, and including, from outside of this region, only such as are of primary importance. Moreover, no attempt is made to enumerate all those known to possess poisonous properties, since it is clear that many of them are not at all likely to be eaten. A still further restriction of the subject is made by omitting, except by mere mention, those poisonous plants or plant parts which become effective only through their medicinal employment, these having been sufficiently treated in the *materia medica* portion of our work.

FRUITS AND SEEDS.

These products are placed first because of their greater liability to being eaten. Contrary to popular ideas, the



FIG. 3845.—Belladonna. Branch reduced one-half; fruit natural size.

number of poisonous fruits and seeds in North America is small. Even in country districts, where correct knowledge of this subject should be found, many per-

fectly innocent substances are commonly regarded as poisons.

Belladonna (fam. *Solanaceæ*).—Undoubtedly this is our most important poisonous fruit, its seeds containing the active constituents pertaining to the roots and leaves. The plant is rare in a wild state in this country, though very common in Southern and Central Europe. Its scarcity, however, renders it on some accounts the more dangerous, since it is thus not well known. It is a highly attractive, purple-black, shining, juicy berry, as indicated by one of its common names, "black cherry," and has been often eaten by children in the regions where it abounds. The accompanying illustration (see Fig. 3845) is ample for identification. The plant is a tall, widely spreading, smooth perennial herb, somewhat resembling the pokeberry plant, though not so large and wanting the strong purple stem coloration of the latter. All matters pertaining to the symptoms and treatment of poisoning by it will be found under *Belladonna*.

Bittersweet, True and False.—Rather closely related to belladonna is the true Bittersweet (*Solanum Dulcamara* L., fam. *Solanaceæ*). Leaf, flower, and fruit forms are shown on page 763, Vol. I., and the plant is there described. It is found both in Europe and in America, and grows commonly in the edges of swamps and along streams, especially where the water is stagnant, or where the ground is subject to overflow. Occasionally also it grows in other localities, as about shaded stone walls and fence rows. The branches are long, slender, sprawling, and widely spreading over bushes, and the fruits are pendulous. Nothing more attractive than these fruits can be imagined. They are of a ruby-red color, smooth, shining, and somewhat translucent, and children are very apt indeed to eat them. Their poisonous properties are rather mild unless large numbers are eaten. The seeds appear to be the poisonous portion. The properties are partly those of the drug *Dulcamara*, but more intense, and the poisonous constituent appears to be solanine.

False Bittersweet (*Celastrus scandens* L., fam. *Celastraceæ*) has been considered in the same connection. Its fruits are also attractive, but possess an acrid taste; hence they are not likely to be eaten in quantity. Their poisonous properties, due probably to a small amount of saponin, are comparatively slight.

Potato Fruits.—The small berries which develop upon potato plants are mildly poisonous, especially when unripe, in the same way as are the berries of true bittersweet. They have a nauseous, acrid, and disagreeable taste, and are not at all likely to be consumed.

Black Nightshade.—The fruits of black nightshade (*Solanum nigrum* L., fam. *Solanaceæ*) may be dismissed with the same remarks which have been applied to potato fruits. This plant grows like a tall, slender, and erect potato plant, in similar situations to those of bittersweet, though usually in dryer ground and more in the vicinity of barns and waste places. It is not very abundant, though somewhat common in the United States, as indeed in almost all other parts of the world. Its fruits are a little larger than large peas, and are of a greenish-black color. The fruits of many tropical species of *Solanum* are similarly, some violently, poisonous.

Other North American berry-like or fleshy fruits requiring consideration in this connection are the baneberries, or cohoshes, red and white, pertaining to the genus *Actæa* and the fruit of the yew.

Actæa (fam. *Ranunculaceæ*) is a genus of several species, probably more numerous than generally admitted by systematic botanists, distributed from Japan across Asia and the most of Europe, and in North America from ocean to ocean. According to ancient, and to one very recent authority, the half-score species of *Cimicifuga* are also included; but to most botanists familiar with the plants in a state of nature, an absurdity is involved in this association. The red and white berries have been recorded as poisonous, the medical botanist Lindley saying of them that they produce death with violent delirium, emesis, and catharsis (see Fig. 3846). The active constituents of the baneberries have not been investi-

cultivated in gardens for use as cathartics, under the name of spurge or spurge seeds, and this habit has not entirely died out. They produce, in overdoses, poisonous results similar to those of ricinus.

Coral Bean.—Acting by a toxalbumin similar to ricin, or even more like abrin (see *Jequirity*), the seeds of several species of *Sophora*, especially *S. coralloides* Benth. (fam. *Leguminosae*), have produced fatal poisoning in Texas and the regions to the southwest. These coral beans resemble a common bean in form, some being larger, some smaller, and are of a bright scarlet color. They grow in a brown or brownish cylindrical pod, which is constricted between the seeds, so as to resemble beads upon a stick, and separating readily into its one-seeded joints. Treatment of this poisoning has proved difficult and uncertain.

Lupines (fam. *Leguminosae*).—Many species of the genus *Lupinus* (wild bean or blue bean) are employed, in both Europe and America, either as fresh fodder or for the production of a hay very similar to clover hay. Although these fodders are used upon a great scale, with only the best results in most cases, yet wholesale and fatal poisoning has at times resulted. Many observations, together with some careful experimentation, have apparently determined the fact that the poisoning is due to the seeds, which resemble small beans and are produced in bean-like or pea-like pods. When the herbage is eaten previous to the formation of these seeds, or after they have been discharged from the pods, no bad results follow; but if the seeds are eaten, especially when ripe, either acute or chronic poisoning may follow. The symptoms indicate a poison similar in its general nature to digitalis or, still more so, to sparteine or ononis. There is cerebral congestion, with frenzied and very active delirium. The heart is slow and strong, the blood pressure high. Convulsions, with extreme alternations of strength and weakness, and finally prostration occur. There is powerful diuresis, the urine being often bloody, as in digitalis poisoning. Death usually occurs in acute cases within two hours of the appearance of the first symptoms.

Esculus.—The common horse chestnut (seed of *A. Hippocastanum* L., fam. *Hippocastanaceae*) is regarded as slightly poisonous, and certainly contains acrid saponin-like principles (*argyræscin* and *aphrodiscin*) which, consumed in large amount, would prove disastrous. Deprived of this principle by powdering and maceration in alcohol, the residue of the kernel is highly nutritious (protein eight per cent., fat seven per cent., non-nitrogenous extract containing among other constituents fourteen per cent. of sugar), and it is now being so manufactured in Germany. It is readily conceivable that, as this industry extends, insufficient purification may lead to the distribution of a poisonous product. A western and southwestern species (*A. Pavia* L.), the buckeye, is apparently much more active, various fatal cases of poisoning by it being on record. Its poisonous constituent is similar to, but distinct from, argyræscin. The symptoms are violent emesis and catharsis, convulsions, and other common accompaniments of poisoning by the saponin group. It would appear from the accounts that narcosis comes on rather more quickly than in cases of poisoning by other saponin-containing drugs.

POISONOUS BARKS.

In the nature of the case poisoning of human beings by barks is not at all likely to occur, except in medical cases where a poisonous bark has been taken by mistake, or overdoses of the bark have otherwise been given. It is true that many barks are employed by savages as arrow poisons (see *Curare*), but this subject scarcely pertains to the present article. The poisoning of stock by the eating of nutritive barks is in general prevented through the natural instinct of the animal. In times of scarcity of food, however, grazing animals sometimes eat the bark of the common locust tree (*Robinia pseudacacia* L.) with poisonous results. This tree pertains to the family Le-

guminosae, or bean family, so noted for its production of albuminoid nutrients. Its poisonous constituent has been determined by Power as a toxalbumin, very subtle and difficult of isolation. Nothing is known of the treatment, except what is derived from a knowledge that the chief symptom is extreme nausea with violent retching, persisting for days, accompanied by dizziness and great depression. In animals marked salivation has been noticed. The barks of wild cherry and of several Ericaceous plants are poisonous to stock in the same way as their foliage, and the latter will be considered under *Herbage*. The barks of various species of elder (*Sambucus*) are more or less poisonous, though it does not appear that they produce accidents. This subject will be considered under *Roots*.

POISONOUS ROOTS.

Besides the true roots, that name is generally applied by the public to all underground parts, such as mandrake, lily of the valley, Solomon's seal and other rhizomes, the potato and the artichoke, which are tubers, and the onion and garlic which are bulbs. All these are therefore here considered together.

The two important poisonous roots of our region are pokeroot and Cicuta. Probably no year passes without some fatal cases of poisoning by these, and it occasionally happens that quite a number of them occur at about the same time.

Pokeroot has already been considered at length as a drug, under that title, and its fruits have been elsewhere discussed in this article. The root has been quite often eaten by mistake for horseradish, which it rather closely resembles, and for other edible roots. The strong acridity of horseradish tends to avert the suspicion which would otherwise be excited by that of the pokeroot. When freshly dug it is quite attractive, being large, whitish, fleshy, and succulent, and containing large amounts of starch and sugar, so that it is readily mistaken for a wholesome and nutritious article. Suspicion once aroused, pokeroot is easily recognized. The base of the stem, which is usually present in a broken condition, is seen to be divided by thin transverse partitions. The surface is finely papillose, and usually presents a spiral appearance, and the cross section exhibits a conspicuous concentric arrangement of the tissues. Since the young shoots are often cut and eaten as a substitute for asparagus, portions of the root are apt to be thus taken by too deep cutting. Thorough cooking ameliorates, but does not destroy its activity.

Cicuta (Water Hemlock, Cowbane, Brook Tongue, Children's Death, Spotted Parsley, Beaver Poison, Muskuash Poison, etc.; Ger., *Wasserchierling*, *Giftwueherich*; Fr., *Cigue vivreuse*) is the root of various species of the genus *Cicuta* L., fam. *Umbelliferae*, a genus closely related and very similar to conium, some of the species even having gone by that name (see Figs. 3850 and 3851). These plants grow in swamps or other wet locations, along lakes, streams, and ditches throughout almost the entire North Temperate zone, and are particularly common and abundant in Eastern and Central North America. Our illustrations give an excellent idea of the roots, foliage, inflorescence, and fruits. The plant grows to a height of from three to five feet, and branches and spreads rather widely. The stems and leaf bases are thick, hollow, crisp, and juicy, and the former are usually more or less purplish and glaucous. The base of the petiole clasps the stem. The leaf blade as a whole, though successively much divided into small segments, is very large, often two feet or more broad and long, and is thin and quite green. The entire plant is smooth, and exhales a not unpleasant odor when bruised. The fine white flowers are in decomposed umbels, terminating the branches. The base of the stem, when longitudinally cut, exhibits thin transverse partitions, though these are obscure in some species. The roots, in fascicles like dahlia roots, are usually from three to ten in number. They have about the consistency of a raw potato, are starchy, crisp, and juicy,

somewhat aromatic, and not unpleasant to the taste. They are externally of a brownish color, internally white. They are about the size of Jerusalem artichokes, which they somewhat resemble, and for which they have been mistaken. Boys visiting swamps for calamus often get hold of them. Frequently also they are turned out in

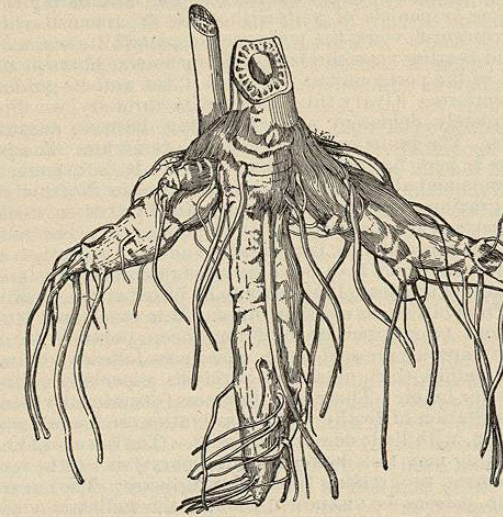


FIG. 3850.—*Cicuta maculata*. (One-half natural size.)

ditching operations, and they have then been experimentally eaten by workmen with fatal consequences. The aromatic stem and the fruits have also been mistaken for angelica. The constituents are believed to include conium (see *Conium*). Cicutoxin is also a very active constituent. Although the nature of the poison partakes of

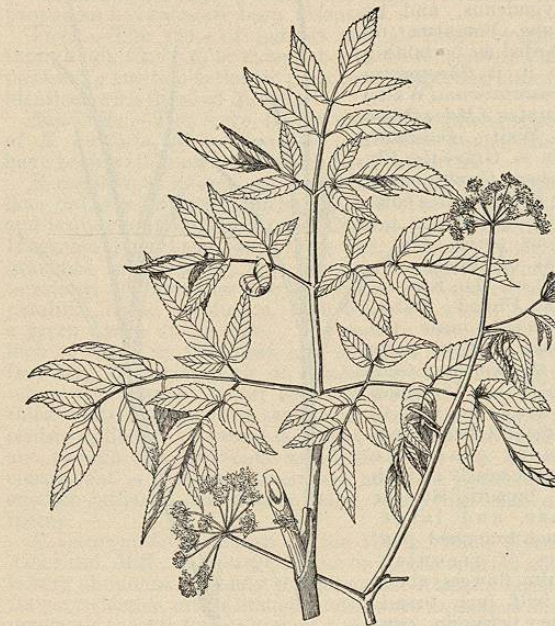


FIG. 3851.—*Cicuta maculata*. (One-fourth natural size.)

that of conium, yet there is far more of a tendency toward irritation and convulsions. Tremors, violent contractions and relaxations of the muscles, astonishing mobility of the eyeball and eyelashes, widely dilated pupil, frothing, often bloody, of the mouth and nose, epilepsy, and after death a peculiar greenish fluid in the stomach

and exuding from the mouth, cold, contracted, pale surface and some diarrhoea have been noted. Prompt emesis

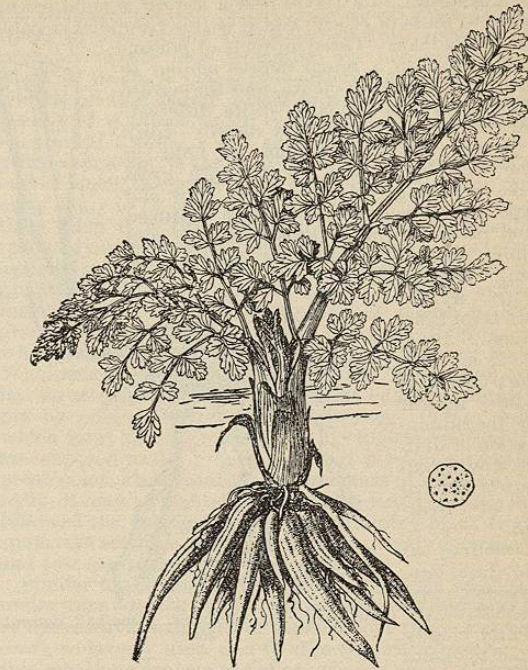


FIG. 3852.—*Enanthe crocata*. Reduced. (After Holmes.)

by the aid of zinc sulphate has been found effective. The further treatment is indicated by the symptoms.



FIG. 3853.—*Sambucus Canadensis*. (One-third natural size.)

Enanthe Crocata.—In Europe this species, closely related and rather similar to cicuta, is regarded as taking