Capsicum annuum

Capsicum an'nuum (*lon'gum*).—Fruit, U.S.P. 1820–1860; Fruit 5–10 Cm. (2–4′) long, 2.5–4 Cm. (1–1⅗′) thick, oblong, conical, sometimes curved or subglobular, yellow or red, brown when dry. Known in England as pod pepper, but often sold as *chillies* or *capsicums*, and is the kind recognized by the Ger. Phar. *C. fastigia'tum.*—Fruit, once official, and like that which is now official, 8–12 Mm. (⅓–½′) long, 3–4 Mm. (⅛–⅙′) thick. *C. cerasifor'me*, fruit resembles a cherry. All three sometimes used for purposes similar to official.

Capsicum frutescens CAPSICUM. CAPSICUM, *U.S.P.*

Capsicum frutescens, *Linné.*

The dried ripe fruit, grown in Africa, with not more than 3 p. c. stems, calyxes, nor 1 p. c. other foreign organic matter, yielding not less than 12 p. c. non-volatile, ether-soluble extractive, nor more than 1.25 p. c. acid-insoluble ash.

Habitat. S. and C. America (Cayenne in Guiana), introduced into E. Indies, Java (by Portuguese), also into Africa; cultivated in United States, also in tropics.

Syn. Capsic., Cayenne Pepper, African Chillies, Spanish, Red, Bird, Garden, Cockspur, Pod, Chilly, Zanzibar, Goat's, Guinea, American Cayenne or African Cayenne Pepper, Chillies; Piper Hispanicum; Br. Capsici Fructus (C. minimum); Fr. Capsique, Piment (rouge) des jardins, Poivre de Cayenne-, Guinée or d'Inde; Ger. Fructus Capsici, Spanischer Pfeffer, Schlotenpfeffer.

Cap'si-cum. L. *capsa*, a box—*i. e.*, shape of the fruit; or from Gr. *κάπτω*, to bite—*i. e.*, from its hot, pungent properties.

Fru-tes'cens. L. *frutex*, shrub, bush—*i. e.*, somewhat shrub-like in habit and appearance.

PLANT.—Small, spreading shrub, .6–1 M. (2–3°) high; stem much branched; leaves alternate, 5–7.5 Cm. (2–3′) long, entire, glabrous; flowers 2–3 together in the bifurcations, greenish-yellow, July–Aug.; ovary 2-celled, many ovules. FRUIT, oblong, conical, usually compressed, 10–25 Mm. (⅖–1′) long, 4–8 Mm. (⅙–⅓′) broad, 2–3-locular, dissepiments united to placenta at base of fruit, brownish-red, orange (pericarp), glabrous, dull, thin, shriveled, striate, membranous, 6–21 yellowish flattened seed, pointed micropyle; odor characteristic, sternutatory; taste intensely pungent. POWDER, yellowish-brown—thin-walled parenchyma with oil globules, epidermal cells of pericarp and seed-coat and stone cells of endocarp. *Tests:* 1. Fragments of pericarp with outer epidermis consisting of irregular cells not in rows but with strongly beaded radial walls and a hypodermis of angular cells with thickened, beaded walls—pres. of Japanese or East Indian capsicum. 2. Macerate 1 Gm. + alcohol 50 cc., 4 days, in a stoppered flask; add to .1 cc. clear supernatant liquid 140 cc. distilled water containing 10 p. c. of sucrose; 5 cc. of this dilution swallowed—at once the pungent sensation of capsicum in the throat of two out of three individuals. *Solvents:* alcohol; ether, hot water partially. Dose, gr. 1–5 (.06–.3 Gm).

ADULTERATIONS.—FRUIT: Fruits of allied species; POWDER: Red oxide of lead, colored sawdust, bran, etc.—the former recognized by adding diluted nitric acid to dissolve lead and precipitating same with sodium sulphate—the two latter by the microscope; corn meal, starch (iodine test), ash 15–18.4 p. c.

Commercial.—Plant largely cultivated in our country to supply demand. Fruit is plucked, exposed to sun until dried, then packed in suitable shape for market; much imported from India, Africa—Liberia, Zanzibar, Natal, Bombay, Penang, Pegu, Cayenne, etc.

Capsicum frutescens.

CONSTITUENTS.—Capsaicin (capsacutin, capsicin) .02 p. c., Capsicine, Volatile oil, fixed oil, fatty acids (oleic, stearic, palmitic), resin, red coloring matter (cholesterin ester of the fatty acids), ash 7 p. c., of which 1 p. c. is insoluble in hydrochloric acid.

Capsaicin, $C_{18}H_{28}O_2N$.—Considered the chief active constituent—identical with capsacutin, resides mostly in the pericarp and placenta, and is obtained by adding diluted caustic alkali to the petroleum extract, passing CO_2 through this alkaline solution, when it crystallizes out in colorless form. It is soluble in alcohol, ether, benzene, fixed oils, and its vapors are intensely acrid and irritating. It has also been obtained as an oleoresin (capsicin, capsicol), amorphous resin-like acid, to which the red coloring matter persistently adheres. Dose, gr. $\frac{1}{10}$–$\frac{1}{4}$ (.006–.016 Gm.).

Capsicine.—This occurs in small quantity; it is a volatile alkaloid, having odor of coniine—devoid of pungency—and is an oily liquid, not existing in the unripe fruit, but results from decomposition processes in ripening.

Volatile Oil.—Obtained by distillation and gives to the fruit its odor.

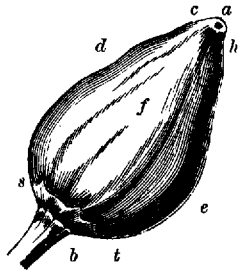
PREPARATIONS.—1. *Oleoresina Capsici.* Oleoresin of Capsicum. (Syn., Oleores. Capsic.; Fr. Oleoresine (Extrait éthéré) de Capsique; Ger. Spanisch-pfeffer-oelharz.)

Manufacture: Percolate slowly, in a covered glass percolator, 100 Gm. with ether, added in successive portions, until 160 cc. of percolate obtained, reclaim most of the ether on water-

bath, transfer residue to a dish, allow remaining ether to evaporate spontaneously in a warm place, remote from a naked flame, pour off liquid portion, transfer remainder to a glass funnel with pledget of cotton; when separated fatty matter (which is to be rejected) has drained, mix liquid

Capsicum fruit: magnified.

Capsicum fruit: cross-section, magnified.



Capsicum annuum: fresh fruit one-half natural size.

portions; yield 12–15 p. c. Should be kept in well-stoppered bottles. Dose, ♏½–1 (.016–.06 cc.).

Prep.: 1. *Emplastrum Capsici.* Capsicum Plaster. (Syn., Emp. Capsic.; Fr. Sparadra(pum) Capsici (de Capsique); Ger. Capsicumpflaster.)

Manufacture: Apply oleoresin of capsicum to the surface of rubber plaster so as to form a thin, even coating, leaving a margin around the edges; each 15 Cm. of spread plaster contains .25 Gm. of oleoresin of capsicum—requiring about 6 ♏; .4 cc.

2. *Tinctura Capsici.* Tincture of Capsicum. (Syn., Tr. Capsic.; Fr. Teinture de Piment des jardins; Ger. Spanischpfeffertinktur.)

Manufacture: 10 p. c. Similar to Tinctura Veratri Viridis, page 104; menstruum: 95 p. c. alcohol. Dose, ♏x–60 (.6–4 cc.).

Preps.: 1. *Mistura Chloroformi et Morphinæ Composita, N.F.,* 2.5 p. c. 2. *Mistura Opii et Chloroformi Composita, N.F.,* 10 p. c. 3. *Mistura Opii et Rhei Composita, N.F.,* 10 p. c.

3. *Pulvis Aromaticus Rubefaciens, N.F.,* 20 p. c. 4. *Pulvis Myricæ Compositus, N.F.,* 5 p. c. 5. *Tinctura Capsici et Myrrhæ, N.F.,* 3 p. c., + myrrh 12, 90 p. c. alcohol q. s. Dose, ♏x–60 (.6–4 cc.).

Unoff. Preps.: Extract, gr. ½–2 (.03–.13 Gm.). *Fluidextract* (alcohol), ♏j–5 (.06–.3 cc.). *Infusion,* 5 p. c., ℥ij–4 (8–15 cc.). *Ointment* (Br.), 20 p. c.

Properties.—Stimulant, stomachic, rubefacient, condiment, diaphoretic; stimulates flow from salivary, gastric, and intestinal glands, also the stomach walls and heart. Long continuance may produce—chronic gastritis, abdominal pain; large quantity—acute gastritis, renal inflammation, strangury.

Uses.—Indigestion, dyspepsia, atonic gout, alcoholism, delirium tremens, intermittents; flatulent colic, low fevers, cholera, menorrhagia, seasickness, tonsillitis, scarlet fever, diphtheria, hemorrhoids; externally—lumbago, rheumatism, neuralgia, chilblains, relaxed uvula. Was known to the Romans, and used in E. Indies from time immemorial.

Carica

Car'ica Papa'ya, Pawpaw, Melon Tree; Papayotin, Papain, Caricin.—An albuminous ferment from the fruit; Tropical America. Tree 6 M. (20°) high, stem 30 Cm. (12′) thick, fruit approximates the size of one's head, and contains an acrid, astringent, bitter, milky juice, which soon separates into a coagulum and aqueous liquid, from which latter papayotin is precipitated upon the addition of alcohol. It is a whitish, hygroscopic powder, inodorous, tasteless, soluble in water, glycerin, active in neutral, acid, but more so in alkaline solutions; it converts starch into maltose, albuminoids into peptones, and emulsifies fats; should digest 200 times its weight. Papoid, Caroid, etc., are weaker forms (dried juice); slightly inferior to pepsin, greatly inferior to pancreatin. Dose, gr. 2–5 (.13–.3 Gm.).

Carthamus

Car'thamus tincto'rius, Safflower.—The dried florets, U.S.P. 1820–1870, India, cultivated, in America, etc. Annual herb, .3–.6 M. (1–2°) high, branched; leaves spinose; flowers orange-red, corolla tubular, 2.5 Cm. (1′) long, 5-lobed; odor slight, taste bitter; contains volatile oil, carthamin (red) .5 p. c., saffron yellow 24–30 p. c. Diaphoretic (hot infusion), tonic, laxative; measles, scarlatina (to promote eruption), catarrh, rheumatism; in infusion. Dose, gr. 5–15 (.3–1 Gm.).

Carthamus tinctorius.

CARUM. CARAWAY, *U.S.P.*

Carum Carvi (Carui), *Linné.* — The dried ripe fruit, with not more than 3 p. c. of other fruits, seeds or foreign organic matter, yielding not more than 1.5 p. c. acid-insoluble ash.

Habitat. C. and W. Asia, Himalayas, Caucasus, Europe, Siberia; cultivated in England, Norway, Russia, Germany, Holland, Morocco, United States.

Syn. Caraway Seed (Fruit), Carawayseed, Carvies; Br. Carui Fructus; Fr. Carui, Carvi, Cumin des Prés; Ger. Fructus Carvi, Kümmel, Gemeiner Kümmel.

Ca'rum. L. *careum*, fr. Gr. *κάρον*, after Caria, in Asia Minor—*i. e.*, its original habitat. *Carui* was the name used by medieval pharmacists for the drug.

Car'vi. L. for *carvy, carvey.* Ar. *karawya*, Eng. caraway. Here frequently the word *Carui* is used, thus assimilating L. gen., as though for *Carui Semina.*

PLANT.—Biennial herb; stem .3–1 M. (1–3°) high, hollow; leaves bi- or tripinnate, deeply incised; flowers May–June, small, white, no involucre; root fleshy, fusiform, white. FRUIT, cremocarp, usually in 2 separated mericarps; curved, tapering, toward both ends, 3–7 Mm. ($\frac{1}{8}$–$\frac{1}{4}$′) long, 2 Mm. ($\frac{1}{12}$′) broad, dark brown, 5 yellow filiform ribs, dorsal surface 4 vittæ, commissural surface 2, endosperm large, oily; odor and taste aromatic. POWDER, yellowish-brown—outer epidermal cells characterized by a waviness and striping of the cuticle; endosperm cells containing aleurone grains with the embedded rosette aggregates; tracheæ, lignified fibers, oil tubes. *Solvents:* alcohol; water partially. Dose, gr. 10–30 (.6–2 Gm.).

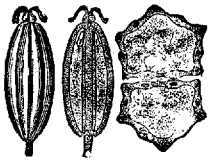
Carum Carvi (*Carui*): flower, fruit, and cross-section of fruit, enlarged.

ADULTERATIONS.—Allied and occasionally exhausted (drawn) fruits — having shriveled appearance; seeds of weeds—usually yielding starch in the powder; dirt—showing excess of ash.

Commercial.—Fruit ripens in the 2d year, August, when the plant is cut down, dried, and thrashed on cloth. There are five varieties: 1, *Holland (Dutch)*, finest; 2, *German;* 3, *English*, shortest; 4, *Mogador*, longest, lightest; 5, *American*, the result of home cultivation in gardens, being quite aromatic but smaller than the German, these two constituting nearly our total supply; yield 8–10 hundred-weight per acre; root, resembling that of parsnip, is employed as food in N. Europe.

CONSTITUENTS.—Volatile oil 5–7 p. c., fixed oil, resin, tannin, sugar, gum, ash 5–8 p. c.; no starch.

Oleum Cari. Oil of Caraway, *U.S.P.*—(Syn., Ol. Cari., Caraway Oil; Br. Oleum Carui; Fr. Essence de Carvi; Ger. Oleum Carvi, Kümmelöl, Carvon.) This volatile oil, obtained by steam distillation from the dried ripe fruit, should yield not less than 50 p. c. of carvone, and is a colorless, pale yellow liquid, characteristic odor and taste, soluble in 8 vols. of 80 p. c. alcohol, sp. gr. 0.905, dextrorotatory; contains a ketone—carvone (*d*-carvone, carvol), $C_{10}H_{14}O$, at least 50 (50–65) p. c., a terpene—carvene (*d*-carvene, citrene, hesperidene, *d*-limonene), $C_{10}H_{16}$, 35–50 p. c., and an alcohol, $C_{10}H_{17}OH$, etc. Carvone may be obtained by treating the oil with alcoholic solution of ammonium sulphide, decomposing the resulting crystals with potassium hydroxide; it is a viscid, yellowish, oily liquid, creosote odor and taste, closely related to menthol and myristicol, identical with thymol, cuminic alcohol and carvacrol, this latter being the product of distilling a mixture of caraway oil and potassium or sodium hydroxide (thus expelling carvene), decomposing residue with sulphuric acid, rectifying; useful in toothache, by inserting it into cavity. Should be kept cool, dark, in well-stoppered, amber-colored bottles. Dose, ♏ij–5 (.13–.3 cc.).



Carum: fruit and longitudinal section, 3 diam.; transverse section, 8 diam.

PREPARATIONS.—FRUIT: 1, *Tinctura Cardamomi Composita*, 1.2 p. c. OIL: 1. *Mistura Carminativa, N.F.*, $\frac{1}{20}$ p. c. 2. *Spiritus Cardamomi Compositus, N.F.*, $\frac{1}{10}$ p. c.

Unoff. Preps.: FRUIT: *Fluidextract*, ♏x–30 (.6–2 cc.). *Infusion*, 5 p. c., ℥j–2 (30–60 cc.). *Water* (Br.), 100 Gm. + water 2000 cc., distil 1000 cc. OIL: *Spirit.*

PROPERTIES.—Carminative, stimulant, diuretic, stomachic.

USES.—Flatulent colic, especially of infants, corrective to nauseous purgatives, flavoring, toothache (carvacrol), as a spice in cakes, bread, etc. The oil is used mostly, which acts externally like other essential oils, as an anesthetic, etc.

CARYOPHYLLUS. CLOVE, *U.S.P.*

Caryophyllus aromaticus, *Linné.* — The dried flower-buds with not more than 5 p. c. stems nor 1 p. c. other foreign organic matter, yielding not less than 15 p. c. volatile ether-soluble extractive nor more than 10 p. c. crude fiber nor .75 p. c. acid-insoluble ash.

Habitat. Molucca (Spice or Clove) Islands, five in number, N. E. of Celebes, now mostly abandoned there, but cultivated in Indian Ocean islands, Amboyna group, Sumatra, Malacca, Penang. etc., S. America, Brazil, Guiana, Cayenne, Africa, Zanzibar, West Indies.

Syn. Caryoph., Cloves, Mother Cloves, Caryophylli Aromatica; Br. Caryophyllum; Fr. Girofle, Clous (aromatiques) de Girofle; Ger. Gewürznelken; Flores Caryophylli, Nägelein.

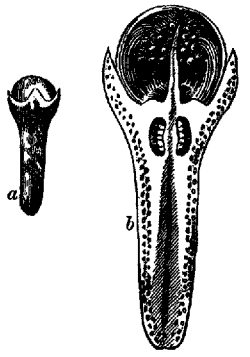
Car-y-o-phyl'lus. L. fr. Gr. *κάρυον*, a nut, + *φύλλον*, a leaf—*i. e.*, referring to the appearance of flower buds.

Ar-o-mat'i-cus. L. aromatic, fragrant—*i. e.*, its aromatic aroma, odor.

Clove. L. *clavus*, a nail—*i. e.*, the resemblance of its dried flowers.

PLANT.—Handsome evergreen tree, 9–12 M. (30–40°) high, much branched, forming a pyramidal crown; bark yellowish; leaves 10 Cm. (4′) long, 5 Cm. (2′) wide, entire, smooth, glandular, parallel veins to midrib, petiolate; flowers 15–20, rose-color, cymes; fruit berry-like. FLOWER-BUDS (clove), tack-shaped, 10–17.5 Mm. ($\frac{2}{5}$–$\frac{3}{4}$′) long, dark

Caryophyllus aromaticus.



Caryophyllus: *a*, natural size; *b*, longitudinal section magnified.

brown, consisting of a stem-like, solid, inferior ovary, obscurely 4-angled, terminated by 4 calyx teeth, and surmounted by a nearly globular head, consisting of 4 petals enclosing numerous curved stamens and 1 style; odor strongly aromatic; taste pungent, aromatic, followed by slight numbness; pressed strongly between thumbnail and finger—volatile oil visible; should not float horizontally on water; stems, separate or attached, sub-cylindrical, 4-angled, 25 Mm. (1′) long, 4 Mm. ($\frac{1}{6}$′) thick, simple, branched, jointed, less aromatic than flower-buds. POWDER, dark brown—parenchyma fragments with large oil reservoirs, spiral tracheæ, few bast-fibers, calcium oxalate rosette aggregates, numerous tetrahedral pollen grains, *Tests:* 1. Stone cells irregular or polygonal, with thick porous walls and large lumina, often filled with yellowish-brown amorphous substance—few or absent (abs. of less than 5 p. c. of stems). 2. No starch grains present (abs. of clove fruit or cereals). *Solvents:* alcohol (volatile oil, resin); water (odor—part of volatile oil but none of the pungent resin). Dose, gr. 5–10 (.3–.6 Gm.).

ADULTERATIONS.—FLOWER-BUDS: Clove-stalks, 2 Mm. ($\frac{1}{12}$′) thick, brown, contain volatile oil 4–5 p. c., for which they are imported as well as for their well-defined stone cells; mother clove (clove fruit, anthophylli) collected just before ripe, 2.5 Gm. (1′) long, resemble clove, but thicker, lighter, weaker, with 4-lobed calyx, each cell 1–2-seeded, contain volatile oil 2–4 p. c.; exhausted clove, such as have undergone partial or complete exhaustion and distillation; pimenta, different shape and aroma; an artificial clove molded from a paste has been reported; POWDER: All of the above—detected chiefly by peculiar starch grains, stone cells, and weakness of the preparations; cassia; ginger; sand; starch; flour; pepper shells. OIL: That from which eugenol has been abstracted or foreign eugenol added; clove-stem oil, alcohol, oils of turpentine, cinnamon, pimenta and copaiba, petroleum, fixed oils, phenol.

Commercial.—Trees yield when 6 years old, reach perfection at 12, and thence decline until, at 20, they perish. Clove (flowers, buds) at first are white, then green, pink, and bright red, being collected at the pink stage by hand-picking on ladders and platforms, or by beating the trees with bamboos and catching the falling buds upon outspread cloths, after which they are dried by sun or slowly by fire. Each tree yields 5 pounds (2.3 Kg.), which are disposed of at 10 cents per pound (.5 Kg.). Clove was unknown to the ancients, having been brought to Europe by the Arabians and Venetians, while the Portuguese and Dutch long monopolized the trade. Now mostly from Zanzibar, the finest from Penang, some from Pemba, or via Bombay; however, much of our supply is from W. Indies, Cayenne, Guiana, etc. There are three varieties: 1, *Molucca* (*Amboyna*), thickest, heaviest, darkest, most oily and aromatic; two annual harvests, June, Dec., in the Moluccas; 2, *Sumatra* (*Bencoolen*), considered by some of equal high grade as the preceding; 3, *S. American*, usually not so fine, but the freshest, contain volatile oil 10–15 p. c.

Clove(s) that are light (floating horizontally on water), small, soft, wrinkled, of pale color, feeble taste and smell, often without corolla bud or "head," are inferior from having been treated with a menstruum, or careless picking (including immature green and red buds) and drying (which should be done quickly and without exposure to bad weather), and should not be used direct or in obtaining the oil.

CONSTITUENTS.—Volatile oil 18 p. c., eugenol, eugenin (white pearly scales, isomeric with eugenol—red with nitric acid), $C_{10}H_{12}O_2$, caryophyllin, tannin 10–13 p. c., resin (tasteless) 6 p. c., gum 13 p. c., vanillin, furfurol, green wax, cellulose 28 p. c., water 18 p. c., ash 4–8 p. c. (of which .5 p. c. is insoluble in hydrochloric acid).

Oleum Caryophylli. Oil of Clove, *U.S.P.*—(Syn., Ol. Caryoph., Clove Oil, Oil of Cloves; Fr. Essence de Girofle; Ger. Oleum Caryophyllorum, Nelkenöl, Eugenol.) This volatile oil distilled from the dried flower-buds (clove) with water or steam, and usually 3 p. c. of sodium chloride, to raise the ebullition-point possibly to 109.5° C.; (229° F.), is a colorless, pale yellow liquid, darker and thicker by age and exposure, characteristic odor and taste of clove, soluble in 2 vols. of 70 p. c., alcohol, levorotatory, sp. gr. 1.038–1.060; contains at least 82 (80–90) p. c. of eugenol, $C_{10}H_{12}O_2$ (heavy portion—phenol), caryophyllene, $C_{15}H_{24}$ (light portion, polymeric with terpene, $C_{10}H_{16}$, sp. gr. 0.918—sesquiterpene), also 2–3 p. c. of eugenol acetate; methyl-amylketone (gives odor), vanillin, furfurol (causes oil to darken), methyl alcohol. *Tests:* 1. Shake oil (1) with hot distilled water (20)—shows only slight acid reaction; filtrate with 1 drop of ferric chloride T. S.—transient grayish-green color, but not blue or violet (abs. of phenol). Should be kept cool, dark, in well-stoppered, amber-colored bottles. Dose, ♏j–5 (.06–.3 cc.).

Eugenol. Eugenol, $C_{10}H_{12}O_2$, *U.S.P.*—(Syn., Eugenolum, Eugenin, Caryophyllic Acid, Eugenic Acid, Allylguaiacol, Ethylmethyl-pyrocatechol, Para-oxy-metamethoxyallyl benzol.) This unsaturated, aromatic phenol (found also in oils of bay, canella, camphor, cinnamon (Ceylon), sassafras, pimento, Massoi bark) is obtained by shaking oil of clove with excess of 5–10 p. c. solution of sodium hydroxide in a separator, drawing off resulting solution of eugenol sodium, washing aqueous liquid with ether, decomposing with diluted sulphuric acid, washing

separated eugenol with sodium carbonate solution (to remove adhering acid), distilling with steam or *in vacuo*. It is a colorless, pale yellow, thin liquid, strongly aromatic odor of clove; pungent, spicy taste; darker and thicker on exposure to air; miscible with alcohol, chloroform, ether, fixed oils, soluble in 2 volumes of 70 p. c. alcohol; mixed with hot distilled water (1 in 20) very slightly acid, sp. gr. 1.067, boils at 253° C. (488° F.); optically inactive and strongly refractive. *Tests:* 1. Dissolve 1 cc. in sodium hydroxide T. S. (12), add distilled water (18)—clear solution, turbid on exposure to air (abs. of hydrocarbons). 2. Shake 1 cc. with distilled water (20); to 5 cc. of clear filtrate add 1 drop of ferric chloride T. S.—transient, grayish-green, not blue or violet (abs. of phenol); upon eugenol alone the value of oil of clove depends. Should be kept cool, dark, in well-closed containers. Dose, ♏j–5 (.06–.3 cc.).

Caryophyllin, $C_{10}H_{16}O$.—Obtained by treating ethereal extract of clove with water, filtering and treating the resulting precipitate with ammonia to purify; occurs in tasteless, inodorous silky needles, soluble in ether, slowly in alcohol, colored red with sulphuric acid, and by oxidation with nitric acid yields crystals of caryophyllinic acid, $C_{20}H_{32}O_6$.

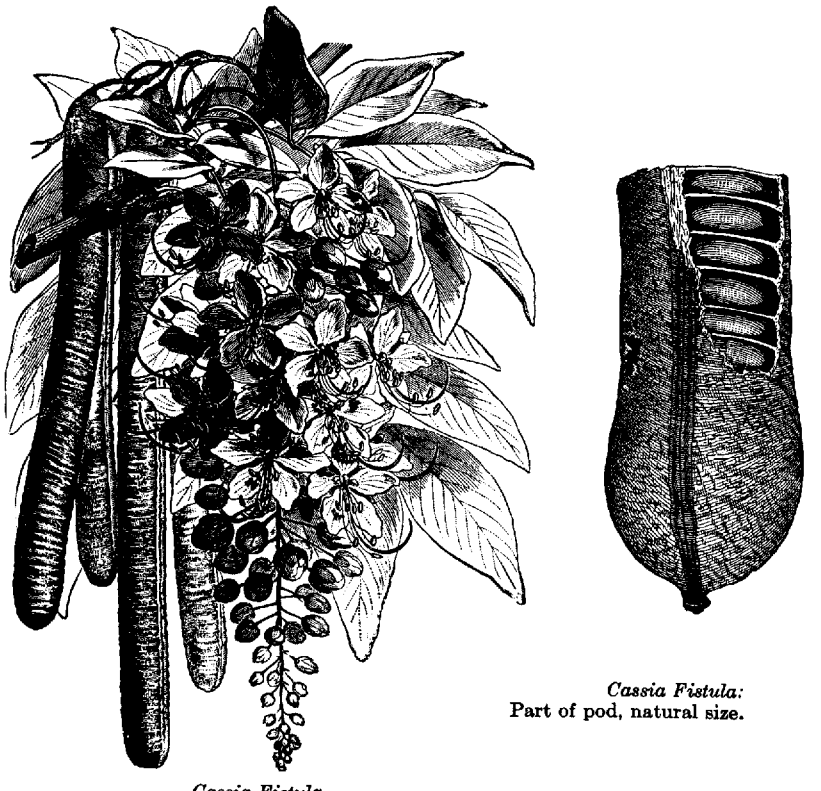
PREPARATIONS.—CLOVE: 1. *Tinctura Lavandulæ Composita,* ½ p. c. 2. *Tinctura Rhei Aromatica,* 4 p. c. 3. *Pulv. Arom. Rubefac., Rubefac. Spice Powder, N.F.,* 30 p. c., + cinnam. 30, zingib. 20, capsic. 20. 4. *Pulv. Cret. Arom., N.F.,* 3 p. c.: Prep.: 1. *Pulv. Cret. et Opii Arom., N.F.,* 97.5 p. c. 5. *Pulv. Myric. Co., Composition Powder, N.F.,* 5 p. c. 6. *Syr. Senn. Arom., N.F.,* ⅖ p. c. 7. *Tr. Arom., N.F.,* 2 p. c. 8. *Tr. Opii Crocat., N.F.,* ⅗ p. c. 9. *Tr. Viburn. Opul. Co., N.F.,* 5 p. c. OIL: 1. *Acet. Arom., N.F.,* 1/10 p. c. 2. *Dentif., N.F.,* 1/20 p. c. 3. *Fldglycer. Casc. Sagr. Arom., N.F.,* 1/10 p. c. 4. *Lavat. Ori., N.F.,* 1 p. c. 5. *Liq. Pepsin, Arom., N.F.,* 1/20 p. c. 6. *Nebul. Arom., N.F.,* ⅕ p. c. 7. *Ol. Ricin. Arom., N.F.,* 1/10 p. c. 8. *Sp. Card. Co., N.F.,* ½ p. c. 9. *Syr. Eriodict. Arom., N.F.,* 1/10 p. c. EUGENOL: 1. *Mist. Ol.-Balsam, N.F.,* ⅖ p. c.

Unoff. Preps.: Infusion (Br.) 2.5 p. c., ℥ss–1 (15–30 cc.). *Inf. Aurant. Co.* (Br.), .5 p. c. *Tinct.,* 25 p. c. (Fr. alc.), ʒss–1 (2–4 cc.).

PROPERTIES.—Stimulant, stomachic, carminative, antiemetic, aromatic, antispasmodic, rubefacient, germicide, antiseptic. Increases circulation, temperature, digestion, nutrition; excreted by kidneys, skin, liver, bronchi—stimulating and disinfecting each.

USES.—Nausea, vomiting, flatulence, colic, indigestion, condiment, corrective; externally in rheumatism, neuralgia, toothache (oil + oil of peppermint + chloral hydrate, āā q. s.), in liniments, etc.; spice powder (poultice)—over stomach to expel gas, relieve colic, on nape of neck for infantile convulsions.

Cassia fistula *C. Fis'tula, Purging Cassia, N.F.*—The dried fruit with not more than 2 p. c. of foreign organic matter; E. India, Egypt, nat. in S. America, W. Indies. Handsome tree, 9–15 M. (30–50°) high; bark gray; leaves paripinnate, leaflets 3–7 pairs, 5–15 Cm. (2–6′) long, ovate; flowers yellow. Fruit cylindrical, 25–50 Cm. (10–20′) long, 20 Mm. (⅘′) thick, chestnut-brown, on one side a longitudinal groove (ventral), on the other a slight ridge (dorsal), indicating the 2 sutures, indehiscent, 25–100 transverse compartments, each with a brown seed, 8 Mm. (⅓′) long, embedded in blackish-brown pulp (30 p. c.) having prune-like odor, mawkish sweet taste; contains (pulp) sugar 60 p. c., mucilage, pectin, albuminoids, tannin, volatile oil, butyric acid, calcium oxalate. Laxative; costiveness, to promote bile flow; usually combined with other drugs (manna, tamarind, salines, etc.). Dose, ʒj–2 (4–8 Gm.); 1. *Confectio Sennæ,* 16 p. c.



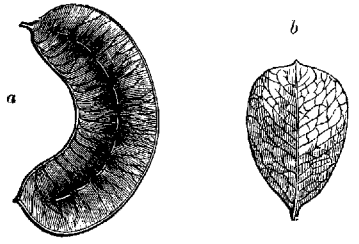
Cassia Fistula: Part of pod, natural size.

Cassia Fistula.

Cassia marylandica *C. marylan'dica.*—Leaflets, U.S.P. 1820–1870; United States, New England to S. Carolina, west to the Mississippi. Plant 1–1.5 M. (3–5°) high; leaves alternate, leaflets paripinnate, 8 pairs, 2.5–5 Cm. (1–2′) long, 12 Mm. (½′) wide; flowers August, yellow; fruit pod, 7.5 Cm. (3′) long; in sandy soil, river banks, introduced into England in 1723, cultivated for ornament, collected Aug.–Sept.; contains cathartic acid, volatile oil, and is given in one-third larger doses than the official varieties; in infusion.

Cassia obovata

Cassia obova'ta.—Leaflets, U.S.P. 1830–1860. This was the first senna known, being introduced by the Moors into Europe as early as the 9th century, where even in the 16th it became very largely cultivated. Grows wild on sandy soil in Egypt, Nubia, Abyssinia, Tripoli, Senegal, Arabia, India; cultivated in Jamaica, being called *Port Royal* or *Jamaica Senna;* leaves 5–7 pairs, leaflets obovate, obtuse. *C. pubes'cens* (*C. holoseric'ea*), *Aden Senna*, Abyssinia, rarely met with now; leaflets 2.5 Cm. (1′) long, ovate, mucronate, hairy, sometimes mixed with Mecca senna. *C. brev'ipes*, C. America; leaflets resemble Indian senna, but have 3 longitudinal veins; infusion non-purgative.



Cassia obovata: a, legume; *b*, leaflet, about natural size.

Cassia senna

SENNA. SENNA, *U.S.P.*

Cassia { **Senna,** *Linné,* **angustifolia,** *Vahl.* } { The dried leaflets, with not more than 10 p. c. of stems, nor 2 p. c. of pods or other foreign organic matter, yielding not more than 3 p. c. of acid-insoluble ash.

Habitat. E. and C. Africa, India.

Syn. Senn.; Br. Sennæ Folia, Senna Leaves: 1. Senna Alexandrina, Alexandrian (Nubian, Tripoli) Senna; Fr. Séné—d'Alexandrie; Ger. Alexandrinische Senna. 2. Senna Indica, East Indian (Arabian, Bombay, Mecca, Mocha, Tinnevelly) Senna; Fr. Séné de l'Inde—de Tinnevelly, Feuilles de Séné; Ger. Folia Sennæ, Sennesblätter, Indische Senna.

Cas'si-a. L. fr. Gr. *κασσία, κασία*, fr. Heb. *qetsi-oth, qatsa*, to cut off, to peel off—*i. e.*, bark of some species cut off and used; classical name of a bark allied to cinnamon.

Sen'na. L. fr. Ar. *sana, sena.* Hind, *sena*—*i. e.*, native Arabian plant name; this is the subgenus of *Cassia*, but should have held full generic rank.

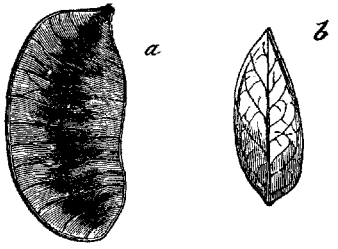
An-gus-ti-fo'li-a. L. *angustus*, narrow, + *folium*, leaf—*i. e.*, leaves narrow.

PLANTS.—*Cassia Senna*, small shrub, .6–1 M. (2–3°) high; stem erect, woody, branching, whitish; flowers large, yellow, axillary raceme; fruit few, legume, 5 Cm. (2′) long, 18 Mm. (¾′) broad, thin, broadly elliptical, reniform, dark green, membranous, smooth, indehiscent, 6–7-celled, each with a cordate, ash-colored seed; leaves alternate, 4–5 pairs, paripinnate, footstalks glandless, 2 small-pointed stipules at base; *Cassia angustifolia*, small shrub similar to preceding, except fruit a trifle longer and narrower, 8-seeded; leaves sessile, 5–8 pairs. LEAFLETS (*C. Senna*): *Alexandria*, 2–3.5 Cm. (⅘–1⅖′) long, 6–10 Mm. (¼–⅖′) broad, inequilaterally lanceolate, lance-ovate, short, stout petiolules, acutely cuspidate, entire, subcoriaceous, brittle, pale grayish-green; hairs short, appressed, few on upper surface more numerous on lower, spreading on the midrib; usually unbroken, occasionally in fragments; odor characteristic; taste mucilaginous, bitter; (*C. angustifolia*): *Tinnevelly*, 2–5 Cm. (⅘–2′) long, 6–15 Mm. (¼–⅗′) broad, yellowish-green, smooth above, paler beneath, slightly hairy, more abruptly pointed than, but odor and taste resembling closely the preceding. POWDER, light green—fragments of veins with lignified tracheæ and crystal-fibers, isolated hairs, masses of palisade and mesophyll parenchyma, stomata, calcium oxalate rosettes, prisms; hairs more numerous in *C. Senna*. *Tests:* 1. Boil for 2 minutes .5 Gm. with

Cassia Senna: half natural size; *A*, leaflets; *B*, legumes.

alcoholic solution of potassium hydroxide (1 in 10) 10 cc., add water 10 cc., acidify filtrate with hydrochloric acid, shake with ether, then shake the ethereal layer with ammonia T. S. 5 cc.—latter pinkish-, bluish-red color. *Solvents:* water or diluted alcohol extracts the active constituents (*emodin, chrysophanic acid*); water-soluble constituents 28 p. c.; a decoction made by long boiling is inert, being rendered more so by the addition of an alkali or acid; leaves by percolation with alcohol are deprived of their griping (resinous) content, odor, taste, and color, but still retain, slightly lessened, their pleasant cathartic power. Dose, ℥ss–3 (2–12 Gm.).

ADULTERATIONS.—*Alexandria:* 1. *C. obovata,* leaflets, called by Arabs *Senna Ealadi* (Wild Senna), and considered in Egypt less valuable than *Senna Jebeli* (Mountain Senna, *C. Senna*). 2. *Solenostem'ma Ar'gel,* leaves which have lateral veins indistinct, leathery, wrinkled, bitter; flower buds present; fruit pear-shaped. 3. *Crac'ca (Tephro'sia) Apollin'ea,* leaflets, S. Europe, uneven base, obovate, emarginate (poisonous). 4. *Coria'ria myrtifo'lia,* leaves (poisonous), and *Colu'tea arbores'cens,* leaflets formerly used. 5. Leaves of *Ailan'thus glandulo'sa, Tree of Heaven,* easily recognized, even in the powder. 6. *Pods, leaf-stalks, branches.* All these now are garbled out carefully. The Arabians preferred the pods, as they contain 25 p. c. more cathartic principle than the leaflets, and no resin or volatile oil, hence do not gripe. Six or eight pods infused in ℥ij (60 cc.) of water will purge an adult.



Cassia Senna: a, legume; *b,* leaflet, about natural size.

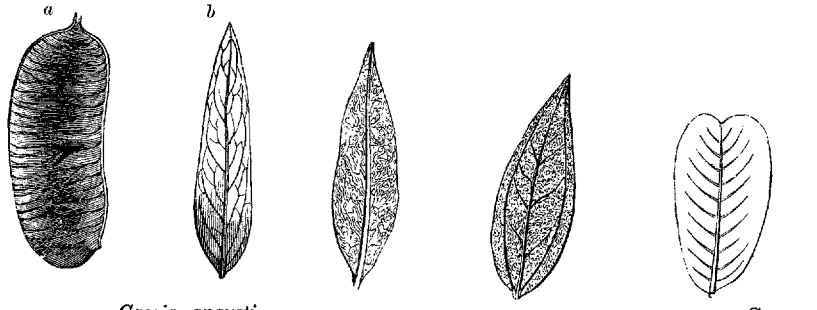
Commercial.—Plants yield two annual crops of leaflets, the larger (best) in September, at the end of the rains, the smaller in April, during the dry season; the entire plants are cut down (by natives), exposed on rocks to the hot sun until dry, stripped of leaflets, which are packed in palm-leaf bags for transportation on camels to the market ports, where, after being garbled, the drug is put into large bales for exportation. There are several varieties: 1. *Alexandrian (Nubian),* chiefly from Nubia (Sennaar, Kordofan), some from Timbuctoo, being forwarded usually via Assouan, Darao, thence by the Nile to Cairo and Alexandria; its botanic source has received various synonyms: *Cassia Senna, C. acutifolia, C. lanceola'ta, C. leniti'va, C. officinalis, C. æthio'pica, C. orientalis,* etc.; *Tripoli senna,* from Tripoli (interior Africa), having no doubt the same botanic origin, is conveyed to market ports by caravans, being, as a rule, much broken, discolored, and mixed with legumes, stalks, and earthy matter, but no foreign leaves, and seldom reaches our country; it is restricted by some to *C. æthiopica (C. obovata, C. ova'ta),* and is not grown in Arabia or India. 2, *Tinnevelly (Indian, Arabian, Mocha),* originally indigenous to S. Arabia and interior of Africa, but entered market via India (Bombay, Calcutta); its botanic source has received several synonyms: *Cassia angustifolia, C. elonga'ta, C. med'ica;* now cultivated extensively, from Arabian seeds, at Tinnevelly, S. India, where it becomes most luxuriant; and owing to freedom from legumes, stalks, etc., furnishes the finest and purest leaflets; it is exported mostly from Tuticorin, and Madras; *Bombay (E. India) Senna,* sold frequently as Tinnevelly, has the same source, but is dried less carefully, often containing small and discolored leaflets; *Arabian (Mecca) Senna,* sold often as Bombay, is collected and dried even with less care, and contains many brown leaflets and legumes.

Cassia angustifolia: half natural size; *A,* leaflets; *B,* legumes.

CONSTITUENTS.—Anthraglucosennin, Emodin 1 p. c., Chrysophanic acid, Glucosennin, Isoemodin, Senna-rhamnetin, Sennanigrin, Kaempferol Kempferin, gum, resin, catharto-mannite (non-fermentable sugar), isomeric with quercite, sennapicrin, oxalic, malic, tartaric acids, combined with calcium, volatile oil (developing after drying), ash 10–12 p. c., of which 3 p. c. is insoluble in hydrochloric acid.

Anthraglucosennin.—Obtained (Tschirch) by evaporating a weak ammoniacal percolate of senna; it is a complex brownish-black powder, partly soluble in ether, acetone, capable of being resolved into components by various solvents; the ether-soluble portion (emodin, chrysophanic acid, glucosennin) when boiled with toluene, to a partial solution, and poured into benzin gives a precipitate—*(senna-)emodin*—trioxymethylanthraquinone, melting at 223° C. (434° F.), while in the benzin mother-liquor remains—*(senna-)chrysophanic acid*—

dioxymethylanthraquinone, obtained by evaporation; the ether-soluble portion insoluble in toluene is an emodin glucoside—*glucosennin*, $C_{22}H_{18}O_8$ (yellow amorphous powder). The ether-insoluble portion (isoemodin, senna-rhamnetin) when treated with acetone and shaken with benzin yields—*(senna-)isoemodin*, $C_{15}H_{10}O_5$ (isomeric with (senna-)emodin, but differs in being soluble in benzin); the acetone



Cassia angustifolia: a, legume; *b*, leaflet, about natural size. Argel leaf. Coriaria leaf. Cracca (Tephrosia) leaflet.

solution retains—*senna-rhamnetin* (reddish-brown powder, differing from rhamnetin in not fluorescing in sulphuric acid solution); the anthraglucosennin residue left after treatment with ether and acetone is a black, amorphous powder, which treated with alcoholic potash yields—(senna-)emodin and (senna-)chrysophanic acid. From an aqueous percolate Tschirch extracted cathartic acid and a crystalline body, $C_{14}H_{10}O_5$, having similar reactions as sennanigrin, but concludes that the cathartic action (peristalsis) is due solely to the emodin and chrysophanic acid, both being oxymethylanthraquinones. Formerly senna was believed to contain: cathartic (cathartinic) acid, sennapicrin, sennacrol (resin causing griping), chrysophan and pheretin (yellow coloring matters), sennite (cathartomannite), mucilage, ash 10–12 p. c.

PREPARATIONS.—1. *Fluidextractum Sennæ.* Fluidextract of Senna. (Syn., Fldext. Senn., Fluid Extract of Senna; Liquor Sennæ Concentratus; Fr. Extrait fluide de Séné; Ger. Sennafluidextrakt.)

Manufacture: Similar to Fluidextractum Sarsaparillæ, page 126; menstruum: 33 p. c. alcohol, reserving first 80 cc. Dose, ʒss–2 (2–8 cc.).

Preps.: 1. *Syrupus Sennæ.* Syrup of Senna. (Syn., Syr. Senn.; Fr. Sirop de Séné; Ger. Sirupus Sennæ, Sennasirup.)

Manufacture: 25 p. c. Mix oil of coriander .5 cc. with fldext. of senna 25, gradually add water 33, let stand 24 hours in cool place, shaking occasionally, filter, pass through filter water q. s. 58 cc., in which dissolve sucrose 63.5 Gm., add water q. s. 100 cc. Dose, ʒss–4 (2–15 cc.).

2. *Syrupus Sennæ Aromaticus, N.F.*, 12.5 p. c., + jalap 5, rhubarb 1.75, +. Dose, ʒj–3 (4–12 cc.). 3. *Syrupus Ficus Compositus, N.F.*, 20 p. c.

2. *Pulvis Glycyrrhizæ Compositus*, 18 p. c. 3. *Confectio Sennæ, N.F.*, 10 p. c., + cassia fistula 16, tamarind 10, prune 7, fig 12, water 65, digest, strain, add sucrose 55.5, evaporate to 89.5, add senna 10, oil of coriander .5. Dose, ʒj–2 (4–8 Gm.). 4. *Infusum Sennæ Compositum, Black Draught, N.F.*, senna 6 Gm., manna 12, magnesium sulphate 12, fennel 2, boiling water q. s. 100 cc.; must be recently prepared. Dose, ℥j–3 (30–90 cc.). 5. *Species Laxativæ, St. Germain Tea, N.F.*, 40 p. c., + sambucus 25, fennel 12.5, anise 12.5, potassium bitartrate 10. Dose, gr. 15–30 (1–2 Gm.).

Unoff. Preps.: Extract, gr. 5–20 (.3–1.3 Gm.). Infusion (Br.), 10 p. c. + ginger .5. Compd. Syrup 13.5 p. c., +. Tinctura Sennæ Composita (Br.), 20 p. c.

PROPERTIES.—Cathartic, acts on nearly the entire intestinal tract (especially colon), increasing peristalsis and intestinal secretion, except biliary; produces in 4 to 6 hours copious yellow stools, with griping and flatulence; does not cause hypercatharsis nor constipation. Large dose vomits, purges, with severe tenesmus, but never poisons; the odor acts as a cathartic on very susceptible persons.

USES.—Arabians used it in skin affections; now employed for habitual constipation, hemorrhoids, fissura ani, fevers. Its smell, taste, tendency to nauseate, injurious effects in hemorrhoids, intestinal hemorrhage, and inflammation, all lessen its popularity; its purgative action is increased by bitters, calumba, etc., while the griping and nausea are diminished by coriander, tamarind, manna, fennel, Epsom or Rochelle salt. If leaves be macerated long in water, or if the mass be pressed tightly, much acrid, resinous principle will be obtained, causing griping, hence should exhaust by rapid percolation.

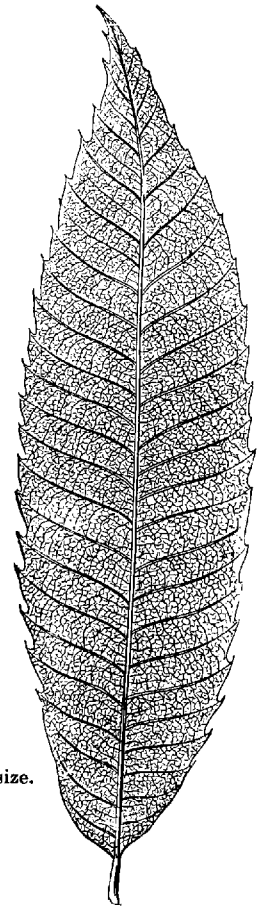
Castanea

Casta'nea denta'ta, Castanea, Chestnut Leaves, N. F.—The dried leaves with not more than 5 p. c. of stems or other foreign organic matter; N. America, W. Asia, S. Europe. Stately tree, 24–30 M. (80–100°) high; wood light, durable; flowers in 3's, monœcious—staminate and pistillate, involucre 4-lobed, becoming prickly; fruit, 4-valved involucre enclosing 1–3 1-seeded nuts. Leaves entire, slightly broken, folded or matted together, 15–25 Cm. (6–10′) long, 5 Cm. (2′) wide, oblong-lanceolate, acuminate, sharply serrate, coriaceous, dark green above, lighter beneath, pinnately veined, petiole stout; odor slight; taste astringent; Powder, greenish—non-glandular hairs, numerous calcium oxalate crystals in rosettes, prisms, parenchyma cells with brown tannin masses which + ammonio-ferric alum T. S.—blue; contains tannin 9 p. c., resin, fat, gum, albumin, ash 6 p. c.; fruit contains starch 35 p. c., fat 2 p. c., proteins 3–4 p. c., sugar 1–2 p. c.; solvents: boiling water, alcohol partially. Tonic, mild sedative, astringent; whooping cough, controlling paroxysms, dysentery; wood resists exposure greatly, nuts a delicacy, thoroughly edible. Dose, gr. 15–60 (1–4 Gm.); 1. *Fluidextractum Castaneæ* (100 Gm., + boiling water to exhaust, evap. to 200 cc., add alcohol 60 cc., lastly glycerin 10, dose, ♏xv–60 (1–4 cc.). *Infusion.*

Castanea pumila

C. (*Fagus*) *pu'mila, Castanea* (*Chinquapin*).—The bark, U. S. P. 1820–1850; Delaware-Mississippi. Shrub or small tree, 6–15 M. (20–50°) high, 25–27.5 Cm. (10–15′) thick, largest being South; leaves differ from chestnut in having underside white, downy; bark grayish, brownish inside; fruit rounded, conical, 12 Mm. (½′) long, 9 Mm. (⅜′) broad at base, same constituents and taste as chestnuts; bark contains tannin, resin, extractive. Tonic, astringent; intermittents.

Castanea dentata.



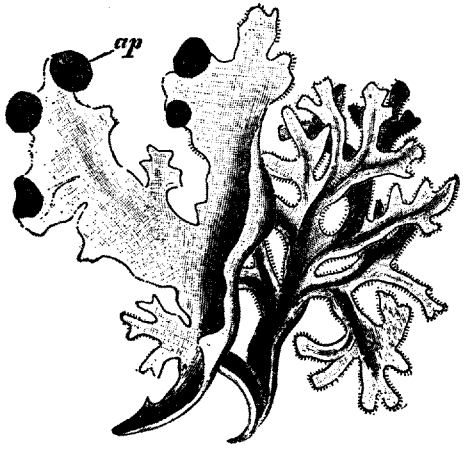
Castanea: leaf, one-half natural size.

Caulophyllum

Caulophyl'lum thalictroi'des, Caulophyllum, Blue Cohosh, Papoose (*Squaw*) *Root, N.F.*—The dried rhizome and roots with not more than 3 p. c. of foreign organic matter, yielding not more than 4 p. c. of acid-insoluble ash; N. America (Canada, United States). Smooth, glaucous perennial, .6 M. (2°) high, with large triternately compound leaf at summit, leaflets 3–5-lobed; flowers greenish-yellow. Rhizome horizontal, 7–25 Cm. (3–10′) long, 5–15 Mm. (⅕–⅜′) thick, large cup-shaped stem-scars above, curved, tortuous, thin, tough, tangled or matted roots below often concealing rhizome, yellowish-gray; fracture tough, woody; odorless, sternutatory; taste bittersweet, acrid. Powder, light brown—numerous starch grains, fragments of cork, tracheæ, wood-fibers, tracheids, parenchyma; contains caulophylline, caulophyllin (resins) 12 p. c., leontin (saponin-like glucoside—active principle). Antispasmodic, diuretic, emmenagogue, demulcent, sternutatory, sedative, oxytocic; hysteria, amenorrhea, spasmodic dysmenorrhea, uterine subinvolution (causing muscular contraction), arrests or produces abortion; the aborigines believed the infusion their best parturient, drinking it for several weeks prior to labor. Dose, gr. 10–30 (.6–2 Gm.); 1. *Fluidextractum Caulophylli* (75 p. c. alcohol): Preps.: 1. *Elixir Aletridis Compositum* (fldext. 6.55 p. c.); 2. *Elixir Heloniadis Compositum* (fldext. 3.2 p. c.). *Extract*, gr. 2–5 (.13–.3 Gm.), *Tincture*, 25 p. c., ʒj–2 (4–8 cc.); decoction, infusion, each 5 p. c., ℥j–2 (30–60 cc.).

Cetraria

Cetra'ria islan'dica, Iceland Moss.—The dried plant, U.S.P. 1820–1890; N. hemisphere. Thallus 5–10 Cm. (2–4′) long, foliaceous, fringed, and channeled lobes, brownish above, whitish beneath, apothecia (fruits) brown, flattish, brittle, inodorous; taste mucilaginous, bitter; contains cetraric acid (bitter) 2–3 p. c., which removed leaves digestible food product containing proteins 2.8 p. c., fat .4 p. c., cellulose 4–6 p. c., lichenin (starch) 79.2 p. c., related substance, water 6 p. c., ash 6.99 p. c. Demulcent (starch), tonic (cetraric acid), nutritive; chronic catarrhs, pulmonary affections (bronchitis, consumption), chronic diarrhea, dysentery; bread, instead of acacia. Dose, ʒss–1 (2–4 Gm.); decoction, .5 p. c., ℥j–4 (30–120 cc.).



Cetraria islandica: ap, apothecium.

Ceylon Moss.—Indian Ocean. Mostly *Sphærococ'cus lichenoi'des*, 10 Cm. (4′) long, 1.5 Mm. ($\frac{1}{16}$′) thick, cylindrical, forked, filiform above; reddish—when dry whitish, brittle.

Chamaelirium

Chamæli'rium lu'teum, Helonias, False Unicorn, N. F.—The dried rhizome and roots with not more than 5 p. c. of foreign organic matter; N. America. Fragrant perennial herb; stem .3–.7 M. (12–18′) high, from basal rosette of lanceolate leaves terminating in plume-like raceme—pistillate greenish, staminate creamy-white; fruit capsule. Rhizome .5–3 Cm. ($\frac{1}{5}$–$1\frac{1}{5}$′) long, 1 Cm. ($\frac{2}{5}$′) thick, roundish, grayish-brown, annulate from scars of bud-scales, leaf bases above, many yellowish wiry roots beneath, 5–8 Cm. (2–3′) long; fracture hard, horny, internally grayish-yellow, cortex 3–4 Mm. ($\frac{1}{8}$–$\frac{1}{6}$′) thick, odor slight; taste bitter, astringent. Powder, yellowish—parenchyma cells with unaltered starch grains, bundles of calcium oxalate raphides, lignified cork and fibers, tracheæ; solvent: diluted alcohol; contains chamelirin (bitter saponin-like glucoside) 10 p. c. Tænifuge, diuretic, uterine tonic, emetic; tape-worm, atony of gastro-intestinal and genito-urinary mucous membranes, dropsy. Dose, ʒss–1 (2–4 Gm.); 1. *Fluidextractum Heloniadis* (diluted alcohol). Preps.: 1. *Elixir Heloniadis Compositum*, 3.2 p. c. (fldext.), + fldext. of caulophyllum 3.2, fldext. of viburnum opulus 3.2, fldext. of mitchella 12.5, dose, ʒss–1 (2–4 cc.); 2. *Elixir Aletridis Compositum*, 6.5 p. c. Helonin ("Eclectic" extract), dose, gr. 1–5 (.06–.3 Gm.).

Chelidonium

Chelido'nium ma'jus, Chelidonium, Celandine.—The entire plant, collected when beginning to flower, U.S.P. 1880–1890; Europe, N. America. Perennial light green plant, .6 M. (2°) high, emitting when wounded a saffron-yellow, opaque juice; leaves pinnate, 10–20 Cm. (4–8′) long; flowers yellowish; root reddish-brown, several-headed, branching; fruit capsule, linear, 2-valved; seed numerous; odor unpleasant when fresh; taste acrid; contains chelerythrine, chelidonine, α- and β-homochelidonine, chelidoxanthin, sanguinarine, protopine, chelidonic (jervic) acid, chelidoninic (ethylenesuccinic) acid, gum, chlorophyll; solvents: water, alcohol. Cathartic, diuretic, diaphoretic, expectorant; used by ancients as now for jaundice, dropsy, intermittent fever, scrofula, skin diseases; externally—warts, corns, eczema, urticaria, itching eruptions; fresh herb in amenorrhea, as a vulnerary. Dose, dried plant, gr. 15–60 (1–4 Gm.); fresh plant, ʒj–2 (4–8 Gm.).

Chelidonium majus: showing fruit, flowers, ovary, and seed.

CHENOPODIUM. CHENOPODIUM.

Oleum Chenopodii. Oil of Chenopodium, *U.S.P.*

Chenopodium ambrosioides, var. **anthelminticum,** *Linné.* — A volatile oil distilled with steam from the fresh, overground parts of the flowering and fruiting plant, yielding not less than 65 p. c. ascaridol ($C_{10}H_{16}O_2$).

Habitat. W. Indies, C. and S. America, waste places, roadsides; naturalized in United States, Europe, Africa; cultivated in Maryland for the oil.

Syn. American (Wild) Wormseed, Stinking Weed, Goosefoot, Jerusalem (Jesuit) Tea, Jerusalem Oak (Jak), Fructus Chenopodii Anthelmintici; Ol. Chenopod., Oil of American Wormseed; Fr. Ansérine Vermifuge (plante fleurie), Essence de Chénopode anthelmintique; Ger. Amerikanischer Wurmsamen, Wurmsamenöl, Chenopodiumöl.

Che-no-po'di-um. L. see etymology, above, of Chenopodiaceæ.

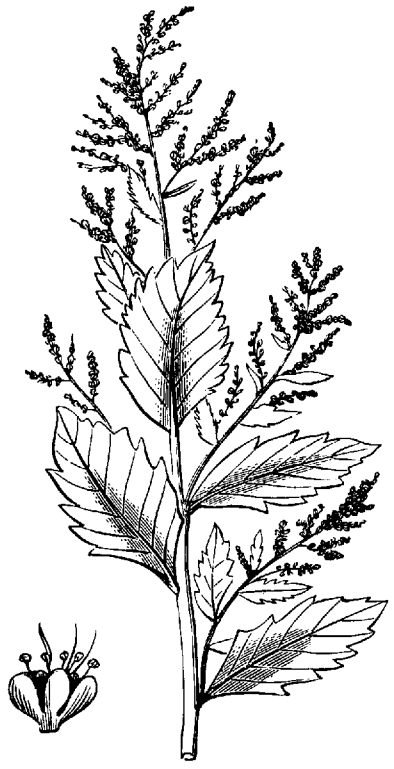
Am-bro-si-oi'des. L. fr. Gr. α, priv., not, + βροτός, mortal, + οειδης, like —*i. e.*, resembling that which is immortal, once thought to effect that condition when taken.

An-thel-min'ti-cum. L. fr. Gr. ἀντί, against, + ἕλμινθα, a worm—*i. e.*, worm antagonizer or destroyer.

PLANT.—Annual or perennial, .6–1.6 M. (2–5°) high; stem angular, furrowed, branched; leaves toothed, yellowish-green, gland-dotted on under surface; flowers July-Sept., greenish-yellow, dense leafy spikes. Fruit, 2 Mm. ($\frac{1}{12}$′) thick, size of pin's head, depressed-globular, greenish-gray, integuments friable, containing a lenticular, obtusely edged, glossy, black seed; odor peculiar, terebinthinate; taste bitter, pungent. All parts of the plant have this disagreeable odor and same medicinal properties when dry and fresh; grows best in rubbish, along fences, in village streets, vacant lots, and should be collected in October.

CONSTITUENTS.—Volatile oil 3–3.5 p. c., from fresh herb .5–1 p. c.

Oleum Chenopodii. Oil of Chenopodium.—This volatile oil, obtained by distilling with water or superheated steam, is a colorless, pale



Chenopodium ambrosioides var. *anthelminticum.*

Chenopodium ambrosioides.

yellowish liquid, peculiar, disagreeable odor, bitter, burning taste, soluble in 70 p. c. alcohol (8), sp. gr. 0.967, levorotatory; contains a terpene — pinene, $C_{10}H_{16}$, and a liquid oxygenated portion ($C_{10}H_{16}O_2$), ascaridol. Should be kept cool, dark, in well-stoppered, amber-colored bottles. Dose, ♏ij–10 (.13–.6 cc.).

PREPARATIONS. — (Unoff.). FRUIT: *Fluidextract,* ♏xv–30 (1–2 cc.). *Decoction* (water or milk), ℥j–2 (30–60 cc.). FRESH PLANT: *Expressed Juice,* ʒij–4 (8–15 cc.), ter die.

PROPERTIES.—Anthelmintic, vermifuge, round worms (*Ascaris lumbricoides*).

USES.—While mainly for worms, it has also been used in intermittents, hysteria, chorea, nervous affections, tenia. May give the powder incorporated with molasses or syrup, but the oil is more popular, being well taken on sugar by children. Should be given twice daily for several days, on empty stomach if possible, and follow with a dose of castor oil. Fruit, U.S.P. 1820–1890.

Allied Plants:

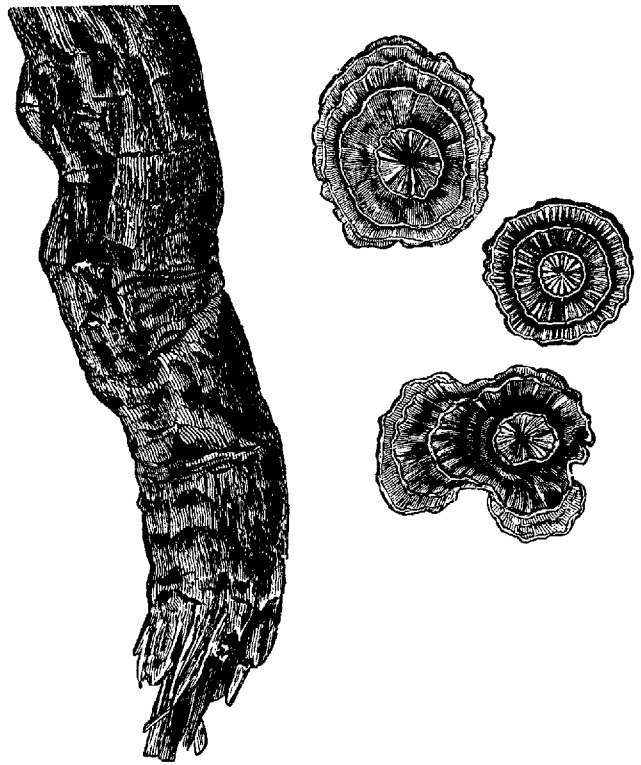
1. *Chenopodium ambrosioi'des, Herba Botryos Mexicanæ, Mexican Tea.*—The fruit, U.S.P. 1890; Europe, Asia. This resembles very closely the preceding plant, the latter being, however, more strongly aromatic, leaves more deeply toothed, the lower ones often nearly pinnatifid, spikes more elongated, usually leafless; fruit of both alike. *C. Bo'trys, Jerusalem Oak (Feather Geranium);* Europe, Asia. Strongly aromatic; catarrh, asthma. *C. Bo'nus Henri'cus, Good King Henry;* Europe; taste saline, mucilaginous. *C. al'bum, Pig Weed (Lamb's Quarters);* taste mucilaginous, saline. *C. Vulva'ria, Fetid Goosefoot;* Europe; plant has fish-brine odor, due to trimethylamine.

Chimaph'ila umbella'ta, Chimaphila, Pipsissewa, Princes' Pine.—Pyrolaceæ, *N.F.*—The dried leaves with not more than 5 p. c. of stems or other foreign organic matter; N. America, Europe, Asia—dry woods. Perennial evergreen herb, 10–25 Cm. (4–10′) high; rhizome creeping, yellowish; flowers terminal umbel, corymb, white tinged with red, fragrant. Leaves, oblanceolate, 2.5–7 Cm. (1–3′) long, 8–20 Mm. (⅓–⅘′) broad, upper portion coarsely, sharply serrate, obtuse, lower cuneiform, nearly entire, coriaceous, dark green, paler beneath; odor slight; taste astringent, bitter. Powder, greenish-brown—epidermal tissue, stomata, palisade and spongy parenchyma with chloroplastids, tracheæ, reddish amorphous substance, calcium oxalate rosettes, starch grains, few stem and root-stock fragments; solvents: diluted alcohol, boiling water; contains chimaphilin, tannin, arbutin, ericolin, urson, volatile oil, resin. Astringent, tonic, diuretic (similar to buchu, uva ursi, pareira, scoparius), rubefacient; scrofula, rheumatism, dropsy, scanty urine, gravel, hematuria, gonorrhea, skin affections, diarrhea, gout, ulcers, tumors. Dose, gr. 15–60 (1–4 Gm.); 1. *Fluidextractum Chimaphilæ* (diluted alcohol), dose, ʒss–1 (2–4 cc.); 2. *Fluidextractum Stillingiæ Compositum,* 12.5 p. c.: Prep.: 1. *Syrupus Stillingiæ Compositus,* 25 p. c. Decoction, Extract.

C. macula'ta, Spotted Wintergreen (Pipsissewa).—The leaves, U.S.P. 1830; N. America. Herb, 7.5–15 Cm. (3–6′) high, leaves 2.5–5 Cm. (1–2′) long, 12 Mm. (½′) wide, ovate-lanceolate, obtuse at base, toothed, upper surface variegated (spotted) with white along midrib and veins; flowers purplish-white.

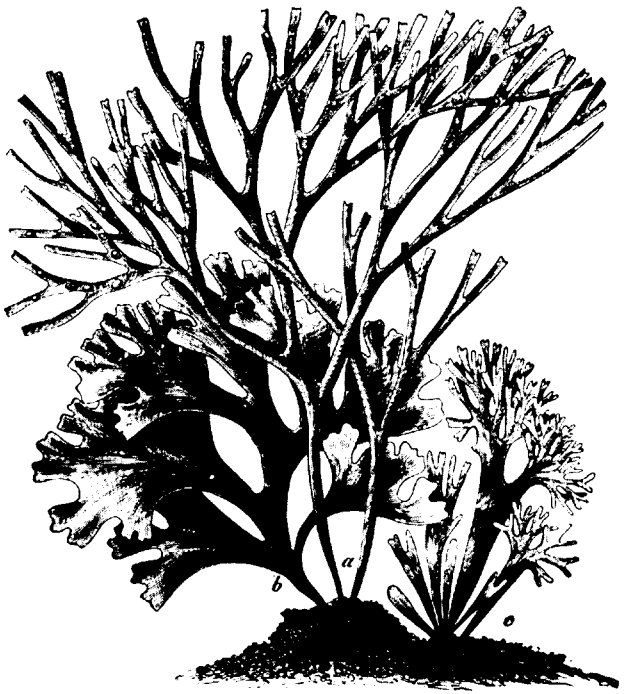
Chimaphila umbellata: upper part of flowering stem.

Chionan'thus virgin'ica, Chionanthus, Fringe Tree Bark, N.F.—The dried root-bark with not more than 5 p. c. of wood and other foreign organic matter, yielding to 70 p. c. alcohol not less than 25 p. c. of non-volatile extractive; S. United States, river banks. Low tree or shrub, very ornamental in cultivation; leaves 5–6, oblong; fruit, purple ovoid drupe, 1–2 Cm. ($\frac{2}{5}$–$\frac{4}{5}$′) long, Bark, usually in transversely curved pieces, occasionally single quills, 1–10 Cm. ($\frac{2}{5}$–4′) long, 2–10 Mm. ($\frac{1}{12}$–$\frac{2}{5}$′) thick, heavy, some pieces sink in water, reddish-brown, transverse wrinkles, scaly, pits and ridges, whitish cork patches, root-scars, inner surface yellowish-brown, striate, undulate; fracture short, hard, coarsely granular (stone cells); odor characteristic; taste bitter. Powder, light brown—starch grains, numerous stone cells in groups or isolated, few short fibers, numerous resin masses, brownish cork cells, parenchyma tissue, prismatic crystals; solvent: water; contains bitter principle, tannin, ash 5 p. c. Alterative, blood purifier; liver trouble, syphilis; popular with Eclectics, Homeopaths. Dose, gr. 15–30 (1–2 Gm.); 1. *Fluidextractum Chionanthi* (75 p. c. alcohol). Decoction, Infusion, 5 p. c., ℥ss–1 (15–30 cc.).



Pareira (brava): portion of a root and transverse section of the same.

Chondroden'dron tomento'sum, Parei'ra, Parei'ra Bra'va, N.F.—**The dried root with not more than 5 p. c. of stems nor 2 p. c. of other** foreign organic matter; Brazil, near Rio Janeiro, Peru. Tall woody climber; stem 1–10 Cm. ($\frac{2}{5}$–4′) thick; bark rough, with elevated prominences; leaves 12.5–30 Cm. (5–12′) long, ovate, cordate, petiolate, smooth above, finely woolly beneath; flowers dicœcious, panicles; fruit purplish-black drupe, 6 in a bunch like grapes. Root subcylindrical, tortuous, in pieces 10–15 Cm. (4–6′) long, 1–6 Cm. ($\frac{2}{5}$–2′) thick, brownish, furrowed, hard, heavy, tough; internally brownish-gray, waxy luster (fresh), several successive concentric zones of fibro-vascular bundles, each 2–4 Mm. ($\frac{1}{12}$–$\frac{1}{6}$′) wide, separated by zones of parenchyma and stone cells, prominent medullary rays; stems grayish, usually covered with lichens, without waxy luster; odor slight; taste bitter. Powder, dark brown—numerous starch grains, tracheæ, wood-fibers, stone cells, brownish cork; bluish-black with iodine T. S.; solvents: 70 p. c. alcohol, boiling water; contains pelosine (cissampeline—identical with bebeerine, buxine, paricine), tannin, starch, gum, ash 6–11 p. c. Diuretic, tonic, laxative; cystitis, calculi, gonorrhea, leucorrhea, dropsy, rheumatism, jaundice; natively for bites of poisonous serpents (leaves to wound, vinous infusion internally). Dose, ℥ss–1 (2–4 Gm.); 1. *Fluidextractum Pareiræ* (diluted alcohol), dose, ℥ss–1 (2–4 cc.). *Extract*, gr. 10–20 (.6–1.3 Gm.). *Infusion, Decoction*, each, 5 p. c., ℥j–2 (30–60 cc.).



Chondrus crispus: a, narrow form, with fruit; *b*, broad form; *c*, small form.

Chon'drus cris'pus or *Gigarti'na mamillo'sa, Irish Moss, Carrageen, N. F.*—Gigartinaceæ. The dried, bleached plants, with not more than 2 p. c. of foreign organic matter; Atlantic Ocean, New England, Irish coast. Entire plants small, matted together, slender dichotomously branching stalk; segments flattened, emarginate, cleft at tips, 5–15 Cm. (2–6′) long, 1–10 Mm. ($\frac{1}{25}$–$\frac{2}{5}$′) broad, yellowish-white, transparent, somewhat cartilaginous, frequently coated with calcareous deposit which effervesces with hydrochloric acid; sporangia embedded (*C. crispus*) or on short stalks (*G. mamillosa*); odor slight, seaweed-like; taste mucilaginous, saline; solvent: water; contains mucilage (carrageenin—not precipitated by alcohol—gum, or by lead acetate—pectin, or blue with iodine—starch, only slightly adhesive) 55–90 p. c., minerals 14 p. c., albuminoids 9 p. c., water 18 p. c., ash 8–15 p. c. Demulcent, nutrient, dietetic; bronchitis, diarrhea, kidney and bladder affections—diet instead of tapioca, sago, barley. Plants green (fresh) or purplish (dry) are taken from the beach after storms, or are torn by boatmen with rakes from rocks, 3–6 M. (10–20°) under water, then washed in sea water and spread high on shore for drying and bleaching—a process frequently repeated several times. Dose, ʒj–2 (4–8 Gm.); 1. *Mucilago Chondri*, 3 p. c.—emulsifier; Decoction, 5 p. c. (water or milk, sweetened and flavored), ʒj–2 (30–60 cc.). *G. acicula'ris* and *G. pistilla'ta* have similar appearance and properties.

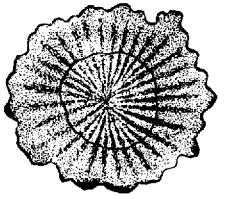
Chrysanthemum

Chrysan'themum (*Pyrethrum*) *ro'seum* and *C. car'neum, Persian Pellitory—Persian* (*Caucasian*) *Insect Powder;* W. Asia, Persia. Perennial plants, resembling chamomile; flower-heads 4 Cm. ($1\frac{3}{5}$′) broad; ray-florets rose-color with anthers included (*roseum*), or purple with anthers projecting (*carneum*); powder grayish-yellow, brownish (best), bright yellow (weakest), tea odor, bitter—used only for killing insects, the toxicity being due to pyrethron (pyrethrotoxic acid—cardiac depressant like veratrine), a neutral, amber-yellow syrupy ester (pyretol) soluble in alcohol, ether, splitting into pyrethrol, $C_{21}H_{34}O$, and several acids, pyrethresin.

C. cinerariæfo'lium, Dalmatian Insect Powder; Dalmatia. These flowers are most valuable when collected immediately after expansion, and yield a more or less inferior insect powder—geeenish-yellow. Plant cultivated in Algeria, Japan, Montenegro, and largely in California, where flowers are dried carefully (to preserve color and volatile oil)—furnishing a superior powder, called "buhach." Should not contain more than 5 p. c. flower-stems or 2 p. c. acid-insoluble ash. *Tests:* 1. Put 4 gr. (.25 Gm.) of the powder upon a fly in a vial—it should be stupefied in 1 minute and dead in 2 or 3 minutes. 2. With microscope can recognize scarcity of pollen and abundance of collenchymatous tissue when much stem and few flowers are used. Powder often adulterated with turmeric (chloroform test), chrome alum (ash not more than 6 p. c.), and other compositous plant flowers, as *Chrysanthemum Leucan'themum* (*Leucanthemum vulga're*), white-weed, oxeye or field daisy, and *C. seg'etum.* Neither of these is an insecticide, but will produce dermatitis in some persons.

Cicho'rium In'tybus, Chicory.—Europe, naturalized in United States. Root with laticiferous vessels radiate, also is whiter, more woody, and has thinner bark than taraxacum. July collection contains 36 p. c. of inulin, bitter principle, etc., and has properties similar to taraxacum root, with which it often is mixed as an adulterant. Roasted root is used frequently to adulterate coffee. *C. Endiv'ia, Endive;* Levant; cultivated for its bitter leaves.

Cichorium Intybus.



Cichorium: transverse section.

Cimicifuga

CIMICIFUGA. CIMICIFUGA, *U.S.P.*

Cimicifuga racemosa, (*Linné*) *Nuttall.* — The dried rhizome and roots with not more than 2 p. c. stems or other foreign organic matter, yielding not more than 4 p. c. acid-insoluble ash.

Habitat. United States, Canada; in shady, rocky places.

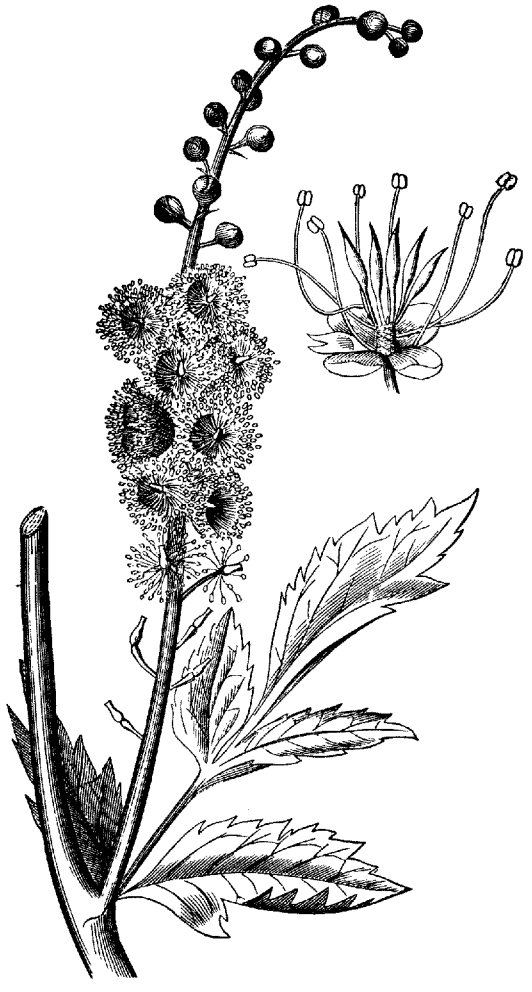
Syn. Cimicif., Black Cohosh, Black Snakeroot, Macrotys, Bugbane, Bugwort, Rattleroot, Rattleweed, Richweed, Squawroot, Rattlesnake's Root; Cimicifuga Rhizoma, Actææ Racemosæ Radix; Fr. Racine d'Actée a Grappes; Ger. Schwarze Schlangenwurzel.

Cim-i-cif'u-ga. L. *cimex*, bug, + *fugare*, to drive away—*i. e.*, from the fact of *Cimicifuga fœtida* being used for that purpose in Siberia and Kamtchatka.

Ra-ce-mo'sa. L. *racemosus*—*i. e.*, full of clusters, racemes—*i. e.*, the flowers.

Plant.—Perennial; stem slender, unbranched, 1.5–2.5 M. (5–8°) high; leaves irregularly ternately decompound, the rather small leaflets incised, 2.5–7.5 Cm. (1–3′) long; flowers June–July, regular, numerous, small, white, in wand-like racemes, 20–50 Cm. (8–20′) long, emit disagreeable odor. Rhizome, horizontal in growth, branched, 2–15 Cm. ($\frac{4}{5}$–6′) long, 1–2.5 Cm. ($\frac{2}{5}$–1′) thick, dark brown, grayish-black, slightly annulate from circular scars of bud scale-leaves; upper surface with numerous hard, erect, curved branches terminated by deep cup-shaped scars showing radiate structure; lower and lateral surfaces with numerous root-scars and few short roots; fracture horny; internally whitish and mealy or dark brown and waxy; bark thin, wood distinctly radiate and of same thickness as pith; odor slight; taste bitter, acrid; roots cylindrical, obtusely quadrangular, 1–3 Mm. ($\frac{1}{25}$–$\frac{1}{8}$′) thick, 3–12 Cm. ($1\frac{1}{5}$–$4\frac{4}{5}$′) long, brownish, blackish, longitudinally

wrinkled, fracture short; internally cortex thin, brownish, wood yellowish, 4–6-rayed. POWDER, light brown—numerous starch grains, .003–.015 Mm. ($\frac{1}{8325}$ $\frac{1}{1650}$') broad, fragments showing tracheæ with



Cimicifuga racemosa.

bordered pores and lignified wood-fibers, fragments of suberized epidermis made up of tabular cells. *Solvents:* alcohol, boiling water. Dose, gr. 5–30 (.3–2 Gm.).

ADULTERATIONS.—Rare: Caulophyllum, podophyllum, each sometimes 1 p. c., comfrey, possessing similar blackish color, smaller amount.

Commercial.—Plant, also named *Actæ'a racemosa*, emits when in bloom an odor resembling meadow-sweet, by many considered unpleasant. Rhizome should be collected in autumn (most active), and used shortly thereafter, as it deteriorates with age; recognized readily by the microscope from black and green hellebore whose rhizomes have few and broad wood-bundles and roots with pentagonal or hexagonal wood-zone; rhizome of *Actæa spica'ta*, Europe, very similar, but its juicy berries are in marked contrast with the official plant's dry follicles.

CONSTITUENTS.—Cimicifugin, resins 3.5 p. c., amorphous resinous body (probably the active principle), racemosin, fat, starch, gum, tannin, volatile oil, sugar; ash 8–10 p. c.; latest investigators claim activity to depend upon: isoferulic acid, salicylic acid, palmitic acid, phytosterol, 3 crystalline bodies (alcohols ?), alkaloids (trace).

Cimicifuga racemosa: transverse section through a branch of the rhizome and through rootlets; natural size.

Cimicifugin.—Bitter, acrid crystalline principle, obtained by acting on the "Eclectic" resinoid, cimicifugin, or upon the fresh rhizome with alcohol, precipitating (resin, tannin, coloring matter) with lead subacetate, removing lead with hydrogen sulphide, and evaporating; it is soluble in alcohol, chloroform, slightly in ether.

Resins.—There are two of these, one soluble in alcohol but not in ether, the other soluble in ether as well as alcohol. These two are obtained as a mixture by exhausting powdered drug with alcohol, precipitating with water, drying precipitate, and as such constitutes the "Eclectic" *cimicifugin* (*macrotin*), a yellowish-brown hygroscopic powder. Dose, gr. ½–2 (.03–.13 Gm.).

PREPARATIONS.—1. *Fluidextractum Cimicifugæ.* Fluidextract of Cimicifuga. (Syn., Fldext. Cimicif., Fluid Extract of Cimicifuga, Fluidextract of Black Cohosh, Fluidextract of Black Snakeroot; Extractum Cimicifugæ Liquidum; Fr. Extrait fluide d'Actée a Grappes; Ger. Cimicifugafluidextakt.)

Manufacture: Similar to Fluidextractum Sarsaparillæ, page 126; menstruum: alcohol. Dose, ♏v–30 (.3–2 cc.).

Prep.: 1. *Elixir Sodii Salicylatis Compositum, N. F.*, 3.2 p. c.

2. *Tinctura Cimicifugæ, N.F.*, 20 p. c. (alcohol). Dose, ʒss–2 (2–4 cc.).

3. *Elixir Tongæ et Salicylatum, N. F.*, 3.5 p. c.

Unoff. Preps.: Decoction, 5 p. c., ʒss–1 (15–30 cc.). *Compound Syrup*, 4 p. c.

PROPERTIES.—Alterative (diuretic, diaphoretic, expectorant), antispasmodic, sedative (arterial and nervous), cardiac stimulant—safer than digitalis, emmenagogue. Acts on the gastric secretion like any other bitter, slightly depresses the rate, but increases the force of the pulse, like digitalis; contracts the uterus, increasing the menstrual flow and arterial tension.

USES.—It was introduced first into medicine in 1831 by Dr. Young. Given as cardiac tonic in fatty heart, chorea, acute and chronic bronchitis, rheumatism, neuralgia, hysteria, phthisis, dyspepsia, amenorrhea, dysmenorrhea, seminal emissions. Large doses cause vertigo, tremors, reduced pulse, vomiting, prostration. Once, but not now, thought efficacious in snake bite, labor-pains, and ills of late pregnancy.

Incompatibles: Iron preparations, stimulants, alcohol, ammonia.

Synergists: Gold, digitalis, ergot, belladonna, etc.

Cinnamomum Loureirii, *Nees.* { The dried bark, yielding not less than 2 p. c. of volatile ether-soluble extractive.

Habitat. Annam (Cochin China).

Syn. Cinnam., Cinnamomum Saigonicum, Annam—China—God's Cinnamon, Annam Cassia, Cortex Cinnamomi Saigonici; Fr. Cannelle de Saigon; Ger. Saigonzimt.

Cin-na-mo'mum. L. fr. Ar. *kinnamon*, cinnamon, probably connected with *qaneh*, a reed, cane—*i. e.*, resemblance of stems; or Malay *kaju manis*, sweet wood, from its aromatic odor and taste.

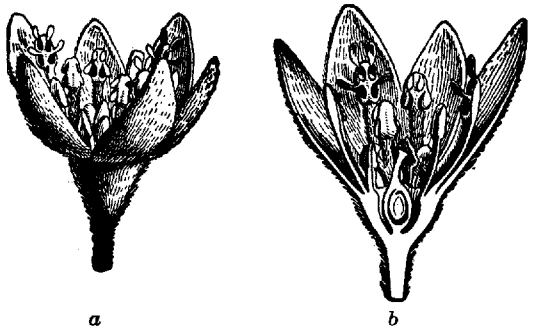
Lou-rei'ri-i. L. *Loureiri-um* in honor of Jean de Loureiro, 1710–1791—*i. e.*, a celebrated Portuguese botanist and writer, author of *Flora Cochinchinensis*, and other important works.

Sa-i-gon'i-cum. L. belonging to Saigon, a country and city in Southern Annam—*i. e.*, its native habitat.

PLANT.—Handsome evergreen tree, 6–9 M. (20–30°) high, trunk .3–.5 M. (12–18′) thick, young twigs slightly quadrangular; leaves coriaceous, 3–5-nerved, but only midrib reaches apex, bright glossy-green above, glaucous beneath, 10–20 Cm. (4–8′) long; flowers Jan.–March, small, hermaphrodite or polygamous, fleshy, black, ovoid, size of small olive, adhering, like acorn, to cup-shaped perianth. BARK, in quills, 30 Cm. (12′) long, 4 Cm. ($\frac{1}{2}$′) broad; bark .5–3 Mm. ($\frac{1}{50}$–$\frac{1}{8}$′) thick, light brown, dark purplish-brown with grayish patches of crustose lichens and numerous bud-scars, finely wrinkled, especially that of younger twigs, otherwise rough from corky patches surrounding the lenticels; inner surface reddish-brown, dark brown, granular, slightly striate; fracture short—inner bark porous from large oil and mucilage cells, and separated from the outer by a layer of stone cells; odor characteristic, aromatic; taste sweetish, aromatic, pungent; POWDER, yellowish-brown—numerous starch grains; single and 2–4-compound, single grains .005–.025 Mm. ($\frac{1}{5000}$–$\frac{1}{1000}$′), stone cells irregular, bast-fibers with slightly lignified walls; parenchyma, reddish-brown walls; oil and mucilage cells. *Solvents:* alcohol; hot water partially. Dose, gr. 5–30 (.3–2 Gm.).

Cinnamomum twig, showing leaf venation.

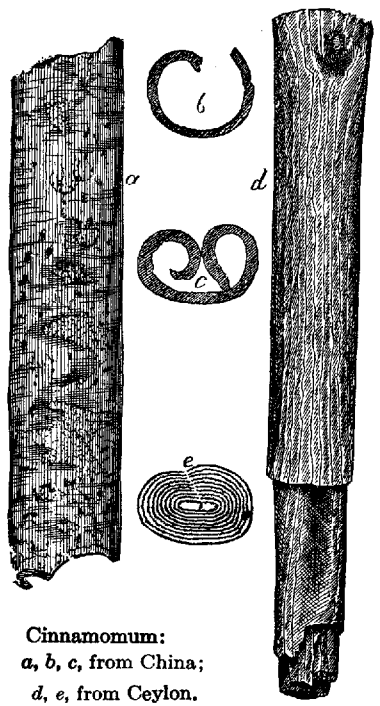
ADULTERATIONS.—BARK: *Saigon*—Cassia bark, and a closely resembling bark of unknown derivation, having lighter gray color and coarser structure identified by weak odor and taste; possibly unscraped Guava bark quills, and clove bark; *Ceylon*—Scarcely possible in the entire state; POWDER: Neither Saigon or Ceylon found on the market, all so labeled being cassia, which is subject to endless admixtures—chips, siftings, buds, walnut-shells, oil stone, flour, sand, beans, grains, starch, clove-buds—exhausted drug, by percolation, distillation; ash (sometimes) 8–10 p. c.; OIL: That distilled from flowers and roots. phenol, oil of clove, petroleum, colophony, lead.



a *b*

Cinnamomum: *a*, flower; *b*, vertical section of the same.

Commercial.—Cinnamon was a very early favorite spice, being brought by Arabian navigators to the Phœnicians, Grecians, and Romans, the Chinese cassia being used first, the Ceylon not until 1275. While there are about 50 species growing wild, only a few yield the commercial bark—this resulting mostly from cultivated plants. At one time Ceylon excelled in the industry, but there coffee largely has replaced it, thus restricting to the neighborhood of Colombo the principal cinnamon gardens; however, S. China has become equally interested in the cultivation and as a result produces much valuable bark. There are two important varieties: 1, *Saigon, Annam Cassia* (*Cinnamon, U.S.P.*), thought to be entirely from wild trees (*C. Lourei'rii*, and other species), growing in the mountainous districts of Annam. While chips and thick trunk-bark sometimes reach us, most is from branches and small stems, all being of good quality—sweet,



Cinnamomum: *a*, *b*, *c*, from China; *d*, *e*, from Ceylon.

aromatic, almost void of astringency and bitterness; some consider it high-grade cassia, but its own specific structure, area of growth, and absence of objectionable qualities in the corky layer seem to preclude such a possibility; certainly it is related more closely to cassia than to Ceylon, and may be an inferior grade (from one or more species distinct from *C. Cassia*) of that distinctive Chinese cinnamon so highly prized by the natives; 2, *Ceylon* (*Cinnamon*), formerly in U.S.P., considered best, being nearly all from cultivated plants through the process of pollarding, so that in 2–3 years many slender stems are produced with bark devoid of astringent and corky layer, this latter not yet having had time to form. The cultivation of cinnamon begins with the planting of seed in prepared soil, 4–5 in each hill, from which, in 5–6 years, the straight stems due to continued pruning, 1.5–3 M. (5–10°) high, are cut down with catty-knives, and by coppicing a new crop of twigs is formed every 2–3 years. The barking (March–June, after which delicacy and aroma lessen) takes place under cover by making 2 equidistant longitudinal incisions and transverse ones every few feet apart, then teasing off easily with a mama-knife (Saigon); the bark may now be allowed to wilt or undergo partial fermentation for several days, becoming soft and pliable, thus facilitating epidermal separation, when it is laid concave downward and scraped to the layer of stone cells, thereby rejecting the bitter or astringent portion (Ceylon); congeries of quills are formed, which when dried (first by shade, then by sun) are made into 30-pound (14 Kg.) bundles and marketed as to quality in *firsts*, *seconds*, *thirds*, the inferior grades being distilled for oil; or each quill is dried separately (Saigon) and tied into bundles for exportation. The bark is imported loose or in bundles with split bamboo bands from Canton, Hong Kong (Saigon), Calcutta, Colombo.

CONSTITUENTS.—Volatile oil .5–2 p. c., tannin 3–5 p. c., resin, bitter principle, sugar, mannite, starch, mucilage, ash 6 p. c., of which 2 p. c. is insoluble in diluted hydrochloric acid.

Oleum Cinnamomi. Oil of Cinnamon, *U.S.P.*—(Syn., Ol. Cinnam., Oleum Cassiæ, U. S. P. 1910, Cassia Oil, Oleum Cinnamomi Cassiæ, Oil of Chinese Cinnamon; Fr. Essence (Huile) de Cannelle de Chine; Ger. Zimtöl, Zimtkassienöl.) This volatile oil distilled from the leaves, twigs, and waste bark of *Cinnamomum Cassia* (Chinese), and rectified by steam distillation, is a yellowish, brownish liquid, darker and thicker by age and exposure, characteristic odor and taste of cassia cinnamon, sp. gr. 1.055 soluble in alcohol (1), glacial acetic acid (1), 70 p. c. alcohol (2), optically almost inactive; contains at least 80 p. c. of cinnamic aldehyde, C_9H_8O (oxidizing into resin and cinnamic acid) upon which the value depends, also cinnamyl acetate, $C_9H_9C_2H_3O_2$ (liquid of unpleasant acrid taste), and phenyl-propyl acetate, orthocumaric aldehyde, cinnamic acid, $C_9H_8O_2$; this latter is not in fresh oil, and after being formed becomes, by further oxidation, benzoic acid. *Tests:* 1. Shake oil (2) with purified petroleum benzin (5–10)—decanted liquid is colorless and gives *no* green color when shaken with equal volume of (1 in 1000) copper acetate solution (abs. of rosin or rosin oils). 2. Thoroughly wash a 1000 cc. beaker and a filter paper free of chlorides; place 3 or 4 drops of oil on a clean watch glass on triangle, ignite, immediately cover with moistened beaker; wash products of combustion through washed filter paper with 10–20 cc. distilled water, acidulate filtrate with 1 drop nitric acid, add 1 drop silver nitrate T. S.—no turbidity (abs. of chlorinated products). Should be kept cool, dark, in well-stoppered, amber-colored bottles. The Ger. P. and U. S. P. recognize only the oil of Chinese cinnamon (cassia), while the Br. P. and Fr. Codex that of Ceylon cinnamon; the former is more abundant and cheaper, the latter of finer flavor and more delicate aroma, containing besides cinnamic aldehyde, some eugenol and phellandrene. Dose, ♏j–5 (.06–.3 cc.).

PREPARATIONS.—1. BARK: 1. *Tinctura Cardamomi Composita*, 2.5 p. c. 2. *Tinctura Gambir Composita*, 2.5 p. c. 3. *Tinctura Lavandulæ Composita*, 2 p. c. 4. *Tinctura Rhei Aromatica*, 4 p. c. 5. *Syrupus Cinnamomi, N.F.*, 10 p. c. 6. *Tinctura Cinnamomi, N.F.*, 20 p. c. (glycerin 7.5 p. c., alcohol 67.5, water 25. Dose, ʒss–2 (2–8 cc.): Preps.: 1. *Elixir Taraxaci Compositum, N.F.*, 3 p. c. 2. *Mistura Rhei Alkalina, N.F.*, 6.4 p. c. 7. *Pulvis Aromaticus, N.F.*, 35 p. c. + ginger 35, cardamom seed 15, myristica 15. 8. *Pulvis Aromaticus Rubefaciens, N.F.*, 30 p. c., cinnamon 30, clove 30, ginger 20, capsicum 20. 9. *Pulvis Cretæ Aromaticus, N.F.*, 8 p. c. 10. *Syrupus Sennæ Aromaticus, N.F.*, $\frac{2}{5}$ p. c. 11. *Tinctura Antiperiodica, N.F.*, $\frac{1}{15}$ p. c. 12. *Tinctura Aromatica, N.F.*, 10 p. c. + ginger 4, galangal 2, clove 2, cardamom seed 2. 13. *Tinctura Opii Crocata, N.F.*, $\frac{3}{5}$ p. c. 14. *Tinctura Opii et Gambir Composita, N.F.*, $\frac{1}{40}$ p. c. 15. *Tinctura Viburni Opuli Composita, N.F.*, 6.5 p. c.

II. OIL: 1. *Aqua Cinnamomi.* Cinnamon Water. (Syn., Aq. Cinnam.; Fr. Eau de Cannelle; Ger. (Einfaches) Zimtwasser.)

Manufacture: $\frac{1}{5}$ p. c. Similar to Aquæ Aromaticæ; triturate oil .2 cc. with purified talc 1.5 Gm., recently boiled distilled water q. s. 100 cc., filter until clear. Dose, ʒss–1 (15–30 cc.).

Preps.: 1. *Infusum Digitalis* (1.5 p. c.)—15 p. c. 2. *Mistura Cretæ*, 40 p. c. 3. *Liquor Ferri Albuminati, N.F.*, 20 p. c. 4. *Syrupus Ipecacuanhæ et Opii, N.F.*, 3.2 p. c. 5. *Tinctura Rhei Aquosa, N.F.*, 12.5 p. c.

2. *Spiritus Cinnamomi.* Spirit of Cinnamon. (Syn., Sp. Cinnam.; Fr. Alcoolat de Cannelle; Ger. Zimtspiritus.)

Manufacture: 10 p. c. Dissolve oil 10 cc. in alcohol q. s. 100 cc. Dose, ♏v–30 (.3–2 cc.).

Preps.: 1. *Syrupus Rhei*, $\frac{2}{5}$ p. c. 2. *Syrupus Ipecacuanhæ et Opii, N.F.*, $\frac{2}{5}$ p. c. 3. *Tabellæ Phenolphthaleini, N.F.*, $\frac{1}{50}$ ♏.

3. *Acidum Sulphuricum Aromaticum*, $\frac{1}{10}$ p. c. 4. *Fluidextractum Cascaræ Sagradæ Aromaticum*, $\frac{1}{50}$ p. c. 5. *Acetum Aromaticum, N.F.*, $\frac{1}{20}$ p. c. 6. *Dentifricium, N.F.*, .175 p. c. 7. *Fluidglyceratum Cascaræ Sagradæ Aromaticum, N.F.*, $\frac{1}{10}$ p. c. 8. *Lavatio Ori, N.F.*, $\frac{1}{2}$ p. c. 9. *Liquor Pepsini Aromaticus, N.F.*, $\frac{1}{40}$ p. c. 10. *Mistura Oleo-Balsamica, N.F.*, $\frac{2}{5}$ p. c. 11. *Nebula Aromatica, N.F.*, $\frac{1}{5}$ p. c. 12. *Nebula Mentholis Composita, N.F.*, $\frac{1}{5}$ p. c. 13. *Odontalgicum, N.F.*, 17 p. c. 14. *Oleum Ricini Aromaticum, N.F.*, $\frac{3}{10}$ p. c. 15. *Spiritus Cardamomi Compositus, N.F.*, 1 p. c. 16. *Spiritus Vanillini Compositus, N.F.*, $\frac{1}{2}$ p. c. 17. *Syrupus Rhamni Catharticæ, N.F.*, $\frac{1}{50}$ p. c.

Unoff. Preps.: BARK: *Fluidextract*, ♏v–30 (.3–2 cc.). *Infusion*, ℥j–2 (30–60 cc.).

PROPERTIES.—Carminative, stomachic, stimulant, astringent, hemostatic, aromatic, antispasmodic, germicide. The oil has no astringency.

USES.—Diarrhea, flatulence, nausea, vomiting, menorrhagia, parturient, to correct griping medicines; for flavoring preparations, chocolate, etc.

Allied Products:

1. *Cinnaldehydum, Cinnamic Aldehyde*, C_5H_8O, U.S.P. 1900.—Obtained as a natural product by shaking oil of cassia with aqueous solution of acid sodium sulphite, filtering, washing crystalline magma with alcohol, decomposing with diluted sulphuric acid, or synthetically by oxidation of cinnamyl alcohol by dry distillation of a mixture of calcium cinnamate and formate, or as a condensation-product by acting on benzaldehyde (10), acetaldehyde (15) with hydrochloric acid gas, or with 10 p. c. solution of sodium hydroxide (10) + water (900). It is a colorless liquid, cinnamon-like odor, burning, aromatic taste, sp. gr. 1.047, boils at 250° C. (482° F.) with partial decomposition, optically inactive, solidified with ice and salt should melt at —7.5° C. (18.5° F.), soluble in alcohol, ether, fixed or volatile oils, sparingly in water; contains at least 95 p. c. of pure cinnamic aldehyde. Similar to oil of cinnamon, for which it may be substituted. Should be kept in well-stoppered, small, amber-colored bottles. Dose, ♏j–5 (.06–.3 cc.).

2. *Cinnamomum Cassia* (*aromat'icum*), *Chinese Cinnamon.*—The dried bark of the shoots deprived of most of the corky portion, U.S.P. 1820–1890; China. Plant—handsome tree, but bark removed when 5–6 years old, occurring in quills 5–20 Mm. ($\frac{1}{5}$–$\frac{4}{5}$′) broad, bark 1–2 Mm. ($\frac{1}{25}$–$\frac{1}{12}$′) thick, deprived of corky layer, yellowish-brown, often with grayish patches, rough, inside nearly smooth, faintly striate, fracture nearly smooth; odor fragrant; taste sweet, aromatic, pungent, astringent. The outer layers are simply imperfectly removed by curved knives or planes, those of iron being avoided, consequently can be recognized readily by having undergone this treatment, also by its more irregular zone of stone cells, the greater abundance of bast-fibers and tannin. This bark is very irregular in quality, owing to its varied origin, and accordingly is recognized in commerce as Cassia, Cassia vera, Cassia lignea, etc. *C. Burman'ni* is believed to yield the Sumatra, also a portion of the Java, China, Timor; *C. Tam'ala*, some of the Calcutta, N. India, Cochin China; *C. i'ners*, part of E. Indian archipelago.

3. *Cassia Buds, Flores Cassiæ.*—These are the small, stem-like immature fruits of various species, somewhat resembling, but smaller than clove, having fine cinnamon odor and taste; contain oil of cinnamon, tannin, etc.

COLOCYNTHIS. COLOCYNTH, *U.S.P.*

Citrullus Colocynthis, (*Linné*) *Schrader.* { The dried pulp of unripe but fully-grown fruit with not more than 5 p. c. seed nor 2 p. c. epicarp, yielding not more than 2 p. c. extractive (purified petroleum benzin) nor 6 p. c. acid-insoluble ash.

Habitat. S. and W. Asia, N. and S. Africa, in arid places, deserts; Arabia, Syria, Egypt, Morocco, Cape of Good Hope, Greece, Spain, Japan; cultivated.

Syn. Colocyn., Colocynth Pulp, Bitter Apple, Colocynth Apple (Fruit), Cucumber, or Gourd; Br. Colocynthidis Pulpa, Colocynth Pulp, Poma Colocynthidis; Fr. Coloquinte; Ger. Fructus Colocynthidis, Koloquinthen, Coloquinthenapfel.

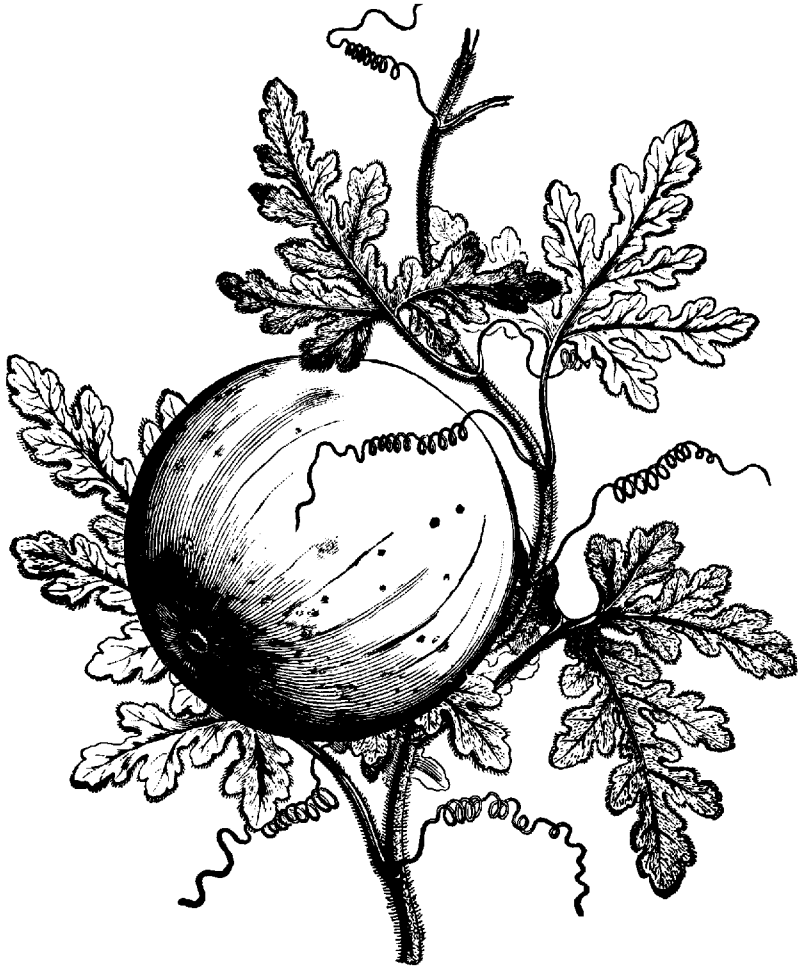
Ci-trul'lus. L. *citrus*, an orange, Gr. κίτρον, citron, Ar. origin—*i. e.*, named after color of the fruit when cut—orange-red.

Col-o-cyn'this. L. fr. Gr. κολοκυνθίς, the classic name of the plant.

PLANT.—Perennial tendril-bearing vine; stem angular, hispid, herbaceous; leaves many-lobed, hairy, 2.5–10 Cm. (1–4′) long, subpalmately cleft on long hispid petioles; tendrils, with which it climbs, short, branching; flowers large, monœcious, both kinds similar, solitary, yellow. FRUIT, before removing seed, nearly globular, 4–7 Cm. ($1\frac{3}{5}$–3′) broad, size of a small orange, usually more or less crushed and in broken pieces, with occasional patches of nearly smooth epicarp; yellowish-white; light, spongy; separable longitudinally when entire into 3 carpels, each containing, near the outer surface, the ovoid, compressed, yellowish seed; odor slight; taste intensely bitter. POWDER yellowish-white, buff and characteristically flaky—fragments of parenchyma and vascular bundles, stone cells, aleurone grains, globules of fixed oil. *Solvents:* alcohol; diluted alcohol; water. Dose, gr. 2–10 (.13–.6 Gm.); laxative, gr. 2–5 (.13–.3 Gm.); drastic purgative, gr. 5–10 (.3–.6 Gm.), repeated in 8–12 hours if necessary.

Commercial.—Plant resembles closely the watermelon (*C. Citrullus*—an annual with larger, smoothish leaves, and much larger sweetish fruit), and has been cultivated in English gardens since 1551. It is a very old medicine, the pulp, constituting 24.5 p. c. of the peeled fruit, being the portion that alone should be used; the separated and rejected seed possess slight bitterness, but also a fixed oil, 12.72 p. c., that, upon removal of testa, renders the kernels (one-half oil) somewhat prized in Africa for food, bread, etc. There are two varieties: 1, *Peeled* (*Turkey*), the smaller, best, usually from the maritime plain between the mountains of Palestine and the Mediterranean; shipped chiefly from Jaffa, Trieste, that from Spain being smaller, darker, more compact, less pulp, blackish seed; 2, *Unpeeled* (*Mogador*), the larger, inferior, covered with smooth, yellowish-brown firm rind. Fruit is gathered in autumn when turning yellow, peeled (or this, if to be done, may be deferred until after drying) and dried quickly by sun or fire; not known or used by native physicians as a cathartic, but simply as a protection against moths.

CONSTITUENTS.—Pulp 24.5 p. c., Seed 75.5 p. c. Pulp contains colocynthin 2 p. c., Colocynthitin, pectin, gum (no starch), ash 15 p. c.; seed contain alkaloid (trace), fixed oil 12.72 p. c., albuminoids 6 p. c., ash 2–4 p. c. (whole fruit 4–5 p. c.).



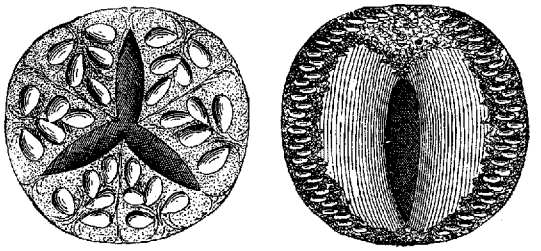
Citrullus Colocynthis.

Colocynthin, $C_{56}H_{84}O_{24}$.—The chief cathartic principle; an amorphous glucoside (bitter principle), obtained by exhausting with water the alcoholic extract, precipitating filtrate with lead acetate and subacetate; the yellow filtered liquid is treated with H_2S to remove lead, filtered, then precipitated with tannin. This tannate of colocynthin is dissolved in alcohol, the tannin thrown down by lead subacetate, filtered liquid digested with animal charcoal, filtered, evaporated. It is a yellow powder, soluble in water, alcohol, boiled with diluted acids splits into sugar and resinous colocynthein. Dose, gr. ½–1 (.03–.06 Gm.)—hypodermically, gr. ⅙–⅓ (.01–.02 Gm.), by which method it is painful, and should be associated with cocaine. The "Eclectic" resinoid, *colocynthin.* Dose, gr. ¼–1 (.016–.06 Gm.).

Colocynthitin (*citrullin*).—A resin left after treating alcoholic extract with cold water in preparing colocynthin; occurs in white, tasteless microscopic prisms, soluble in ether, hot alcohol.

PREPARATIONS.—1. *Extractum Colocynthidis.* Extract of Colocynth. (Syn., Ext. Colocyn., Powdered Extract of Colocynth, Extractum Colocynthidis Alcoholicum; Fr. Extrait de Coloquinte; Ger. Koloquinthenextrakt.)

Manufacture: Macerate, percolate 100 Gm. with diluted alcohol until exhausted (500 cc.), reclaim alcohol, evaporate residue to dryness, pulverize, add dried starch q. s. 25 Gm.; mix thoroughly, pass through fine sieve; 1 Gm. represents 4 Gm. of the drug. Should be kept in small, wide-mouthed, tightly-stoppered bottles. Dose, gr. ½–2 (.03–.13 Gm.).



Peeled colocynth: transverse and longitudinal sections.

Prep.: 1. *Extractum Colocynthidis Compositum.* Compound Extract of Colocynth. (Syn., Ext. Colocyn. Co., Powdered Compound Extract of Colocynth; Fr. Extrait de Coloquinte composé; Ger. Zusammengesetztes Koloquinthenextrakt.)

Manufacture: Triturate together until No. 60 powder, extract of colocynth 16 Gm., aloe 50, cardamom seed 5, resin of ipomœa 14, soap (dried powder) 15, pass through fine sieve. Should be kept in small, wide-mouthed, tightly-stoppered bottles. Dose, gr. 5–15 (.3–1 Gm.).

Preps.: 1. *Pilulæ Hydrargyri Chloridi Mitis Compositæ,* 1¼ gr. (.075 Gm.). 2. *Pilulæ Catharticæ Vegetabiles, N.F.,* 1 gr. (.06 Gm.)—ext. colocyn. co. 6 Gm., ext. hyosc. 3, res. jalap 2, ext. leptand., res. podoph. āā 1.5, ol. menth. pip. .8, alcohol dil. q. s. 100 pills, Dose, 1.3 pills.

Unoff. Preps.: Fluidextract, dose, ♏ij–10 (.13–.6 cc.). *Tincture,* 10 p. c. (alcohol), ℥ss–1 (2–4 cc.).

PROPERTIES.—Drastic and hydragogue cathartic, hepatic stimulant, diuretic; small doses bitter, stomachic; large doses emetic, irritant poison, causing violent griping, dangerous bowel inflammations—gr. 90 (6 Gm.) have killed.

USES.—The Greeks and Arabians were unacquainted with its drastic effect, but prescribed it for its other properties. Now used as an evacuant, dropsy, melancholia, coma, apoplexy, paralysis, but never in pregnancy, nor where gastric or intestinal inflammation is present. It is very harsh and seldom used alone.

Poisoning: Same as for aloe, etc. Evacuate stomach, give demulcents, opium, stimulants.

Citrullus citrullus

Citrul'lus Citrullus (*vulgaris*)—*Cucurbita* (*Cu'cumis*) *Citrullus, Watermelon Seed.*—S. Asia; cultivated. Fruit edible, very large; seed flat, ovate, 12 Mm. (½′) long, blackish, marbled, or orange-brown, ungrooved, blunt on the edge, otherwise like pumpkin seed. Kernels contain fixed oil 7.4 p. c., petroleum benzin extract 19 p. c., proteins, sugar, resin (cucurbitol—closely related to grindelol and ipurganol); diuretic, tenifuge, anthelmintic. Dose, ʒij–16 (8–60 Gm.).

Citrus aurantium var.amara

AURANTIUM. ORANGE.

Aurantii Amari Cortex. Bitter Orange Peel, *U.S.P.*
Oleum Aurantii Florum. Oil of (Neroli) Orange Flowers, *N.F.*

Citrus Aurantium, (var. **amara,**) *Linné.*
1. The dried rind of the unripe fruit.
2. The volatile oil distilled from the fresh flowers.

Habitat. N. India, cultivated near the Mediterranean Sea, Spain, W. Indies, Madeira, China, S. and S. W. United States, Florida, California, etc.

Syn. Aurant. Amar. Cort., Curaçao (Wild) Orange, Aurantii Pericarpium, Cortex Pomorum Aurantii; Br. Aurantii Cortex Recens, Aurantii Cortex Siccatus; Fr. Écorce (Zeste) d'Orange amère, Écorce de Bigarade; Ger. Cortex Aurantii Fructus, Pomeranzenschale.

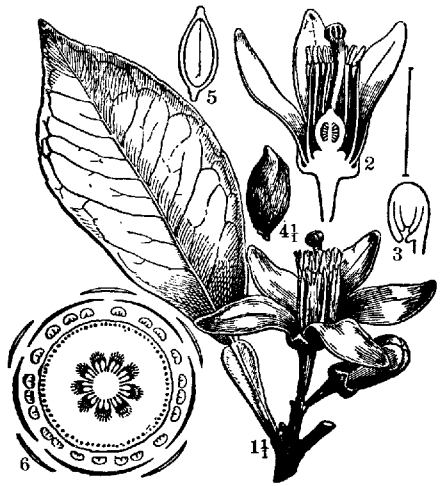
Cit'rus. L. fr. Gr. *κίτριον*, after the town of Citron in Judea, where it formerly flourished.

Au-ran'ti-um. L. *aurum*, gold—*i. e.*, yellow color of fruit.

A-ma'ra. L. *amarus*, bitter—*i. e.*, the decided bitter taste of the fruit.

Orange. Eng. fr. Skr. *nagarange* through the Arab. *naranj*.

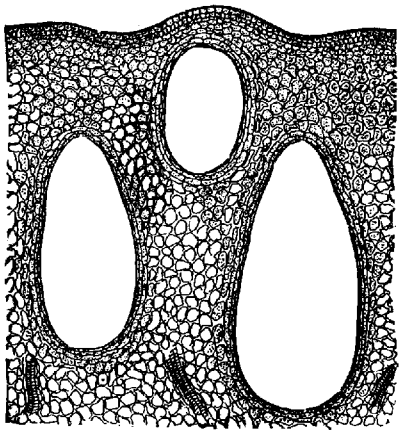
PLANT.—Small tree 3–4.6 M. (10–15°) high; stem branched; bark shining, smooth, greenish-brown; leaves 7.5–10 Cm. (3–4′) long, ovate, evergreen, faintly serrate, with oil-vesicles, fragrant, petioles 12–25 Mm. (½–1′) long; flowers May, 2.5 Cm. (1′) broad, white;



Citrus Aurantium (var. *amara*): *1*, the end of a flowering twig; *2*, flower, vertical section; *3*, longitudinal section of ovary; *4*, seed; *5*, longitudinal section of seed; *6*, diagram of flower.

fruit 5–10 Cm. (2–4′) in diameter, round, red or yellow, 9–11-celled, each several-seeded. RIND (zest), in thin, irregular bands (ribbons) or quarters, yellowish, greenish-brown, numerous minute pits and fine reticulate ridges; inner surface whitish, many slight conical projections, fine anastomosing lines formed by vascular bundles; fracture hard, short; odor fragrant, aromatic; taste aromatic, bitter. POWDER, yellowish-gray, light brown—many parenchyma fragments with thick cell walls, tracheæ very small, calcium oxalate prisms; with potassium hydroxide T. S.—yellowish. *Solvents:* alcohol; water. Dose, gr. 15–30 (1–2 Gm.). OIL (flowers), a pale yellow, slightly fluorescent, neutral liquid, distinctive fragrant odor, similar to orange blossoms, and an aromatic, sweet then bitter taste; soluble in alcohol (1) with violet fluorescence, neutral reaction, in 80 p. c. alcohol (2), with excess—cloudy; sp. gr. 0.874, dextrorotatory. Should be kept cool, dark, in small, well-stoppered, amber-colored bottles.

Commercial.—This bitter fruit grows mostly in Spain, Madeira, India, China, being known as Seville or Bigarade Orange, and is not in the fresh state a commercial article with us. The Mandarin (*C. sinen'sis*), S. Europe, is much smaller, having flattened ends, very thin rind, and pleasant taste. The celebrated Bizarria, of Italy, pro-



Orange peel: transverse section, magnified 65 diam.

duces on the same stem oranges, lemons, and citrons, and these often in mixed parts. The oil is distilled from fresh flowers, when it floats upon the water, and may easily be separated. There are four commercial grades: 1. *Ne'role* (*Essence de*) *Pe'tale*, most delicate—from flowers of *C. Aurantium*. 2. *Ne'role* (*Essence de*) *Bigarade*—from flowers of *C. amara* (*Bigaradia*), *N.F.* 3. *Ne'role* (*Essence de*) *Portugal*—from immature fruits of *C. Aurantium*, 4. *Ne'role* (*Essence de*) *Petit Grain*—from immature fruits and leaves of *C. amara*. Imported mostly from Grasse, Cannes, Messina, Nice.

CONSTITUENTS.—RIND: Volatile oil, naringin (aurantiin) very bitter glucoside, aurantiamarin 1.5–2.5 p. c., leading bitter glucoside, isohesperidin .4–3 p. c., aurantiamaric acid .1 p. c., hesperidin, hesperic acid, (fixed oil, resin, gum, albumin, tannin, ash 4–7 p. c.). OIL

(flowers): Limonene, linalool, linalyl acetate 7–18 p. c., geraniol, methyl anthranilate (to which odor and fluorescence are due).

Oleum Auranti Amari, *N.F.*—A volatile oil obtained by expression from the fresh peel. It is a pale yellow liquid, with characteristic, aromatic odor of Seville orange, and aromatic, bitter taste, soluble in alcohol (4), solution neutral, in all proportions of dehydrated alcohol, in glacial acetic acid (1); sp. gr. 0.845, dextrorotatory. Should be kept cool, dark, in small, well-stoppered, amber-colored bottles.

PREPARATIONS.—I. RIND: 1. *Tinctura Aurantii Amari.* Tincture of Bitter Orange Peel. (Syn., Tr. Aurant. Amar.; Br. Tinctura Aurantii; Fr. Teinture d'Écorce d'Oranges amères; Ger. Pomeranzen-(schalen)tinktur.)

Manufacture: 20 p. c. Similar to Tinctura Veratri Viridis, page 104, menstruum: 60 p. c. alcohol. Dose, ʒj–2 (4–8 cc.).

Prep.: 1. *Elixir Aurantii Amari, N.F.,* 2 p. c.

2. *Tinctura Cinchonæ Composita,* 8 p. c. 3. *Tinctura Gentianæ Composita,* 4 p. c. 4. *Infusum Gentianæ Compositum, N.F.,* ⅘ p. c. 5. *Tinctura Amara, N.F.,* 6 p. c.

II. FLOWERS: 1. *Aqua Aurantii Florum.* Orange Flower Water. (Syn., Aq. Aurant. Flor., Aqua Aurantii Florum Fortior, Triple Orange Flower Water.)

Manufacture: Obtained as a by-product in distilling oil of orange flowers, or by collecting 3 parts of distillate from 2 of flowers. It is a saturated solution of the odoriferous principles of the fresh flowers obtained by distilling with water and separating the clear, saturated portion of the distillate; it is nearly colorless, clear or faintly opalescent, strong pleasant odor, and taste of orange blossoms; must be free from empyreuma, mustiness, or fungoid growths, and is best preserved by allowing a limited access of fresh air to the container. *Tests:* 1. Evaporate 100 cc.—residue .001 Gm.; neutral, slightly acid. 2. With hydrogen sulphide T. S., or sodium sulphide T. S.—no reaction (abs. of metallic impurities). Dose, ʒj–4 (4–15 cc.).

Preps.: 1. *Syrupus Aurantii Florum.* Syrup of Orange Flowers. (Syn., Syr. Aurant. Flor.; Fr. Sirop de Fleurs d'Oranges; Ger. Pomeranzenblüthensirup.)

Manufacture: Dissolve by agitation sucrose 85 Gm. in a mixture of orange flower water and distilled water, each 22.5 cc., without heat, add of the latter q. s. 100 cc., mix thoroughly, strain. Dose, *ad libitum;* as a flavoring vehicle.

2. *Trochisci Acidi Tannici,* q. s. 3. *Elixir Aurantii Amari, N.F.,* 2 p. c. 4. *Elixir Amygdalæ Compositum, N.F.,* 15 p. c. 5. *Elixir Glycyrrhizæ Aquosum, N.F.,* 20 p. c. 6. *Liquor Hypophosphitum Compositus, N.F.,* 3.5 p. c. 7. *Liquor Phosphatum Compositus, N.F.,* 12.5 p. c. 8. *Syr. Calc. Lactophos., N.F.,* 5 p. c.

III. OIL (Rind): 1. *Elixir Aurantii Amari, N.F.,* ⅔ p. c.

IV. OIL (Flowers): 1. *Spiritus Odoratus, N.F.,* ⅖ p. c.

Unoff. Preps.: RIND: *Fldext.* (75 p. c. alc.). *Inf.* (Br.), 5 p. c., ʒiv–8 (15–30 cc.). *Inf. Comp.* (Br.), 2.5 p. c. + lemon peel 1, clove .5. *Wine* (Br.)—fermenting saccharine solution + fresh bitter orange peel.

PROPERTIES.—Stimulant, tonic, carminative, stomachic, bitter; excessive doses of both peel and oil cause colic, convulsions, occasionally death.

USES.—In indigestion, flatulence, corrigent to purgatives; aromatic when in combination with gentian, calumba, quassia, cinchona, etc.; most of the preparations are used as flavoring agents. Workmen employed among the fruit have skin eruptions, nervousness, headache, gastralgia, insomnia, muscular spasms.

Citrus aurantium var.bergamia

Citrus Aurantium, var. *Bergam'ia, Bergamot; Oleum Bergamottæ, Oil of Bergamot, N.F.*—The volatile oil obtained by expression from the rind of the fresh fruit with not less than 36 p. c. of ester, calculated as linalyl acetate; S. Italy, France; cultivated. Small tree resembling the lemon and orange, flowers peculiar, delicious odor, fruit pale lemon color, pyriform or globose, with concave receptacles of oil in the rind. Oil obtained as that of lemon and orange, and is a greenish-yellow liquid, neutral, faintly acid, characteristic fragrant odor, aromatic bitter taste; forms clear solution with alcohol (½), not turbid with further addition, soluble in glacial acetic acid, 80 p. c. alcohol (2), with slight cloudiness and no separation of oil globules; sp. gr. 0.877, dextrorotatory; 2 Gm. evaporated to soft green residue—corresponds to not more than 6 p. c. of the oil (abs. of fixed oils); contains limonene (citrene), dipentene (bergaptene, bergamot camphor), linalool, and linalool acetate 36–39 p. c., upon which the value chiefly depends. Stimulant, excitant, aromatic; used exclusively as a perfume; 1. *Spiritus Odoratus,* 1.5 p. c.

Citrus aurantium var.sinensis

AURANTII DULCIS CORTEX. SWEET ORANGE PEEL, *U.S.P.*

Citrus Aurantium, var. **sinensis,** *Linné.* { The fresh, outer rind of the ripe fruit.

Habitat. Same as *C. Aurantium* (var. *amara*).

Syn. Aurant. Dulc. Cort., Curaçao, Navel (Seedless) Orange, Forbidden Fruit, Golden (Orange) Apple, Nerotia Flowers; Fr. Écorce (Zeste) d'Orange douce; Ger. Apfelsinenchalen.

Si-nen'sis. L. (Chinensis) Chinese, of or belonging to China—*i. e.,* its chief habitat.

PLANT.—Small tree, 4.5–6 M. (15–20°) high, identical with *C. Aurantium* (var. *amara*), differing only in point of variety, but having leaves and flowers more fragrant, and the fruit sweeter, larger, deeper yellow. RIND (zest), the outer orange-yellow layer recently separated by grating or paring, consisting of epidermal cells, parenchyma cells