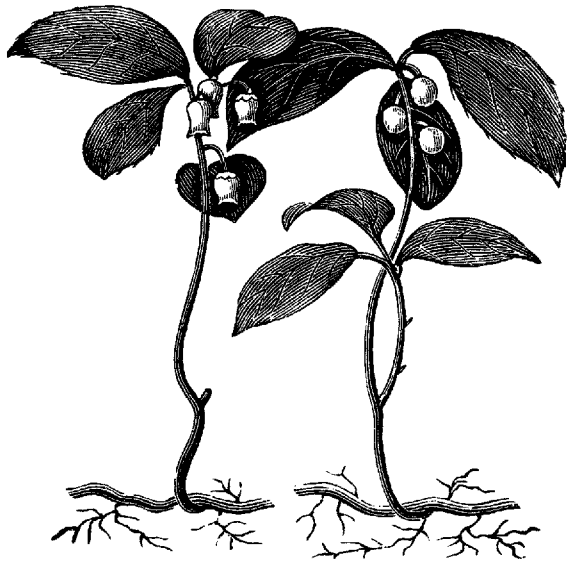


Gaultheria procumbens.

petroleum products. The label must indicate definitely its specific source. Should be kept cool, in well-stoppered, amber-colored bottles. Dose, ♏j-10 (.06–.6 cc.).

PREPARATIONS.—1. *Emulsum Olei Morrhuæ*, $\frac{2}{5}$ p. c. 2. *Fluidextractum Cascaræ Sagradæ Aromaticum*, $\frac{1}{50}$ p. c. 3. *Syrupus Sarsaparillæ Compositus*, $\frac{1}{50}$ p. c. 4. *Cataplasma Kaolini, N.F.*, $\frac{1}{5}$ p. c. 5. *Dentifricium, N.F.*, $\frac{875}{1000}$ p. c. 6. *Inunctum Mentholis Compositum, N.F.*, 10 p. c. 7. *Liquor Antisepticus, N.F.*, $\frac{12}{100}$ p. c. 8. *Liquor Antisepticus Alkalinus, N.F.*, $\frac{1}{20}$ p. c. 9. *Liquor Ferri Salicylatis, N.F.*, $\frac{1}{5}$ p. c. 10. *Liquor Pepsini Antisepticus, N.F.*, $\frac{1}{20}$ p. c. 11. *Nebula Aromatica, N.F.*, $\frac{1}{2}$ p. c. 12. *Nebula Mentholis Composita, N.F.*, $\frac{1}{2}$ p. c. 13. *Odontalgicum, N.F.*, 45 p. c. 14. *Petroxolinum Methylis Salicylatis, N.F.*, 20 cc. in 100 cc. product. 15. *Syrupus Trifolii Compositus, N.F.*, $\frac{1}{50}$ p. c. 16. *Trochisci Ulmi, N.F.*, $\frac{1}{38}$ p. c,

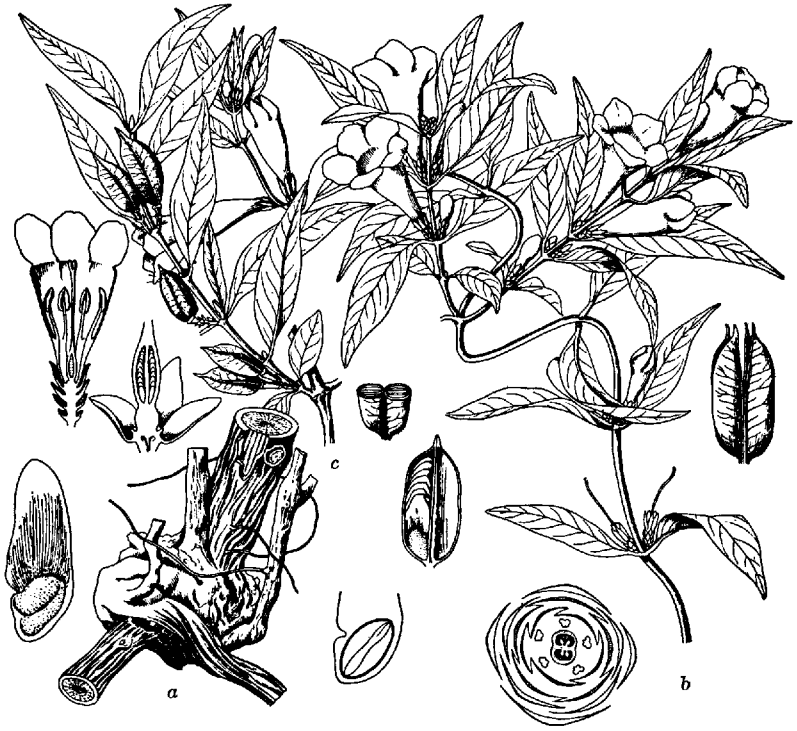
Unoff. Preps.: Oil of Gaultheria (Br.), ♏j-10 (.06–.6 cc.). *Spirit*, 5 p. c., ℥j–2 (4–8 cc.).

PROPERTIES AND USES.—Similar to salicylic acid: Antiseptic, analgesic, stimulant, carminative, flavoring; muscular rheumatism, lumbago, sciatica; locally applied upon lint over swollen joints, acute articular rheumatism, tic douloureux, etc. Amount may be increased, if no impairment of digestion, until full effect produced.

Poisoning: Large quantities produce drowsiness, cerebral congestion, delirium, gastric irritability, vomiting, purging, intestinal pain, rapid pulse, hot dry skin, difficult breathing; give diffusible stimulants —ether, alcohol, ammonia, etc.

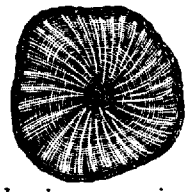
Gaultheria (Leaves), U.S.P. 1820–1880; *Oleum Gaultheriæ*, U.S.P. 1820–1900; *Oleum Betulæ* (*Volatile*), U.S.P. 1890–1900.

Gelse'mium semper'virens, Gelsemium, Yellow Jasmine (*Root*), *N.F.*—The dried rhizome and roots with not more than 2 p. c. of foreign organic matter; United States, Va. to Fla. Beautiful woody climber; leaves persistent, evergreen, lanceolate, entire, flowers large, yellow, fragrant, poisonous, corolla funnel-shaped; fruit brown, capsule. Rhizome, cylindrical, in pieces 3–20 Cm. (1⅛–8′) long, 3–30 Mm. (⅛–1⅛′) thick, yellowish-brown, wrinkled, transverse fissures, few stem-scars above, numerous roots beneath; fracture tough, splintery; bark thin; wood radiate, excentric; odor slight; taste bitter. Powder, yellowish—tracheæ, few bast-fibers, lignified tracheids, starch grains, few calcium oxalate monoclinic prisms, groups of stone cells; solvent: diluted alcohol; contains gelsemine, gelseminine, gelsemic acid (beta-methyl-æsculetin) .3–.4 p. c., volatile oil .5 p. c., 2 resins 4 p. c., starch, gum, pectin. Nervine, sedative, mydriatic, antispasmodic, antiperiodic; closely resembles hemlock in action, and somewhat digitalis, aconite, veratrum viride, antimony; rheumatism, neuralgia, intermittent and yellow fevers, headache, migraine, asthma, chorea, epilepsy, nervous cough, mania. *Poisoning:* Dim vision, projected eyeballs, dropping of



Gelsemium sempervirens: a, rhizome; *b*, flowering branch; *c*, fruiting branch (¼ natural size); also flower, ovary, fruit, seed, floral diagram, enlarged.

upper eyelid and lower jaw, difficult enunciation, labored breathing, convulsions (strychnine-like), death—evacuants, tannin, cardiac stim-



Gelsemium sempervirens: rhizome, transverse section.

ulants: ammonia, strychnine, atropine, digitalis; external heat and friction. Dose, gr. 2–10 (.13–.6 Gm.); 1. *Fluidextractum Gelsemii* (80 p. c. alcohol), dose, ♏ij–10 (.13–.6 cc.): Preps.: 1. *Elixir Sodii Salicylatis Compositum,* 1.6 p. c.; 2. *Tinctura Gelsemii,* 10 p. c. (65 p. c. alcohol). Dose, ♏x–60 (.6–4 cc.).

Gentiana

GENTIANA. GENTIAN, *U.S.P.*

Gentiana lutea, *Linné.* { The dried rhizome and roots, yielding not less than 30 p. c. of water-soluble extractive.

Habitat. C. and S. Europe (France, Austria, Germany, Switzerland, Portugal, England); mountainous districts.

Syn. Yellow Gentian Root, Pale Gentian, Bitter Root, Bitterwort, Felwort, Radix Gentianæ Rubræ, Luteæ or Majoris; Br. Gentianæ Radix; Fr. Gentiane, Racine de Gentiane (de Gentiane jaune); Ger. Radix Gentianæ, Enzianwurzel, Bitterwurzel, Rother (Gelber) Enzian.

Gen-ti-a'na. L. see etymology, page 487, of Gentianaceæ.

Lu'te-a. L. *luteus,* golden-yellow—*i. e.,* the flowers.

PLANT.—Large perennial herb; stem thick, hollow above, .6–1.3 M. (2–4°) high, yellowish-green, underground portion .6–1 M. (2–3°) long, branched; leaves entire, 5–7-nerved, 15–30 Cm. (6–12′) long, ovate, glabrous, yellowish-green; flowers June–Aug., numerous, cymes of 20 or more; corolla 5 Cm. (2′) long, orange-yellow, spotted, 6 segments; fruit 1-celled, ovate capsule, 3 Cm. (1½′) long, many winged-seed. RHIZOME (root), in subcylindrical, sometimes branching pieces, of variable length, 5–40 Mm. (⅕–1⅗′) thick, yellowish-brown, rhizome annulate, roots longitudinally wrinkled; fracture short and uneven when dry, tough and flexible when damp; internally yellowish-brown, bark .5–2 Mm. ($\frac{1}{50}$–$\frac{1}{12}$′) thick, separated from a spongy wood by a dark brown cambium zone; odor strong, characteristic; taste slightly sweetish, strongly and persistently bitter. POWDER, yellowish-brown — parenchymatous cells with fragments of scalariform or reticulate tracheæ, few or no starch grains and calcium oxalate crystals; no stone cells, bast- or wood-fibers. *Solvents:* water; diluted alcohol. Dose, gr. 5–30 (.3–2 Gm.).

Gentiana lutea.

ADULTERATIONS.—RHIZOME: Through carelessness—rhizomes, roots of allied species, especially *G. asclepia'dea* (stone cells and prosenchymatous tissue); aconite, belladonna, white hellebore, orris (none yellow internally), *Rumex alpi'nus* (odor and taste distinct—bitter, astringent without gentian aroma); POWDER: Ground pine-wood, almond shells, olive stones, sack and rope fibers, etc.

Commercial.—Plant, remarkable for beauty and size, was used by the Greeks and Arabians, and grows in the Alps, Apennines, Pyrenees, Jura, Vosges, 900–1200 M. (3000–4000°) elevation, along with veratrum album, the leaves of both closely resembling. Rhizome and roots are collected usually when in flower, washed, dried, and exported from Germany, France (Marseilles)—our chief supply. Austria imposes a fine for collecting any less than 2 Cm. (⅘′) thick at the crown—product of plants 3 years old, which insures propagation through having produced seed.

CONSTITUENTS.—Gentiopicrin, Gentiin, gentiogenin, $C_{10}H_{10}O_4$, gentienin, $C_{14}H_{10}O_5$, gentianose, $C_{16}H_{66}O_{31}$ (uncrystallizable sugar) 14 p. c., resin, gum, pectin, fixed oil 6 p. c., yellow coloring matter, identical with quercitrin, ash 6 p. c.

Gentiopicrin, $C_{16}H_{20}O_9$.—Bitter glucoside, upon which activity depends, obtained by diluting alcoholic extract with alcohol, extracting with equal weight of warm hydrous ether, evaporating to get crystals that contain 1 p. c. gentiin, which can be removed by recrystallizing from acetic ether + 2 p. c. of water; by hydrolysis yields glucose and gentiogenin (white crystals).

Gentiin, $C_{25}H_{28}O_{14}$.—Crystallizes from 60 p. c. hot alcohol in yellow needles, insoluble in water, blackish-green with ferric chloride, heated with 4 p. c. of sulphuric acid splits into glucose, xylose and gentienin.

Gentian rhizome, longitudinally sliced, about one-half natural size.

PREPARATIONS.—1. *Tinctura Gentianæ Composita.* Compound Tincture of Gentian. (Syn., Tr. Gentian Co.; Fr. Teinture de Gentiane composée; Ger. Zusammengesetzte Enziantinktur.)

Manufacture: 10 p. c. Similar to Tinctura Veratri Viridis, page 104—using gentian 10 Gm,. bitter orange peel 4 Gm., cardamom seed 1 Gm., packing moderately; 1st menstruum: glycerin 10 cc., alcohol 50, water 40, finishing with diluted alcohol q. s. 100 cc. Dose, ʒj–2 (4–8 cc.).

2. *Extractum Gentianæ, N.F.*—yield 30 p. c. (water). Dose, gr. 2–10 (.13–.6 Gm.).

Preps.: 1. *Pilulæ Antiperiodicæ, N.F.,* q. s. 2. *Pilulæ Ferri, Quininæ, Aloes et Nucis Vomicæ, N.F.,* q. s.

3. *Fluidextractum Gentianæ, N.F.* (diluted alcohol). Dose, ♏v–30 (.3–2 cc.).

Preps: 1. *Elixir Gentianæ, N.F.,* 3.5 p. c. Dose, ʒj–2 (4–8 cc.).

Preps.: 1. *Elixir Gentianæ et Ferri, N.F.,* 90 p. c. 2. *Elixir Gentianæ et Ferri Phosphatis, N.F.,* 95 p. c. Dose, each, ʒj–2 (4–8 cc.).

2. *Elixir Gentianæ Glycerinatum, N.F.,* 1 p. c. Dose, ʒj–2 (4–8 cc.).

4. *Infusum Gentianæ Compositum, N.F.*, 3 p. c. Dose, ʒij–4 (8–15 cc.). 5. *Tinctura Rhei et Gentianæ, N.F.*, 1¾ p. c. 6. *Tinctura Amara, Bitter Stomach Drops, N.F.*, 6 p. c. + centaury 6, bitter orange peel 6, zedoary 2 (67 p. c. alcohol q. s.). Dose, ʒss–1 (2–4 cc.). 7. *Tinctura Antiperiodica, N.F.*, ⅕ p. c.

PROPERTIES.—Tonic, bitter, increases appetite, digestion (action local); large doses oppress stomach, irritate bowels, nauseate, and cause vomiting.

USES.—Dyspepsia, atonic gout, amenorrhea, hysteria, scrofula, intermittents. *G. Elliot'tii (Catesbæ'i), Elliott's Gentian.*—The root, U.S.P. 1820–1870; United States, grassy swamps. Perennial herb, 20–60 Cm. (8–24′) high, rough; leaves 2.5–5 Cm. (1–2′) long, lanceolate, serrate; flowers Oct., blue, 4 Cm. (1⅗′) long; corolla 10 segments, 5 inner fringed; root resembles the official; constituents and uses similar; in infusion, wine, tincture. *G. purpu'rea* (purplish flowers), *G. pannon'ica* (dark purple flowers), and *G. puncta'ta* (yellow, purple-dotted flowers); all grow along with official, and collected for it.

Geranium

Gera'nium macula'tum, Geranium, Cranesbill, N.F.—Geraniaceæ. The dried rhizome with not more than 2 p. c. of foreign organic matter; N. America, rich woods, thickets. Perennial, hairy herb, .3–.6 M. (1–2°) high; leaves palmately 5–7-lobed, each lobe incised at apex, cuneate, hairy, pale green with paler spots; flowers large, purplish, umbels; petals 5, entire; fruit long-beaked. Rhizome, cylindraceous, 2.5–10 Cm. (1–4′) long, 3–15 Mm. (⅛–⅗′) thick, somewhat branched, bent, flattened, strongly tuberculated, root-scars, wrinkled, dark purple-brown, internally light purple-brown; fracture short, non-

Geranium maculatum: rhizome and transverse section of rhizome and root, natural size.

fibrous, bark thin, cambium distinct, irregular, wood-wedges, large central pith, few fibro-vascular bundles; odorless; taste strongly astringent. Powder, purplish-brown—cortical and pith parenchyma, starch grains, calcium oxalate rosettes, cork cells with brownish amorphous content, fragments bluish-black with ammonio-ferric alum T. S.; tracheæ, tracheids; solvents: alcohol, water; contains tannin 10–28 p. c., gallic acid, resin, crystalline principle, geranium-red, a phlobaphene formed from the tannin, ash 8 p. c. Astringent, tonic; diarrhea, chronic dysentery, hemorrhages, gleet, leucorrhea, aphthæ, relaxed vagina, throat, uvula, rectum, indolent ulcers. Dose, gr. 15–60 (1–4 Gm.); 1. *Fluidextractum Geranii* (75 p. c. alcohol). Extract; Tincture; Decoction, 5 p. c. (water or milk); "Eclectic" *geranin.*

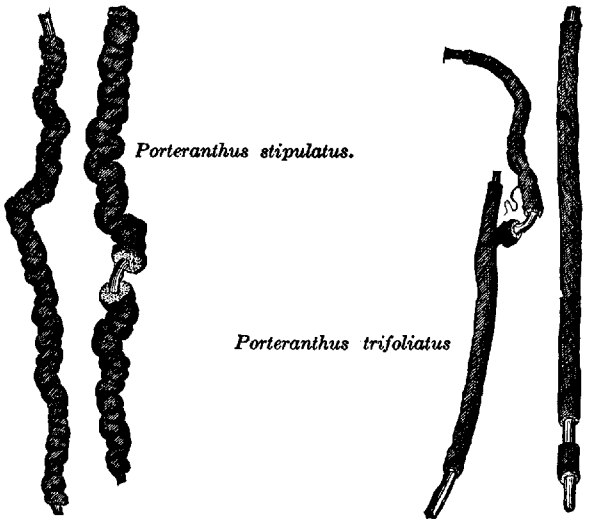
G. Robertia'num.—Europe; popular astringent for hemorrhage, diuretic for gravel. *Ero'dium (Geranium) moscha'tum, Stork's-bill;* diaphoretic. *E. cicuta'rium, Heron's-bill;* diuretic for dropsy.

Geum

Ge'um riva'le, Purple (Water) Avens.—The rhizome, U.S.P. 1820–1870; N. America. Perennial plant .3–.6 M. (1-2°) high, stem purple; leaves 3-foliate or 3-lobed; flowers purplish-orange. Rhizome 5–7.5 Cm. (2–3′) long, 6 Mm. (¼′) thick, tuberculate, wrinkled, brownish-red; bark thin, wood-wedges white, pith large; aromatic, astringent, bitter; contains volatile oil, tannin, bitter principle. Astringent, tonic; diarrhea, hemorrhage, leucorrhea, phthisis, scrofula, rheumatism, intermittents, dyspepsia, menstrual derangements; decoction, infusion, tincture. Dose, gr. 15–30 (1–2 Gm.).

Gillenia

Porteran'thus stipula'tus (Gille'nia stipula'cea), Indian Physic, and *P. trifolia'tus (G. trifolia'ta), American Ipecac.*—The root, U.S.P. 1820–1870; United States; shrubs .6–1 M. (2–3°) high, stems reddish-brown, leaves trifoliate; leaflets 5–10 Cm. (2–4′) long, pubescent; flowers white, pink; root (rhizome) 12–25 Mm. (½–1′), thick, with thin bark and many fissured rootlets, 3–6 Mm. (⅛–¼′) thick, bitter; contains gillenin, resin, tannin. Emetic (substitute for ipecac), purgative, tonic; infusion, decoction, tincture; very popular with North American Indians. Dose, emetic, gr. 15–30 (1–2 Gm.); tonic, gr. 2–5 (.13–.3 Gm.).



Glaucium

Glau'cium Glaucium (lu'teum), Yellow Horned Poppy, and *G. cornicula'tum.*—Both are similar to chelidonium; contain yellow juice and nearly identical alkaloids, hence used for about the same purposes.

Glyc'ine (So'ja) his'pida, Soja Bean.—Japan, cultivated S. Asia; contains casein 40 p. c., fixed oil 15–20 p. c., dextrin 10, starch 5, cellulose 5, water 10, amylolytic ferment. Owing to the beans containing so little starch they are ground into flour, and made into bread for diabetic patients, in order to decrease sugar in the urine; plant—turned under as a nitrogenous fertilizer to land.

GLYCYRRHIZA. GLYCYRRHIZA, *U.S.P.*

Glycyrrhiza glabra, *Linné,* + var. { **typica,** *Regel et Herder,* **glandulifera,** *Regal et Herder,* or other varieties yielding a yellow sweet wood. } The dried rhizome and roots with not more than 2.5 p. c. of acid-insoluble ash.

Habitat. S. Europe, W. Asia, Syria, Persia, N. Africa; cult. in Russia, Spain, England, France, Germany, United States, China; rich low-lands, river valleys.

Syn. Glycyrrh., Liquorice Root, Licorice, Sweet Wood, Italian Juice Root (Wood), Spanish Juice Root, Radix Glycyrrhizæ Hispanicæ; Br. Glycyrrhizæ Radix; Fr. Réglisse, Bois de Réglisse—doux, Racine douce; Ger. Radix Liquiritiæ, Süssholz, Spanisches Süssholz, Lakritzenholz.

Glyc-yr-rhi'za. L. fr. Gr. γλυκύρριζα—γλυκύς, sweet, +ρίζα, root—*i. e.*, its saccharine taste (Dioscorides).

Gla'bra. L. *glaber*, smooth, hairless—*i. e.*, pods, leaves smooth on both sides.

Glan-du-lif'e-ra. L. *glandula*, a gland, + *ferre*, to bear—*i. e.*, pods covered with thick glandular spines.

Ty'pi-ca. L. *typicus*, typical, representative—*i. e.*, possessing the strongest characteristics of its group.

Lic'o-rice—Liq'uo-rice (lik'o-ris). Fr. L. *liquiritia*, corruption of *glycyrrhiza*.

PLANTS.—Perennial herbs; stem .6–1.5 M. (2–5°) high, several from the (crown) thick rhizome; leaves imparipinnate; leaflets 4–7 pairs, ovate, entire, smooth, glutinous beneath, dark green; flowers yellowish-white or purplish, pulse-shaped, racemes; fruit legume, 2.5 Cm. (1′) long, brown, ovate, flat, 1-celled, 1–6-(kidney-shape) seeded; *G. glabra*, var. *glandulifera*—stem somewhat pubescent; leaves hairy, glandular beneath; legumes glandular, prickly. RHIZOME (*G. glabra*, var. *typica*): *Spanish*, nearly cylindrical, upper portion somewhat knotty, usually in pieces 14–20 Cm. (6–8′) long, 5–20 Mm. ($\frac{1}{5}$–$\frac{4}{5}$′) thick, yellowish-brown to dark brown, longitudinally wrinkled; thinner rhizomes often having prominent alternate buds, thicker having distinct corky patches; fracture coarsely fibrous; internally yellow, radiate; bark 1–3 Mm. ($\frac{1}{25}$–$\frac{1}{8}$′) thick; wood porous, in narrow wedges, rhizome with small pith—none in roots; odor distinctive; taste sweetish, slightly acrid—bark; (*G. glabra*, var. *glandulifera*): *Russian*, nearly cylindrical, somewhat tapering, sometimes split longitudinally, 15–30 Cm. (6–12′) long, 1–5 Cm. ($\frac{2}{5}$–2′) thick, pale yellow when deprived of outer corky layer; fracture coarsely fibrous; internally pale yellow; wood radially cleft; less sweet than preceding. POWDER, brownish-yellow with reddish-brown cork cells (Spanish); pale yellow without reddish-brown cork cells (Russian)—numerous wood-fibers, bast-fibers, and starch grains, .002–.02 Mm. ($\frac{1}{12500}$–$\frac{1}{1250}$′) broad, tracheæ, crystal-fibers with monoclinic calcium oxalate prisms. *Solvents:* water, diluted alcohol. Dose, gr. 15–60 (1–4 Gm.).

ADULTERATIONS.—The one variety of the root with the other, as they often are collected together; also the underground stem, which resembles the root, but has a thin central pith; roots of allied species (wood not yellow nor sweet), worm-eaten, decayed and discolored pieces, fibrous roots (little sweetness).

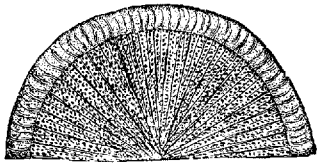
Commercial.—Plants, like lemon and orange, do not thrive in cold latitudes, becoming woody and less sweet, and while formerly the wild grown, owing to hardy, persistent rapacious habit, supplied the demand, now it is cultivated extensively by planting cuttings in rows, 4 feet (1.3 M.) apart. Roots are dug when sweetest, autumn of 4th year—preferably of plants that have not borne fruit, a process that exhausts the sweetness of the sap, by removing the earth 2–3 feet (.6–1 M.) deep, the entire length of rows, thereby exposing subterranean portion and allowing easy pulling up of whole plants, from which roots are taken, cleaned, washed, trimmed, assorted, cut into suitable lengths, and marketed via Alicante, Tortosa, Hamburg, in bundles, bales, bags. There are two varieties: 1, *Spanish* (*Italian, Turkish, Alicante, Tortosa—G. glabra*, var. *typica*), usually *unpeeled* and for a long time most esteemed, but as bitterness and acridity reside in the bark it now constitutes only one-tenth of that consumed; 2, *Russian* (*G. glabra*, var. *glandulifera*), usually *peeled*, larger, richer in glycyrrhizin and extractives, and in far greater demand. The Calabrian is preferred by many, while the Italian and Sicilian are consumed at home for making the extract.

Glycyrrhiza glabra, var. *typica*.

CONSTITUENTS.—Glycyrrhizin, $C_{44}H_{63}O_{18}N$, 6–8 p. c., Glycyramarin, $C_{36}H_{57}O_{13}N$ (bitter principle, mostly in the bark), sucrose, glucose, asparagin 2–4 p. c., fat .8 p. c., volatile oil .03 p. c., gum, tannin, starch, resin, yellow coloring matter, ash 5–7 p. c.

Glycyrrhizin.—This is combined with ammonia, being called glycyrrhizate of ammonium or glycyrrhizic acid, $C_{44}H_{62}O_{18}N.NH_4$. It is a tribasic acid (glucoside) obtained from cold infusion by coagulating albumin with heat, filtering, precipitating with sulphuric acid, washing precipitate with water, dissolving it in alcohol to which a little ether has been added (or in very weak ammonia water, 1 to 10), filtering, evaporating; it is very soluble in water, sparingly in alcohol, ether, when boiled with diluted sulphuric acid (by hydrolysis) splits into parasaccharic acid (glucose), $C_6H_{10}O_8$, and bitter resinous glycyrrhetin, $C_{32}H_{47}O_4N$.

Glycyrrhiza glabra, var. *typica* (rhizome), natural size.



Glycyrrhiza glabra, var. *glandulifera* (root).

PREPARATIONS.—1. *Extractum Glycyrrhizæ.* Extract of Glycyrrhiza. (Syn., Ext. Glycyrrh., Extract of Licorice, Extractum liquiritiæ, Licorice; Fr. Suc (jus) de Réglisse, Sucre noir; Ger. Succus Liquiritiæ, Süssholzsaft, Lakritz, Lakritzensaft.)

Manufacture: Evaporate decoction to proper consistence, pulverize or mold. This is the commercial extract, in flattened, cylindrical masses or rolls, 15–18 Cm. (6–7′) long, 15–30 Mm. ($\frac{3}{5}$–$1\frac{1}{5}$′) thick, glossy black, brittle, sharp, smooth, conchoidal fracture; characteristic, sweet taste; yield 26–32 p. c., containing glycyrrhizin 10–24 p. c.; at least 60 p. c. soluble in cold water; powder brown; ash 8 p. c. Dose, *ad libitum.*

Preps.: 1. *Trochisci Ammonii Chloridi*, 3 gr. (.2 Gm.). 2. *Pilulæ Ferri Iodidi, N.F.*, $\frac{1}{6}$ gr. (.01 Gm.).

2. *Extractum Glycyrrhizæ Purum.* Pure Extract of Glycyrrhiza. (Syn., Ext. Glycyrrh. Pur., Pure Extract of Licorice Root; Br. Extractum Glycyrrhizæ, Extractum Glycyrrhizæ Depuratum; Fr. Extrait de Réglisse (pur); Ger. Succus Liquiritiæ depuratus, Gereinigter Süssholzsaft.)

Manufacture: Macerate, percolate, in metallic percolator, 100 Gm. with boiling water until exhausted; promptly evaporate to a pilular consistency; yield 16–25 p. c. Dose, *ad libitum.*

Prep.: 1. *Fluidextractum Cascaræ Sagradæ Aromaticum*, 4 p. c.

3. *Fluidextractum Glycyrrhizæ.* Fluidextract of Glycyrrhiza. (Syn., Fldext. Glycyrrh., Fluidextract of Licorice, Fluid Extract of Glycyrrhiza; Br. Extractum Glycyrrhizæ Liquidum; Fr. Extrait fluide de Réglisse; Ger. Süssholzfluidextrakt.)

Manufacture: Macerate 100 Gm. + 500 cc. boiling water 2 hours, pack in a tinned or enameled metallic percolator, exhaust with boiling water, promptly evaporate to 75 cc., cool, add alcohol 25 cc., mix, allow to stand 7 days in a stoppered container, decant clear liquid, filter remainder, wash residue with mixture alcohol 1, water 3, q. s. 100 cc. Dose, ℥xv–60 (1–4 cc.).

Preps.: 1. *Elixir Glycyrrhizæ.* Elixir of Glycyrrhiza. (Syn., Elix. Glycyrrh., Elixir Adjuvans, Elixir of Licorice, Flavoring Elixir; Fr. Elixir de Réglisse—adjuvant; Ger. Gewürzhaftes Lakritzenelixir.)

Manufacture: Mix fluidextract of glycyrrhiza 12.5 cc. with aromatic elixir 87.5 cc., filter. Dose. *ad libitum;* as a flavoring vehicle.

2. *Mistura Glycyrrhizæ Composita.* Compound Mixture of Glycyrrhiza. (Syn., Mist. Glycyrrh. Co., Brown Mixture; Fr. Mixture de Réglisse; Ger. Lakritzenmixtur.)

Manufacture: Dilute fluidextract of glycyrrhiza 12 cc. with glycerin 12, water 50, add antimony and potassium tartrate .024 Gm., dissolved in hot water 1.2 cc., then camphorated tincture of opium 12, spirit of nitrous ether 3, and water q. s. 100 cc., mix. Dose, ʒss–4 (2–15 cc.).

3. *Syrupus Sarsaparillæ Compositus*, 1.5 p. c. 4. *Elixir Glycyrrhizæ Aquosum, N.F.*, 15 p. c.: Prep.: 1. *Elixir Cascaræ Sagradæ, N.F.*, 50 p. c. 5. *Elixir Taraxaci Compositum, N.F.*, 6 p. c.

4. *Pulvis Glycyrrhizæ Compositus.* Compound Powder of Glycyrrhiza. (Syn., Pulv. Glycyrrh. Co., Compound Licorice Powder; Fr. Poudre pectorale de Réglisse composée; Ger. Pulvis Liquiritiæ compositus (Pectoralis Kurellæ), Brustpulver.)

Manufacture: Mix oil of fennel .4 Gm. with sucrose 50 Gm., add glycyrrhiza 23.6, senna 18, washed sulphur 8; mix thoroughly, pass through No. 80 sieve. It is greenish-yellow, fennel-like odor—fragments of glycyrrhiza with yellow fibers, crystal-fibers, large tracheæ, starch grains, .002–.02 Mm. ($\frac{1}{12500}$–$\frac{1}{1250}$′) broad; fragments of senna with non-glandular hairs, epidermis, stomata with 2 neighboring cells, crystal-fibers. *Tests:* 1. Moisten .1 Gm. with alcohol 2 cc., + water 10 cc., boil, cool, filter; filtrate—pale yellowish-brown; + 1 drop of potassium hydroxide T. S.—changes at once to yellowish-red; should be free from hydrogen sulphide odor. Dose, ʒss–2 (2–8 Gm.).

5. *Massa Hydrargyri*, 10 p. c.

6. *Fluidglyceratum Glycyrrhizæ, N.F.*, 100 p. c.

Preps.: 1. *Syrupus Glycyrrhizæ, N.F.*, 25 p. c., + syrup q. s. 100; or macerate root (20) in water (100) + ammonia water (10) for 12 hours, filter, add syrup q. s. 100 parts; or mix fluidextract (2) with syrup (8). Dose, *ad libitum;* mostly for flavoring; 2. *Elixir Bromidorum Quinque, N.F.*, 8 p. c.; 3. *Elixir Guaranæ et Apii, N.F.*, 3 p. c.

7. *Fluidextractum Sarsaparillæ Compositum, N.F.*, 12 p. c. 8. *Fluidextractum Trifolii Compositum, N.F.*, 21.5 p. c. 9. *Pilulæ Ferri Iodidi, N.F.*, $\frac{2}{3}$ gr. (.045 Gm.). 10. *Pilulæ Laxativæ Compositæ, N.F.*, $\frac{2}{3}$ gr. (.045 Gm.). 11. *Species Pectorales, N.F.*, 15 p. c. 12. *Tinctura Aloes,*

N.F., 20 p. c. 13. *Tinctura Aloes et Myrrhæ, N.F.*, 10 p. c. 14. *Tinctura Rhei Dulcis, N.F.*, 4 p. c.

Unoff. Preps.: Ammoniated Glycyrrhizin, gr. 5–15 (.3–1 Gm.). Decoction, Infusion, each, 5 p. c.

PROPERTIES.—Demulcent, expectorant, laxative; locally—slight stimulant. Increases, when chewed, the flow of saliva and mucus, which secretions are emollient to the throat.

USES.—Febrile catarrhal conditions, bronchitis, bowel and urinary affections; here should be prepared with flaxseed, rice, barley, or gum water. In pharmacy used to mask taste of aloe, ammonium chloride, bitter sulphates, colocynth, guaiacum, hyoscyamus, mezereum, senega, senna, quinine, turpentine, etc. Mechanically as an excipient and dryer in pills, troches, etc.

Allied Plants:

1. *Glycyrrhiza echina'ta.*—Europe, Hungary, S. Russia; flowers in globular heads, pod ovoid with long spines. *G. lepido'ta;* United States (Mo., Minn.).

2. *A'brus precato'rius, Indian (Wild) Licorice, Jequirity,* India, Brazil.—Seed used as standard weight, and for criminal poisoning, although inert when taken whole; contain *abrin*, having the action of snake-venom, being cardiac depressant; root contains glycyrrhizin, but is a poor substitute for glycyrrhiza.

3. *Ono'nis spino'sa, Rest-harrow,* Europe.—Root .6 M. (2°) long, 12 Mm. (½′) thick; odor and taste similar to official glycyrrhiza.

4. *Ar'achis hypogæ'a, Peanut, Groundnut.*—Tropical America, cult. United States. Small succulent plant, yielding abundant subterranean seed, which are edible, popular and contains fixed oil 45 p. c. suitable for replacing sesame or olive oil.

Gnaphallium

Gnapha'lium obtusifo'lium (polyceph'alum), Common, Sweet, or *Fragrant Life Everlasting.*—Annual erect herb, .3–1 M. (1–3°) high, woolly, fragrant; leaves lanceolate, undulate, sessile, flowers in heads, clustered at summit of corymbose branches, obovate, whitish involucre, yellow, tubular, odor pleasant, bitter; contains volatile oil and bitter principle. Used for diarrhea, hemorrhages, externally in fomentation and as a vulnerary to bruises, ulcers, etc. Dose, ʒss–1 (2–4 Gm.).

Gossypium

GOSSYPIUM. COTTON.

1. GOSSYPIUM PURIFICATUM. Purified Cotton, *U.S.P.*
2. OLEUM GOSSYPII SEMINIS. Cottonseed oil, *U.S.P.*

Gossypium herbaceum, *Linné,* or other species.

1. The hairs of the seed of cultivated varieties, freed from adhering impurities and linters, and deprived of fatty matter. 2. The refined fixed oil from the seeds of cultivated varieties.

Habitat. C. Asia, India, China, Arabia, N. E. Africa, Egypt; cultivated in United States, W. Indies, C. and S. America, N. Africa, Australia, Spain.

Syn. 1. Gossyp. Purif., Absorbent Cotton, Gossypium, Cotton, Cotton Wool; Fr. Coton; Ger. Gossypium depuratum, Gereinigte Baumwolle. 2. Ol. Gossyp. Sem., Cotton Seed Oil; Fr. Huile (de Coton) de Semences de Cotonnier; Ger. Baumwollsamenöl.

Gos-syp'i-um. L. fr. Ar. *Goz, Gothn,* a soft, silky substance—*i. e.*, the hairs of the seeds.

Her-ba'ce-um. L. *herbaceus,* grassy, herby—*i. e.*, the plant habit.

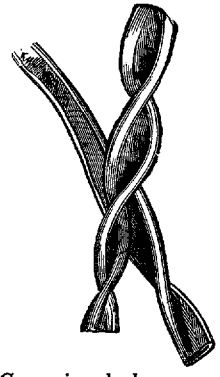
PLANT.—Small biennial or triennial shrub; stem branching, 1.5–3 M. (5–10°) high, more or less woody; leaves hoary, palmately 3–5-lobed; flowers large, 5–7.5 Cm. (2–3′) long and wide, yellow, purple spot near the claw; fruit capsule or boll 4–5 Cm. (1⅗–2′) long, 3–5-celled, opening by as many valves when ripe, revealing loose, white tuft of long, slender hair that surrounds each one of the numerous seeds. HAIRS OF THE SEED, in white, soft, fine filaments, 12–37.5 Mm. (½–1½′) long; under microscope hollow, flattened, twisted bands, spirally striate, slightly thickened edges; odorless; almost tasteless; insoluble in ordinary solvents. *Tests:* 1. Compress in the hand, throw upon cold water—readily absorbs latter and sinks. 2. Incinerate 5 Gm.—ash .2 p. c. 3. Thoroughly saturate 10 Gm. with water 100 cc., with glass rod press out 2 separate portions, 25 cc. each; first portion, + 3 drops of phenolphthalein T. S.—no pink color (abs. of alkali); second portion, + 1 drop of methyl orange T. S.—no pink color (abs. of acid). 4. Exhaust 10 Gm. with ether q. s. 200 cc., evaporate to dryness—residue not over .6 p. c. (abs. of fatty matter). 5. Extract 10 Gm. with alcohol q. s. 50 cc.; observed downward through a column 20 Cm. in depth—may show yellowish color, but no blue or green (abs. of dyes). *Impurities:* Alkali, acid, fatty matter, dyes, water-soluble substances. *Solvent:* Ammoniated cupric oxide T. S. OIL OF THE SEEDS, a pale yellow, oily liquid, odorless, nearly odorless, bland taste, slightly soluble in alcohol; miscible with ether, chloroform, petroleum benzin, carbon disulphide, sp. gr. 0.918; on cooling below 12° C. (54° F.) particles of solid fat separate, and at —5 C. (23° F.) nearly or quite a solid. *Tests:* 1. Oil and carbon disulphide equal volumes + sulphuric acid (sp. gr. 1.6–1.7)—reddish-brown color rapidly produced. 2. Mix 2 cc. with 2 cc. of a mixture of equal vols. amyl alcohol and a 1 p. c. solution of precipitated sulphur in carbon disulphide, and immerse to one-third depth in boiling saturated aqueous solution of sodium chloride—red color in 10–15 minutes. Dose, ʒij–8 (8–30 cc.).

SUBSTITUTIONS.—I. HAIRS: *Bœhme'ria ni'vea,* fiber may be used for cotton, lint, etc. II. OIL: 1, Brazil or Para Nut Oil; nuts 2.5–5 Cm. (1–2′) long, 3-edged, brownish-gray kernel, white, almond taste; yield 60 p. c. oil; 2, Oleum Fagi, Beech Oil, from fruit of *Fa'gus sylvat'ica,* kernels yield 22 p. c. oil; yellow, sp. gr. 0.922, congeals at —17.5° C. (0° F.).

Commercial.—Cotton was known to the Arabians, Egyptians, and Chinese in the 10th century, and was carried to Spain by the Moors in the 16th century. The ancient Egyptians possibly were unacquainted with it, as their mummy fibers are all linen, and no seeds or paintings of plants are found in the tombs. However, in Peru mummy clothing from earliest date contain cotton, consequently here may be its original habitat. Many species now give similar products, but our own is thought to be from *G. barbadense,* Barbados Islands, W. Indies. Chap-

man refers long-staple or Sea Island cotton, which we cultivate, to *G. ni'grum,* and short-staple or Upland cotton to *G. al'bum.* The hairs are removed by hand or mill (cotton gin) from the seeds, and owing to the latter containing fixed oil, 15–20 p. c., a portion of it becomes absorbed by the attached fiber and must be eliminated before adapted for general use. Purification is effected by boiling carded cotton in 5 p. c. solution of potassium or sodium hydroxide, washing with water to remove soap, expressing, adding 5 p. c. solution of chlorinated lime, allowing to stand half an hour, washing, expressing, adding acidulated (HCl 5 p. c.) water, washing, expressing—a process that may be repeated if necessary, removing 7–10 p. c. of weight, chiefly fat. The oil is obtained by cracking off testa, grinding and expressing kernels; at first it is thick, reddish-brown, turbid from albumen and mucilage, which mostly subside on standing, yielding orange-colored *clarified oil;* when this is treated with boiling water or superheated steam albuminoids are coagulated, giving lighter colored *refined oil,* which upon being bleached (agitated with alkaline solution and heated) yields *winter-bleached oil;* the loss in refining is 5–10 p. c., and as such is official. It is exported extensively for olive oil adulteration, for which demand a line of tanked steamers ply regularly between New Orleans and Europe, each having a capacity of 500,000–1,000,000 gallons; 12,000–20,000 barrels (1894–3788 Kl.).

Gossypium herbaceum: a, outside calyx; *f,* fruit.



Gossypium herbaceum: cotton fiber, magnified 250 diam.

CONSTITUENTS.—I. HAIRS: Cellulose $(C_6H_{10}O_5)_x$, inorganics 1.5 p. c., fixed oil 7–10 p. c. II. OIL: Olein, palmitin, linolein, glyceride of linoleic acid, and non-saponifiable yellow coloring matter.

PREPARATIONS.—I. HAIRS: 1. *Pyroxylinum.* Pyroxylin. (Syn., Pyroxylin, Soluble Gun Cotton, Colloxylin, Collodion Cotton, Lana Collodii; Fr. Fulmicoton soluble; Ger. Kollodiumwolle.)

Manufacture: Macerate purified cotton in a cooled mixture of 14 vols. of nitric acid and 22 vols. of sulphuric acid until the cotton is soluble in a mixture of 1 vol. of alcohol and 3 vols. of ether, remove adhering acid by washing first with cold, then boiling water, dry in small portions at 60° C. (140° F.). It is a yellowish-white matted mass of filaments, resembling raw cotton in appearance, harsh to the touch, exceedingly inflammable, burning, when unconfined, very rapidly with luminous flame, less explosive than cellulose hexanitrate; kept in well-closed bottles exposed to light, decomposes with evolution of nitrous vapors, and carbonaceous residue; consists chiefly of cellulose tetranitrate, $C_{12}H_{16}O_6(NO_3)_4$. *Tests:* 1. Soluble slowly but completely in 25 parts of a mixture of 1 vol. of alcohol and 3 vols. of ether; soluble in acetone, glacial acetic acid, and precipitated from these solutions on the addition of water. 2. Saturate .5 Gm. with alcohol in a dish in cold water, ignite from top; when combustion complete, heat dish to redness—ash .3 p. c. 3. Stir 1 Gm. + water 20 cc. for 10 minutes, filter—filtrate shows no acid reaction; 10 cc. evaporated to dryness on water-bath—residue not more than .0015 Gm. (abs. of soluble substances). Should be kept dark, dry, in cartons packed loosely.

Prep.: 1. *Collodion.* Collodion. (Syn., Collod.; Fr. Collodion; Ger. Collodium, Kollodium.)

Manufacture: Add alcohol 25 cc. to pyroxylin 4 Gm., shake, add ether 75 cc., shake until dissolved; cork well, set aside until clear, decant from any sediment. It is a clear, slightly opalescent, syrupy liquid; colorless, slightly yellowish; odor of ether; highly inflammable, and when exposed in thin layer leaves a transparent, tenacious film; sp. gr. 0.770; mixed with equal volume of distilled water a viscid, stringy mass (pyroxylin) separates; aqueous liquid not acid. Should be kept cool, remote from fire, in well-closed containers.

Prep.: 1. *Collodium Flexile.* Flexible Collodion. (Syn., Collod. Flex.; Fr. Collodion élastique; Ger. Collodium elasticum, Elastisches Kollodium.)

Manufacture: Shake in a tared bottle collodion 95 Gm., castor oil 3, camphor 2, until latter dissolved. Should be kept cool, remote from fire, in well-closed containers.

Preps.: 1. *Collodium Bituminis Sulphonati, N.F.,* 90 p. c. 2. *Collodium Salicylicum Compositum, N.F.,* 90 p. c. 3. *Collodium Stypticum, N.F.,* 90 p. c.; each should be kept cool, in tightly-stoppered bottles.

2. *Gossypium Stypticum, N.F.*—macerate 100 Gm. for 1 hour in solution of ferric chloride 80 cc., glycerin 16, water 225, press until it weighs 300 Gm., dry; keep in well-closed glass containers. II. OIL: 1. *Linimentum Camphoræ,* 80 p. c. 2. *Ampullæ Camphoræ, N.F.,* q. s. 3. *Unguentum Picis Compositum, N.F.,* 34 p. c.

Unoff. Preps.: I. HAIRS: *Medicated Cottons* (borated, benzoinated, chlorinated, phenolated (carbolated), salicylated, iodoform, mercuric (bi)chloride, hemostatic, etc.); *Iodine Collodion,* 5 p. c.; *Iodoform Collodion,* 5 p. c., *Croton Oil Collodion,* 10 p. c. II. SEED: *Cottonseed Tea* (mucilaginous drink for dysentery, diarrhea, etc.).

PROPERTIES.—I. HAIRS: Protective. II. OIL: Demulcent, nutrient.

USES.—I. HAIRS: Dressing in burns, scalds, erysipelas, blisters, surgical wounds; prevents entrance of organic germs that cause suppuration and septic disease. Cotton batting maintains local heat in pneumonia, rheumatism, and may be made into pessaries. II. OIL: Like olive and almond oils in pharmacy, liniments, etc., in culinary use for lard; to adulterate olive oil, in preparing woollen cloth, morocco

leather, lubricating machinery, etc.

Derivative Product:

1. *Gossypii (Radicis) Cortex, Cotton Root Bark, N.F.*—The recently gathered air-dried bark of the root of one or more cultivated varieties with not more than 5 p. c. of wood or other foreign organic matter. Root-bark, in flexible bands, quilled pieces, up to 30 Cm. (12′) in length, 1 Mm. ($\frac{1}{25}$′) thick, orange-brown, smooth, usually finely wrinkled, fissured, roughened from exfoliation of corky layers, fuzzy; inner surface light brown, striate; fracture tough, fibrous, separable into fibrous layers; odor slight; taste slightly acrid. Powder, brownish—numerous bast-fibers, cortical parenchyma, starch grains, secretory reservoirs, medullary ray cells, calcium oxalate rosette crystals; solvents: diluted alcohol, boiling water; contains resin (acrid, colorless, soluble in water, becoming red on exposure and insoluble) 8 p. c., fixed oil, tannin, starch, ash 7 p. c. Emmenagogue, oxytocic, uterine hemostatic, similar to ergot, but less reliable; dysmenorrhea, amenorrhea, uterine tumors and hemorrhages—popular among negroes (who brought it from Africa) in Southern States for inducing abortion. Dose, ʒss–1 (2–4 Gm.); 1. *Fluidextractum Gossypii Corticis* (alcohol), dose, ʒss–1 (2–4 cc.). Decoction—ʒiv (120 Gm.) + water Oij (900 cc.), evaporated to Oj (450 cc.), ʒij (60 cc.), every half hour. *G. barbaden'se, G. arbo'reum, G. religio'sum* (fibers yellow), etc., furnish products which may be used similarly to the official.

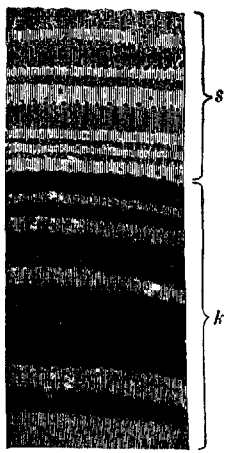
Grindelia

Grindelia campo'rum*, or *G. cuneifo'lia, G. squarro'sa, Grindelia, Gum-plant, N.F.—The dried leaves and flowering tops with not more than 10 p. c. of stems over 2 Mm. ($\frac{1}{12}$′) thick, or 2 p. c. of other foreign organic matter; N. America, west of Rocky mountains. Plants—small perennial, woody herbs, .3–1 M. (1–3°) high, bushy; stems and branches cylindrical, yellowish, pinkish, alternate leaf-scars and basal portions of leaves, sometimes flexuous and coated with resin, terminating in resinous flower-heads; leaves usually separate and broken, oblong, oblong-spatulate, 1–7 Cm. ($\frac{2}{5}$–3′) long, sessile, or amplexicaul, serrate, yellowish-green, resinous, coriaceous, brittle; flower-heads 5–20 Mm. ($\frac{1}{5}$–$\frac{4}{5}$′) broad, urceolate, resinous, involucre bracts numerous, imbricated with recurved tips; ray-florets yellowish-brown, ligulate and pistillate; disk-florets yellow, perfect, pappus of 2–3 linear awns; disk achenes ovoid, oblong, angled, irregular summit; odor balsamic; taste aromatic, bitter, resinous. Powder, yellowish-brown—numerous fibrous fragments bearing tracheæ with thickenings or pores, lignified wood-fibers, pith cells with protoplasm bearing spheroidal granules; fragments of leaf epidermis with polygonal areas, chloroplastids, glandular hairs, spherical pollen grains; solvent: alcohol; contains resin (activity), bitter principle 1–2 p. c., volatile oil, grindeline, fixed oil, tannin 1.5 p. c., ash 7–8 p. c. Cardiac tonic (slows heart action), expectorant, antispasmodic, diuretic; asthma, bronchitis, whooping-cough, catarrh of bladder and uterus, poisoning by rhus toxicodendron—in solution or poultice. Dose, gr. 15–60 (1–4 Gm.); 1. *Fluidextractum Grindeliæ* (75 p. c. alcohol), dose, ♏xv–60 (1–4 cc.). Extract, gr. 5–15 (.3–1 Gm.). Infusion. Tincture. *G. glutino'sum*, stem often purplish, tomentose, and *G. hirsu'tula*, W. United States, being very similar, are often collected and mixed with commercial drug.

Guaiacum sanctum.

Guaiacum

Guai'acum officina'le or *G. sanc'tum, Guaiac, Guaiac Resin, N.F.*—Zygophyllaceæ. The resin of the wood, yielding not more than 15 p. c. of residue insoluble in alcohol; W. Indies, S. America. Small trees 6–9 M. (20–30°) high, stem-bark ash-gray, striated, spotted; leaves paripinnate, yoked in pairs, evergreen; leaflets 2.5–4 Cm. (1–1$\frac{3}{5}$′) long; flowers large, blue; fruit 2–5-celled capsule; seeds black, red. Wood (Lignum Vitæ): sap yellowish, heart brownish, heavier than water, sp. gr. 1.30, hard, dense, tough, resinous, with heat—emitting balsamic odor; taste slightly acrid; in shop as raspings. Resin: in irregular fragments, large masses, tears, brown—greenish gray-brown on exposure; fracture with glassy luster, thin pieces translucent, reddish to yellowish-brown. Powder, grayish, becoming green on exposure; odor balsamic; taste slightly acrid; soluble in alcohol, ether, chloroform, creosote, solutions of alkalies, chloral hydrate T. S., sparingly in carbon disulphide, benzene; alcoholic solution with excess of chlorine water or tincture ferric chloride—blue, changing quickly to green; solvents: alcohol, acetone, chloroform;



Guaiacum wood; cross-section, magnified 4 times; *k*, heartwood; *s*, sapwood.

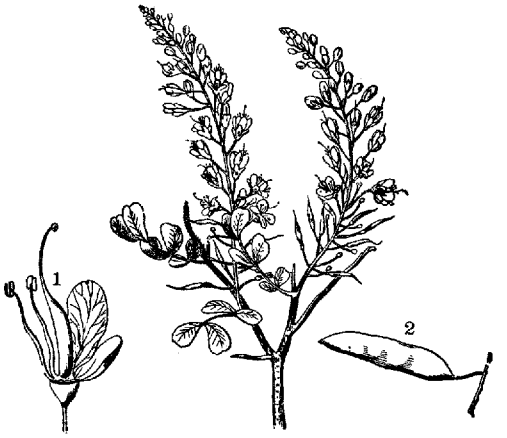
contains guaiaretic acid, guaiaconic acid (alpha-resin) 50–70 p. c., guaiac beta-resin 10 p. c., gum 4–9 p. c., guaiacic acid, guaiac-yellow, by dry distillation get guaiacol. Alterative, diaphoretic, expectorant, stimulant, antiseptic; rheumatism, gout, lumbago, syphilis, scrofula, amenorrhea, dysmenorrhea, diphtheria. Dose, gr. 5–30 (.3–2 Gm.); 1. *Tinctura Guaiaci*, 20 p. c. (alcohol), dose, ♏v–60 (.3–4 cc.); 2. *Tinctura Guaiaci Ammoniata*, 20 p. c. (sp. ammon. arom.), dose, ♏v–30 (.3–2 cc.): Prep.: 1. *Gargarisma Guaiaci Compositum*, 10 p. c. + tr. cinch. co. 10, honey 20, pot. chloras 4, + ; 3. *Tinctura Guaiaci Composita, Dewees' Tincture of Guaiac*, 12.5 p. c., + pot. carb. .6, pimenta 3.2 (diluted alcohol), dose, ♏v–60 (.3–4 cc.). Mixture (Br.), 2.5 p. c., ℥iv–8 (15–30 cc.). Lozenge (Br.), 3 gr. (.2 Gm.), Syrup. *G. angustifo'lium;* S. Texas, Mexico. Wood hard, heavy, splitting irregularly, yellowish-brown; sometimes substituted for the preceding.

Guarea

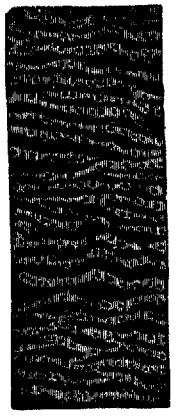
Gua'rea (Sycocar'pus) Rus'byi, Cocillana, N.F.—Meliaceæ. The dried bark with not more than 5 p. c. of wood or other foreign organic matter; Bolivia—river-bottoms. Tree resembles a large apple tree. Bark, in flat, curved pieces, variable length and width, up to 2 Cm. (⅘′) in thickness, externally fissured, gray-brown, ashy gray from lichens, orange-brown where cork removed, inner surface brownish, longitudinally striate; inner bark thicker than outer; fracture coarsely splintery-fibrous, soft; odor characteristic; taste slightly astringent, peculiar, slightly nauseous. Powder, light brown—lignified fibers, crystal-fibers, calcium oxalate prisms, medullary ray cells with brownish contents or starch grains, abundant stone cells, fragments of cork tissue; solvent: 75 p. c. alcohol; contains rusbyine, resins (2), alkaloid, fat, tannin, ash 10 p. c. Expectorant (superior to ipecac), laxative, emetic; bronchitis, bronchial pneumonia, phthisis. Dose, gr. 5–20 (.3–1.3 Gm.); 1. *Fluidextractum Cocillanæ*. Syrup, Elixir, each 10 p. c., dose, ℥j–2 (4–8 cc.).

Haematoxylon

Hæmatox'ylon campechia'num, Hematoxylon, Logwood, N.F.—The heartwood with not more than 2 p. c. of foreign organic matter. C. America, nat. in W. Indies. Spreading tree, 7.5–12 M. (25–40°) high, .3–.6 M. (1–2°) thick, knotty, tough; bark dark, rough, white dotted; leaves paripinnate, leaflets 4–5 pairs, obcordate, smooth; flowers yellow, racemes, jonquil odor; fruit legume, 2.5–4 Cm. (1–1⅗′) long, compressed, tapering ends, 2-seeded. Heartwood in logs 1 M. (3°) long, 15 Cm. (6′) thick, sp. gr. 1.06, hard purplish-black, internally brownish-red, irregular concentric circles, medullary rays 4 cells wide; odor faint, agreeable; taste sweetish, astringent; colors saliva dark pink. In shops as small chips, occasionally in billets, coarse powder, reddish-brown, freshly cut surface dark yellowish-red. Powder, reddish-brown—wood-fibers, crystal-fibers with calcium oxalate monoclinic prisms, tracheæ with brownish amorphous content; medullary rays, walls of cells with simple pores; pieces with a greenish luster (fermentation or oxidation of hematoxylin into hematein by ammonia



Hæmatoxylon campechianum: 1, flower; 2, fruit.



Lignum campechianum; cross-section, magnified 4 diam.

in the air) should be rejected. It imparts a yellowish color to slightly acidified water, changed to purple or violet-red by alkalies (red with Brazil wood, no change with red saunders); solvents: boiling water, alcohol; contains hematoxylin 12 p. c., volatile oil, tannin, fat, resin, ash 3.5 p. c. There are four varieties: 1, Campeachy; 2, Honduras; 3, St. Domingo; 4, Jamaica. Astringent, tonic, antiseptic, similar to tannin; cholera infantum, chronic diarrhea, dysentery, leucorrhea, hemorrhage, dyspepsia; antiseptic in gangrene, ulcers, cancer; chiefly in dyeing violet, blue, gray, black. Dose, ℥ss–1 (2–4 Gm.); 1. *Extractum Hæmatoxyli*, 10 p. c. (water), dose, gr. 5–15 (.3–1 Gm.); decoction (Br.) 5 p. c. + cinnamon 1, ℥ss–2 (15–60 cc.).

Hagenia Abyssinica: A, branch of panicle; *B*, staminate flower; and *C*, pistillate flower, magnified 4 diam.

Hagenia

Hage'nia abyssin'ica, Brayera, Kousso, Cusso, N.F.—The dried panicle of the pistillate flowers with not more than 10 p. c. of staminate flowers or other foreign organic matter, yielding not more than 5 p. c. of acid-insoluble ash; stems over 3 Mm. ($\frac{1}{8}$′) thick and all binding material must be rejected before powdering or using; Abyssinia, tablelands, mountains. Ornamental tree, 6–12 M. (20–40°) high; leaves 25–30 Cm. (10–12′) long, imparipinnate, leaflets 3–6 pairs, 7.5–10 Cm. (3–4′) long, sessile, serrate; flowers monœcious—staminate (Kousso-esels) greenish-yellow, with 20 fertile stamens. Pistillate (Red kousso) in reddish-brown rolls, flattened bundles, 25–50 Cm. (10–20′) long, or more or less lose and stripped from larger portions of the panicles, branches cylindrical, flattened, furrowed, light brown, yellowish, tomentose, glandular; cork brownish, fibro-vascular bundles in wedges, pith large, nodes with scar or branch, internodes 1–2 Cm. ($\frac{2}{5}$–$\frac{4}{5}$′) long; flowers with bracts, calyx turbinate, purple-veined bractlets; petals 5, caducous, usually absent in drug, carpels 2, stigmas broad, hairy, fruit achene, 2 Mm. ($\frac{1}{12}$′) thick; odor slight, taste bitter. Powder, brownish—non-glandular hairs, glandular hairs, tracheæ, pith, stomata, calcium oxalate rosettes, prisms, pollen grains; solvents: alcohol, boiling water; contains kosin (amorphous resins) 6.25 p. c., volatile oil, tannin 24 p. c., kosidin, protokosin, kosotoxin, ash 5–9 p. c. Anthelmintic, tænifuge. Dose, ʒij–6 (8–24 Gm.); 1. *Infusum Brayeræ*, 6 p. c., dose, ʒij–8 (60–240 cc.). Fluidextract (alcohol); kosin (koussin, brayerin—amorphous impure best), gr. 5–30 (.3–2 Gm.).

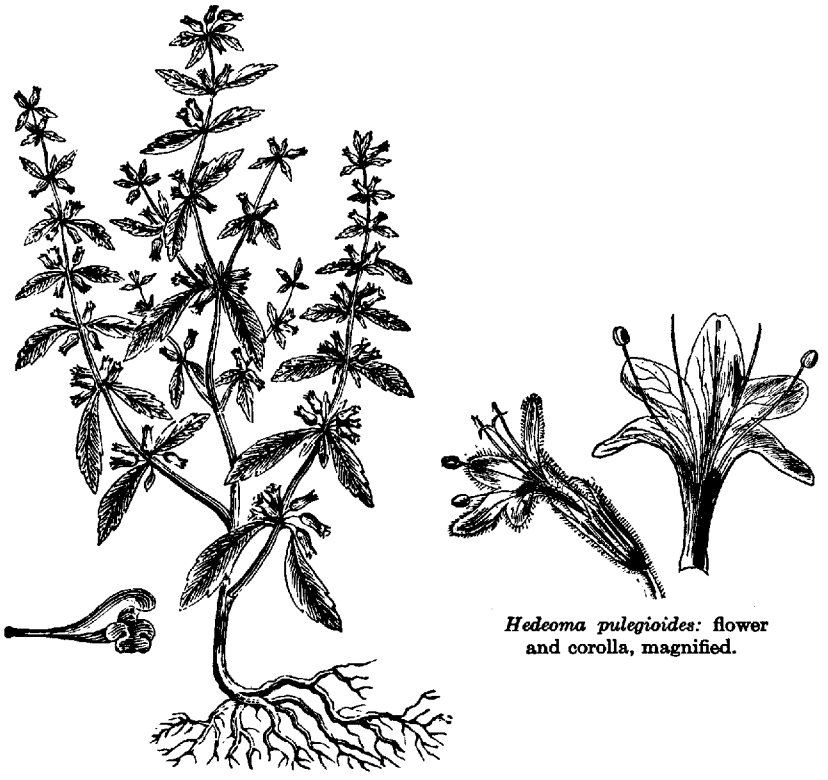
Hamamelis

Hamame'lis virginia'na; Hamamelidis Folia, Hamamelis Leaves, Witch Hazel Leaves, N.F.—The dried leaves with not more than 5 p. c. of stems nor 2 p. c. of other foreign organic matter; N. America, thickets, ponds, ditch banks. Woody shrub 1.5–4.5 M. (5–15°) high, 7.5–15 Cm. (3–6′) thick; stem crooked. Bark and twigs, in irregular quilled, bent pieces, 1–2 Mm. ($\frac{1}{25}$–$\frac{1}{12}$′) thick, grayish-brown, many lenticels, or reddish-brown, with short transverse ridges or scars, or somewhat scaly in old bark, thin corky layer easily removed from pale cinnamon-color middle bark, inner surface pale cinnamon, yellowish, smooth, finely striate, fracture short (young) or tough (old) in the bast layer. Leaves short, petiole 1–1.5 Cm. ($\frac{2}{5}$–$\frac{3}{5}$′) long, lamina broadly elliptical, inequilateral, 8–12 Cm. ($3\frac{1}{5}$–5′) long, acute, rounded, acuminate, slightly cordate and oblique, sinuate-dentate, pale or brownish-green with few stiff hairs above, lighter underneath, hairy, midrib and veins prominent; odor slight; taste astringent, aromatic, bitter. Powder, light-green—elliptical stomata, numerous stellate hairs and tracheæ, wood fibers, calcium oxalate prisms, crystal and bast-fibers; solvents: 33 p. c. alcohol, boiling water; contains tannin, volatile oil, bitter principle, extractive, ash 6 p. c. Astringent, hemostatic, styptic, sedative, tonic; external inflammations, congestion, sore throat (gargle), hemorrhages of nose, uterus, gums; piles, tumors, diarrhea. Dose, ʒss–1 (2–4 Gm.); 1. *Fluidextractum Hamamelidis Foliorum* (leaves), 1st menstruum: glycerin 10, alcohol 30, water 50, 2d: 33 p. c. alcohol. 2. *Aqua Hamamelidis, Distilled Extract of Witch Hazel* (twigs), 100 p. c.; macerate 24 hours in water 200, distil 85, add alcohol 15; it is clear, colorless, characteristic odor and taste, neutral, faintly acid; must be free from mucoid or fungous growths, acetous odor, formaldehyde, acetone, methanol, dissolved impurities. Should be kept cool, in tightly-closed containers.

Hamamelis virginiana: A. flowering twig; *B*, fruit-bearing twig; 1, flower, magnified; 2, sepal and stamen; 3, sepal, outer surface; 4, essential organs; 5, pistil; 6, fruit; 7, seed (four last longitudinal sections); 8, floral diagram.

Hedeoma

Hedeo'ma pulegioi'des, (American) Pennyroyal.—The dried leaves and flowering tops, U.S.P. 1830–1900; N. America, sandy fields, hills, open woods, scenting the atmosphere. Annual herb; stem 25–37.5 Cm. (10–15′) high, quadrangular, pubescent, branched; root fibrous, yellowish. Leaves opposite, 15–35 Mm. ($\frac{3}{5}$–$1\frac{2}{5}$′) long, thin, obtuse, obscurely serrate, glandular-hairy beneath, petiolate; flowers, axillary fascicles; calyx tubular, 5-toothed, bilabiate; corolla pale blue, spotted, bilabiate, containing 2 sterile and 2 fertile stamens; odor strong, mint-like; taste aromatic, pungent; solvents: alcohol, boiling water partially; contains volatile oil 1 p. c., bitter principle, tannin. Stimulant, carminative, emmenagogue, aromatic; flatulent colic, nausea, indigestion, corrective to purgatives; hot infusion—diarrhea, bronchitis, rheumatism, amenorrhea (hot hip and foot baths); odor repulsive to fleas, mosquitoes, etc.; large doses, for suppressed catamenia or for inducing abortion, have occasioned death from narcosis. Dose, gr. 15–60 (1–4 Gm.); fluidextract (diluted alcohol), ʒss–2 (2–8 cc.); infusion, 5 p. c., ʒij (60 cc.), every hour; spirit (oil 1, + alcohol 9), externally and in spray. Volatile oil (Oleum Hedeomæ), U.S.P. 1820–1900, often added to liniments as a rubefacient. *Mentha Pule'gium, European Pennyroyal*, resembles closely the above, having oval, serrate leaves, and purplish flowers, cymes, corolla 4-lobed; *Hedeoma piperi'ta*, Mexico, is used for peppermint, while *H. thymoi'des*, Texas, having more agreeable odor, as aromatic, diaphoretic.



Hedeoma pulegioides.

Hedeoma pulegioides: flower and corolla, magnified.

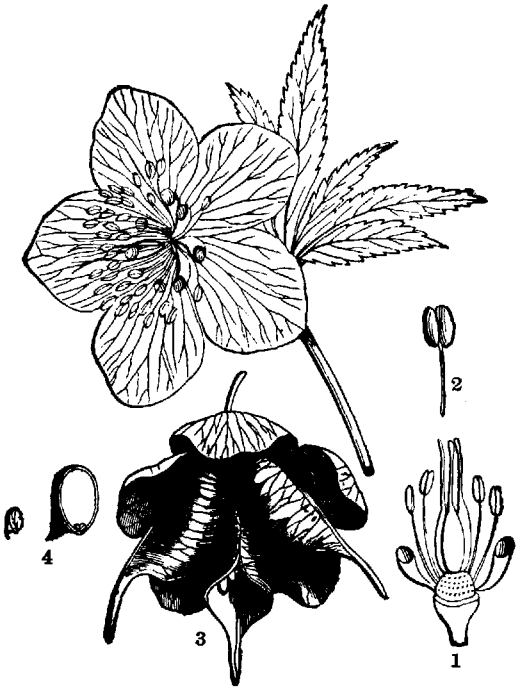
Helianthemum

Helian'themum canaden'se, Helianthemum, Rock-rose, Frost-wort (-weed), U.S.P. 1850–1870.—Cistaceæ. The dried herb; N. America. Hoary perennial. 15–45 Cm. (6–18′) high, terete, reddish; leaves 1–3 Cm. ($\frac{2}{5}$–$1\frac{1}{5}$′) long, 4–8 Mm. ($\frac{1}{6}$–$\frac{1}{3}$′) broad, oblong, entire; flowers, 2 kinds, yellow; fruit ovoid capsule; odor slightly aromatic; taste astringent, bitter; solvent: diluted alcohol; contains volatile oil, fixed oil, wax, tannin, glucoside. Tonic, astringent, alterative; prurigo; large doses emetic. Dose, gr. 5–30 (.3–2 Gm.); Decoction, Extract, Fluidextract (diluted alcohol).

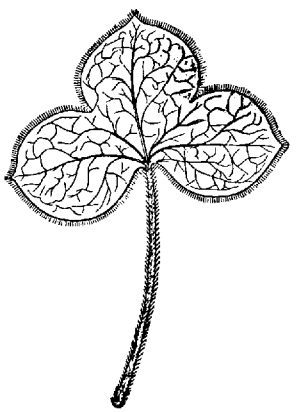
Helleborus

Helleb'orus ni'ger, Black Hellebore.—**The dried rhizome and roots, U.S.P. 1820–1870; C. and S. Europe, mountains. Acaulescent perennial, leaves evergreen, 7–9-lobed, flowers rose-like. Rhizome knotty, 5 Cm. (2′) long, 12 Mm. ($\frac{1}{2}$′) thick, blackish, bark thick, wood-wedges 8, medullary rays broad, taste sweet, bitter, usually from Germany;** contains helleborin, helleborein, helleboretin, resin, volatile oil, fixed oil, gum, etc. Heart stimulant, drastic hydragogue cathartic, alterative; used for melancholia, mania, dropsy, amenorrhea, epilepsy, skin troubles; in decoction, infusion, tincture, extract. Dose, gr. 5–20 (.3–1.3 Gm.).

H. fœ'tidus, Bear's Foot.—The leaves, U.S.P. 1820–1830; Europe. Perennial herb—the most energetic of the genus. Used for asthma, hysteria, hypochondriasis, tenia; in powder, decoction, syrup. Dose, gr. 5–20 (.3–1.3 Gm.). *H. vir'idis, Green Hellebore.* The rhizome (root), United States, Europe; rhizome about the same as *H. niger,* but has only 4 wood-wedges, and is smaller.



Helleborus viridis: 1, receptacle, tricarpelled ovary, and stamens; 2, a stamen; 3, the three resulting ripened fruits; 4, a seed.



Hepatica Hepatica (triloba): leaf showing venation.

Hepatica

Hepat'ica Hepatica (tri'loba), Noble Liverwort.—The leaves, U.S.P. 1830–1870, N. America, Europe. One of our earliest harbingers of spring; acaulescent perennial, flowers, April, bluish, leaves reniform, 5 Cm. (2′) long, 3-lobed; contains mucilage, tannin. Tonic, demulcent, deobstruent; liver affections, bronchitis, phthisis; in decoction, infusion. Dose, ʒss–2 (2–8 Gm.).

Heracleum

Heracle'um lana'tum, Cow-parsnip, Masterwort.—The root, U.S.P. 1820–1850; United States. Plant 1.5–3 M. (5–10°) high, 2.5–4 Cm. (1–1⅘′) thick, pubescent, hollow; root resembles parsley, disagreeable odor, acrid taste, fruit has each mericarp with 5 ribs and 6 vittæ; contains volatile oil, resin. Stimulant, carminative; epilepsy, dyspepsia, warts, escharotic; in infusion, juice. Dose, ʒss–1 (2–4 Gm.).

Heuchera

Heu'chera america'na, Alum Root.—The rhizome, U.S.P. 1820–1870; United States. Plant viscid, pubescent, .6–1.3 M. (2–4°) high; leaves 5–7.5 Cm. (2–3′) wide, crenate; flowers purplish-white; root 15 Cm. (6′) long, 12 Mm. (½′) thick, several-headed, many thin radicals, brownish-purple; bark thin, inodorous, astringent, bitter; contains tannin 18–20 p. c., starch 5–16 p. c. Astringent, tonic; diarrhea, menorrhagia, aphthæ, ulcers, hemorrhoids. Dose, gr. 15–30 (1–2 Gm.), in decoction.

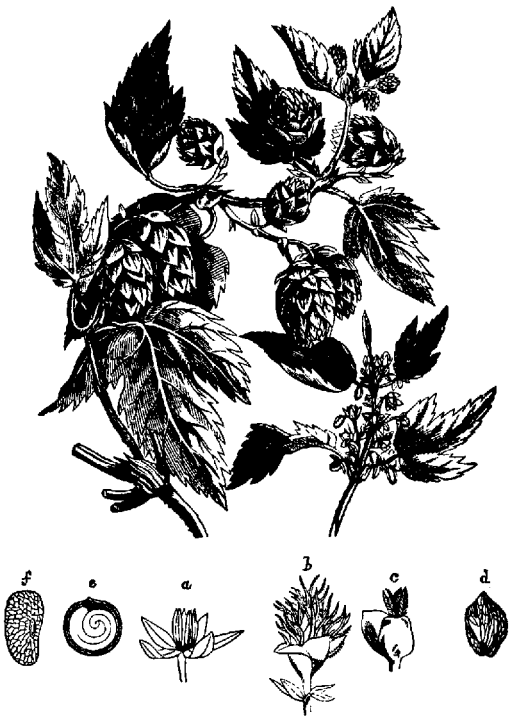
Hevea

Heve'a (brasilien'sis and *H. guianen'sis), Elastica, Rubber.*—The prepared milk-juice, U.S.P. 1890–1900; S. America, east of Andes, India, near streams. Large trees, smooth straight trunks, 15–18 M. (50–60°) high; leaves trifoliate, leaflets obovate, 10 Cm. (4′) long, dark green; flowers racemes. Resin (rubber), in flask-shaped, roundish masses, incised pieces showing laminated structure, lighter than water, brownish-black, internally lighter, mottled, tough, elastic, odor creosote-like, almost tasteless; solvents: chloroform, carbon disulphide, oil of turpentine, petroleum benzin, benzene; melts at 125° C. (257° F.), soft and adhesive on cooling; heated with sulphur 10 p. c.—vulcanized and insoluble; with 40 p. c.—hard rubber (ebonite). Milk (resembling cow's) exudes from small pick holes, being caught in small cups, emptied into large vessels and conveyed to smoking station, where wooden paddles (lower end) are dipped repeatedly into it (then sometimes into sand—adulteration), and rotated in a column of smoke until coagulated and mass has attained considerable size; contains resin (caoutchouc) 32 p. c., volatile oil, fixed oil. Base of plasters; woven into fabrics to compress and support relaxed muscles and parts; hard rubber in surgical implements—bougies, catheters, pessaries, specula, syringes, etc.

Humulus

Hu'mulus Lu'pulus, Humulus, Hop, N.F.—The carefully dried strobile bearing its glandular trichomes with not more than 2 p. c. of stems, leaves, or other foreign matter, yielding not more than 5 p. c. of acid-insoluble ash; N. Temperate Zone—N. America, C. Asia, cultivated. Perennial herbaceous twiner (left to right), stems several, 6 M. (20°) long, flexible, flowers dicœcious, pistillate greenish, cone-like spikes producing the fruit. Strobile (fruit) ovoid-cylindical, 3 Cm. (1⅕′) long, flexuous rachis, numerous yellowish-green membranous scales, the base of each with numerous brownish glandular hairs (lupulin) and enclosing a glandular achene; odor strong, characteristic—disagreeable, valerian-like on aging; taste aromatic, bitter; should be kept dark, in tightly closed containers. Powder, yellowish-green—parenchyma cells with calcium oxalate rosettes, branching tracheæ, non-lignified hairs, glandular hairs with yellowish oil, few pollen grains, large cells with calcium carbonate cystoliths; solvents: diluted alcohol, boiling water; contains volatile oil .8 p. c., choline (lupuline), resin (3) 9–18 p. c., trimethylamine, tannin (lupulo-) humulo-tannic acid, sugar, salts. Tonic, stimulant, nervous, sedative, anodyne, hypnotic; nervous insomnia, dyspepsia, delirium tremens, hysteria, irritable bladder, rheumatism, abscesses (poultice). Dose, ʒss–1 (2–4 Gm.); 1. *Fluidextractum Humuli* (alcohol 5 vols., water 3), dose, ♏xv–60 (1–4 cc.); 2. *Tinctura Humuli*, 20 p. c. (diluted alcohol), dose, ʒj–2 (4–8 cc.). *Infusion*, 5 p. c.; extract, elixir, poultice.

Lupulinum, Lupulin, N.F.—The glandular trichomes separated from the strobiles, yielding not less than 60 p. c. of ether-soluble extractive nor more than 10 p. c. of acid-insoluble ash. It is a yellowish-brown, granular powder, characteristic odor and taste of hop, being obtained therefrom by removing scales, shaking, and rubbing glands through fine sieve—yield 8–16 p. c.; trichomes globular, ellipsoidal,



Humulus Lupulus: a, staminate flower; *b*, pistillate flower; *c*, sepal; *d*, bract; *e*, embryo; *f*, lupulinic gland (lupulin).

.1–.3 Mm. ($\frac{1}{250}$–$\frac{1}{80}$′) broad, layer of secreting cells in form of shallow cup, the cuticle on inner surface being separated by secreted yellowish oleoresin; should be kept dark in tightly closed containers and when dark reddish and of disagreeable valerian-like odor from aging must not be used. Dose, gr. 5–15 (.3–1 Gm.); 1. *Fluidextractum Lupulini* (alcohol), dose, ♏v–30 (.3–2 cc.). *Oleoresin* (acetone, ether) gr. 5–15 (.3–1 Gm.); *Tincture*, 12 p. c. (alcohol); Pills (excipient—little ether, or heat, or brisk rubbing with spatula.

Lupulin (fresh).

Hydrangea *Hydran'gea arbores'cens, Hydrangea, Seven-barks, N.F.*—Saxifragaceæ. The dried rhizome and roots with not more than 3 p. c. of foreign organic matter; N. America, on rocky banks near streams; .3–2.5 M. (1–8°) high, stem grayish, bark exfoliates into thin layers (7), glabrous; leaves ovate, serrate, pale green beneath; flowers cymes, flat, greenish; fruit 2-celled, 2-beaked, many-seeded capsule. Rhizome, usually in pieces 3–10 Cm. ($1\frac{1}{5}$–4′) long, 3–20 Mm. ($\frac{1}{8}$–$\frac{4}{5}$′) thick, yellowish-brown, wrinkled, lenticels, stem-scars above, fibrous roots beneath; fracture tough, whitish, wood radiate—pith; roots 25 Cm. (10′) long, 2 Mm. ($\frac{1}{12}$′) thick—no pith; inodorous; taste sweetish, acrid. Powder, yellowish—tracheæ, tracheids, stone cells, numerous calcium oxalate raphides, starch grains; solvent: 60 p. c. alcohol; contains hydrangin (glucoside) 1 p. c., volatile oil, fat, resin, starch, ash 3 p. c. Diuretic, narcotic; renal and cystic calculi. Dose, gr. 15–30 (1–2 Gm.); 1. *Fluidextractum Hydrangeæ* (60 p. c. alcohol). 2. *Elixir Hydrangeæ et Lithii*, 40 p. c., + lithium benzoate and salicylate āā 2.6 p. c. Dose, ʒj–2 (4–8 cc.).

Hydrastis

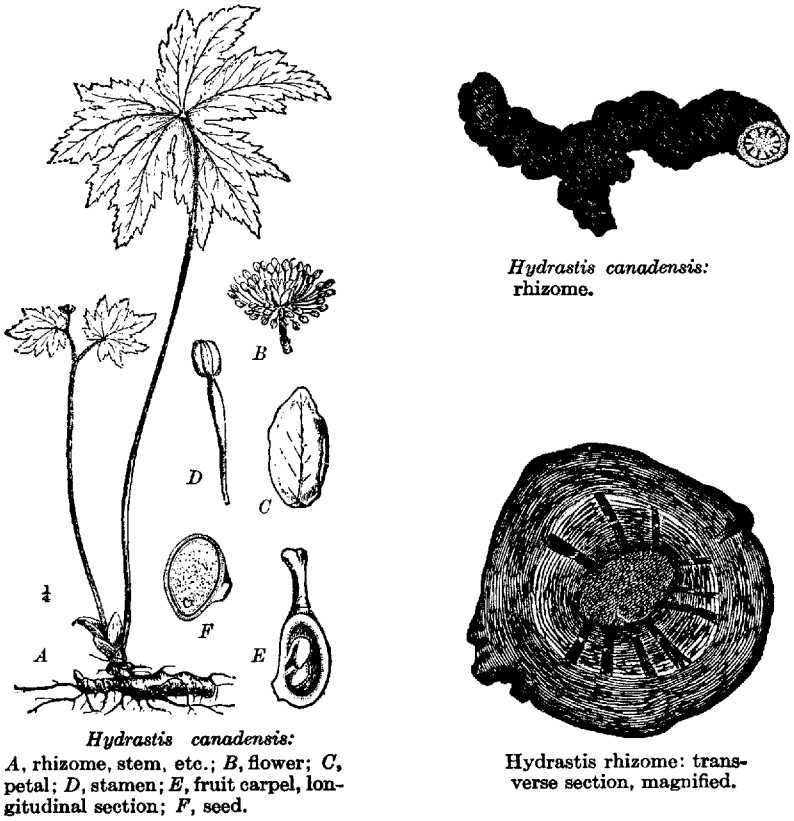
HYDRASTIS. HYDRASTIS, *U.S.P.*

Hydrastis canadensis, *Linné.*

The dried rhizome and roots with not more than 2 p. c. stems and leaves, nor 2 p. c. other foreign organic matter, yielding not less than 2.5 p. c. ether-soluble alkaloids, nor more than 3 p. c. of acid-insoluble ash.

Habitat. N. America, Canada, east of the Mississippi; rich woodlands, mountains.
Syn. Golden Seal, Yellow (Orange) Root, Yellow Puccoon (Indian Paint), Turmeric (Jaundice) Root, Ohio Curcuma, Indian Turmeric (Dye), Ground Raspberry, Eye Balm (Root), Yellow Eye; Br. Hydrastis Rhizoma; Fr. Racine Orange, Sceau d'Or; Ger. Hydrastisrhizom, Canadische Gelbwurzel.
Hy-dras'tis. L. fr. Gr. *ὕδωρ*, water, + *δράω* to act—*i. e.*, alluding to the active properties of the juice, or to the plants growing in marshy places.
Can-a-den'sis. L. of Canada—*i. e.*, its northern habitat limit.
Golden Seal—*i. e.*, its yellow scarred rhizome, once used as a paint and dye.

PLANT.—Perennial herb 15–30 Cm. (6–12′) high, simple, hairy, 2-leaved near apex, one sessile at top, the other an inch or so below with thick petiole; leaves pubescent, round, cordate, palmately 5–7-lobed, pointed, serrate, 10–22.5 Cm. (4–9′) wide; flowers May–June, only one, greenish-yellow, arising from upper leaf on a peduncle; fruit compound red berry, 12 Mm. ($\frac{1}{2}$′) thick, composed of 12 or more 1–2-seeded berries like raspberry. RHIZOME, horizontal or oblique growth, subcylindrical, flexuous, 1–5 Cm. ($\frac{2}{5}$–2′) long, 2–10 Mm. ($\frac{1}{12}$–$\frac{2}{5}$′)



Hydrastis canadensis: *A*, rhizome, stem, etc.; *B*, flower; *C*, petal; *D*, stamen; *E*, fruit carpel, longitudinal section; *F*, seed.

Hydrastis canadensis: rhizome.

Hydrastis rhizome: transverse section, magnified.

thick, grayish-brown, longitudinally wrinkled, annulate from scars of bud-scales; upper surface occasionally with stem- or leaf-bases, many stem-scars; under and lateral surfaces with easily detached filiform roots, up to 35 Cm. (14′) long, and 1 Mm. ($\frac{1}{25}$′) thick; yellowish; brittle; curved, twisted, matted, or broken; fracture short, waxy; internally deep yellow, or greenish-yellow, enclosing an interrupted circle of small fibro-vascular bundles; odor distinctive; taste bitter. POWDER, brownish-yellow—numerous starch grains, .002–.015 Mm. ($\frac{1}{12500}$–$\frac{1}{1650}$′) broad, parenchyma and fragments of tissues with fibro-vascular bundles, tracheæ, tabular cork cells, no calcium oxalate crystals. *Test:* 1. Moistened with water, mounted directly in sulphuric acid shows numerous acicular, or rod-shaped crystals. *Solvents:* alcohol; diluted alcohol; boiling water. Dose, gr. 5–30 (.3–2 Gm.).

ADULTERATIONS.—Rhizomes of *Aristolochia Serpentaria, Aristolochia reticulata, Cypripedium hirsutum, Cypripedium parviflorum, Asarum canadense, Xanthorrhiza apiifolia*, and roots of *Styloph'orum diphyl'lum.*

Commercial.—The Cherokee Indians used hydrastis very early as a domestic remedy and dye, and although they disclosed its value to the American settlers, it did not attract medical attention until 1798, but soon thereafter became popular with the "Eclectics" and later one of our important drugs.

CONSTITUENTS.—Hydrastine 1.5–3.14 p. c., Berberine 3–4 p. c., Canadine (resin, fluorescent compound, starch, sugar, gum, fat, coloring matter), ash 5 p. c.

Hydrastina, Hydrastine, $C_{21}H_{21}O_6N$.—This characteristic colorless alkaloid is obtained by adding hydrochloric or sulphuric acid in excess to an alcoholic tincture of hydrastis, whereby the corresponding berberine salt deposits in crystals; to the filtered mother-liquor add ammonia water until acidity is nearly neutralized, strain to remove ammonium salt, concentrate to a syrupy consistence and pour this into 10 volumes of cold water, to remove fat and resin; to the filtrate, containing crude hydrastine salt, add ammonia water in excess to precipitate impure alkaloid, which may be purified by dissolving in diluted sulphuric acid, again precipitating with ammonia water and repeated crystallization from hot alcohol; also prepared synthetically; occurs in white, creamy white, glistening prisms, white microcrystalline powder, permanent, soluble in benzene, alcohol (170), hot alcohol (22), chloroform (1.4), ether (175); insoluble in water; saturated alcoholic solution alkaline, melts at 131° C. (268° F.). Dose, gr. $\frac{1}{4}$–$\frac{1}{2}$ (.016–.03 Gm.).

Hydrastinæ Hydrochloridum, Hydrastine Hydrochloride, $C_{21}H_{21}O_6N.HCl$, *N.F.*—The hydrochloride of the alkaloid hydrastine obtained by dissolving the pure alkaloid in alcoholic solution of hydrochloric acid, concentrating until crystals appear; occurs as a white, creamy-white powder, odorless, hygroscopic; soluble in water, alcohol, slightly in chloroform, ether; aqueous solution (1 in 20) neutral, slightly acid. *Tests:* 1. With silver nitrate T. S.—white precipitate, insoluble in nitric acid; with sulphuric acid—yellow color, changing to purple on heating. 2. With sulphuric acid containing .005 Gm. molybdic acid in each cc.—green, olive-green, brown; substitute selenous acid for molybdic acid—light green color, changing to brown; with nitric acid—reddish-yellow color; incinerate .1 Gm.—ash non-weighable. 3. Solution of .1 Gm. in diluted sulphuric acid 10 cc.—no blue fluorescence (abs. of hydrastinine), but gradually adding potassium permanganate T. S., avoiding excess—blue fluorescence develops. 4. Aqueous solution (1 in 20)—not reddened by chlorine water (abs. of berberine). Should be kept dark, in well-closed containers. Dose, gr. $\frac{1}{4}$–$\frac{1}{2}$ (.016–.03 Gm.).

Hydrastininæ Hydrochloridum, Hydrastinine Hydrochloride, $C_{11}H_{11}O_2N.HCl$.—This hydrochloride of the artificial alkaloid is obtained by the oxidation of hydrastine with an oxidizing agent (nitric acid, potassium dichromate or permanganate, etc.) in acid solution; dissolve hydrastine 10 Gm. in nitric acid 75 cc., heat to 60° C. (140° F.), upon cooling opianic acid crystallizes out, add to filtrate potassium hydroxide solution to precipitate hydrastinine, purify by recrystallizing from benzene or acetic ether, dissolve crystals in hydrochloric acid, crystallize from alcohol; occurs in light yellowish needles, yellowish-white, crystalline powder, odorless; soluble in water, alcohol, chloroform (195), ether (1820); aqueous solution (1 in 20) neutral, with blue fluorescence, especially when highly diluted, melts at 210° C. (410° F.) with partial decomposition. Used chiefly for uterine hemorrhage (hypodermically), also as oxytocic; slows heart, but increases force of contraction, motor-depressant, paralyzant. Dose, gr. $\frac{1}{3}$–$\frac{1}{2}$ (.02–.03 Gm.), in 10 p. c. solution.

Berberine, $C_{20}H_{17}O_4N$.—This colored alkaloid is obtained by the preceding process for separating hydrastine; occurs in bitter yellow needles, crystalline powder, soluble in hot water or alcohol; the hot alcoholic solution with iodine gives dark green lustrous scales; forms several yellow salts, carbonate, hydrochloride, phosphate, sulphate, etc., which dissolve in water with difficulty; found also in berberis, calumba, coptis, menispermum, xanthorrhiza, etc. Dose, gr. $\frac{1}{2}$–1 (.03–.06 Gm.).

Canadine, $C_{20}H_{21}O_4N$.—This forms white needles; in alcohol solution, with iodine get yellow crystals; it is called sometimes tetrahydroberberine, and differs from hydrastine in being more soluble in acetic ether and alcohol; only the hydrochloride and sulphate are easily soluble in alcohol or hot water; the name xanthopuccine once assigned to it, but as such it was very likely impure berberine.

PREPARATIONS.—I. RHIZOME: 1. *Fluidextractum Hydrastis.* Fluidextract of Hydrastis. (Syn., Fldext. Hydrast., Fluid Extract of Hydrastis, Fluidextract of Golden Seal; Br. Extractum Hydrastis Liquidum; Fr. Extrait fluide d'Hydrastis; Ger. Hydrastisfluidextrakt.)

Manufacture: Similar to Fluidextractum Ergotæ, page 63; 1st menstruum: alcohol 60 cc., water 20, glycerin 10; 2d: 67 p. c. alcohol; reserve first 75 cc., in which dissolve soft extract, assay and add 2d q. s. for 100 cc. to contain 1.8–2.2 Gm. of ether-soluble alkaloids. Dose, ♏v–30 (.3–2 cc.): Preps.: 1. *Mistura Rhei Alkalina, N. F.*, $\frac{4}{5}$ p. c.

2. *Elixir Hydrastis Compositum,* Alkaline Elixir, *N. F.*, fldext. 1.75 p. c. + fldexts. oat, xanthox. āā 1.75, fldexts. gentian, ginger āā .875, sodium bicarb. .875, elix. arom. q. s. 100.

2. *Extractum Hydrastis, N. F.*; yields 9–11 p. c. of ether-soluble alkaloids, and 1 Gm. represents 4 Gm. of hydrastis. Dose, gr. 1–10 (.06–.6 Gm.). 3. *Tinctura Hydrastis, N. F.*, 20 p. c. (67 p. c. alcohol). Dose, ℥ss–1 (2–4 cc.). II. HYDRASTINE: 1. *Liquor Hydrastinæ Compositus,* Colorless Hydrastine Solution, *N. F.*, $\frac{3}{10}$ p. c. Dose, ℥ss–1 (2–4 cc.).

Unoff. Preps.: Decoction, 5 p. c., ℥j–2 (30–60 cc.). *Hydrastin* of "Eclectics" is a resinoid, prepared by exhausting the drug with alcohol, evaporating, and precipitating with acidulated (HCl) water; it is chiefly berberine chloride, which often occasions for it the substitution of the pure hydrochloride of that alkaloid, dose, gr. 2–6 (.13–.4 Gm.).

PROPERTIES.—Upon digestion, circulation, respiration, and nervous system analogous to, but much milder than, strychnine. Bitter tonic, increases appetite, digestion, gastric secretions (berberine), and the flow of bile; antiperiodic, protoplasmic poison, interfering with the white blood-corpuscle movement, alterative to the mucous membranes, deobstruent to the glandular system, antiseptic, cholagogue, diuretic. Hydrastine acts on the nervous system like quinine, but it is non-toxic, as large doses only produce warmth in the stomach and ringing in the

ears.

USES.—Chronic dyspepsia and cystitis, catarrhs of the stomach, duodenum, gall-ducts, bladder, uterus and vagina, constipation, bronchitis, malaria, intermittent fever, jaundice. Locally in gonorrhea, leucorrhea, otorrhea, gleet, chronic nasal catarrh and pharyngitis, syphilitic sores in the mouth, nares, and throat, unhealthy intractable ulcers and sores, cancers, fistulas, hemorrhoids, fissured nipples, conjunctivitis, tonsillitis, hemorrhage. Hydrastine for chronic malaria is much weaker, but next in value to quinine; hydrastinine (hypodermically) for menorrhagia and metrorrhagia. The yellowish liquids are objectionable owing to their staining qualities, for which, however, the Indians valued them in dyeing fabrics yellow; with indigo they impart a fine green to wool, silk, and cotton.

Poisoning: Same as for nux vomica and strychnine.

Incompatibles: Alkalies, mineral acids, tannic and other vegetable acids, chloral hydrate, potassium bromide, motor depressants.

Synergists: Quinine and the vegetable tonics upon the stomach, ergot upon the uterus, and strychnine upon the spinal cord.

Hyssopus

Hysso'pus officina'lis, Hyssop.—S. Europe. Plant .3 M. (1°) high, stem square, leaves 2.5 Cm. (1′) long, punctate on both sides, flowers purplish-blue, stamens 4, exserted; contains volatile oil .5 p. c., bitter principle, resin, fat. Used in Biblical times as a cathartic, now as a carminative, stimulant, sudorific; for dyspepsia, amenorrhea, rheumatism, bruises, bronchitis, sore throat, chronic catarrhs. Dose, gr. 15–60 (1–4 Gm.); infusion, 5 p. c.; oil ♏j–2 (.06–.13 cc.).

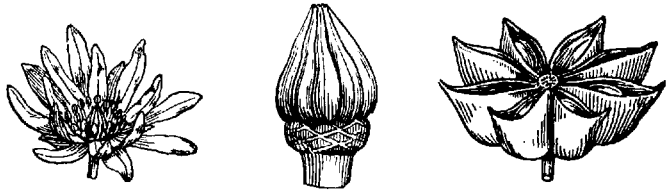
Ilex paraguensis

I. paraguen'sis (paraguayen'sis), Maté, Paraguay Tea.—Brazil. Leaves contain caffeine .2–1.6 p. c., tannin 10–16 p. c., volatile oil, stearoptene, wax, glucoside, proteins 5 p. c., ash 4–8 p. c.

Illicium

Illic'ium ve'rum, Star Anise.—The fruit, U.S.P. 1880–1890; N. Annam, S. W. China (mountains). Small tree, 3–6 M. (10–20°) high, branched; leaves evergreen, lanceolate, pointed, entire, pellucid-punctate, 5–15 Cm. (2–6′) long; flowers greenish-yellow. Fruit (capsule—integuments 87 p. c., seed 22 p. c.), star-shaped, being composed of 8 stellately arranged boat-shaped carpels, 8 Mm. (⅓′) long, woody, wrinkled, brown, dehiscent on upper suture; internally each carpel glossy, reddish-brown, containing 1 flattish, oval, glossy-brown seed; odor anise-like (*anisatum*); taste sweet, aromatic—seed oily; contains (integuments) — volatile oil (one of the sources of Oleum Anisi, U.S.P.) 5.3 p. c. (congeals at

Illicium religiosum (anisatum).



a *b* *c*

Illicium verum: a, flower; *b,* fruit carpels of the flower magnified; *c,* fruit.

1.° C.; 34° F., and consists chiefly of anethol), resin 10.7 p. c., fixed oil 2.8 p. c., saponin, protocatechuic acid, shikimic acid, mucilage, ash 2 p. c.; (seed)—volatile oil 1.8 p. c., resin 2.6 p. c., fixed oil 20 p. c.; solvents: alcohol, hot water partially. *Adulteration:* Poisonous fruit of the allied species, *Illicium religiosum (anisatum).* Carminative, anodyne, stimulant, diuretic; flatulent colic, indigestion, infantile catarrh, bronchitis, rheumatism, earache, flavoring. Dose, gr. 5–30 (.3–2 Gm.); infusion, 5 p. c., ℥j–2 (30–60 cc.); volatile oil ♏j–2 (.06–.13 cc.).

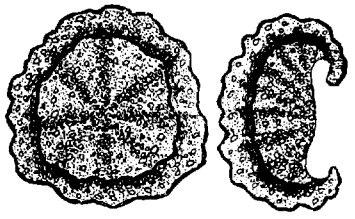
I. religio'sum (anisa'tum).—Cultivated around Buddhist temples in China and Japan, being called *Shikimi.* Fruit very similar to the preceding, having 8 carpels, but is more woody and shriveled, with thin, upward-curved beak; odor faint, clove-like; taste unpleasant; contains .44 p. c. of a non-solidifying volatile oil, sp. gr. 0.990, shikimic acid, sikimipicrin (crystalline, bitter), and sikimin (poisonous). The oil consists of a terpene, safrol, $C_{10}H_{10}O_2$, eugenol, $C_{10}H_{12}O_2$, and liquid anethol. The fruit is used natively for killing rats, fish, etc., the latter serving as food in spite of the poison. Upon persons it causes vomiting, epileptiform convulsions, and dilated pupils; *I. florida'num* and *I. parviflo'rum;* Fla., Ga., La.; the former has fruit with 13 carpels, the latter with only 8; barks are substituted sometimes for cascarilla.

Inula

In'ula Hele'nium, Inula, Elecampane, N.F.—The dried rhizome and roots with not more than 5 p. c. of stem-bases nor 2 p. c. of other foreign organic matter; C. and S. Europe, C. Asia. Perennial herb 1–2 M. (3–6°) high; stem thick, solid, striate, villous; leaves large, .3–.5 M. (10–18′) long, 10–20 Cm. (4–8′) broad, ovate, serrate, pubescent beneath, long-petioled, fleshy midrib; flowers large, 6 Cm. (2⅖′) broad, single, golden-yellow. Rhizome, dug in autumn of second year, usually split into longitudinal, oblique pieces having one or more roots; up to 8 Cm. (3′) long, 4 Cm. (1⅗′) thick, grayish-brown, longitudinally wrinkled with occasional buds or stem-scars, surmounted at crown by portion of over-ground stem; inner (cut) surface concave, edges incurved with the overlapping bark, yellowish-brown, striate, fibrous near cambium zone; fracture short, horny; internally light brown, with many oleoresin canals; roots cylindrical, tapering, curved, curled, up to 13 Cm. (5⅕′) long, 1.5 Cm. (⅗′) thick; odor aromatic; taste acrid, bitter, pungent. Powder, light brown—fragments of parenchyma having inulin and small separate masses of inulin; tracheæ with pores, thickenings, occasional lignified wood-fibers and brownish fragments of walls of oleoresin canals; solvents: alcohol, water partially; contains volatile oil, acrid resin, bitter principle, inulin, helenin, wax, ash 10 p. c.

Stimulant, diaphoretic, diuretic, expectorant, emmenagogue, tonic; lung diseases, bronchitis, vesical catarrh, amenorrhea, dyspepsia, skin affections, dropsy, whooping-cough, diphtheria. Dose, ʒss–1 (2–4 Gm.); 1. *Pilulæ Antiperiodicæ*, gr. ¼ (.016 Gm.); 2. *Tinctura Antiperiodica*, ⅔ p. c. Decoction, 5 p. c., ʒj–2 (30–60 cc.); Fluidextract, ʒss–1 (2–4 cc.); Infusion, 5 p. c., ʒj–2 (30–60 cc.). *I. squarro'sa;* S. Europe. Leaves tomentose, rugose, ray-florets 3-cleft, tubular; emmenagogue, diuretic; powder burned to repel insects. *Pulica'rea*

Inula Helenium.



Inula: transverse section, natural size.

(*Inula*) *dysenter'ica, Fleawort,* and *Carli'na acau'lis, Carline Thistle, Radix Carlinæ;* Europe—both have constituents and properties similar to elecampane; diaphoretic, diuretic, large doses purgative; typhoid condition, impotence, amenorrhea, paralysis of the tongue. Dose, gr. 10–20 (.6–1.3 Gm.).

Ipomea orizabensis

IPOMŒA. IPOMEA, *U.S.P.*

Ipomœa orizabensis, *Ledenois.* { The dried root, yielding not less than 15 p. c. total resins nor more than 3 p. c. acid-insoluble ash.

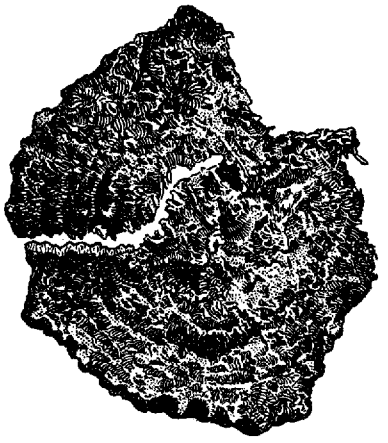
Habitat. Mexico—eastern slopes of Mexican Andes, rainy atmosphere.

Syn. Ipom., Orizaba Jalap Root, Mexican Scammony Root, Fusiform, Light, or Woody Jalap; Br. Ipomœa Radix.

Ip-o-mœ'a. L. fr. Gr. ἴψ, ιπός, a worm, bindweed, + ὁμοῖος, like, resembling—*i. e.*, from the stems' twining habit, resembling the contortions of a worm.

O-ri-za-ben'sis. L. of or belonging to Oriza'ba, a Mexican city, around which it grows and is collected.

PLANT.—A climbing vine resembling closely our common "Morning glory," *I. purpu'rea;* stem cylindrical, villous; leaves large, petiolate, cordate, acuminate, villous on veins; corolla campanulate, reddish-purple; fruit capsule, 2-locular, 1-seeded. ROOT, large, .3–.6 M. (1–2°) long, fusiform, branching, yellowish, internally whitish; usually in nearly flat transverse slices, 2–12 Cm. (⅘–5′) broad, 1–5.5 Cm. (⅖–2⅕′) thick, brownish, deeply wrinkled, fracture tough, fibrous, cut surface light brown, showing concentric rings from which coarse fibers protrude; odor distinct, aromatic; taste slightly sweet, acrid. POWDER, light grayish-brown—starch grains, .003–.035 Mm. ($\frac{1}{8325}$–$\frac{1}{710}$′) broad, numerous calcium oxalate crystals, mostly in rosette aggregates, occasionally rhombohedra; fragments of yellowish-brown resin cells, tracheæ, wood-fibers, *Solvent:* alcohol. Dose, gr. 10–30 (.6–2 Gm.).



Ipomœa orizabensis: transverse section (disk), natural size.

Commercial.—Ipomœa root has been made official to replace the more acceptable Levant Scammony Root for some years unobtainable. The two roots differ strikingly in marketable form, Ipomœa being cut when fresh into disks, rapidly dried in the sun, and shipped from Mexico City; internally unlike scammony in not being mottled, in showing regular concentric wood-bundles, in having no stone cells, and calcium oxalate crystals in rosette aggregates rather than monoclinic prisms.

CONSTITUENTS.—Resin (jalapin, orizabin) 15–18.5 p. c. (75–90 p. c. ether-soluble), starch, gum, tannin, ash 9.89 p. c.

PREPARATIONS.—1. *Resina Ipomœæ.* Resin of Ipomea. (Syn., Res. Ipom.; Br. Scammoniæ Resina, Scammony Resin.)

Manufacture: Macerate, percolate 100 Gm. with alcohol until percolate when dropped into water produces only slight turbidity, reclaim alcohol until percolate reduced to a thin syrup, and pour this slowly, stirring constantly, into hot water 100 cc., let resin subside, decant supernatant liquid, wash resin twice by decantation, each time with hot water 100 cc., dry on water-bath. It is in translucent, brownish masses, fragments; fracture resinous, glossy; odor characteristic; soluble in alcohol, chloroform, ether (80–90 p. c.), petroleum benzin loses not more than 1 p. c. (abs. of water). 2. Dissolves in ammonia T. S. (5) or potassium hydroxide T. S. (5) with turbidity—not gelatinous on standing; these solutions, + little hydrochloric acid— only slight turbidity (abs. of rosin, guaiac, other resins). 3. Triturated with distilled water—latter not colored, as it dissolves none of the resin (abs. of soluble impurities), nor does it acquire bitter taste (abs. of aloin). *Impurities:* Rosin, guaiac, aloin, water-soluble substances, other resins. Dose, gr. 1–5 (.06–.3 Gm.).

Preps.: 1. *Extractum Colocynthidis Compositum,* 14 p. c. 2. *Tinctura Jalapæ Composita, N.F.,* 3 p. c.

PROPERTIES.—Hydragogue, cholagogue cathartic; Root seldom

employed internally; resin similar to that of scammony, but a greater irritant and nauseant which may be overcome by combination with other cathartics, and aromatics.

USES.—Dropsies, cerebral affections, torpid intestines with slimy mucus.

Poisoning: Same as for aloe, colocynth, jalap, etc.

Ipomœ'a pandura'ta (*Convolvulus pandura'tus*), *Wild Potato* or *Jalap, Man Root, Man of the Earth.*—The root, U.S.P. 1820–1850; United States. Plant recognized by its fiddle-shaped leaves, stem purplish, climbing 3.5–4.5 M. (12–15°) high; flowers campanulate, white, purplish; root conical, .6–1 M. (2–3°) long, 5–7.5 Cm. (2–3′) thick, in slices, wrinkled, brownish-yellow, milky inside, bark thin with a zone of resin-cells, odor slight, taste sweetish, bitter, acrid; contains resin 1–2 p. c. (glucoside). Diuretic, cathartic in strangury, calculi. Dose, gr. 15–60 (1–4 Gm.).

I. sim'ulans, Tampico Jalap.—Root irregularly globular or elongated, deeply wrinkled, no transverse ridges—as in the official; yields resin (*tampicin*) 10–15 p. c., nearly all being soluble in ether, and believed identical with resin of scammony.

Ipomea purga

JALAPA. JALAP. *U.S.P.*

Exogonium Jalapa, (*Nuttall et Coxe*) *Baillon.* { The dried tuberous root, yielding not less than 7 p. c. of the total resins.

Habitat. E. Mexico, in damp, rich, shady woods; cultivated in India.

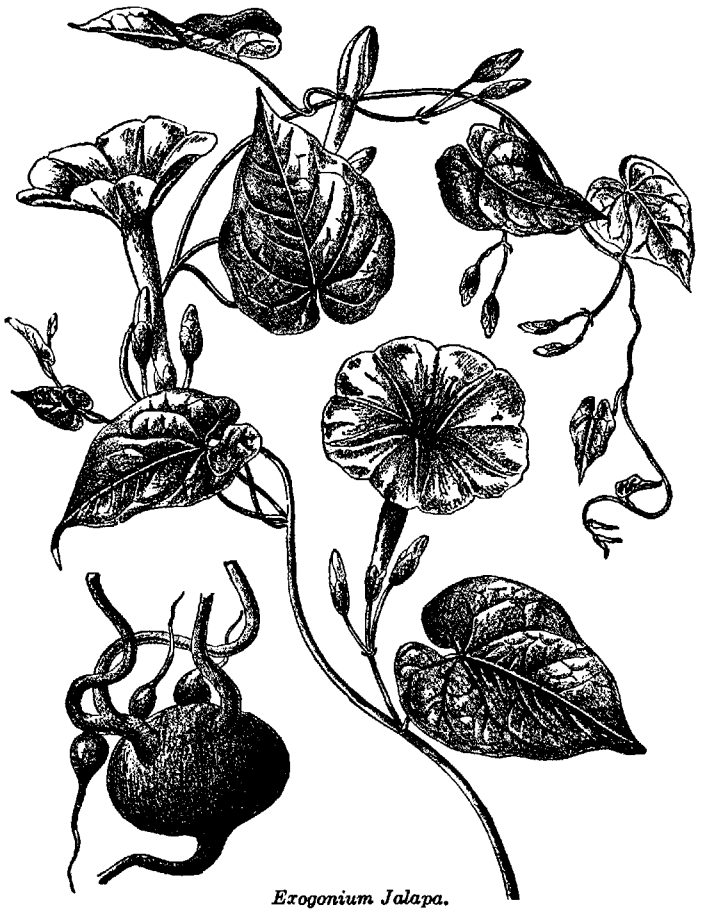
Syn. True Jalap, Vera Crux Jalap, Radix Jalapæ; Fr. Jalap—tubéreux—officinal; Ger. Tubera Jalapæ, Jalapenwurzel, Jalapenknollen, Jalape.

Ex-o-go'ni-um. L. fr. Gr. ἔξω, outside, + γόνος, offspring—*i. e.*, parts of generation (stamens, pistil) exserted—extended above corolla.

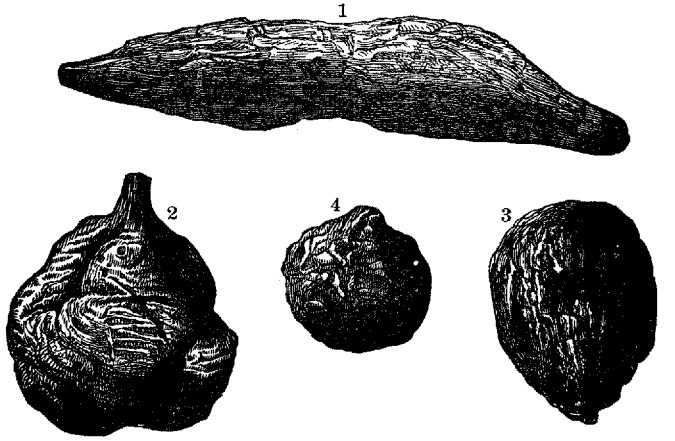
Jal'a-pa. L. named after *Jalapa* or *Xalapa*, a city in Mexico, whence imported.

Jal'ap. Formerly *jal'op*, English abbreviation from *Jalapa.*

PLANT.—Perennial twining herb; stems numerous, slender, twisted, furrowed, smooth, purplish, 3.6–6 M. (12–20°) long, twining around neighboring objects; leaves exstipulate, 10–12.5 Cm. (4–5′) long, cordate, entire, smooth, pointed, under side paler, prominently veined, on long petioles; flowers Sept.–Nov., purple, salver-shaped, tube 5 Cm. (2′) long, limb 5–7.5 Cm. (2–3′) wide, in 3-flowered cymes, stamens exserted (*exogonium*). ROOT, fusiform, irregularly ovoid, pyriform, 4–15 Cm. (1⅗–6′) long, 1–10 Cm. (⅖–4′) thick, often incised or cut into pieces; dark brown, longitudinally wrinkled or furrowed, numerous lenticels; hard, compact; not fibrous, internally grayish-brown, with distinct brown cambium line; odor slight, distinctive, smoky; taste somewhat sweet, acrid. POWDER, light brown—numerous starch grains, .003–.035 Mm. ($\frac{1}{8325}$–$\frac{1}{725}$′) broad, concentric or excentric lamellæ, calcium oxalate rosette aggregates, tracheæ, simple pores, secretory cells with yellowish-brown resinous contents. *Solvents:* diluted alcohol extracts virtues completely; water or alcohol alone only partially, each taking out a portion of purgative property, the alcoholic solution being more griping than the aqueous. Dose, gr. 5–20 (.3–1.3 Gm.).



Exogonium Jalapa.



Jalap tubers, small sized: *1*, fusiform; *2*, pear-shaped; *3*, date-shaped; *4*, globular.

ADULTERATIONS.—False Jalap roots (*Ipomœa simulans, I. orizabensis*), and roots of allied species; immature jalap roots, collected at improper times and containing very little resin; jalap roots deprived of resin by soaking in alcohol, becoming sticky to the touch, darker internally and thereby easily recognized; roots of other species of *Exogonium* and *Ipomœa* genera; mealy jalap, resembling the true root, but with mealy fracture and very few resin cells.

Commercial.—Plant resembles our Morning-glory, demands rich forest-loam and a climate suitable to Cinchona; grows on the eastern slope of the Mexican Andes, 1,500–2,400 M. (5,000–8,000°) elevation, flourishes well in the Neilgherry, India, and is cultivated in Jamaica. It is trained upon trellises and various supports, and not disturbed until 3 years old and only thereafter every third year. Roots are dug in all seasons (hence varying appearance and strength), but chiefly in the spring, when young shoots appear, and in the autumn (best), after aërial stems have decayed, then washed, placed into nets and dried by holding over fire (there being no sunshine during the rainy season), which imparts a slight smoky odor and hydrates much of the starch; prior to desiccation the very large pieces are divided into halves, quarters, or transversely that tends to make it less desirable; after drying it is put into bags (100–200 pounds; 45–90 Kg.) and shipped from Vera Cruz.

CONSTITUENTS.—Resin 7–15–22 p. c., starch, gum 15 p. c., sugar 2 p. c., bassorin, coloring matter, ash 5–6.5 p. c.

Resin.—Consists of: 1. *Jalapin* (probably identical with scammonin), 4–10 p. c., soft, waxy, soluble in ether, alkalies, reprecipitated by acids, and medicinally inert. 2. *Jalapurgin, rhodeoretin, convolvulin*, $C_{62}H_{100}O_{32}$, 90–96 p. c., a white, odorless glucoside, hard, insoluble in ether, soluble in alkalies, more of an irritant than jalapin, and the chief active constituent; converted by alkalies into jalapurgic (convolvul(in)ic acid, which is soluble in water), $C_{28}H_{52}O_{14}$, by warming with diluted acids or emulsin into glucose, volatile methyl-ethyl-acetic acid, $C_5H_{10}O_2$, and convolvulic acid, and this latter by continued action into glucose and crystalline convolvulinolic acid, $C_{16}H_{30}O_3$; the name jalapin has unfortunately been assigned to both resins.

Jalap tuber: transverse section.

PREPARATIONS.—1. *Pulvis Jalapæ Compositus.* Compound Powder of Jalap. (Syn., Pulv. Jalap. Co., Pulvis Purgans—Catharticus or Jalapæ tartaratus; Fr. Poudre de Jalap composée; Ger. Jalapenpulver mit Weinstein.)

Manufacture: 35 p. c. Triturate together jalap 35 Gm., potassium bitartrate 65; mix thoroughly, pass through No. 60 sieve. It is light brown—numerous sharp, angular, colorless, rectangular fragments, straight-edged, slowly soluble in water or chloral hydrate T. S., strongly polarizing light with strong display of colors (fragments of potassium bitartrate crystals); other elements of identification—tissues of jalap. Dose, gr. 15–60 (1–4 Gm.).

2. *Resina Jalapæ.* Resin of Jalap. (Syn., Res. Jalap.; Br. Jalapæ Resina; Fr. Résine de Jalap; Ger. Jalapenharz.)

Manufacture: Macerate, percolate 100 Gm. with alcohol until the percolate when dropped into water only produces slight turbidity (250 cc.), reclaim alcohol until percolate reduced to 25 Gm., and add this, constantly stirring, to water 300 cc., let precipitate subside, decant supernatant liquid, wash precipitate twice by decantation, each time with hot water 100 cc., drain, dry on water-bath. It is in yellowish-brown masses, fragments, breaking with resinous, glassy fracture, translucent at edges, or yellowish-brown powder, slight, peculiar odor, somewhat acrid taste, permanent, soluble in alcohol, insoluble in carbon disulphide, benzene, fixed or volatile oils; alcoholic solution faintly acid. *Tests:* 1. Shake occasionally for an hour in a stoppered flask 1 Gm. with 20 cc. of chloroform, wash flask and filter with 3 successive 5 cc. portions of chloroform, evaporate combined filtrates, dry residue—should weigh .3 Gm. 2. Dissolve in ammonia water (5)—solution not gelatinous on standing; acidify with hydrochloric acid—only slight turbidity (abs. of rosin, guaiac, other resins). *Impurities:* Rosin, guaiac, aloin, acid resins, other resins, water, soluble substances. Dose, gr. 1–5 (.06–.3 Gm.).

Preps.: 1. *Pilulæ Hydrargyri Chloridi Mitis Compositæ*, ⅓ gr. (.02 Gm.). 2. *Pilulæ Catharticæ Vegetabiles, N.F.*, ⅓ gr. (.02 Gm.).

3. *Fluidextractum Jalapæ, N.F.*, 100 p. c. root (7 p. c. resin—alcohol). Dose, ♏ij–10 (.3–.6 cc.).

4. *Tinctura Jalapæ, N.F.*, 20 p. c. root (1.4 p. c. resin—67 p. c. alcohol). Dose, ʒss–1 (2–4 cc.).

5. *Tinctura Jalapæ Composita, N.F.*, 12.5 p. c. (root) + resin of ipomœa 3 p. c. (67 p. c. alcohol.) Dose, ʒss–1 (2–4 cc.).

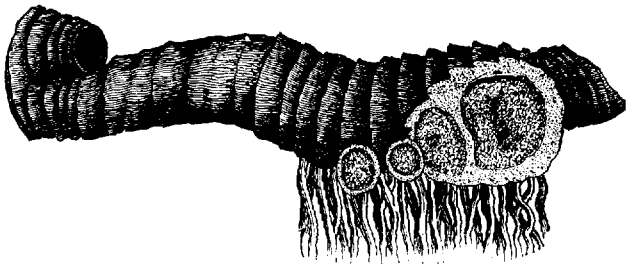
Unoff. Preps.: Abstract (alcohol), gr. 2–5 (.13–.3 Gm.). Extract (alcohol), gr. 2–10 (.13–.6 Gm.).

PROPERTIES.—Hydragogue cathartic, diuretic. Has no effect until the duodenum is reached, where with the bile it forms a purgative compound that stimulates vascularity, peristalsis, and profuse secretion from intestinal glands, with no action on biliary flow; usually acts in 4 hours. It is less irritating than gamboge, podophyllum, or scammony, but occasionally gripes, nauseates and vomits. Often given to children for worms, as it has little taste and a safe action. Excessive doses produce dangerous hypercatharsis. Jalapurgin (convolvulin) in large doses is likewise an active irritant or poison.

USES.—Dropsy, constipation, in febrile and inflammatory affections, head troubles; was introduced into Europe early in the 17th century, and is even now quite popular, being combined usually with calomel, cream of tartar, etc.

Iris versicolor

I'ris versic'olor, Blue Flag, N.F.—Iridaceæ. The dried rhizome with not more than 5 p. c. of roots and leaf bases or other foreign organic matter; N. America; swampy places. Perennial herb, .6–1 M.



Iris versicolor: joint of rhizome and section of branches.

2–3°) high; stem angled on one side, branched; leaves narrow, equitant, sword-shaped; flowers lily-like, beautiful purplish-blue, with yellowish and whitish markings at base of sepals. Rhizome, often branched, 5–20 Cm. (2–8′) long, 3 Cm. (1⅕′) thick at nodes, usually cut pieces, grayish-brown, annulate, markings of leaf bases above, root-scars and remnants below; fracture short, yellowish, exhibiting central stele, whitish fibro-vascular bundles, distinct endodermis and cortex; odor slight, not distinctive; taste acrid, nauseous. Powder, brownish—resin cells filled with amorphous substance, starch grains, calcium oxalate prisms, tracheæ with markings, pores, few fibers; contains extract (resin) 25 p. c., volatile oil .025 p. c., isophthalic acid, sugar, phytosterol, myricyl alcohol, heptatosane, ipuranol, cerotic acid, ash 7 p. c. Cholagogue, emetic, diuretic, alterative; costiveness, malarial jaundice, bilious remittent fever, dropsy; very nauseating and prostrating; hepatic stimulant equal to podophyllum and less irritating, more pungent than euonymus. Dose, gr. 5–20 (.3–1.3 Gm.); 1. *Fluidextractum Iridis Versicoloris* (alcohol), dose, ♏v–20 (.3–1.3 cc.): Prep.: 1. *Elixir Corydalis Compositum,* 9 p. c.; 2. *Fluidextractum Stillingiæ Compositum,* 12.5 p. c.: Prep.: 1. *Syrupus Stillingiæ Compositus,* 25 p. c. Extract, gr. 1–4 (.06–.26 Gm.); Irisin, iridin ("Eclectic" oleoresin or resinoid), gr. 1–4 (.06–.26 Gm.).

Iris in bloom.

Iris versicolor

Iris florenti'na or *I. german'ica,* or *I. pal'lida, Orris (Florentine), Orris Root, N.F.*—The rhizome with not more than 1 p. c. of foreign organic matter. N. Italy (near Florence), Germany, France. Perennial plant, leaves radical, sword-shape, shorter than stem, which rises in their midst (.3–.6 M.; 1–2°) high, bearing 2 large white or bluish flowers; fruit capsule, 3-celled, many-seeded. Rhizome, various formed and sized pieces, usually jointed, branched, 5–10 Cm. (2–4′) long, 1.5–3 Cm. (⅗–1⅕′) wide, knotty enlargements; leaf-scars above, numerous root-scars below, yellowish-white; fracture hard, rough, mealy, narrow cortex, distinct endodermis, large stele, many vascular bundles; odor fragrant, resembling violet; taste aromatic, bitterish. Powder, light yellow—parenchyma cells filled with characteristic starch grains, tracheæ with markings, calcium oxalate prisms; solvent: alcohol; contains volatile oil (orris butter), iridin, starch, resin, tannin, ash 5 p. c. Stimulant, diuretic, emetic, cathartic; fresh root irritant; diarrhea, bronchitis, dropsy, tooth powder, masticatory for perfuming breath and teething infants; for this latter the more slender pieces are peeled smoothly and whitened with chalk or magnesium oxide; 1. *Species Pectorales,* 5 p. c. *Adulterations:* Rhizomes of *I. pseudac'orus* and *I. fœtidis'sima,* both being somewhat darker, more astringent and acrid.

Jateorhiza

CALUMBA. CALUMBA, *U.S.P.*

Jateorhiza palmata, (*Lamarck*) *Miers.* { The dried root yielding not more than 2.5 p. c. of acid-insoluble ash.

Habitat. E. Africa, Madagascar (Mozambique and Quilimane forests, along the lower Zambesi River); cultivated in Africa and E. India islands.

Syn. Calumb., Columba, Columbo, (Foreign) Colombo, Kalumb.; Br. Calumbæ Radix; Fr. Colombo, Racine de Colombo (Calumbé); Ger. Radix Colombo, Kolombowurzel.

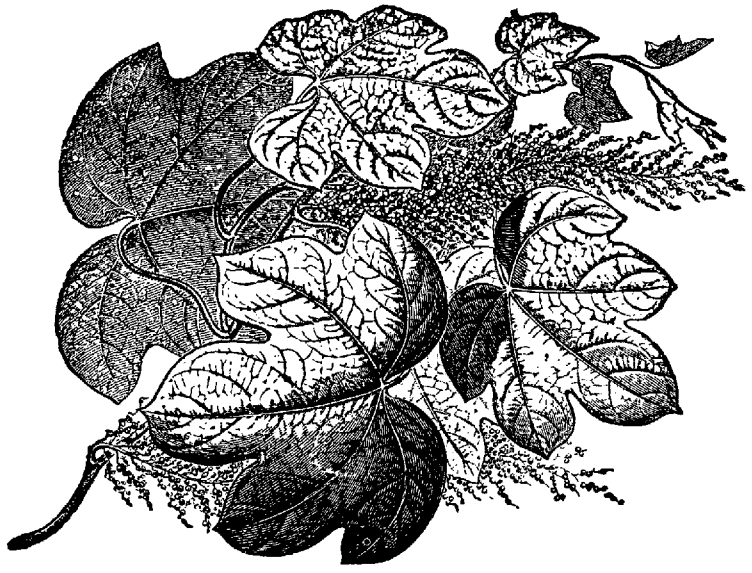
Jat-e-o-rhi'za. L. fr. Gr. *ἰατήρ(ιος),* healing, + *ῥίζα,* a root—*i. e.,* its medicinal virtues.

Pal-ma'ta. L. *palmatus,* like the palm of the open hand with radiating fingers (segments)—*i. e.,* the leaves palmately-lobed or divided.

Ca-lum'ba. L. fr. native African name, *kalumb,* hence Colombo in Ceylon, supposed to be the plant's original habitat.

PLANT.—Perennial climber; stems several, green, 6–12 Mm. (¼–½′) thick, hairy, from short, thick, irregular rhizome; leaves petiolate, large, 25 Cm. (10′) long, 35 Cm. (14′) broad, orbicular, cordate, 3–5–7-palmately-lobed, lobes entire, wavy, hairy; flowers dicœcious, 6's, 12 Mm. (½′) broad; fruit 3 ovoid fleshy drupes, size of hazelnut, 1-seeded. ROOTS, from rhizome, many, fleshy, fasciculated, fusiform; commercially in circular, oval disks up to 10 Cm. (4′) and seldom exceeding 2 Cm. (⅘′) thick, or longitudinal, oblique slices up to 30 Cm. (12′) long; edge brown, roughly wrinkled, cut surfaces yellowish-brown, grayish-yellow, transverse slices radiate in outer portion with dark cambium, center often depressed (thinnest); fracture short, mealy; odor slight; taste slightly aromatic, very bitter. POWDER, greenish-brown, grayish-yellow—many starch grains, .003–.085 Mm. ($\frac{1}{8325}$–$\frac{1}{300}$′) broad, few stone cells with one or more calcium oxalate prisms or sphenoidal microcrystals; few fragments with tracheæ associated with wood-fibers. *Solvents:* alcohol (75 p. c.); boiling water largely (calumbin, berberine). Dose, gr. 5–30 (.3–2 Gm.).

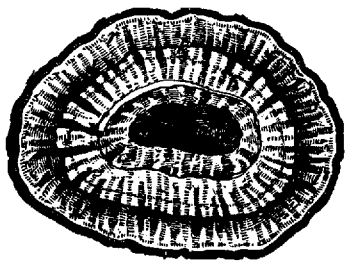
ADULTERATIONS.—Roots of *Bryonia alba* and *Frasera carolinensis* (*Walteri*)—American Columbo. These sometimes are dyed yellow with turmeric or safflower, and made bitter with infusion of calumba or



Jateorhiza palmata (calumba).

quassia, thus giving a near resemblance, but recognized by the lighter or slightly false color, absence of dark cambium zone, radiating lines, etc.; the latter also precipitates with iron salts, is not mucilaginous nor affected by infusion of galls, reddens litmus, evolves ammonia with fixed alkalies, and contains no starch. Occasionally with slices of the stem of *Coscin'ium fenestra'tum*, Ceylon, which are harder, smoother, and not contracted centrally; false calumba—center elevated, not depressed.

Commercial.—Plant, also named *Menispermum palmatum*, *Coc'culus palma'tus*, and natively called *Kalumb*, resembles very closely our *Menispermum canadense*, reaching the top of lofty forest trees from the seacoast to many miles inland. Roots of wild plants are dug in hot dry season (March), tubercles separated, washed, cut into transverse and longitudinal slices, and dried slowly in the shade; often more or less worm-eaten. Portuguese always have controlled (1508) its trade, exporting it for 3 centuries via Colombo, Ceylon, also their possession, to veil its origin; now enters market from Zanzibar, or via Bombay.



Calumba: transverse section, natural size; *r*, bark; *k*, cambium; *h*, wood; *m*, pith (medulla).

CONSTITUENTS—Calumbin .8 p. c., Berberine 1 p. c., Calumbic acid, calumbine (?), starch 35 p. c., pectin 17 p. c., gum 4.7 p. c., resin 5 p. c., wax, calcium oxalate, ash 6–8 p. c.

Calumbin, $C_{21}H_{24}O_7$.—Gives most of the bitterness—obtained by exhausting root or alcoholic extract with alcohol or ether, evaporating and letting stand several days for crystals to form, which are white, bitter, odorless, soluble in alcohol, ether, chloroform, alkalies, acetic acid, almost insoluble in water. Dose, gr. ½–1 (.03–.06 Gm.).

Berberine, $C_{20}H_{17}O_4N$.—This is left in mother-liquor from calumbin, which is evaporated to dryness, exhausted with boiling alcohol, evaporated, allowed to crystallize upon standing. Recently this content has been resolved into three alkaloids—palmatine, calumbamine, jateorhizine—which with calumbin constitute the drug's activity. Dose, gr. ½–1 (.03–.06 Gm.).

Calumbic Acid, $C_{21}H_{22}O_6.H_2O$.—Obtained from 3 p. c. oxalic acid infusion by adding barium hydroxide and treating precipitate with alcohol; it is less bitter than calumbin, amorphous, straw-yellow, soluble in alcohol, alkalies, almost insoluble in water or ether, and is in combination with berberine—the two believed to be derived from calumbin, this latter being the anhydride of calumbic acid.

Calumba contains no tannin, hence can well be used with iron salts and alkalies as a substitute for gentian, etc.; its infusion or tincture, however, precipitates with infusion of galls or solution of lead acetate.

PREPARATIONS.—1. *Tinctura Calumbæ.* Tincture of Calumba (Syn., Tr. Calumb., Tinctura Colombo; Fr. Teinture de Colombo; Ger. Kolombotinktur.)

Manufacture: 20 p. c. Similar to Tinctura Veratri Viridis, page 104—packing moderately; menstruum: 60 p. c. alcohol. Dose ʒss–2 (2–8 cc.). 2. *Fluidextractum Calumbæ, N.F.* (67 p. c. alcohol). Dose, ♏v–30 (.3–2 cc.). *Extract*, gr. 1–5 (.06–.3 Gm.). *Infusion*, 5 p. c., ʒss–1 (15–30 cc.).

PROPERTIES.—Tonic, stomachic, stimulant, increases appetite and digestion by stimulating the gustatory nerves, thereby dilating the gastric vessels and augmenting secretion, does not constipate; externally—antiseptic, disinfectant, anthelmintic.

USES.—Dyspepsia, debility, remittent fevers, dysentery, diarrhea, cholera morbus, cholera infantum, hectic fever of phthisis, vomiting of pregnancy, bowel flatus, purging; large doses emeto-cathartic.

Jateorhiza calumba

Jateorhiza Calumba.—About the same as the official, possibly having a variety difference in that the basal lobes of leaves are rounded but do not overlap, and male inflorescence is hispid. In the official variety, basal lobes mostly overlap, and male inflorescence is smooth. Our commercial root is collected indiscriminately from both species.