



Styrax Benzoin: 1. flowering twig; 2, vertical section of flower; 3, diagram of the flower; 4, fruit, with upper portion laid bare, showing channeled surface; 5, anther; 6, seed, longitudinal section.

while hot, supersaturating filtrate with hydrochloric acid, allowing to crystallize, purifying; or more frequently (*dry process*) by the sublimation of benzoin (sometimes having an equal weight of sand added) between the temperatures 140–180° C. (284–366° F.). It is made also from hippuric acid (horse and cattle urine, furnishing the *German benzoic acid*), as well as synthetically from phthalic acid (naphthalene), but chiefly for commercial purposes, artificially from toluene (toluol), $C_6H_5CH_3$, by passing chlorine into it (boiling) until ceasing to gain weight, thereby converting it first into benzo-trichloride, and then treating this with water under pressure— $C_6H_5CCl_3 + 2H_2O = C_6H_5COOH + 3HCl$; it is in lustrous scales, friable needles; natural—white, yellowish, darker on exposure to light, slight odor of benzoin; synthetic—white, odorless, slight odor of benzaldehyde; pungent acid taste, somewhat volatile at moderate temperature, freely with steam; soluble in water (275), boiling water (18), alcohol (2.3), boiling alcohol (1.5), chloroform (4.5), ether (3), benzene (10), carbon disulphide or tetrachloride (30), oil of turpentine (23), solutions of alkali hydroxides, fixed and volatile oils, sparingly in petroleum benzin; melts at 120° C. (248° F.); saturated solution acid; contains not less than 99.3 p. c. of C_6H_5COOH ; the sublimed is most soluble in water and contains volatile oil imparting odor; melts at 121° C. (250° F.); ash—.05 p. c. *Tests*: 1. Warm for 5 minutes .1 Gm. synthetic acid + sulphuric acid 2 cc.—not darker than light yellow, acid from benzoin—light brown (abs. of readily carbonizable substances). 2. Dissolve .3 Gm. in hot water 15 cc., + $\frac{N}{10}$ potassium permanganate—no odor of benzaldehyde (dif. from cinnamic acid). *Impurities*: Chlorinated compounds, cinnamic acid, readily carbonizable substances. Should be kept cool, dark, in well-closed containers. Dose, gr. 5–15 (.3–1 Gm.).

Cinnamic Acid, $C_9H_8O_2$.—Obtained by agitating filtered ethereal solution with weak sodium hydroxide solution (to remove benzoic acid and vanillin), distilling off ether, saponifying pure esters by boiling with sodium hydroxide solution several hours, acidifying, boiling, filtering, cooling, when crystals appear. The two acids may be separated by their different degree of volatility, benzoic acid melting at 121.4° C. (250.5° F.) and the two mixed (1 cinnamic, 2 benzoic) at 25.5° C. (78° F.).

Resins.—One is extracted along with benzoic acid by boiling solution of potassium carbonate in excess; another is dissolved from the residue by ether, while the third is affected by neither solvent, hence left as a residue. With melted potassium hydroxide get paroxybenzoic acid, $C_7H_6O_3$, protocatechuic acid, $C_7H_6O_4$, and pyrocatechin, $C_6H_6O_2$.

Vanillin, $C_8H_8O_3$.—Is obtained by treating Siam benzoin with caustic lime, precipitating benzoic acid with hydrochloric acid and shaking liquid with ether.

PREPARATIONS.—I. BENZOIN: 1. *Adeps Benzoinatus*. Benzoinated Lard. (Syn., *Adeps Benz.*, Benzoated Lard, Unguentum Benzoini, Axungia Balsamica—Benzoinata or Benzoata; Br. *Adeps Benzoatus*; Fr. *Axonge benzionée*; Ger. *Adeps Suillus Benzoinatus*, Benzoe (Benzoinirtes)-schmalz.)

Manufacture: 1 p. c. Melt lard 100 Gm. on water-bath, add Siam benzoin, in coarse powder, 1 Gm., mix thoroughly, heat gently, 60° C. (140° F.), for 2 hours, covering the vessel, strain, stir occasionally while cooling; when for hot-weather use, may replace 5 p. c. (or more) of the lard by white wax. Should be kept cool, in well-closed containers impervious to fat.

Preps.: 1. *Ceratum*, 70 p. c. 2. *Ceratum Cantharidis*, 20 p. c. 3. *Unguentum*, 80 p. c. 4. *Unguentum Hydrargyri Fortius*, 25 p. c. 5. *Unguentum Sulphuris*, 85 p. c. 6. *Ceratum Camphoræ N.F.*, 40 p. c. 7. *Mulla Acidi Salicylici, N.F.*, 10 p. c. 8. *Mulla Hydrargyri Chloridi Corrosivi, N.F.*, 5 p. c. 9. *Mulla Zinci, N.F.*, 20 p. c. 10. *Pasta Zinci Sulphurata, N.F.*, 70 p. c. 11. *Unguentum Plumbi Iodidi, N.F.*, 90 p. c. 12. *Unguentum Potassii Iodidi, N.F.*, 80 p. c. 13. *Unguentum Stramonii, N.F.*, 65 p. c. 14. *Unguentum Sulphuris Alkalinum, N.F.*, 65 p. c. 15. *Unguentum Veratrinæ, N.F.*, 90 p. c.

2. *Tinctura Benzoini*. Tincture of Benzoin. (Syn., Tr. Benz.; Fr. *Teinture de Benjoin*; Ger. Tr. Benzoes, Benzoetinktur.)

Manufacture: 20 p. c. Similar to *Tinctura Cardamomi Composita*, page 137; menstruum: alcohol. Dose, ζ ss–1 (2–4 cc.); largely externally.

Prep.: 1. *Unguentum Picis Compositum, N.F.*, 2 p. c.

3. *Tinctura Benzoini Composita*. Compound Tincture of Benzoin. (Syn., Tr. Benz. Co., Friar's or Turlington's Balsam, *Tinctura Balsamica*, Balsamum Commendatoris, Elixir Traumaticum; Fr. *Teinture balsamique*, Baume du Commandeur de Permes; Ger. *Persischer Wundbalsam*.)

Manufacture: 10 p. c. Similar to *Tinctura Cardamomi Composita*, page 137—using benzoin 10 Gm., aloë 2, storax 8, tolu 4; menstruum: alcohol. Dose, ʒss-1 (2-4 cc.); mostly externally.

4. *Sevum Benzoinatum*, *N.F.*, 3 p. c.

Preps.: 1. *Mulla Acidi Salicylici*, *N.F.*, 80 p. c. 2. *Mulla Creosoti Salicylata*, *N.F.*, 65 p. c. 3. *Mulla Hydrargyri Chloridi Corrosivi*, *N.F.*, 90 p. c. 4. *Mulla Zinci*, *N.F.*, 70 p. c.

II. BENZOIC ACID: 1. *Tinctura Opii Camphorata*, ʒ p. c.

Unoff. Prep.: *Benzoic Acid Lozenge* (Br.), each ½ gr. (.03 Gm.).

PROPERTIES.—Stimulant, expectorant, antiseptic, diuretic, antipyretic. It is eliminated slightly by the skin, salivary glands, and broncho-pulmonary mucous membrane, but mostly by the kidneys, where it is converted into hippuric acid, which renders alkaline urine acid, increases the flow, disinfects and stimulates the genito-urinary tract.

USES.—Chronic laryngitis, diarrhea, dysentery. Locally the tincture as a stimulant and protective to wounds, to arrest coryza. Benzoic acid—for bronchitis, uric acid deposits, cystitis, acute gonorrhœa, phosphatic gravel, incontinence of urine, rheumatism. Bright's disease, albuminuria, dressing to wounds, ulcers.

Incompatibles: The tinctures with all aqueous preparations.

Swertia

Swertia Chiray'ita, *Chirata*, *N.F.*—The dried plant with not more than 3 p. c. of foreign organic matter; N. India—mountains. Annual plant, 1 M. (3°) high, cylindrical above, quadrangular below, smooth, yellowish-brown, branched; wood yellowish—thin, enclosing large yellowish, easily separable pith; root simple, 7 Mm. (¼') thick near the crown; leaves opposite, sessile, ovate-lanceolate, entire; flowers small, paniced, 4-lobed calyx and corolla; fruit capsule, ovoid, many-seeded; odor slight; taste intensely bitter. Powder, yellowish-brown—numerous tracheæ, lignified fibers, abundant pith parenchyma cells with lignified walls, epidermis with stomata, seed, fragments of seed-coat, pollen grains, cells with brown resin and tannin masses; solvents: diluted alcohol, water partially; contains ophelic acid, chiratin, ash 6 p. c. (K, Ca, Mg, carbonates and phosphates). Tonic, febrifuge, stomachic, laxative, antispasmodic, hepatic, stimulant, large doses nauseate; indigestion, constipation, chronic bronchitis, similar to gentian and calumbo. Dose, gr. 15-30 (1-2 Gm.); 1. *Fluidextractum Chiratae* (diluted alcohol), dose, ʒxv-30 (1-2 cc.); Tincture 10 p. c. (67 p. c. alcohol), ʒss-1 (2-4 cc.). *S. angustifolia* and *S. pulchel'la* have entire square stems, pith thin or wanting; less bitter but used to adulterate the preceding.

Symplocarpus

Spathy'e'ma (*Symplocar'pus*) *fæ'tida*, *Skunk Cabbage*.—The dried rhizome and roots, U. S. P. 1820-1870. Perennial, spathe appears first in spring, covered with purplish spots and stripes, flowers dull purple, leaves .3-.6 M. (1-2°) long, .3-.4 M. (12-15') wide. Rhizome obconical, truncate, 7.5-10 Cm. (3-4') long, 5 Cm. (2') thick. Many rootlets,

brownish-gray, inside whitish, many wood-bundles, whole plant fetid, more so when triturated, taste acrid, biting; contains volatile oil, gum, fat, resin, starch. Emetic, diuretic, antispasmodic, stimulant, narcotic; asthma, chronic catarrh, rheumatism, chorea, hysteria, dropsy, bronchitis, in infusion, tincture. Dose, gr. 5-15 (.3-1 Gm.).

Tamarindus

Tamarin'dus in'dica, *Tamarindus*, *Tamarind*, *N.F.*—The partially dried ripe fruit, deprived of the brittle outer portion of the pericarp and preserved in sugar (sucrose) or syrup, containing not more than 2 p. c. of foreign organic matter; India, Africa, nat. in W. Indies.



Tamarindus indica.

Tamarind fruit:
cross-section: ep, epicarp; me,
mesocarp; en, endocarp; s, seed.

Handsome tree, 18-24 M. (60-80°) high; bark rough, ash color; leaves paripinnate, leaflets 8-16 pairs, sessile, 12-25 Mm. (½-1') long, 6 Mm. (¼') broad; flowers yellow, racemes; fruit indehiscent legume, compressed, 7.5-15 Cm. (3-6') long, 2.5 Cm. (1') broad, curved, nearly smooth, yellowish-brown, pericarp thin, brittle, corky. Pulp—a pulpy mass, light reddish-brown, darker with age, containing some branching fibers and numerous reddish-brown, smooth, oblong, quadrangular, compressed seed, each in a tough membrane; pulp with parenchyma cells containing few starch grains, calcium oxalate rosettes and crystal-fibers with prisms; odor distinct; taste sweet, agreeably acid. Bright iron in contact with moist pulp 30 minutes should not show reddish deposit (abs. of copper from evaporating vessels). There are three varieties: 1, W. Indian (Brown, Red), the once official kind, cakes kneaded with sugar or hot syrup, or alternate layers of pulp and sugar; 2, E. Indian (Black), masses simply pressed together and dried in the sun; 3, Egyptian, cakes, flat, round, black, acrid, often moldy; contains tartaric acid 5-9 p. c., citric acid 4-6 p. c., potassium bitartrate 5-6 p. c., malic acid, acetic acid (mostly as potassium salts), sugar, pectin, tannin (in seed testa), insoluble matter 12-20 p. c. Laxative, refrigerant; febrile diseases, combined with other laxatives (senna, etc.) as a flavoring. Dose, ʒss-5 (2-20 Gm.); 1. *Confectio Sennæ*, 10 p. c.



Tanacetum vulgare: flower; a, single flower.

Tanacetum vulgare, *Tanacetum*, *Tansy*.—The leaves and tops, U.S.P. 1820–1890; Europe, Asia. Perennial herb, .6–1 M. (2–3°) high; stem obscurely hexagonal, striated, often reddish; root fibrous, many-headed; flowers yellowish discoid, dense, terminal corymbs; fruit achene, small, oblong, 5–6 ribs, crowned with pappus. Leaves, 15 Cm. (6') long, bipinnatifid, segments obtuse, oblong, serrate, glandular, receptacle convex, naked, florets tubular; odor strong, aromatic; taste pungent, bitter; contains volatile oil .25 p. c., tanacetin, fat, resin, tannin, mucilage; solvents: alcohol, water. Stimulant, tonic emmenagogue, anthelmintic, diuretic, narcotic; large doses cause vomiting, convulsions, coma, mydriasis, feeble respiration and pulse, death from paralytic asphyxia. Used in intermittents, hysteria, amenorrhœa, colic, abortifacient; locally for bruises, sprains, rheumatism, ulcers. Dose, gr. 15–60 (1–4 Gm.); fluidextract, ℥xv–60 (1–4 cc.); infusion, 5 p. c., ʒj–2 (30–60 cc.); oil, ℥j–5 (.06–.3 cc.). *T. vulgare* var. *crispum*, *Double Tansy*.—Leaves twice pinnatifid, curled. *T. Balsamita* (*Pyrethrum Tanacetum*), S. Europe; odor strong, taste bitter. Both often cultivated and used similar to *T. vulgare*.

Taraktogenos CHAULMOOGRA. CHAULMOOGRA.

Oleum Chaulmoogræ. Chaulmoogra Oil, U.S.P.

Taraktogenos Kurzii, King, }
or certain species of **Hydnocarpus**. } The fixed oil expressed from the seeds.

Habitat. S. Asia; India, Siam, Burma, China, Africa.

Syn. Kalan Tree; Ol. Chaulmoog., Chaulmugra, Chaulmaugra, Oleum Gynocardia; Fr. Huile de Chaulmougra (Chaulmougrè); Ger. Chaulmugröl.

Ta-rak'to-ge'nos. L. fr. Gr. ταρακτός, confused, disordered, jumbled up, + γένος, genus, race—i. e., genus that was overlooked and once confused with *Hydnocarpus*.

Kur'zi-i. L. named by Prof. Geo. King (1890) in honor of Prof. Sulpiz Kurz, author of *Forest Flora* of British Burma, and curator, Royal Botanical Gardens, Calcutta.

Hyd-no-car'pus. L. fr. Gr. ὑδνον, edible fungus-truffle, + καρπός, fruit—i. e., alluding to superficial appearance of fruit.

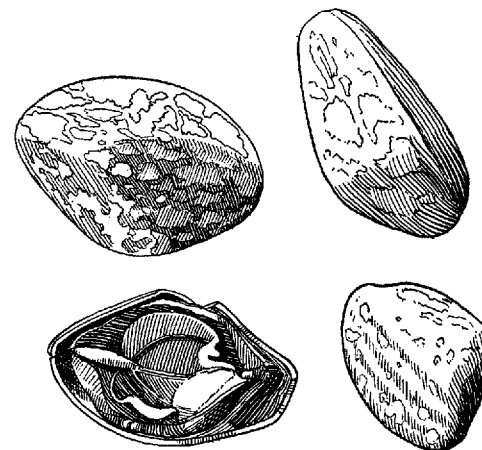
Chaul-moo'gra. L. fr. native Asiatic (Burmese) name.

PLANT.—Large tree, 7–15 M. (21–40°) high, smooth, pale yellowish bark, straight trunk, branches at right-angles, but drooping down; fruit size of large orange, light fawn color, velvety; seed numerous, irregularly imbedded in fleshy pulp, brownish-yellow, 2–3 Cm. (¾–1¼') long, more or less angular flattened, not as broad, roundish ends.

CONSTITUENTS.—SEEDS: Fixed oil, 25–50 p. c., starch, proteins, tannin, coloring matter, ash 1–5 p. c.

Oleum Chaulmoogræ. Oil of Chaulmoogra.—This fixed oil is a yellow, brownish-yellow liquid, or below 25° C. (77° F.), a whitish, soft solid;

characteristic odor, somewhat acrid taste; soluble in benzene, chloroform, ether, petroleum benzin, sparingly in alcohol, sp. gr. 0.950; contains palmitin, linolein, but chiefly glycerides of two fatty acids—chaulmoogric, C₁₈H₃₂O₂, and hydnocarpic, C₁₆H₂₈O₂; both acids are optically active but differ from ordinary fatty acids in having a five atom carbon ring with an unstable hydrogen atom; both acids are readily converted into ethyl esters having therapeutic advantages over the oil; both acids form crystals that melt at 60–68° C. (140–155° F.). *Tests:* 1. Dissolve 1 Gm. in 15 cc. of a mixture of equal vols. alcohol and ether previously neutralized with $\frac{N}{10}$ sodium hydroxide, using 5 drops



Taraktogenos Kurzii: whole seed; longitudinal section.

phenolphthalein T. S., indicator, when titrated with $\frac{N}{10}$ sodium hydroxide to pink color—1.8–5 cc. should be required (abs. of free acid); forms salts—sodium chaulmoograte, sodium hydnocarpate, etc. Should be kept cool, dark, in well-closed containers. Dose, ℥v–30 (.3–2 cc.).

Æthylis Chaulmoogras. Ethyl Chaulmoograte, U.S.P.—(Syn., Æthyl. Chaulmoog.; Fr. Chaulmougrè d'éthyle; Ger. Chaulmestrol, Antilep-röl). This mixture of ethyl esters of the fatty acids (chaulmoogric and hydnocarpic) of chaulmoogra oil, obtained by fractionating, is a clear, pale, yellow liquid, with slight fruity odor, miscible with alcohol, chloroform, ether, insoluble in water, sp. gr. 0.904. *Test:* 1. 1 cc. in 10 cc. neutralized alcohol, using 2 drops phenolphthalein T. S.—requires not more than .1 cc. $\frac{N}{10}$ sodium hydroxide for neutralization (abs. of free acid); its fluidity is its chief advantage over the oil, although it has a more agreeable taste and is less irritating when injected. Should be kept in well-closed containers. Dose (mouth, intramuscular injection), ℥xv–60 (1–4 cc.).

ADULTERATIONS.—Various hydnocarpus oils not agreeing with physical and chemical properties of oil of chaulmoogra; gynocardia oil.

Commercial.—The seeds are washed, dried in the sun, shelled, crushed and subjected to hydraulic pressure; yield 25–32 p. c. oil (best); extraction with ether or other volatile solvents—35–41 p. c. There are several varieties: 1. True Oil of Chaulmoogra (*Taraktogenos Kurzii*);

2. Lukrabo Oil (*Hydnocarpus anthelmin'tica*), Siam, imported, as are the seeds, into China, where it is called Tafungtsze; 3. Oil from *Hydnocarpus Wightia'na*, synonymous with *H. inebria'ns*, yields a very similar and effective oil.

PROPERTIES.—Alterative, germicide, antiseptic, counter-irritant, blood-purifier; large doses toxic to dogs and rabbits causing vomiting, loss of appetite (central origin), destructive of blood corpuscles (hemolytic); in fatal intoxication—fatty degeneration of liver, irritation of kidneys; only two cases of fatty embolism of lungs, in man (hypodermic injection)—no serious poisoning so far reported.

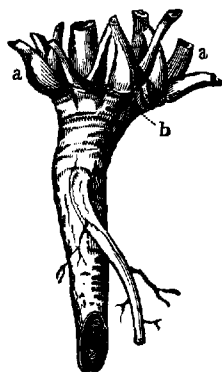
USES.—Leprosy—practically a specific against *Lep'ra bacillus*, when it must be used freely, internally and externally for 2-3 years, supplemented by nourishing diet to maintain bodily vigor; action may be due to stimulation of leukocytosis, or to its powerful germicidal effect, exceeding 100 times that of phenol; may have solvent power on the waxy coating of acid-fast bacilli, and may be absorbed by alimentary tract; but intramuscular injection gives best results; hypodermic injections of ethyl esters into leprosy nodules cause them to swell to an ultimate recession, 50 p. c. of the cases being curable; also used for sores, wounds, sprains, bruises, tuberculous ulcers of larynx, and with doubtful effect on *Tubercle bacillus*.

Taraxacum

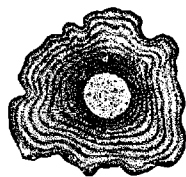
Taraxacum, *Leon'todon Tarax'acum*, *Dandelion*, N.F.—The dried rhizome and roots with not more than 2 p. c. of foreign organic matter, yielding not more than 4 p. c. of acid-insoluble ash; Europe, naturalized in N. America. Perennial acaulescent herb; leaves radical, 15-22.5 Cm. (6-9') long, 5-7.5 Cm. (2-3') broad, toothed (runcinate), 5-6 teeth on a side, sessile; flowers golden-yellow, closing at night, terminal upon hollow scape; fruit achene, compressed; spreading pappus on stalk—for dissemination. Rhizome, cylindrical, somewhat flattened, gradually tapering, usually in broken pieces, 6-15 Cm. (2½-6') long, 5-15 Mm.



Taraxacum.



Leon'todon Taraxacum:
rhizome revealing at head the remnants of flower stalks and leaf stalks.



Taraxacum: transverse section of root.

($\frac{1}{5}$ - $\frac{3}{8}$ ') thick, brownish, longitudinally wrinkled, numerous root- and rootlet-scars; crown simple, branched, with many leaf-bases showing annulate markings; bark 2-6 Mm. ($\frac{1}{12}$ - $\frac{1}{4}$ ') thick, composed of concentric layers of laticiferous vessels and sieve tissues, alternating with whitish inulin-bearing parenchyma; odor slight, inodorous, taste bitter. Powder, light brown—parenchyma cells large, thin-walled containing irregular masses of inulin; fragments with yellowish-brown laticiferous vessels, tracheæ reticulate, intermediate fibers non-lignified, with pores, no starch; solvents: diluted alcohol, boiling water; contains milk juice (taraxacin, taraxacerin, 2 resins, glutinous body), reducing sugars, levulin, inulin (yellow with iodine) 24 p. c., pectin, ash 5-10 p. c. Diuretic, tonic, stomachic, aperient, deobstruent; congestion of liver, spleen, dyspepsia, constipation, skin affections, dropsies. **Adulterations:** Chiefly chicory, *Cichorium Intybus*, which, however, is paler and with milk vessels in radiating lines—not concentric. Subject to insect attack, and should be kept in tightly closed containers. Dose, ʒss-2 (2-8 Gm.); 1. *Extractum Taraxaci* (12.5 p. c. alcohol), dose, gr. 5-30 (.3-2 Gm.); 2. *Fluidextractum Taraxaci* (glycerin 10, alcohol 50, water 40, + diluted alcohol), dose, ʒss-2 (2-8 cc.).

Preps.: 1. *Elixir Taraxaci Compositum*, 3.5 p. c. + fldext. prun. virg. 2, fldext. glycyrrh., tr. aurant. dulc. āā 6, +, dose, ʒj-2 (4-8 cc.).

Preps.: 1. *Elixir Eriodict. Arom.*, 44 p. c. 2. *Elixir Guaranae*, 60 p. c. 3. *Elixir Viburni Opuli Compositum*, 70 p. c.

2. *Elixir Gentiana Glycerinatum*, 15 p. c. Decoction 5 p. c., ʒj-2 (30-60 cc.). *Succus Taraxaci* (Br.), expressed juice 3, alcohol 1, ʒj-2 (4-8 cc.).

Thea

THEA. TEA.

Caffeina. Caffeine (Theine), $C_8H_{10}(N_2)_4O_2 \cdot H_2O$, U.S.P.

Thea sinensis, Linné,
and
Coffea arabica, Linné.

{ Trimethyl-xanthine, a feeble basic substance (alkaloid) obtained from the leaves of the former, and seeds of the latter (Rubiaceæ), also occurring in other plants; chiefly prepared synthetically.

Habitat. S. E. Asia, China, India, Japan; cultivated.

Syn. Thea Bohea, Black Tea, Thea viridis, Green Tea; Fr. Thé; Ger. Thee.

The'a. L. see etymology, above, of Theaceæ.

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

PLANT.—Evergreen shrub 1.2-2 M. (4-6°) high, much branched, bark brown, young twigs downy; leaves 5-10 Cm. (2-4') long, petiolate, acute at both ends, oval, irregularly serrate, veins prominent, dark green; flowers in winter, 2.5 Cm. (1') wide, yellowish-white; fruit 3-celled trigonous capsule, with thin brown woody pericarp; diluted alcohol or boiling water exhausts the leaves. Dose, ʒj-2 (4-8 Gm.).

ADULTERATIONS.—Prussian blue, indigo, turmeric, gypsum; the three first impart color to water, the last soon deposits; various leaves, recognized by shape, venation, margin, etc.

Commercial.—The plant, springing from seed, begins to yield satisfactory leaves in 3 years, and at 7 attains perfection, being about the height of a man. Three collections are made yearly (Feb., Apr., June), the first, consisting mostly of young leaves, having greatest value. There are two varieties: 1. *Green*, collected more carefully and quickly dried, and containing most tannin; 2. *Black*, owing to slower process, undergoing partial fermentation, which changes color and often impairs quality.

CONSTITUENTS.—Caffeine (Theine) 1–5 p. c., volatile oil .6–1 p. c., theophylline (isomeric with theobromine), ademin, tannin 11–21 p. c., boheic acid, albumin, resin, wax, ash 4–6 p. c. (14 p. c. being phosphoric acid); leaves yield 40 p. c. of aqueous extract.

Theophyllina. **Theophylline**, $C_7H_{10}(CH_3)_2O_2N_4.H_2O$, *U.S.P.*— (Syn., Theophyll., Dimethylxanthine; Synthetic—Theocine; Ger. Theophyllinum, Theophyllin, Theocin.) This organic base (alkaloid), isomeric with theobromine, is obtained sparingly from tea leaves, but mostly synthetically by a German patent under the name of theocine, wherein ammonia, carbon dioxide, potassium cyanide, acetic and formic acids are employed in a series of 12 reactions, and in fact becomes our first organic plant base (alkaloid) made on a commercial scale by strictly synthetic methods. It is a white, crystalline odorless powder, bitter taste, permanent, soluble in solutions of potassium hydroxide and in ammonia water, in alcohol (80), water (120), more readily in hot water, sparingly in ether; saturated aqueous solution neutral; melts at 271° C. (520° F.). *Tests:* 1. Dissolve .2 Gm. in 5 cc. of



Thea sinensis.

potassium hydroxide T. S., or in 5 cc. of ammonia T. S.—clear solution (dif. from caffeine, theobromine, paraxanthine). 2. Dissolve .2 Gm. in 5 cc. of sulphuric acid—only faint yellow (abs. of readily carbonizable substances). 3. Dissolve .01 Gm. in hydrochloric acid 1 cc., add potassium chlorate .1 Gm., evaporate to dryness, invert dish over one containing a few drops of ammonia T. S.—residue purple, destroyed by fixed alkalies. 4. Aqueous solution with tannic acid T. S.—precipitate, soluble in excess of reagent; when dried to constant weight—loses 9.5 p. c. (water); incinerate .1 Gm.—ash negligible. *Impurities:* Caffeine, theobromine, paraxanthine, readily carbonizable substances.

PROPERTIES AND USES.—Claimed to be the best diuretic, increasing amount of urine as well as solids; cardiac affections, nephritis, dropsy; similar to caffeine and theobromine, but much more effective; may produce gastric disturbances, renal irritation, which can be obviated by using its salt—theophylline sodio-acetate. Dose, gr. 3–8 (.2–.5 Gm.), in warm tea.

PREPARATIONS.—(Unoff.): *Fluidextract*, dose, ℥xv–60 (1–4 cc.). *Infusion (Tea)*, dose, *ad libitum*.

PROPERTIES AND USES.—Similar to coffee, under Rubiaceæ, page 580.

Allied Plants:

1. *Thea (Camellia)*, after George Joseph Camel or Camelli, a Dutch Jesuit missionary and botanist *japonica*.—Japan. An ornamental shrub with poisonous seed. *T. oleosa (Camellia oleifera)* and *T. drupifera*. Seeds resemble those of *T. sinensis* and yield a bland fixed oil—that of *T. drupifera* being fragrant.

Theobroma THEOBROMA. CACAO (CHOCOLATE TREE).

Oleum Theobromatis. Oil of Theobroma, *U.S.P.*

Theobroma Cacao, } The fat obtained from the roasted seeds.
Linné.

Habitat. S. America (Brazil), C. America, Mexico, W. Indies; cultivated in the tropics, largely in some of the W. Indies.

Syn. Semen (Fabæ) Cacao; Ol. Theobrom., Butter of Cacao, Cacao Butter, Oleum Theobromæ; Fr. Cacao, Fèves du Mexique, Beurre de Cacao; Oleum Cacao; Ger. Kakaobohnen; Kakaobutter.

The-o-bro'ma. L. fr. Gr. *θεός*, a god, + *βρώμα*, food, food of the gods—*i. e.*, its delicious qualities.

Ca-ca'o. L. Sp. from Mexican *kakahuati*—*i. e.*, its native name.

PLANT.—Handsome tree 9–12 M. (30–40°) high, round branches, bark gray, smooth; leaves 20–22.5 Cm. (8–9') long, 6 Cm. (2½') wide, lanceolate, acute, round base, entire, veins prominent beneath, petiole 2.5 Cm. (1') long, thickened at both ends; young leaves pink; flowers pale pink, calyx and corolla 2.5 Cm. (1') broad, alike in color; fruit large, 15–17.5 Cm. (6–7') long, broadly fusiform, with 10 shallow furrows and blunt ridges, tuberculated, pendulous, single or 2–3 together, at first yellow, then red, purple, pericarp thick, tough, 5-celled; seed many, closely packed in tiers, size of almonds, angular from pressure, immersed in copious, sweet buttery pulp, seed-coats 2, brownish.

CONSTITUENTS.—SEEDS: Fixed oil 50 p. c., starch 16 p. c., theobromine 1.5–4.5 p. c., caffeine, proteins 18 p. c., sugar .6 p. c., cacao-red 5–6 p. c., volatile odorous principle, ash 3.6–4.6 p. c.



Theobroma Cacao.

Oleum Theobromatis. Oil of Theobroma.—This fat (concrete fixed oil) is a yellowish-white solid (lighter colored with age), faint, agreeable odor, bland, chocolate-like taste, usually brittle below 25° C. (77° F.), soluble in ether, chloroform, petroleum benzin, benzene, boiling dehydrated alcohol, slightly in alcohol, sp. gr. 0.973, melts at 30–35° C. (86–95° F.); contains stearin 40 p. c., palmitin, laurin, small amounts of glycerides of acetic, butyric, formic, linoleic, and arachidic acids. *Test:* 1. Dissolve 1 Gm. in ether 3 cc. in test-tube at 17° C. (63° F.), immerse test-tube in ice-cold water—liquid not turbid nor does it deposit white flakes in less than 3 minutes, and after congealing should clarify at 15° C.; 59° F. (abs. of wax, stearin, tallow). Dose, ʒss–1 (2–4 Gm.).

ADULTERATIONS.—Wax, stearin, tallow, etc.

Commercial.—The seed when taken from the fruit (size of cucumber but with pointed ends, consisting of shells 12 p. c. and kernels 88 p. c.) and dried, still retain astringency and bitterness (kernel), which may be overcome by roasting, or sweating and fermenting in heaps for 1 week, or burying in a box in clayed soil (“clayed,” “claying”—best and yellowish) for 3 days, then throwing seed into heaps, covering with leaves for a week, thereby destroying tannin and bitter principle, and developing the derivative constituents on which the properties of chocolate partly depend, then drying. The oil is extracted afterward by: 1, Expression; 2, Decoction; 3, Solution (benzin, carbon disulphide, chloroform, ether), the first process being considered best, and consisting in roasting, discarding shells, grinding kernels, heating at 70° C. (158° F.), subjecting mass to hydraulic pressure between hot iron plates or rollers, then running oil into rectangular molds, where it soon congeals. The residual dryish, oleaginous pulp (expressed

cake, oil cake), still containing variable amounts of oil, is utilized as cocoa or chocolate—the former containing the least oil, and both darkened in color and lightened in flavor by an alkali. Chocolate (fr. Ind. *chocolat*), as a confection consists usually of expressed cake finely ground, sugar, vanilla, cinnamon, annatto, etc., molded into varying shapes. Either cocoa or chocolate may be boiled with milk, or milk and water, sweetened, to form a valuable nutritive drink in convalescence from acute diseases. Both are subject to much adulteration with starch, rice flour, barley flour, sassafras nuts, chestnuts, clove, butter, lard, coco-nut shells, etc.

PREPARATIONS.—(Unoff.) *Emulsion. Ointments. Suppositories.*

PROPERTIES.—Nutrient, demulcent, emollient.

USES.—Seldom internally, only as suppositories, when it acts as an excipient or carrier for other medicine. Externally in cosmetic ointments, pill coating, abraded or inflamed surfaces.

Derivative Products:

1. **Theobrominæ Sodio-Salicylas.** **Theobromine Sodio-Salicylate,** $C_7H_7O_2N_4Na + NaC_7H_5O_3$, U.S.P.—(Syn., Theobrom. Sodio-Sal., Diuretin; Fr. Theobromine et Salicylate de Soude; Ger. Theobrominatriumsalicylate.) Obtained by mixing aqueous solutions of equal molecules of sodium theobromine and sodium salicylate, evaporating to dryness. It is a white, odorless powder, sweetish, saline, somewhat alkaline taste, gradually absorbs carbon dioxide liberating theobromine, becoming incompletely soluble in water, frequently develops a characteristic odor, soluble in water (1), slightly in alcohol; contains, when dried to constant weight, theobromine 46.5 p. c., salicylic acid 35 p. c., losing water 10 p. c. *Tests:* 1. Ignited—residue produces intensely yellow flame and effervesces with acids. 2. Aqueous solution (1 in 20) colorless, clear, opalescent; aqueous solution (1 in 100), slightly acidulated with acetic acid, + ferric chloride T. S.—violet. 3. .05 Gm. theobromine (separated in assay), + hydrochloric acid 1 cc. + potassium chlorate .1 Gm., dry on water-bath—reddish-yellow residue which becomes purple when moistened with 1 drop of ammonia T. S. 4. Dissolve .1 Gm. in sulphuric acid 2 cc.—no effervescence (abs. of carbonate); produces only slight color (abs. of readily carbonizable substances). 5. Dissolve 1 Gm. in water 10 cc., add a few cc. sodium hydroxide T. S., shake with chloroform 10 cc., separate chloroform layer, evaporate to dryness (constant weight)—residue does not exceed .005 Gm. (abs. of caffeine). *Impurities:* Caffeine, sodium carbonate, water, readily carbonizable substances. Should be kept in well-closed containers. Dose, gr. 5–15 (.3–1 Gm.), 5–6 times daily, in dilute solution, capsule, wafer, followed by water.

PROPERTIES AND USES.—Diuretic, nervous stimulant; cardiac dropsy, nephritis (chronic, acute), dyspnea, coughs; very slight action on heart and circulation; may produce headache, irregular pulse, vomiting, diarrhea, gastric irritation (avoided by small doses and weak solutions); owing to greater solubility far superior to theobromine. *Incompatibles:* Acids, fruit syrups (decomposing and precipitating theobromine), bicarbonates, borates, phosphates, ferric salts, chloral hydrate, wines, etc.

2. *Theobromine* (dimethylxanthine), $C_7H_8O_2N_4$.—This is obtained by exhausting the kernels with hot water, straining, precipitating with lead acetate, filtering, removing lead with hydrogen sulphide, filtering, evaporating, and treating residue with hot alcohol, from which whitish, bitter crystals deposit. It is a weak base (alkaloid) not altered by solution of potassium hydroxide, slightly soluble in water, alcohol, ether, forms salts (hydrochloride, nitrate, salicylate, etc.), and is related to caffeine, this latter being its methyl derivative—methyltheobromine, into which theobromine may be converted by treating theobromine silver with methyl iodide.

3. *Cacao Præparatum, Cocoa, Prepared Cacao (Chocolate), N.F.*—A powder prepared from the roasted, cured kernel of the ripe seed. It is brownish-red; numerous oil globules, protein grains, starch grains; odor and taste chocolate-like, free from sweetness; yields 6 p. c. of crude fiber, 15 p. c. of starch, and when extracted with ether, 18–25 p. c. of fat—the fatty residue shows not more than 3 p. c. of cocoa shells, and is without spicy odor and taste. Dose *ad libitum*; 1. *Syrupus Cacao*, 5 p. c., + tr. vanill. $\frac{1}{2}$ p. c., alcohol 5, sucrose 80, aq. dest. q. s. 100; 2. *Tabellæ Santonini*, 1 gr. (.06 Gm.); 3. *Tabellæ Santonini Compositæ*, 1 gr. (.06 Gm.).

Thuja occidentalis

Thuja occidentalis, Thuja, Arbor Vitæ, N.F.—The dried, leafy, young twigs with not more than 2 p. c. of stems over 4 Mm. ($\frac{1}{8}$ ') thick or other foreign organic matter—only the recently dried drug should be used; Canada, United States. Handsome evergreen tree, resembling *Chamæcyp'aris sphaeroides (Cupressus thyoides)* 6–15 M. (20–50°) high, trunk crooked, bark pale, shreddy, wood light, soft, durable. Twigs fan-shaped, flattened, leaves appressed in 4 rows, edges boat-shaped, glands on the back; odor strongly balsamic, aromatic, pungent; taste camphoraceous, terebinthinate, bitter. Powder, greenish-brown—chlorenchyma, stomata, guard cells, long fibers, oblique pores; solvent: alcohol; contains volatile oil 1 p. c., resin, tannin, pinipicrin, thujin, thujigenin, ash 7 p. c. Stimulant, diuretic, irritant, emmenagogue (resembling savin); fevers, bronchial catarrh, rheumatism, dropsy, worms, ulcers, warts. Dose, gr. 15–60 (1–4 Gm.); 1. *Fluidextractum Thujae* (alcohol).

Thymus

THYMUS. THYME, *N.F.*

Thymol. Thymol, $C_{10}H_{14}O$, *U.S.P.*

Thymus vulgaris, { A phenol occurring in the volatile oil of this and
Linné. { other plants.

Habitat. S. Europe (Portugal to Greece); cultivated in gardens, etc.

Syn. Common Garden Thyme, Mother of Thyme; Acidum Thymicum, Thymic Acid, Methyl-propyl phenol; Fr. Acide Thymique; Ger. Herba Thymi, Thymian; Thymolum, Thymiansäure.

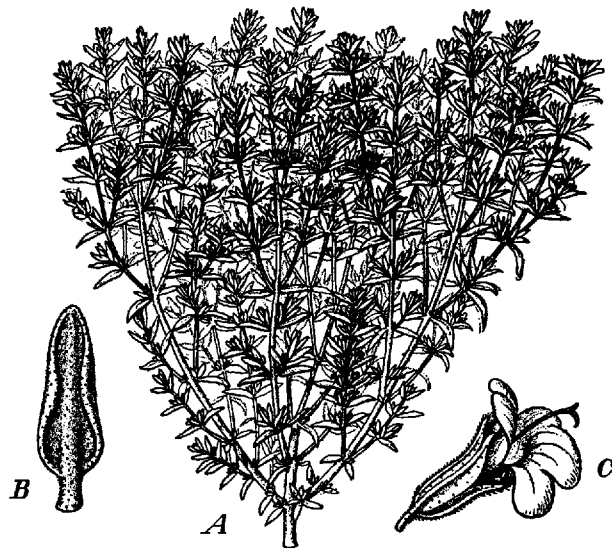
Thymus. L. fr. Gr. *θυμος*, strength, its invigorating smell. Used in temples as incense.

Vul-ga'ris. L. ordinary, common—*i. e.*, the kind growing wild and in common use.

PLANT.—Small shrub, 25–30 Cm. (10–12') high; stem and branches quadrangular; bark pale brown, shoots purplish; stems .5 Mm. ($\frac{1}{50}$ ') thick, grayish-brown, pubescent, nodes 5–20 Mm. ($\frac{1}{2}$ – $\frac{1}{4}$ ') apart. Thymus, Thyme, *N.F.* Leaves and flowering tops with not more than 3 p. c. of stems over 1 Mm. ($\frac{1}{2}$ ') thick, or other foreign organic matter, yielding not more than 4 p. c. of acid-insoluble ash. Leaves linear-lanceolate, ovate, .5–6 Mm. ($\frac{1}{50}$ – $\frac{1}{4}$ ') long, .5–2 Mm. ($\frac{1}{50}$ – $\frac{1}{2}$ ') broad, acute, base tapering into short petiole, revolute, grayish-green, puberulent, many non-glandular hairs, grayish, pubescent beneath; numerous glandular secreting hairs above, depressed in cuticle giving glandular-punctate appearance; flowers polygamous, bilabiate, small, pubescent, upper lip 3-toothed, lower 2-toothed, purplish; fruit nutlets, .5 Mm. ($\frac{1}{50}$ ') broad, spheroidal. Powder, light-green—non-glandular hairs 2 types, glandular hairs 2 types, leaf chlorenchyma with vascular tissue and epidermal cells, stomata, pollen grains.

CONSTITUENTS.—Volatile oil 2.5 p. c. (thymol), resin, tannin, gum, ash 14 p. c.

Oleum Thymi. Oil of Thyme, N.F.—A volatile oil distilled from the flowering plant containing not less than 20 p. c., by volume, of phenols. It is a colorless or red liquid, characteristic odor and taste, soluble in 2 vols. 80 p. c. alcohol, sp. gr. 0.912, levorotatory; contains at least 20 p. c., by volume, of phenols, also cymene, $C_{10}H_{14}$, *l*-pinene, borneol, linalool; the phenol content in the French and German oil, amounting to 25–42 p. c., is mostly thymol, but sometimes carvacrol, or a mixture of the two, whereas in the Spanish oil it is chiefly carvacrol, amounting to 50–70 p. c. **Adulterations:** Oil of turpentine which lowers specific gravity and increases angle of rotation, while wild thyme oil only does the latter. **Test:** 1. Shake 1 cc. with hot distilled water 10 cc., cool, pass aqueous layer through a wetted filter—filtrate not blue or violet with a drop of ferric chloride T. S. Should be kept cool, dark, in well-stoppered, amber-colored bottles. Dose, m̄j–5 (.06–.3 cc.).



Thymus vulgaris: A, plant in bloom; B, leaf seen from under surface, magnified 4 diam.; C, flower seen from the side, magnified 5 diam.

Thymol. *Thymol, U.S.P.*—This monatomic phenol, occurring in the volatile oils of *Thymus vulgaris*, *Monarda punctata*, and *Ptycho'tis Cop'tica* (*Ajowan*—*Umbelliferae*), the latter alone supplying most of the commercial article, is obtained by subjecting to freezing the residue left upon distilling any of these oils below 200° C. (392° F.), whereby thymol crystallizes out; or may agitate this residue with sodium hydroxide solution, and after a time add hot water to separate sodium thymol ($\text{NaC}_{10}\text{H}_{13}\text{O}$) solution from thymene, and to allow unattacked oil to float on top; to sodium hydroxide solution add hydrochloric acid which sets thymol free as an oily layer and upon cooling crystallizes when a crystal of thymol is added; yield 20–61 p. c. It is in large colorless, translucent, rhombic prisms, aromatic, thyme-like odor, pungent, aromatic taste, very slight caustic effect upon the lips; soluble in glacial acetic acid, fixed or volatile oils, water (1000), alcohol (1), chloroform (.7), ether (1.5); olive oil (1.7); alcoholic solution (1 in 20) neutral, optically inactive; isomeric with carvone (carvol, carvacrol); as a solid heavier than water, when liquefied by fusion lighter than water, melts at 50° C. (122° F.); liquefies when triturated with equal weight of ears, thready pulse, low temperature—treat symptoms, withdraw drug. **OIL:** Chlorosis, rheumatism, neuralgia, bronchitis, diarrhea, gleet, gonorrhoea, leucorrhoea, vesical catarrh; externally in baths, lotions for scabies, muscular rheumatism, to correct fetor from sores, ulcers, gangrene. Applied to cotton for toothache, earache, for veterinary practice, scenting soap.

Thymacetin, $\text{C}_6\text{H}_2\cdot\text{CH}_3\text{OC}_2\text{H}_5\text{C}_3\text{H}_7\text{NH}\cdot\text{COCH}_3$, a derivative, has the same relation to thymol that phenacetin has to phenol, and is prepared similarly; it is a white crystalline powder, soluble in alcohol, slightly in water. Analgesic, hypnotic, antiseptic; used in neuralgic headache like phenacetin. Dose, gr. 5–15 (.3–1 Gm.).

Thyme plant (fresh) is used as a condiment to aid digestion of fat pork, goose, duck, etc., and to flavor insipid dishes, as is sage, marjoram, parsley; it is used also with other aromatic herbs in baths, cataplasms, fomentations, for rheumatism, gout, scabies, indolent ulcers.

Toluifera balsamum

TOLU. *TOLU, U.S.P.*

***Toluifera Balsamum*,** } A balsam.
Linné.

Habitat. S. America (Venezuela, Colombia, Peru); high rolling countries.

Syn. Balsamum Tolutanum, Balsam of Tolu, U.S.P. 1910, Tolu Balsam; Fr. Baume—du Tolu—de Carthagène; Ger. Tolubalsam.

To-lu-if'e-ra. *L. tolu* + *fero, ferre*, to bear, producing tolu or an allied balsam—*i. e.*, it was brought first from Tolu, now Santiago de Tolu in U. S. Columbia.

Bal'sa-mum. *L. fr. Gr. βάλαμον*, for balsam, name of balsam tree—*i. e.*, from its characteristic secretion.

PLANT.—Evergreen tree 24 M. (80°) high, often branchless for 15 M. (50°) above ground, roundish spreading head; bark smooth, yellowish-brown, with numerous white lenticels; leaves having 4–7 leaflets; flowers upon smooth pedicels, dense racemes, 10–12.5 Cm. (4–5') long; calyx broadly tubular upon hispid pedicel, mouth 3–4 lobed; anthers versatile; fruit 10–12.5 Cm. (4–5') long. **BALSAM (Tolu)**

is a yellowish-brown plastic solid, brittle when old, dried, or exposed to cold, transparent in thin layers; odor pleasant, aromatic, vanilla-like; taste mild, aromatic; soluble in alcohol, chloroform, ether, solutions of fixed alkalies, usually leaving insoluble residue; nearly insoluble in water, petroleum benzine; alcoholic solution (1 in 20)—acid. *Tests:* 1. Shake 1 Gm. with carbon disulphide (25), let stand 30 minutes, filter, evaporate 15 cc. to dryness, dissolve residue in glacial acetic acid, + few drops of sulphuric acid—not green; shake remainder of filtrate with equal volume of aqueous solution of copper acetate (1 in 1000)—not green (abs. of rosin, copaiba). Dose, gr. 5–30 (.3–2 Gm.).

ADULTERATIONS.—Turpentine—blackish instead of cherry-red with sulphuric acid, soluble in carbon disulphide; sweet gum—yields styracin to hot benzine, crystallizing when cold; storax, rosin, copaiba, saponifiable substances, various other resins. A factitious balsam has been found containing storax 63 p. c.

Commercial.—Plant resembles *Toluifera Pereirae* in flowers and fruit but differs from it in having shorter leaves, smaller and fewer leaflets, recurved with non-puckered margin, non-hairy rachis and petiole, and less prominent glands. Balsam—a physiological product in very young tissues, thereafter becoming pathological, possibly an antiseptic protec-



Toluifera Balsamum: twig one-third natural size, with fruit.

tive against depleting local injury—is collected by making V-shaped incisions through the bark and hollowing out the wood below each to support a small calabash cup for catching the flow, there often occurring 20–30 of these from the ground upward (2.5–3 M.; 8–10°), the higher being cut from ladders or scaffolds. Bleeding continues, July–April, at the rate of filling the cups “each moon,” they being emptied as occasion demands into rawhide flask-shaped bags (carried by donkeys) which when filled are sent to ports along the Magdalena and Orinoco Rivers where the balsam is transferred to cylindrical tins (10–25 pounds; 4.5–11.5 Kg.), formerly calabashes or baked earthen jars, and as such enters commerce via Carthage.

CONSTITUENTS.—Resin 75–80 p. c., Cinnamic and Benzoic acids 18–20 p. c., Volatile oil 1 p. c., Vanillin .05 p. c., benzyl cinnamate and benzyl benzoate—last two form an acid, aromatic oily liquid 7.5 p. c.

Resin, C₁₈H₂₀O₅.—Chief constituent, consisting of tolu-resinotannol combined with cinnamic acid and small amount (1.5 p. c.) of benzoic acid; it is amorphous, black, brittle, similar to that of *T. Pereira*, having a portion soluble in carbon disulphide, which upon evaporation yields a crystalline, nearly colorless residue about 25 p. c. of the balsam; a portion of resin sparingly, another readily soluble in alcohol.

Volatile Oil.—Obtained by distilling with water; contains benzyl benzoate, benzyl cinnamate, phellandrene, farnesol, hardens by exposure, odor pleasant, sp. gr. 0.858.

Acids.—Obtained by distillation—benzoic, cinnamic, with benzylic ethers of both, the benzyl cinnamate predominating. Trommsdorf found resin 88 p. c., volatile oil .2 p. c., cinnamic acid 12 p. c., this latter coming over as a heavy oil condensing into white crystalline mass. Dry distillation gives the above acids and ethers, also styrol, phenol, toluol—this latter being found in coal tar, wood tar, organic compounds, balsams (Peru, etc.) and resins; it is a colorless, oily liquid, readily convertible into benzoic acid.

PREPARATIONS.—1. *Tinctura Tolu.* Tincture of Tolu. (Syn., Tr. Tolu, Tinctura Tolutana, Tolu Tincture; Fr. Teinture de Baume de Tolu; Ger. Tolubalsamtinktur.)

Manufacture: 20 p. c. Similar to Tinctura Cardamomi Composita, page 137; menstruum: alcohol. Dose, ℥x–30 (.6–2 cc.).

Prep.: 1. *Syrupus Tolu.* Syrup of Tolu. (Syn., Syr. Tolu, Syrupus Tolutanus; Fr. Sirop (balsamique)—de Baume de Tolu; Ger. Tolubalsamsirup.)

Manufacture: 1 p. c. Rub tincture of Tolu 5 cc. + magnesium carbonate 1 Gm. + sucrose 6, gradually add with trituration, water 43 cc., filter; dissolve in clear filtrate, gently heating, sucrose 76 Gm., strain syrup (hot), add through strainer, water q. s. 100 cc. Dose, ʒj–4 (4–15 cc.).

Preps.: 1. *Trochisci Ammonii Chloridi*, q. s. 2. *Emulsum Olei Morrhuæ cum Vitello*, N.F., 10 p. c. 3. *Mistura Pectoralis*, N.F., q. s.

1. *Pilula Phosphori*, q. s. 2. *Tinctura Benzoini Composita*, 4 p. c. 3. *Pilula Ferri Iodidi*, N.F., q. s.

Unoff. Preps.: *Emulsion. Inhalations* (steam—acute laryngitis with aphonia). *Lozenges.*

PROPERTIES.—Stimulant, expectorant, disinfectant, vulnerary, stomachic.

USES.—Much less decided than balsam of Peru, but similar; bronchitis, diphtheritic deposits, catarrh, coughs, flavoring, perfumery.

Incompatibles: Water and aqueous preparations with the tincture.

Synergists: Balsams, aromatic drugs, volatile oils, stimulant expectorants.

Allied Plants:

1. *Myroxylon punctatum*.—The *Quino-quino* tree, and *M. peruvianum*, both of Peru; yield balsams resembling official Peru and Tolu.

Toluifera pereirae

BALSAMUM PERUVIANUM. BALSAM OF PERU, U.S.P.

Toluifera Pereira, } A balsam.
(Royle) Baillon.

Habitat. Central America (San Salvador), in woods near the coast.

Syn. Bals. Peruv., Peru Balsam, Balsamum Peruvianum Nigrum, Balsamum Indicum, Black Balsam; Fr. Baume—du Pérou,—de Sonsonate,—des Indes; Ger. Perubalsam, Indischer Balsam.

Per-ei-ræ. L. of Pereira—*i. e.*, in memory of Jonathan Pereira (1804–1853), the author of *Elements of Materia Medica*, and Professor to the British Pharmaceutical Society, who visited S. America to study these and many other plants.

Pe-ru-vi-a-num. L. adj. form, fr. *peruvianus* of or pertaining to Peru—*i. e.*, the secretion.

PLANT.—Handsome tree, 15–25 M. (50–80°) high, branching 2.5 M. (8°) above ground; leaves 6–10, alternate, 15–20 Cm. (6–8') long, imparipinnate; leaflets 5–7.5 Cm. (2–3') long, oblong-ovate, hairy, puckered margin; flowers 12 Mm. (½') long, whitish, tomentose, racemes; fruit 1-seeded legume 10 Cm. (4') long, yellowish-brown. **BALSAM** (of Peru), is a viscid, dark brown liquid, free from stringiness or stickiness, transparent and reddish-brown in thin layers; odor agreeable, vanilla-like; taste bitter, acrid, persistent, burning sensation in the throat when swallowed; does not harden on exposure; soluble in alcohol, chloroform, glacial acetic acid with slight opalescence, partly soluble in ether, petroleum benzin; agitated with water—latter acid to litmus; sp. gr. 1.145. **Tests:** 1. Shake 1 Gm. with chloral hydrate (3) in distilled water (2)—clear solution (abs. of fixed oils). 2. Shake 1 Gm. with purified petroleum benzin (5), warm 10 minutes, replacing loss by evaporation, evaporate 2 cc.—no turpentine odor, and residue treated with few drops of nitric acid—not green or bluish (abs. of turpentine, rosin). Dose, ℥v–30 (.3–2 cc.).

ADULTERATIONS.—Extract of bark and wood, alcohol, fixed and volatile oils, castor oil, storax, benzoin, gurjun balsam, copaiba, Canada turpentine, rosin, water.

Commercial.—Plants grow wild in forests, either isolated or in groups, occasionally in apparent rows suggesting original planting, but there is no evidence of regular plantations, do not thrive above 300 M. (1,000°) elevation, bear fragrant flowers, yield mahogany-like wood and balsam after the 25th year continuing for 75 years. Balsam, a pathological product that owes its qualities to neither wood nor bark but to the special treatment of the trees, is collected by the aborigines in a district reserved to them, Sonsonate, Balsam Coast, extending

from Acajutla to La Libertad, San Salvador. After the last rains, Nov.-April, the outer cortical portion is scraped from the trunk and stout branches in alternating strips (or squares, 12' 30 Cm.) an $\frac{1}{8}$ inch (3 Mm.) deep, exposing the inner layer from which, within 5-8 days, the mature sap begins to flow; after this has continued a week the tender portion is covered with a clean cloth to absorb the sap, and a second irritation effected by carefully applying a burning torch for 5 minutes, and repeating this every 2 months, six changes of cloths



Toluifera Pereira.

during each interval; a second hacking often follows; cloths are boiled half an hour in kettles with water, expressed (hot) in primitive press, and squeezed—the balsam being caught in large bladders, gourds, or wooden bowls—that in the kettles settles to the bottom and, after pouring off supernatant liquid is mixed with that from the cloths furnishing “crude or raw balsam,” which is refined by heating moderately in a vat, whereby water is evaporated and impurities rise to the surface, straining, when the “clarified balsam” is poured into rectangular, screw-top tin canisters, 55 pounds (25 Kg.). As long as the wounds are kept open there usually is some flow, and if the process is conducted carefully the lower ones will heal while the upper and fresher are being worked; the loose bark and wood are ground up and extracted, the

extract being added to the other collected portions. When trees have been tapped six consecutive seasons a rest of 2-3 years renders the product more abundant and satisfactory, while a longer period, 5-6 years in every 20, assures a continued yield; each tree averages 2-5 pounds (1-2.5 Kg.) annually. It is exported from Acajutla (Pacific coast) and Belize (Atlantic coast) in jars, metallic canisters, drums, etc. There also is obtained from the fruit by expression a white semi-fluid substance, *Balsamo blanco*, having the odor of Tonka and the appearance of Tolu, but, in spite of containing a crystalline resin, *myroxocarpin*, it is entirely distinct from Tolu or Peru. The natives prepare from the fruit with rum a tincture or alcoholic extract, *Balsamito*, which is used as a stimulant, anthelmintic, diuretic, and externally for indolent ulcers, freckles, etc., while there often exudes from the trees a gum-resin containing 77.4 p. c. of resin, but no aromatic principle or cinnamic acid. Balsam of Peru was considered formerly to be from *Myroxylon peruiferum*, a different tree flourishing in Brazil, Ecuador, Peru, whose product reached Europe via Peru (Callao), hence its name, being a fragrant balsam resembling Tolu and at Rio called *Olea vermelho*.

CONSTITUENTS.—Benzoic acid-benzyl ester, Cinnamein (volatile oil) 56-66 p. c., Resin 16-25 p. c., Cinnamic and Benzoic acids 23 p. c., Vanillin.

Benzoic Acid-benzyl Ester (Benzyl Benzoate).—The chief active constituent is a colorless oily liquid, boiling at 173° C. (344° F.), congealing at 32° C. (90° F.), and may readily be made synthetically.

Cinnamein.—Consists largely of benzoic acid-benzyl ester, and to a small extent of cinnamic acid-benzyl ester (benzyl cinnamate) both esters being separated easily by fractional distillation *in vacuo*, and thus obtained pure possess the characteristics, chemical and therapeutical, of the synthetic esters; the cinnamic acid-benzyl ester boils at 213° C. (416° F.), and congeals at 37° C. (99° F.).

Resin.—Consists of peru-resinotannol combined with benzoic and cinnamic acids, soluble in caustic alkali, and when in solution precipitated by carbon dioxide, insoluble in carbon disulphide; on dry distillation yields benzoic acid, styrol, and toluol, C₇H₈.

PREPARATIONS.—1. *Mistura Oleo-Balsamica, Hoffman's Balsam, N.F.*, 1.6 p. c., + eugenol, oils of cinnamon, lavender, lemon, myristica, thyme, āā $\frac{2}{3}$ p. c., alcohol q. s. 100 (nervine). 2. *Solutio Mastiches Chloroformica Composita, N.F.*, 30 p. c. *Ointment. Syrup.*

PROPERTIES.—Stimulant, expectorant, disinfectant, vulnerary, stomachic. It is eliminated by bronchial mucous membrane, kidneys, and skin, stimulating and disinfecting their secretions.

USES.—Chronic catarrh, asthma, phthisis, gonorrhoea, amenorrhoea, rheumatism, palsy; externally on indolent ulcers, scabies, ringworm, tonsillar diphtheria, bronchitis, tuberculosis of the skin, bone, or larynx, chilblains, eczema, for masking the odor of iodoform in ointment.

Trifolium

Trifolium pratense, *Trifolium*, *Red Clover Blossoms*, *N.F.*—The dried inflorescence with not more than 2 p. c. of foreign organic matter; Europe, naturalized in N. America. Well-known fodder-plant. Heads ovoid, 12–25 Mm. ($\frac{1}{2}$ –1') long and broad, shriveled, purplish, brownish on drying, consisting of many small papilionaceous flowers crowded together, stipules green; leaves trifoliate; odor faintly aromatic, tea-like, taste sweetish, slightly bitter. Powder, greenish-brown—non-glandular hairs, pollen grains, epidermis with stomata, polygonal cells (corolla) with rhombohedron of calcium oxalate; solvent: diluted alcohol; contains isorhamnetin, pratol, tannin, pratensol, trifolin (glucoside). Alterative, deobstruent, sedative; whooping-cough, spasmodic affections. Dose, \mathfrak{z} ss–1 (2–4 Gm.); 1. *Fluidextractum Trifolii* (diluted alcohol); 2. *Fluidextractum Trifolii Compositum*, 21.5 p. c., + glycyrrhiza 21.5, berberis, cascara amara, lappa, phyto-lacca, stillingia, $\bar{a}\bar{a}$ 10.8, xanthoxylum 3, (33 p. c. alcohol), dose, \mathfrak{z} j–2 (4–8 cc.): Prep.: 1. *Syrupus Trifolii Compositus*, 30 p. c., +, dose, \mathfrak{z} j–2 (4–8 cc.).

Trigonella

Trigonella Foeniculum, *Fenugreek*.—The seed; India, Europe; cultivated in France, Germany, etc. Annual herb, .3 M. (1°) high, leaves trifoliate, leaflets dentate, flowers yellowish, fruit compressed legume containing 16 seed; seed 3 Mm. ($\frac{1}{8}$ ') long and broad, 2 Mm. ($\frac{1}{2}$ ') thick, rhombic, flattened, brownish-yellow, large diagonal groove; strong aromatic, to some pleasant, odor; taste mucilaginous, bitter; contains volatile oil, fixed oil 6 p. c., mucilage 28 p. c., proteins 22 p. c., bitter principle, choline, trigonelline .13 p. c. Powder sometimes adulterated with ground amylose seeds. Used similar to flaxseed, elm, althea; emollient cataplasms, enemata, ointments, plasters, decoction, 5 p. c. (usually thick and slimy); demulcent in veterinary condition-powders.

Trillium

Trillium erectum, *Trillium*, *Beth (Birth) Root*, *N.F.*—The dried rhizome with not more than 2 p. c. of foreign organic matter; N. America, Stem 20–40 Cm. (8–16') high, terminated by a whorl of 3 rhombic leaves and a purplish, solitary, unpleasantly scented flower; fruit ovoid, horny. Rhizome, .6–5 Cm. ($\frac{1}{2}$ –2') long, 1–3 Cm. ($\frac{2}{3}$ –1 $\frac{1}{2}$ ') broad, compressed, annulated by leaf-scars and fissured by stem-scars; rootlet scars in concentric rows on under side, yellowish-brown, internally pale yellow; fracture uneven, hard or spongy; odor distinct; taste bitter, acrid, on chewing—warmth in throat and secretion of saliva. Powder, yellowish-white—calcium oxalate raphides, starch grains, epidermal

tissue with porous walls, tracheæ with markings; solvent: diluted alcohol; contains saponin-like body (activity) 5 p. c., trilline, fixed oil, volatile oil, resin, tannin, starch, ash 5 p. c. Alterative, expectorant, astringent, oxytocic; uterine stimulant, indolent ulcers, injuries. Dose, gr. 15–30 (1–2 Gm.); 1. *Fluidextractum Trillii* (75 p. c. alcohol): Prep.: 1. *Elixir Viburni Opuli Compositum*, 15 p. c.

Triosteum

Triosteum perfoliatum, *Fever Root*, *Fever-wort*, *Horse-gentian*.—The root (rhizome), U.S.P. 1820–1870; United States. Perennial herb 1–1.3 M. (3–4°) high, hirsute; leaves pubescent beneath, 15 Cm. (6') long; flowers purplish, fruit dry yellow drupe, 12 Mm. ($\frac{1}{2}$ ') long. Root 15–20 Cm. (6–8') long, 15 Mm. ($\frac{3}{8}$ ') thick, knotty, brownish-yellow, bitter, nauseous; contains bitter principle, starch. Used as cathartic, emetic, diuretic, substitute for ipecac; in decoction, extract, infusion. Popular with Indians for fevers, amenorrhea. Dose, gr. 15–30 (1–2 Gm.).

Tsuga canadensis

Tsuga (Abies) canadensis, *Picea Canadensis* (*Canada Pitch*, *Hemlock Pitch*).—Prepared resinous exudation, U.S.P. 1830–1880; N. America. Hemlock spruce is an evergreen tree 18–24 M. (60–80°) high, .6–1 M. (2–3°) thick, trunk straight, uniform size for 12–15 M. (40–50°), bark rough, leaves 18 Mm. ($\frac{3}{4}$ ') long, 2 Mm. ($\frac{1}{2}$ ') wide, in 2 rows, numerous, glaucous, silvery beneath, cones ovate, 2.5 Cm. (1') long, resin (oleoresin) reddish-brown, translucent, or opaque, nearly hard, brittle, fracture shining, conchoidal; odor mild, balsamic, terebinthinate. Oleoresin is obtained by exudation, incision, or boxing; yield small. Used as stimulant, irritant, in plasters. *Emplastrum Picea Canadensis*, U. S. P. 1860–1880.

Turnera

Turnera diffusa, or *T. aphrodisiaca*, *Damia'na*, *Turnera*, *N.F.*—Turneraceæ. The dried leaf with not more than 15 p. c. of stems nor 3 p. c. of other foreign organic matter, yielding not more than 4 p. c. of acid-insoluble ash; W. Mexico, S. California, Texas. Leaves obovate, 10–25 Mm. ($\frac{2}{3}$ –1') long, 4–10 Mm. ($\frac{1}{8}$ – $\frac{2}{3}$ ') broad, short-petioled, acute, cuneate base, 2–10-toothed on each side, smooth, light green; lower surface densely tomentose (*T. diffusa*), or glabrous, with few hairs on ribs (*T. aphrodisiaca*); frequently some reddish twigs; flowers yellowish, globose pods; odor aromatic; taste characteristic, aromatic, resinous. Powder, yellowish-green—stomata, hairs, tracheæ, few tracheids from stem, calcium oxalate crystals in rosettes or prisms, starch grains; solvent: diluted alcohol; contains volatile oil (amber-colored, aromatic odor, warm camphoraceous taste) .5 p. c., damianin (bitter principle), 2 resins 6.4 p. c., tannin 3.5 p. c., starch, ash 10 p. c. Aphrodisiac, tonic, stimulant, laxative; sexual impotence, in conjunction with strychnine, phosphorus. Dose, \mathfrak{z} ss–2 (2–8 Gm.); 1. *Fluidextractum Damiana* (75 p. c. alcohol), dose, \mathfrak{z} ss–2 (2–8 cc.); Infusion—substitute for tea.

Tussilago

Tussila'go Far'fara, Farfara, Colts-foot (Leaves), Tussilago Leaves, Cough-wort, N.F.—The dried leaf with not more than 3 p. c. of foreign organic matter, yielding not more than 4 p. c. of acid-insoluble ash; Europe, N. Asia, naturalized in N. United States. Low succulent perennial, creeping annulate rhizome, scaly scapes in spring, bearing a single head; flowers yellow. Leaves, petioled, pubescent (young—white, floccose beneath, old—dark green above, glabrous below), orbicular, 8–15 Cm. (3–6') long and broad, cordate, dentate, red-brown teeth, palmately 5–9-nerved, glabrous above, wrinkled, greenish; odor indistinct; taste mucilaginous, faintly herbaceous, bitter. Powder, yellowish-green—many hairs twisted together, elliptical stomata and striated epidermal cells with wavy vertical walls; few non-porous fibers and tracheæ, parenchyma cells with chloroplastids; solvents: water, diluted alcohol; contains glucoside (bitter), resin, tannin, volatile oil, gum, wax, caoutchouc, ash 20 p. c. Demulcent, toxic; bronchitis, pulmonary affections, coughs. Dose, gr. 30–60 (2–4 Gm.); 1. *Species Pectorales*, 20 p. c. Decoction, Infusion, each 5 p. c., $\frac{3}{4}$ ss–1 (15–30 cc.); Expressed juice; dried root, as well as leaves smoked for cough—popular domestic remedy.

Ulmus fulva

ULMUS. ELM, U.S.P.

Ulmus fulva, } The dried inner bark.
Michaux.

Habitat. N. America, New England, S. Carolina, west to Louisiana, Nebraska. *Syn.* Elm Bark, Slippery Elm, Moose-, Red-, Indian-, Sweet-, Rock or American Elm; British Tea (the leaves), Cortex Ulmi Interior; Fr. Écorce d'Orme (fauve); Ger. Ulmenrinde, Rüsterrinde.

Ulmus. L. see etymology, page 163, of Ulmaceæ.

Fulva. L. *fulvus*, deep yellow, tawny—*i. e.*, the color of the liber bark.

PLANT.—Large tree, 15–18 M. (50–60°) high, 3–6 M. (1–2°) thick; bark and wood reddish-brown, branches rough, whitish; leaves large 10–20 Cm. (4–8') long, 5–7.5 Cm. (2–3') broad, oblong, acuminate, unequal at subcordate base, unequally serrate, pubescent; rough on both sides, petiolate, buds covered with dense russet down; flowers April, small, appearing before leaves, sessile, in clusters, calyx downy, corolla wanting; fruit samara, 12–18 Mm. ($\frac{1}{2}$ – $\frac{3}{4}$ ') long, flat, broadly oblong, entire, notched, 1-celled, wing yellow, silky with short fulvous hairs. **BARK**, usually broad, flat, oblong pieces, 1–4 Mm. ($\frac{1}{16}$ – $\frac{1}{8}$ ') thick; outer surface pale brown, roughened by longitudinal striæ and partially detached bundles of bast-fibers, occasionally patches of thin dark brown cork; inner surface light yellowish-brown, finely striate; fracture fibrous, projections of fine bast bundles; odor distinctive; taste mucilaginous. **POWDER**, light brown (fawn)—numerous bast-fibers, calcium oxalate prisms, starch grains, .003–.015 Mm. ($\frac{1}{333}$ – $\frac{1}{111}$ ') broad, numerous mucilage fragments, cork cells few or absent. *Test:* 1. Macerate for 1 hour 1 Gm. in water 40 cc.—light brown mixture of thick mucilaginous consistence. Dose, $\frac{3}{ij}$ –4 (8–15 Gm.).

ADULTERATIONS.—**BARK:** Barks that are more brittle, less fibrous and mucilaginous; **POWDER:** Corn meal, flour, starches.

Commercial: Tree flourishes in open high places, firm dry soil, being distinguished from *U. americana* by character of branches (rougher), leaves, buds, flowers, seed. Bark should be collected in spring, deprived of epidermis, and dried, for which trees are felled in Michigan and other Western States, peeled and wood burnt or allowed to decay.

CONSTITUENTS.—Mucilage, starch and tannin (slight), ash 8–10 p. c.; European bark also contains tannin (considerable) and bitter principle, but no starch.

Mucilage.—Resembles that of flaxseed—precipitated by lead acetate, but alcohol separates from its solution a gelatinous liquid.

PREPARATIONS.—1. *Trochisci Ulmi, N.F.*, gr. 3 (.18 Gm.). *Mucilage*, 6 p. c. (if to be free from starch must use cold water); dose, *ad libitum*. *Poultice. Uterine tents.*

PROPERTIES.—Demulcent, emollient, nutritive.

USES.—Dysentery, diarrhea, diseases of urinary passages, bronchitis. Externally—finely ground or powdered bark mixed with hot water into pasty mass and used as a poultice for inflammations, boils, etc.; in shape of tents to dilate fistulæ, strictures, os uteri, also in form of vaginal and rectal suppositories.

Allied Plants:

1. *Ulmus campestris.*—Europe. Bark thinner than official, cinnamon color, mucilaginous, bitterish, astringent. *U. effusa*, *Black Elm*, bark very similar; *U. americana*, *White Elm*, New England, chiefly shade tree; *U. alata*, *Wahoo*, S. United States. Bark used in making ropes.

Umbellularia

Umbellularia californica, *California Bay Laurel* or *Spice Tree.*—Wood brownish, close-grained, esteemed for cabinet-work; leaves yield volatile oil 4 p. c., with nutmeg and cardamom odor; seed contain a fat; stimulant, anodyne in diarrhea, neuralgia, headache.

Urtica

Urtica dioica, *Nettle (Stinging Nettle).*—Urticaceæ; N. America, Europe. Plant 6–1 M. (2–3°) high, very bristly, stinging, leaves ovate, heart-shaped, pointed, serrate, downy beneath, upper stem downy, spike much branched. Tonic, astringent, uterine hemorrhage. Dose, gr. 15–30 (1–2 Gm.).

Ustilago

Ustilago Maydis, *Corn Smut.*—The fungous growth upon *Zea Mays*, U.S.P. 1880. United States, etc. The fungus is abundant upon stem, grains, and tassel; in irregular, globose masses 10–15 Cm. (4–6') broad, consisting of a blackish, gelatinous membrane enclosing many blackish, globular, nodular spores; odor and taste disagreeable. Should be kept dry and not longer than one year; contains fixed oil 2.5 p. c., sclerotic acid, crystalline principle (ustilagine) and alkaloid (secaline), volatile base, sugar, mucilage, ash 5 p. c. Emmenagogue, parturient, increases uterine pains during labor, like ergot. Dose, gr. 15–30 (1–2 Gm.).

VALERIANA. VALERIAN, U.S.P.

Valeriana officinalis,
Linné. { The dried rhizome and roots, with not more
than 5 p. c. foreign organic matter, yielding
not more than 10 p. c. acid-insoluble ash.

Habitat. Europe, N. Asia, in moist as well as dry localities, banks of streams; naturalized in New England and New York; cultivated.

Syn. Valer., Wild, Great Wild, English, German, Common, Cat's, Vermont or American-English Valerian, Setwall, Vandal Root, All Heal, Radix Valerianæ Minoris; Br. Valerianæ Rhizoma; Fr. Valériane officinale, Racine de Valériane; Ger. Radix Valerianæ, Baldrian, (Wilde) Baldrianwurzel.

Va-le-ri-a'na. L. see etymology, above, of Valerianaceæ.

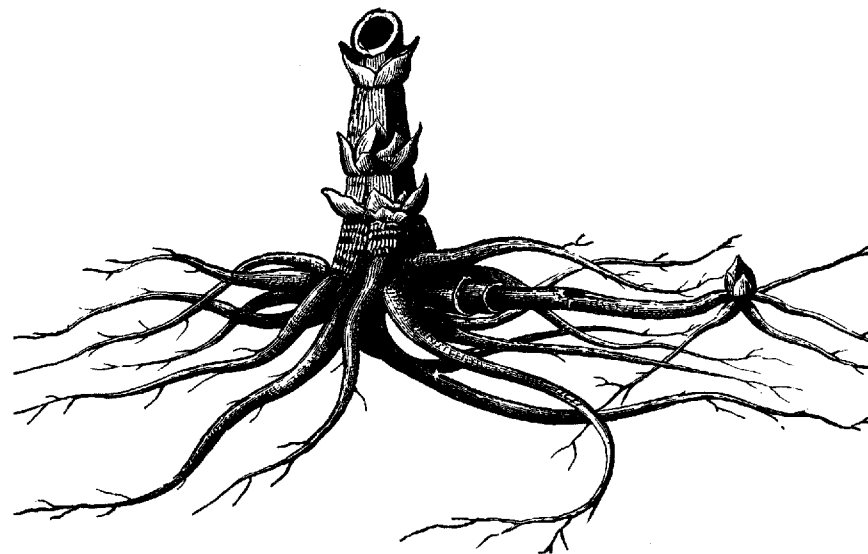
Of-fi-ci-na'-lis. L. see etymology of (*Smilax*) *officinalis*, page 122.



Valeriana officinalis.

PLANT.—Large perennial herb; stem .6–1.3 M. (2–4°) high, branched at top, cylindrical, hollow, fluted and channeled, often hairy; leaves imparipinnate with long clasping petioles; leaflets 4–10 pairs, 2.5–6.5 Cm. (1–2½') long, lanceolate, dentate; flowers small, white or rose color, agreeably odorous, terminal corymbs, corolla 5-lobed, stamens 3, sessile; fruit, capsule, 4 Mm. (¼') long, plano-convex, compressed, 4-ribbed, pale brown, 1-seeded, oblong-ovate. **RHIZOME**, upright, 2–4 Cm. (¾–1¾') long, 1–2 Cm. (¾–1') thick, usually cut longitudinally into 2–4 pieces, yellowish-brown, upper portion with stem-bases, frequently, with a short, horizontal branch or stolon, from outer surface numerous, slender, brittle roots; fracture short, horny; internally light brown with a thick bark and narrow, central cylinder; odor of valeric acid, stronger upon aging; taste sweetish, camphoraceous, somewhat bitter. **POWDER**, grayish-brown—numerous starch grains, .003–.02 Mm. (1/8325–1/250') broad, tracheal fragments, walls with pores or thickenings, narrow fibers with walls thin, porous, lignified, occasional fragments of epidermis with root hairs and fragments of cork. *Solvents:* water; alcohol. Dose, gr. 15–60 (1–4 Gm.).

ADULTERATIONS.—Rhizome and roots of *V. Phu*, *V. dioica*, *Cyananthum Vincetoxicum*, *Veratrum album*, *Si'um latifolium*, *Scabiosa succisa*, and *S. arvensis*, also several ranunculaceous roots.

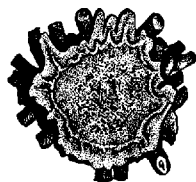
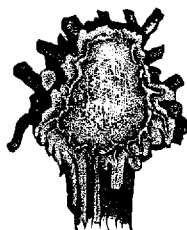


Valeriana officinalis: rhizome, roots, and rootlets.

Commercial.—Valerian flourishes equally well in damp woods, meadows, and dry places, affording a variability in characteristics that has suggested four varieties, all, however, being one and the same and yielding identical constituents; it is cultivated in England (best), Germany, Holland, United States (New Hampshire, Vermont, New York), very little of the wild grown, although stronger and smaller, being utilized. Rhizome is collected in the spring before stem begins to shoot, or preferably in autumn, when leaves decay, from dry soil plants, and at first is without specific odor; tops are cut off in the spring to prevent seeding and thereby strengthen the rhizome, which must be dug carefully, washed, dried (entire or split) in kilns, packed tightly, and kept dry to prevent deterioration.

CONSTITUENTS.—Volatile oil .5–3 p. c., Valeric acid, formic, acetic, malic acids, chatinine, tannin, resin, starch, mucilage, sugar, ash 15–20 p. c. (largely manganese).

Volatile Oil, (Oleum Valerianæ), U.S.P. 1860–1890.—This is obtained by distilling with water; it is a pale green liquid, pungent valerian odor, aromatic taste, sp. gr. 0.945, yellow and viscid on exposure, levorotatory; contains: 1, a terpene—borneene, $C_{10}H_{16}$, boiling at 157° C. (315° F.); 2, an alcohol—borneol (liquid, and solid crystalline compound), $C_{10}H_{18}O$, with the liquid portion chromic acid yields camphor along with formic, acetic, and valeric acids, these latter being likewise present in old rhizomes from slow oxidation of this $C_{10}H_{18}O$; 3, an ether—borneol, or borneol oxide, $(C_{10}H_{17})_2O$, greenish syrupy oil, but colorless when rectified, along with formic, acetic, and valeric esters, which, by oxidation, form their respective acids. Recent investigators claim these components to be pinene, camphene, borneol, and the formic, acetic, and isovaleric esters of borneol. Dose, mj–5 (.06–.3 cc.).



Valeriana: longitudinal and transverse sections.

Valeric (Valerianic) Acid, Acidum Valer(ian)icum, $C_5H_{10}O_2$, U.S.P. 1860-1870.—Not in fresh rhizome, but results from oxidation of the volatile oil on exposure—a change believed dependent largely upon presence of manganese; however, this is obtained mostly by oxidizing amyl alcohol with sulphuric acid and potassium dichromate. It is an oily liquid, volatile, with characteristic odor, salts sweet-tasted.

PREPARATIONS.—1. *Tinctura Valerianæ*. Tincture of Valerian. (Syn., Tr. Valer.; Fr. Teinture de Valériane; Ger. Baldriantinktur.)

Manufacture: 20 p. c. Similar to Tinctura Veratri Viridis, page 104; menstruum: 75 p. c. alcohol. Dose, ʒss-2 (2-8 cc.).

2. *Tinctura Valerianæ Ammoniata*. Ammoniated Tincture of Valerian. (Syn., Tr. Valer. Ammon., Tinctura Valerianæ Composita; Fr. Teinture de Valériane ammoniacale; Ger. Ammoniakalische Baldriantinktur.)

Manufacture: 20 p. c. Similar to Tinctura Veratri Viridis, page 104; menstruum: aromatic spirit of ammonia. Dose, ʒss-2 (2-8 cc.).

3. *Fluidextractum Valerianæ, N.F.* (80 p. c. alcohol). Dose, ʒxv-60 (1-4 cc.).

Unoff. Preps.: *Abstract*, gr. 5-20 (.3-1.3 Gm.). *Extract*, gr. 5-10 (.3-6 Gm.). *Infusion*, ʒj-2 (30-60 cc.). *Syrup*. Water (*Aqua*).

PROPERTIES.—Similar to other drugs having a volatile oil. Stimulant, anodyne, nervine, antispasmodic, vermifuge, no narcotic effect; increases heart action and temperature, causing exhilaration, stimulates circulation, secretion, and peristalsis of the stomach and intestines; it is eliminated by kidneys, bronchial and genito-urinary mucous membranes; if used continuously, may produce melancholia, hysteria. Large doses cause nausea, diarrhea, urination, delirium, lessen motility, sensibility, and reflex excitability; the oil paralyzes the brain, spine, slows pulse, lowers blood-pressure.

USES.—Hysteria, hypochondriasis, hemicrania, nervous coughs, whooping-cough, diabetes, delirium tremens, typhoid state, dysmenorrhea, vertigo, epilepsy, worm convulsions, flatulence, reflex neuralgia.

Allied Plants:

1. *Valeriana Walli'chii, Valerianæ Indicæ Rhizoma* (Br.); India; rhizome 5 Cm. (2') long, 10 Mm. ($\frac{3}{8}$ ') thick, brown, curved, many root-scars, few thick roots—equivalent to official. *V. Phu'*; W. Asia, S. Europe; tall perennial; rhizome (*Radix Valerianæ Majoris*) is 10-15 Cm. (4-6') long, 12 Mm. ($\frac{1}{2}$ ') thick, annulated, brown; *V. mexicana* and *V. tolucca'na*, Mexico. All three yield valeric acid; odor and taste weaker than official.

2. *V. celtica (Nardus Spica celtica)*.—Alps, and *Nardos'tachys Jataman'si, Nar'dus in'dica (Spica nardi)* or true spikenard, India; the former has valerian odor, the latter that of serpentaria.

Vanilla

VANILLA. VANILLA, *N. F.*

Vanillinum. Vanillin, $C_8H_8O_2$, U.S.P.

Vanilla planifolia, *Andrews.* { Methylprotocatechuic aldehyde occurring naturally in vanilla (cured fruit), or prepared synthetically.

Habitat. E. Mexico, hot, damp woods, forests; cultivated in tropics.

Syn. Vanilla Aromatica, Vaniglia; Fr. Vanille, Vanilline; Ger. Fructus (Siliqua) Vanilla, Vanillin.

Vanilla. L. fr. Sp. *vainilla*, formerly *vaynilla*, dim. of *vaina (vayna)*, scabbard, sheath, pod, lit. "little pod"—*i. e.*, pod resembling the sheath of a knife.

Planifolia. L. *planus*, flat, + *folium*, leaf, flat-leaved—*i. e.*, leaves plain or flat, without prominent veins.

PLANT.—Succulent, dark green, epiphytic, terrestrial or parasitic, perennial climber; stem long, 1-2 Cm. ($\frac{3}{4}$ -') thick, smooth, much branched, nodes with aerial roots and rootlets, 12.5-15 Cm. (5-6') long, for clinging to trees, frame-work, etc., leaves 10-15 Cm. (4-6') long, oval, tough, fleshy, veinless, dark green, paler beneath; flowers 5 Cm. (2') broad, pale yellowish-green, loose axillary racemes of 8-10. Fruit (pod). **Vanilla, Vanilla Bean, N.F.**—The cured full-grown, unripe fruit, preserved in a cool place where it will not become brittle, when it should not be used. It is linear, flattened, tapering, 12-35 Cm. (5-14') long, 5-9 Mm. ($\frac{1}{5}$ - $\frac{1}{3}$ ') broad, in clusters of 3-15, flat circular

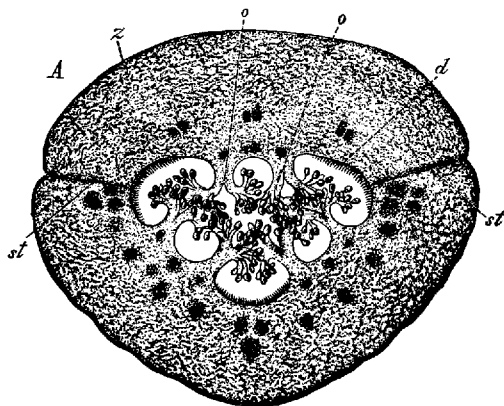


Vanilla planifolia.

scar at summit, curved (hooked) at base (Tahiti variety—middle broad, tapering similarly towards either end), blackish-brown, longitudinally wrinkled, moist-glossy, occasionally with efflorescence of vanillin acicular crystals, and 3-divided near tip; frequently cork patches; flexible, tough, 1-celled; blackish-brown pulp and many triangular, reticulate seed, .25-.30 Mm. ($\frac{1}{100}$ - $\frac{1}{8}$ ') broad; odor and taste characteristic, very agreeable. *Test*: 1. Efflorescent crystal on slide, + 1 drop of phloroglucinol T. S. and hydrochloric acid—carminic-red (dist. from benzoic acid); solvent: 75 p. c. alcohol. Dose, gr. 5-30 (.3-2 Gm.).

Commercial: Plant mostly cultivated, since 1850, from cuttings, sometimes seed, in Papantla, Misantla, Vera Cruz, Oaxaca provinces,

where moisture is abundant and temperature never below 18° C. (65° F.); it climbs by rhizoids (non-absorbing roots), pollinates by



Vanilla fruit, cross-section magnified: z, fruit flesh; st, opening suture; o, seed placentae; d, papillae.

insects, hand; bears fruit 3d year, continues 30–40; fruit (cured, full-grown, unripe) develops in 2–3 months, but a longer time is required for maturing, and when collected (late autumn before quite ripe, as green begins disappearing into yellow, to avoid splitting) is placed in heaps, sheltered from sun and rain, to undergo partial fermentation and shriveling, then followed by the process of “sweating”—exposure to sun or stove heat (60° C.; 140° F.) until a fine chestnut-brown color is acquired, and the odorous principle, vanillin, has been developed from the normal coniferin (secreted by the internal hair-like fibrillae), which is converted by hydrolization into glucose and coniferic alcohol, then this latter by an oxydase into vanillin—the object being to drive moisture out upon the surface and finally drying the latter; the process may be aided by the sweating-box, steaming, wrapping in blankets, etc.; they now are dried by a 2-months’ exposure to the sun, then coated with oil (that which exudes, also cocoa and cashew nut), tied in small bundles of 50–75, wrapped in foil, and marketed; by insufficient drying, to retain weight, the interior of beans and wherever tied sometimes become moldy. There are several varieties: 1, *Mexican (Vera Cruz)*, best, but beans vary much in value; 2, *Bourbon*, from Isle of Réunion, resembles Mexican, but beans blacker, tapering portion shorter, less firm and fleshy, surface smooth, waxy, soon becoming coated with acicular crystals (frost); odor more like Tonka bean; 3, *Mauritius (Seychelles)*, often sold as inferior Bourbon; beans only 15 Cm. (6’) long, 6 Mm. ($\frac{1}{4}$ ’) broad, pale color, smooth, not waxy, faint odor; 4, *South American (Guadeloupe)*, resembles Mexican, but broader, flatter, often 12 Mm. ($\frac{1}{2}$ ’) broad, reddish-brown, odor of fermented molasses, pulpy, resinous, few crystals on surface, beans often open and seed on the surface; 5, *Tahiti*, transplanted Mexican; beans 15 Cm. (6’) long, 12 Mm. ($\frac{1}{2}$ ’) broad, reddish-brown, heliotrope odor; 6, *Java*, mostly consumed in Holland, beans 10–15 Cm. (4–6’) long, fine flavor of Mexican but odor much more powerful; 7, *Vanillons (Brazilian—V. Pompo’na)*, larger, thicker than S. American, inferior vanilla odor (heliotrope), used by perfumers, tobacconists; contains vanillin .5 p. c.

Beans also are imported from Honduras, Madagascar, Martinique, etc., while some occur on the market deprived by a solvent of vanillin, and others to which benzoic acid, etc., have been added; all may be purchased as “splits” and “cuts.”

CONSTITUENTS.—FRUIT: Vanillin (Mexican 1.7 p. c., Bourbon 2 p. c., Java 2.75 p. c., in the 2 last associated with odorous oil), fixed oil 11 p. c., balsam, resin, sugar, mucilage, tannin, oxalic acid, ash 4–6 p. c.

Vanillinum. Vanillin.—This is obtained (1) by crushing the pods (fruit) with sand, extracting with ether in a Soxhlet tube, shaking out ethereal extract with sodium sulphite solution, liberating vanillin from this by treating with sulphuric acid, expelling sulphurous acid generated, extracting with ether; (2) by slowly adding a concentrated solution of coniferin, $C_{16}H_{22}O_8$, from cambium sap of pines, to a warm solution of potassium dichromate in water and sulphuric acid, finally heating to boiling for 3 hours—coniferin, by hydrolysis from action of acid, is converted into dextrose and coniferyl alcohol, and this latter oxidizes into vanillin and aldehyde: $C_{16}H_{22}O_8 + H_2O = C_6H_{12}O_6 + C_{10}H_{12}O_3$; $C_{10}H_{12}O_3 + O = C_8H_8O_3 + C_2H_4O$ —passing steam through mixture, or adding successive portions of ether, filtering, reclaiming ether, when vanillin crystallizes; (3) by boiling eugenol, $C_{10}H_{12}O_2$, with acetic anhydride, forming acetyl-isoeugenol, $C_{10}H_{11}(C_2H_3O)_2$, which is oxidized with potassium dichromate into acetyl-vanillin—the latter upon treating with potassium hydroxide solution and concentrating being converted into vanillin, which may be removed by acidulating filtrate with sulphuric acid and shaking out with ether; this method, owing to economic reasons, is used chiefly. It is in fine, white, slightly yellowish, needle-like crystals, odor and taste of vanilla, 400 times stronger than the pod, soluble in alcohol, chloroform, ether, glycerin (20), water (100), hot water (16), aqueous solutions of alkali hydroxides, from which it is precipitated by acids; melts at 81° C. (178° F.); incinerate—ash .05 p. c.; aqueous solution acid, optically inactive. *Tests*: 1. Aqueous solution with ferric chloride T. S.—blue color, changed to brown on boiling, and on cooling—white precipitate (dihydrodivanillin). 2. Shake ethereal solution with saturated aqueous solution of sodium bisulphite, add sulphuric acid—vanillin precipitated. 3. Cold aqueous solution with lead acetate T. S.—white precipitate (lead compound of vanillin), soluble in hot water. 4. Warm .1 Gm. with concentrated alcoholic solution of sodium hydroxide, + a drop of chloroform, warm—no odor of phenylisocyanide (abs. of acetanilid). *Impurities*: Acetanilid, benzoic acid, boric acid, terpin hydrate, coumarin, 50–90 p. c. Should be kept dark, in well-closed containers. Dose, gr. $\frac{1}{8}$ – $\frac{1}{2}$ (.01–.03 Gm.).

PREPARATIONS.—I. FRUIT: 1. *Tinctura Vanilla*, N.F., 10 p. c. + sucrose 20 (1st menstruum alcohol, 2d diluted alcohol): Preps.: 1. *Elixir Ammonii Valeratis*, N.F., 1.6 p. c. 2. *Emulsum Olei Ricini*, N.F., 2.5 p. c. 3. *Syrupus Bromidorum*, N.F., 3.2 p. c. 4. *Syrupus Cacao*, N.F., $\frac{1}{2}$ p. c. 5. *Tabellae Santonini*, N.F., $\frac{1}{4}$ m. 6. *Tabellae Santonini Compositae*, N.F., $\frac{1}{4}$ m. II. VANILLIN: 1. *Spiritus Vanillini Compositus*, N.F., 20 p. c.: Prep.: 1. *Elixir Vanillini Compositum*,

N.F., 20 p. c. 2. *Elixir Amygdalæ Compositum*, N.F., $\frac{1}{10}$ p. c. 3. *Liquor Ferri Peptonati*, N.F., $\frac{5}{100}$ p. c. 4. *Liquor Ferri Peptonati et Mangani*, N.F., $\frac{5}{100}$ p. c. 5. *Oleum Ricini Aromaticum*, N.F., $\frac{1}{10}$ p. c.

PROPERTIES.—Carminative, stimulant, aphrodisiac, antihysterical, irritant. Those working in it have itching hands, face, neck (the skin being covered with pruriginous eruptions), dizziness, weariness, muscular pains; eruptions due to an *acarus* which does not enter the skin.

USES.—The Spanish conquerors found vanilla in use in Mexico for flavoring chocolate, etc., and while now recommended for hysteria, it is employed chiefly as a flavoring agent, being the most general of all substances; large quantities may produce poisonous symptoms. *Vanilla Pompona*, Guadeloupe variety, *V. Gardneri*, Brazilian and Bahia, *V. odorata*, *V. phæantha*, Jamaica, Trinidad—used similarly.

Veratrum

VERATRUM VIRIDE. VERATRUM VIRIDE, U.S.P.

Veratrum viride, Aiton. { The dried rhizome and roots, with not more than 5 p. c. stems or other foreign organic matter, yielding not more than 4 p. c. acid-insoluble ash.

Habitat. N. America, Canada to Georgia, in rich, wet woods, swamps.

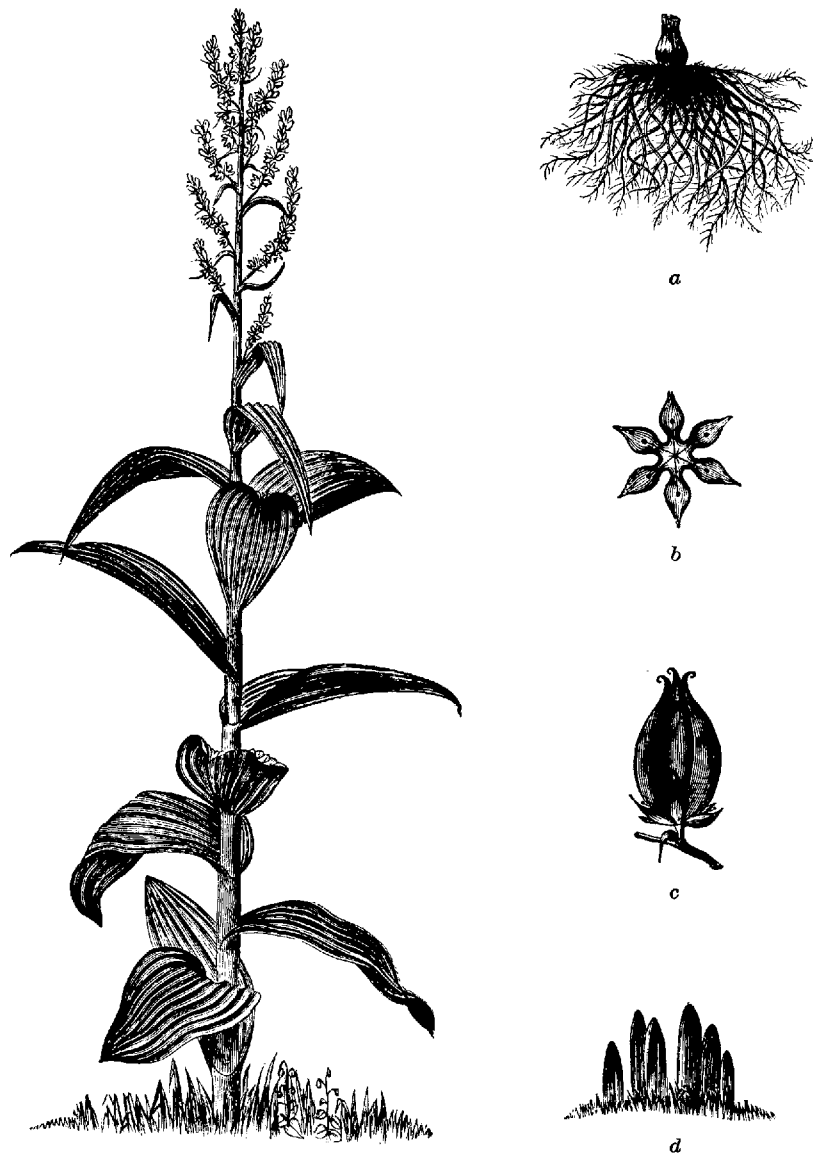
Syn. Verat. Vir., Green Hellebore, American Hellebore, American White Hellebore, Swamp or False Veratrum (Hellebore), Devil's Bite, Duckretter, Bugbane, Bugwort, Earth Gall, Indian Poke (their ordeal poison). Tickle (Itch) Weed (to bare-legged boys); Veratri Viridis Rhizoma; Fr. Vétrate vert; Ger. Grüner Germer.

Ve-ra'trum. L. vere, truly, + ater, black, dark—i. e., the color of the roots of some species.

Vir'i-de. L. viridis, green—i. e., flowers are greenish.

PLANT.—Large, luxuriant, perennial herb; stem annual .6–2 M. (2–7°) high, stout, cylindrical, solid, nearly smooth, pale green, unbranched except in the inflorescence; leaves 12.5–20 Cm. (5–8') long, oblong, acuminate, sheathing the stem, plaited, nerved, pubescent; flowers May–July, many polygamous, nearly sessile, greenish-yellow, racemes with downy peduncles, sepals petaloid; fruit of 3 nearly distinct follicles 2.5 Cm. (1') long, pericarp dry, brown, ventral dehiscence; seed flat, about 12 in each carpel. RHIZOME, upright, obconical, usually cut longitudinally into 2–4 pieces, 2–7 Cm. ($\frac{1}{2}$ –3') long, 1.5–3 Cm. ($\frac{3}{8}$ –1 $\frac{1}{2}$ ') thick, brownish, frequently numerous thin leaf-bases closely arranged at the summit, otherwise rough, wrinkled, somewhat annulate from scars of bud-scales; inodorous; taste bitter, acrid. Roots numerous, nearly cylindrical, 3–8 Cm. (1 $\frac{1}{2}$ –3') long, 1–4 Mm. ($\frac{1}{25}$ – $\frac{1}{8}$ ') thick, usually brittle, whitish, more or less starchy. POWDER, grayish-brown—strongly sternutatory, numerous starch grains .003–.02 Mm. ($\frac{1}{8325}$ – $\frac{1}{1250}$ ') broad, raphides of calcium oxalate, tracheæ scalariform or reticulate, often with lemon-yellow contents, lignified porous fibers; few reddish-brown cork fragments. *Solvent:* alcohol. Dose, gr. 1–4 (.06–.26 Gm.).

ADULTERATIONS.—Rhizome of allied plants, also those of *Spathyema (Symplocarpus) fatida*.



Veratrum viride: a, root; b, flower; c, ovary; d, plant at its early age.

Commercial.—Rhizome is collected chiefly in autumn, sometimes just before flowering, washed, dried, entire or sliced, and, owing to likely deterioration, should not be kept more than a year. Fresh leaves in contact with the skin often produce itching, and when carelessly gathered and cooked, as spinach, in place of marsh marigold (cowslip—*Cal'tha palus'tris*), cause very serious results.

CONSTITUENTS.—Protoveratrine .03 p. c., Jervine .1 p. c., Rubijervine .005 p. c., Pseudojervine, Protoveratridine (decomposition product), Cevadine, veratramarin (bitter glucoside), jervic acid, fat, resin, gum, starch; veratroidine no longer considered an alkaloid, but a mixture of amorphous bases.

Protoveratrine, $C_{22}H_{51}O_{11}N$.—Most important; white shining crystals, soluble in chloroform, hot alcohol; solution greenish with H_2SO_4 , changing to blue, violet.

Jervine, $C_{26}H_{37}O_3N$.—Most abundant; white crystals, tasteless, non-sternutatory, slightly toxic, soluble in alcohol, acetone, chloroform.

Rubijervine, $C_{26}H_{45}O_2N.H_2O$.—White prisms, distinguished from jervine by the ready solubility of its nitrate and sulphate; almost inert.

Pseudojervine, $C_{29}H_{48}O_7N$.—White crystals, soluble in alcohol; almost inert.

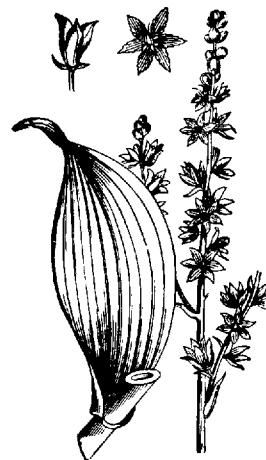
PREPARATIONS.—1. *Tinctura Veratri Viridis*. Tincture of *Veratrum Viride*. (Syn., Tr. Verat. Vir., Tincture of Green (American) Hellebore; Fr. Teinture de Véatré vert; Ger. Grün Nieswurzelntinktur.)

Manufacture: 10 p. c. Moisten 10 Gm. with sufficient alcohol, transfer to percolator without pressing, let stand, well-covered, for 6 hours, pack firmly, add alcohol to saturate and cover, macerate for 24 hours, percolate with alcohol q. s. 100 cc. Dose, $mj-10$ (.13-.6 cc.).

Unoff. Preps.: *Extract*, dose, gr. $\frac{1}{8}-\frac{1}{4}$ (.008-.016 Gm.). *Fluidextract*, dose, $mj-4$ (.06-.24 cc.). *Dr. Norwood's Tincture*, 50 p. c., saturated, being the same strength as the U. S. P. tincture of 1870, dose, $m\bar{v}-8$ (.3-.5 cc.).

PROPERTIES.—Sedative, emetic, diaphoretic, irritant, sternutatory, errhine. This resembles aconite very closely in action, being a cardiac depressant and spinal paralyzant. It diminishes the frequency and force of cardiac contractions, by depressing heart muscle, and stimulating inhibition (vagus), lowers arterial and blood-pressure, depresses spinal cord, causing muscular relaxation, induces cutaneous relaxation, hence free sweating; large doses produce rapid but very feeble pulse, cold, clammy skin, vomiting, debility, giddiness, impaired vision, partial unconsciousness; it is eliminated by the bowels. Protoveratrine, the most active heart content, slows the pulse by its powerful stimulating influence upon the vagus nerve, while jervine, constituting more than one-half of the total alkaloids, plays an important part in lowering arterial tension by depressing powerfully the heart and vasomotor center; the so-called veratroidine depresses the cord, paralyzes respiration, and causes emetocatharsis, thereby often preventing fatal results.

USES.—To reduce arterial excitement, spinal spasms, pneumonia, cardiac diseases, typhoid fever. Always given in the commencing or inflammatory stages, heart disease, nervous palpitation, puerperal and epileptiform convulsions, tetanus, chorea, mania-a-potu, diphtheria.



Veratrum album.

Poisoning, Incompatibles, Synergists: Same as for aconite.

Allied Plants:

Veratrum album, *White Hellebore (Veratrum)*.—The rhizome, U. S. P. 1820-1870; Europe—Alps, Pyrenees, Balkans. Plant nearly identical with the official, slight variations being due possibly to climate and soil; constituents same in character and name, except there is no cevadine; the veratralbine of former writers is no longer considered an alkaloid, but a mixture of amorphous bases. Properties and uses precisely as the official.



Verbascum Thapsus.

Verbascum

Verbascum Thapsus, *Verbasci Folia*, *Mullein Leaves*, *Great Mullein*, *N.F.*—The dried leaves with not more than 2 p. c. of foreign organic matter, yielding not more than 4 p. c. of acid-insoluble ash; Europe, nat. in N. America—growing in fields, waste places. Stout woolly perennial, .3-1.3 M. ($1-4^\circ$) high; flowers, spike, yellow, 2.5-4 Cm. ($1-1\frac{3}{4}'$) broad, thick, tough (moist), brittle (dry), greenish-gray, densely long-tomentose, numerous non-glandular hairs; nearly odorless; taste mucilaginous, slightly bitter. Powder, dark green—numerous lignified hairs, glandular hairs, epidermal cells, stomata, chlorenchyma with fibro-vascular tissue; solvent: diluted alcohol; contains resin, tannin, volatile oil, mucilage, sugar, ash 14 p. c. Demulcent, pectoral, anodyne, nutritive; consumption, nasal catarrh, coughs—smoked. Dose, gr. 15-60 (1-4 Gm.); 1. *Fluidextractum Verbasci Foliorum* (diluted alcohol), dose, $m\bar{xv}-60$ (1-4 cc.); Infusion.

V. phlomoides, or *V. thapsiforme*, *Clasping-leaved Mullein*, *Verbasci Flores*, *Mullein Flowers*, *N.F.*—The dried corollas with adhering stamens and not more than 2 p. c. of foreign organic matter—flowers which have become brown should not be used. Plants similar to preceding; stem .3-1.2 M. ($1-4^\circ$) high, usually simple; leaves oblong, crenate, woolly-tomentose; corolla light yellow, woolly, 14-30 Mm. ($\frac{3}{8}-1\frac{1}{2}'$) broad, rotate, 2-lipped, tube 1-2 Mm. ($\frac{1}{25}-\frac{1}{2}'$) long and broad; stamens 5, didynamous, filaments thick, fleshy, pollen grains smooth;

odor peculiar, agreeable; taste mucilaginous; with boiling water—yellow, with dilute sulphuric acid—green, becoming brown with alkali; solvents: water, diluted alcohol; contains volatile oil, resin, tannin, fixed oil, gum, glucoside, coloring, ash 6 p. c. Diaphoretic, demulcent, diuretic, anodyne, resolvent, antispasmodic, emollient; bronchial affections. Dose, ʒj-2 (4-8 Gm.); 1. *Species Pectorales*, 10 p. c. Fomentation, Infusion.

Verbena

Verbe'na hasta'ta, *Verbena*, *Blue Vervain*.—*Verbenaceæ*. The dried overground portion, collected when flowering; N. America. Perennial roughish, pubescent, 1-2.5 M. (3-7°) high; in broken or cut pieces; stem stout, quadrangular, rough, pubescent; leaves opposite, 7-15 Cm. (3-6') long, lanceolate, acute, serrate, lobed, deep green, petiolate; flowers panicles, spikes; corolla salver-form, 5-lobed, bright blue, didynamous; fruit 4-seeded, 4 nutlets at maturity; odor heavy, taste bitter, astringent, disagreeable; contains bitter glucoside, tannin; solvent: water. Diaphoretic, expectorant, nauseant, antiperiodic, similar to eupatorium. Dose, gr. 15-30 (1-2 Gm.). Fluidextract (dil. alc.); Infusion, 5 p. c.

Veronicastrum

Veron'ica virgin'ica, *Leptandra*, *Culver's Root*, *N.F.*—The dried rhizome and roots with not more than 5 p. c. of stem-bases or other foreign organic matter, yielding not more than 6 p. c. of acid-insoluble ash; N. America, low grounds. Perennial herb, .6-2 M. (2-6°) high, angular, smooth or downy; leaves lanceolate, serrate, 7.5-10 Cm. (3-4') long, whorls; flowers, spikes, whitish, tubular, stamens 2, exserted; fruit small, compressed capsule. Rhizome, horizontal, nearly cylindrical, branched, 4-10 Cm. (1½-4') long, 4-13 Mm. (¼-½') thick, grayish-brown, annulate from circular scars of bud-scales,



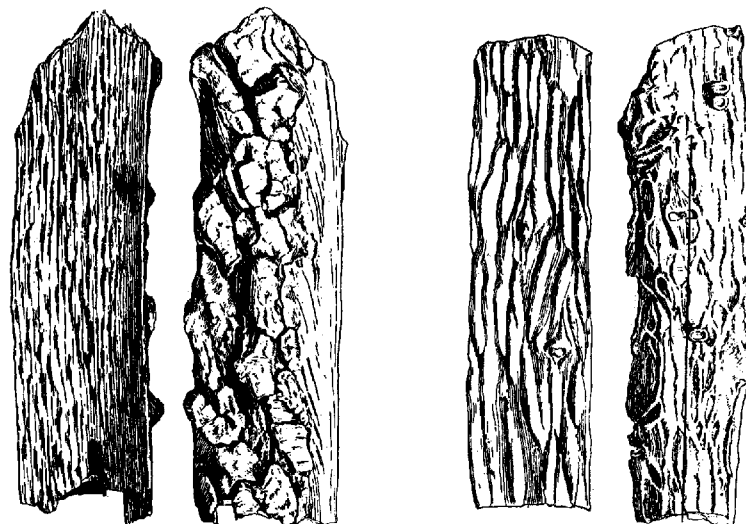
Veronica officinalis: flowering branch.



Veronica virginica: transverse sections of rhizome and root.

numerous stem-scars above, coarse roots on sides and beneath; fracture tough, woody, wood and bark thin, latter, resinous, pith large, more or less hollow; roots 1-10 Cm. (¼-4') long, .5-2 Mm. (1/50-1/12') thick, with light brown central cylinder; odor characteristic; taste very bitter, acid. Powder, yellowish-brown—numerous fragments with chloral hydrate T. S.—pink or violet, starch grains, tracheæ, wood-fibers, parenchyma with brownish resin often adherent to starch grains in the cells preventing separation of latter; solvents: 75 p. c. alcohol, water;

contains (mostly in bark) leptandrin, resin 6 p. c., tannin, saponin, gum, volatile oil. Emeto-cathartic, cholagogue, alterative, tonic; duodenal atony, chronic constipation with insufficiency of biliary and intestinal secretions; acts violently on some persons. Dose, gr. 15-60 (1-4 Gm.); 1. *Extractum Leptandræ* (75 p. c. alcohol), dose, gr. 1-5 (.06-3 Gm.); 2. *Fluidextractum Leptandræ* (75 p. c. alcohol), dose, mxxv-60 (1-4 cc.). Tincture, ʒj-2 (4-8 cc.); leptandrin (similar to podophyllin), gr. 1-5 (.06-3 Gm.). *V. officinal'is*, *Common Speedwell*; Europe, N. America. —Procumbent, pubescent, perennial, stem ascending, 7.5-25 Cm. (3-10') high; leaves obovate, petioled, 2-4 Cm. (¾-1½') long, serrate, grayish-green; flowers axillary racemes, wheel-shaped, 4-parted, pale blue corolla with dark blue stripes, 2 exserted stamens; contains bitter principle, tannin; plant used as alterative, diuretic (urinary, calculus disorders), diaphoretic, expectorant (skin diseases, scurvy); in infusion. Dose, gr. 30-60 (2-4 Gm.).



Viburnum prunifolium, a, trunk bark, b, root bark.

Viburnum prunifolium

Vibur'num prunifo'lium, *Viburnum*, *Black Haw*, *N.F.*—The dried root-bark, with not more than 7 p. c. of wood or other foreign organic matter, yielding not more than 3 p. c. of acid-insoluble ash: United States, New York to Florida. Handsome shrub, 3-6 M. (10-20°) high; leaves 2.5-5 Cm. (1-2') long, 12-16 Mm. (½-¾') broad, serrate; flowers white cymes; fruit oval, black drupe (berry), sweet, edible. Bark, in irregular, transversely curved, quilled pieces, 1.5-6 Cm. (¾-2½') long, .5-1.5 Mm. (1/50-1/8') thick, grayish-brown, or, where outer cork has scaled off, brownish-red; wrinkled, inner surface reddish-brown, striate; fracture short, uneven; odor strong, sourish; taste distinctly bitter, somewhat astringent. Powder, dark brown—many

stone cells, calcium oxalate rosette aggregates, prisms, lignified cork tissue, parenchyma cells, starch grains, few bast-fibers; solvent: 67 p. c. alcohol; contains viburnin, valeric acid, resin (brown, bitter) 2.5 p. c., tannin, sugar, salts, ash 8-9 p. c. Diuretic, tonic, antispasmodic, nervine, astringent; in threatened abortion, nervous diseases of pregnancy, dysmenorrhea, menorrhagia, after-pains, asthma, hysteria. Dose, \mathfrak{ss} -2 (2-8 Gm.); 1. *Fluidextractum Viburni Prunifolii* (67 p. c. alcohol): Prep.: 1. *Elixir Viburni Prunifolii*, 12.5 p. c., dose, \mathfrak{zj} -2 (4-8 cc.). Extract, gr. 3-10 (.2-.6 Gm.). Decoction, 5 p. c., Infusion, 5 p. c., each, \mathfrak{zj} -2 (30-60 cc.).

Viburnum opulus

Viburnum Op'ulus, var. *america'num*, *High Bush, Cranberry Bark, Cramp Bark, N.F.*—The dried bark of the stem with not more than 5 p. c. of adhering wood or other foreign organic matter; United States, low grounds, north and west. Handsome perennial shrub, 1.3-3.5 M. (4-12°) high; stem smooth, branched; leaves 3-lobed, dentate; flowers cymes, large, greenish-white; fruit 12 Mm. ($\frac{1}{2}$ ') long, ovoid, red (substitute for cranberries). Bark, in strips, 20-30 Cm. (8-12') long, 12-18 Mm. ($\frac{1}{2}$ - $\frac{3}{4}$ ') broad, .5-3 Mm. ($\frac{1}{50}$ - $\frac{1}{8}$ ') thick, quills, chip-like fragments, light gray, brownish stripes and lenticels, fissured or thinly scaly, inner surface yellowish-brown, short oblique striæ; fracture in 2 layers, short weak, whitish to brownish; odor slight, characteristic; taste mildly astringent, bitter. Powder, light grayish-brown—cork cells, calcium oxalate rosettes, starch grains, parenchyma with amorphous substance, occasional tracheal fragments with wood-fibers, bast-fibers and stone cells; solvent: 67 p. c. alcohol; contains viburnin, valeric acid, resin 8 p. c., tannin, salts, ash 8-9 p. c. Diuretic, tonic, antispasmodic, nervine, astringent, weaker than *V. prunifolium*; nervous conditions of pregnancy, abortive preventive, dysmenorrhea, menorrhagia, ovarian irritation, asthma, hysteria. Dose, \mathfrak{ss} -2 (2-8 Gm.); 1. *Fluidextractum Viburni Opuli*, dose, \mathfrak{ss} -2 (2-8 cc.): Preps.: 1. *Elixir Viburni Opuli Compositum*, 7.5 p. c., + fldext. of trillium 15, fldext. of aletris 7.5, dose, \mathfrak{zj} -2 (4-8 cc.); 2. *Elixir Aletridis Compositum*, 3.275 p. c.; 3. *Elixir Heloniadis Compositum*, 3.2 p. c. 2. *Tinctura Viburni Opuli Composita*, 3.5 p. c., + dioscorea 3.5, scutellaria 1, clove 5, cinnamon 6.5; menstruum: glycerin 7.5 cc., alcohol 75, water 17.5, finishing with 75 p. c. alcohol q. s. 100, dose, \mathfrak{zj} -2 (4-8 cc.)—substitute for Hayden's Viburnum Compound. Decoction, Infusion, each, 5 p. c., \mathfrak{zj} -2 (30-60 cc.). *V. obova'tum*, *Small Viburnum, Black Haw*; S. United States; shrub 2.4 M. (8°) high, fruit black, leaves broadly obovate, leathery, bitter, also used as antiperiodic.



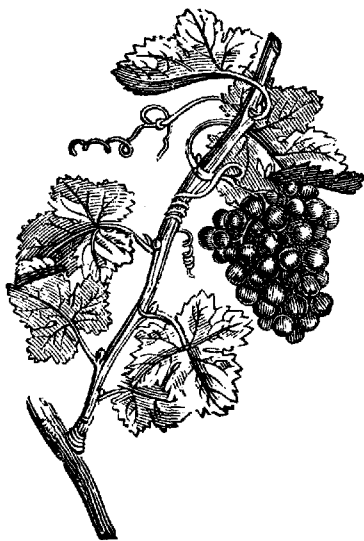
Viburnum Opulus.

Viola

Vio'la tri'color, *Pansy*.—Violaceæ. The flowering herb, U.S.P. 1880; Europe, N. America, cultivated. Plant 10-30 Cm. (4-12') high, angular; leaves roundish, cordate; flowers variegated (yellow, whitish, blue, purplish); taste bitter; contains salicylic acid .1 p. c., bitter principle, resin. Alterative, expectorant; large doses emetic, cathartic; skin diseases, scrofula, syphilis, bronchitis, nephritis. Dose, gr. 15-60 (1-4 Gm.); in decoction, infusion, extract. *V. peda'ta*, *Bird's-foot or Blue Violet*. The herb and rhizome, U.S.P. 1820-1870; Europe, N. America. Plant acaulescent; leaves 3-5-divided; flowers bluish; rhizome 25 Mm. (1') long, 18 Mm. ($\frac{3}{4}$ ') thick, bitter, acrid. Used as the preceding.



Viola tricolor.



Vitis vinifera: in fruit.

green, yellow, purple, red; pulp juicy, greenish, sweet, acidulous; seed few, pyriform; grapes contain sugar 12–30 p. c., potassium bitartrate, calcium tartrate, calcium phosphate, potassium sulphate, sodium chloride, tannic acid, malic acid, albumin, pectin, etc.; argol—potassium bitartrate, tartaric acid. 1. Vinum Album, White Wine. Obtained by fermenting for several weeks the juice of fresh grapes freed from seeds, stems, skins; contains 7–12 (8.5–15 vol.) p. c. of alcohol, and includes Sherry, Lisbon, Teneriffe, Madeira, Rhenish, Hock, Moselle, French, California, etc. 2. Vinum Rubrum, Red Wine. Obtained by fermenting juice of fresh grapes in the presence of their skins; contains 7–12 (8.5–15 vol.) p. c. of alcohol, and includes Claret, Port, Burgundy, etc. Stimulant, depressant, astringent, tonic, diaphoretic; fevers, general debility, irritable stomach, ulceration, gangrene, tetanus, old age.

Vouacapoua araroba ARAROA. GOA POWDER, Br.

Chrysarobinum. Chrysarobin, $C_{30}H_{26}O_7$, U.S.P.

Vouacapoua Araroba, { A mixture of neutral principles obtained from
(*Aguiar*) Druce. } Goa Powder, a substance deposited in the
wood (of this plant).

Habitat. Brazil, Bahia; in damp forests.

Syn. Araroba or Arariba Tree, Po(h)de Bahia, Crude Chrysarobin; Chrysarob.; Fr. Poudre de Goa, Chrysarobine; Ger. Goa Pulvre, Chrysarobin.

Vou-a-ca-pou'a. L. fr. native C. American name (nomen caribæum), *voicapou*.

Ar-a-ro'ba. L. fr. E. India name, *ar(ar)oba*, as applied to the bark.

Chry-sar-o-binum. L. for *Chry-sar'o-bin*, fr. Gr. χρῶς, gold, + *ar(ar)oba*.

Go'a. After Portuguese colony of Goa, on the Malabar coast of India, to which it was imported from Bahia, in Brazil, 1852.

PLANT.—Large tree 24–30 M. (80–100°) high; trunk smooth, spheroidal, head not very bushy; leaves paripinnate, with long petioles; flowers purple, paniculate racemes; wood yellow, with numerous

longitudinal canals and many irregular transverse interspaces or lacunæ in which the Goa Powder is found—a result of decay or chemical changes in the cell-walls of the trunk-wood (medullary rays), being possibly an antiseptic preservative of the plant; yields much chryso-phanic acid by oxidation.

Commercial.—Tree resembles the copaiba, and is called natively *Angelim Amargoso*; the oldest yield most powder, which is obtained by felling, splitting the tree, and then scraping the powder from the clefts, those doing this often suffering with irritated eyes and face; occurs as a light yellow powder when fresh, but brownish on exposure, slightly crystalline, rough, mixed with wood fibers, inodorous, bitter; 7 p. c. soluble in water, 80 p. c. in benzene, 50 p. c. in hot chloroform.

CONSTITUENTS.—GOA POWDER: Chrysarobin 65–85 p. c., gum 7 p. c., resin 2 p. c., bitter extractive 7 p. c., woody fiber 5 p. c., ash 3–3 p. c.

Chrysarobinum. **Chrysarobin.**—Obtained by treating Goa Powder with hot benzene (hot chloroform), evaporating to dryness, powdering. It is a brownish, orange-yellow, microcrystalline powder, tasteless, odorless, irritating mucous membrane, soluble in alcohol (385), chloroform (13), ether (160), benzene (30), carbon disulphide (180), solutions of fixed alkali hydroxides (red), slightly in water and boiling water—neutral; contains methyl chrysarobin in varying percentage, and is a reduced quinone. *Tests:* 1. Dissolve in sulphuric acid—deep red solution, which poured into water deposits chrysarobin unchanged. 2. Incinerate—ash .25 p. c.; shake 1 Gm. with potassium hydroxide T. S. (10)—yellow, yellowish-red, deep red, due to absorbing oxygen from the air, producing chrysophanic acid— $C_{30}H_{26}O_7 + O_4 = 2C_{15}H_{10}O_4 + 3H_2O$, or inversely— $2C_{15}H_{10}O_4 + H_8 = C_{30}H_{26}O_7 + H_2O$. 3. Mix .002 Gm. with 2 drops of fuming nitric acid—red mixture, turning violet-red with a few drops of ammonia T. S. (dif. from chrysophanic acid—yellow liquid). Should be kept dark, in well-closed containers. Dose, gr. $\frac{1}{8}$ (.008 Gm.).

PREPARATION.—1. *Unguentum Chrysarobini.* Chrysarobin Ointment. (Syn., Ung. Chrysarob.; Fr. Pommade de Chrysarobine; Ger. Chrysarobinsalbe.)

Manufacture: 6 p. c. Triturate chrysarobin 6 Gm. with hydrous wool fat 94 Gm. previously melted, heat on water-bath for 20 minutes, stirring occasionally, strain (thereby removing about 1 p. c.), stir until congealed.

PROPERTIES.—Irritant, in doses of gr. 20 (1.3 Gm.) gastro-intestinal irritant, causing large watery, bilious stools, vomiting, nausea. Externally—produces diffuse dermatitis, followed by follicular and furuncular inflammation; stains skin dark brown, removed by chlorinated lime.

USES.—Parasitic skin diseases of vegetable origin, ringworm, acne, favus, psoriasis, chronic eczema, hemorrhoids—ointment; solution in water, vinegar, or chloroform—allowed to dry then cover with colloidion; suppositories, 1 gr. (.06 Gm.)—hemorrhoids.

Allied Compounds:

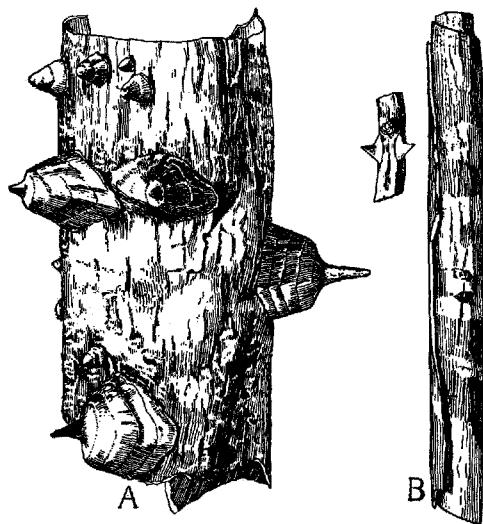
1. *Anthrarobin (Desoxyalizarin)*, $C_{14}H_{10}O_3$.—Obtained from the coal-tar product alizarin by action of nascent hydrogen; it is a strong deoxidizing agent, miscible with fats, weaker, less irritating and toxic than chrysarobin, soluble in alcohol, glycerin.

2. *Hydroxylamine Hydrochloride*, NH_2OHHCl .—This does not stain the skin, hence is preferred often to the other reducing agents (chrysarobin, pyrogallol, anthrarobin, etc.) in skin diseases, but being a poison, care should be exercised not to allow too much to be absorbed by the system.

Xanthium *Xanthium Strumarium*, *Broad Cocklebur*; N. America. Achenes 2.5 Cm. (1') long, flat, oblong, without pappus, enclosed in the involucre, which is densely beset with hooked prickles. *X. spinosum*, *Spiny* or *Thorny Clotbur*; N. America, S. Europe; leaves with spines at base 2.5 Cm. (1') long; fertile axillary burs (achenes) crowned with 1 inconspicuous beak. *X. canadense*, and its var. *echinatum*; achenes, with 2 stout beaks, hooked, 2.5 Cm. (1') long, densely prickly, hispid; river banks, waste places; var. *echinatum*, smaller plant—possibly unworthy of variety distinction.

Xanthorrhiza

Xanthorrhiza apiifolia, *Shrub Yellow-Root*.—The rhizome and roots, U.S.P. 1820–1870; S. and C. United States. Shrub .6–1 M. (2–3°) high, stem clustered, 6 Mm. ($\frac{1}{4}$ ') thick, wood yellow, leaves compound, flowers April, purple, racemes, rhizome .6–1 M. (2–3°) long, 12 Mm. ($\frac{1}{2}$ ') thick, yellowish internally and externally, bitter; contains berberine, resin, starch, gum, etc. Used as a tonic like calumba or quassia; in infusion, decoction, tincture. Dose, \mathfrak{z} ss–1 (2–4 Gm.).



Xanthoxylum

Xanthoxylum bark: A, Southern; B, Northern ($\frac{1}{3}$ Nat.).

Xanthoxylum americana and *Z. Clava-Herculis*. 1. *Xanthoxylum*, *Prickly Ash Bark*, N.F.—The dried bark with not more than 2 p. c. of foreign organic matter; 2. *Xanthoxyli Fructus*, *Prickly Ash*

Berry, N.F. The dried fully grown fruit with not more than 2 p. c. of foreign organic matter; N. America; *Z. americanum*, Canada to Virginia—*Northern*; *Z. Clava-Herculis*, Virginia to Florida—*Southern*. *Z. americanum*, shrub 2–4 M. (6–12°) high, covered with sharp, scattered prickles; leaves imparipinnate, leaflets 4–5 pairs; flowers before the leaves, yellowish-green, corolla absent. Bark, transversely curved fragments, quills, 2–15 Cm. ($\frac{1}{2}$ –6') long, bark .5–2 Mm. ($\frac{1}{10}$ – $\frac{1}{2}$ ') thick, light gray, with foliaceous lichens, wrinkled, whitish lenticels, few straight, 2-edged spines linear at base, 5 Mm. ($\frac{1}{5}$ ') high, numerous shining crystals, fracture short, uneven, odor slight; taste bitter, acrid, pungent. Powder, light grayish-brown—parenchyma with starch grains, oily globules, calcium oxalate prisms; Northern—only a few non-lignified bast-fibers, stone cells and cork cell fragments; *Z. Clava-Herculis*, small tree, 6–12 M. (20–40°) high, .3–.6 M. (1–2°) thick, with prickles protruding through large corky cones, larger prickles on branches and petioles; leaflets 3–8 pairs, crenate; flowers after leaves appear, corolla present. Bark, transversely curved, irregular, oblong, flattened pieces, quills 2–40 Cm. ($\frac{1}{2}$ –16') long, bark 1–4 Mm. ($\frac{1}{15}$ – $\frac{1}{8}$ ') thick, light gray, with numerous large barnacle-shaped projections of cork, .5–3.5 Cm. ($\frac{1}{2}$ –1 $\frac{1}{2}$ ') thick, often 2 Cm. ($\frac{1}{2}$ ') high, lenticels, foliaceous lichens, obscurely striate, without crystals; odor and taste as in preceding. Fruit, capsules with short stalks (*Z. americanum*) or without stalks (*Z. Clava-Herculis*), ellipsoidal, fleshy, gray-brown, dehiscent; seeds 1–2, oblong, black; odor faintly aromatic, citral-like; taste of two species quite different, but both pungent, warm, aromatic, tingling sensation on chewing. Powder, dark brown—pericarp tissue with oil cavities, parenchyma cells with spherocrystals of hesperidin, numerous globules of volatile oil; solvents: alcohol, boiling water; contain (root and fruit) resins (2), alkaloid (bitter—berberine (?)), xanthoxylum (tasteless, inert, crystalline), volatile oil (acrid, green), tannin, sugar, fat, gum, ash 12 p. c. Alterative, stimulant, sialagogue, diaphoretic, diuretic—causes salivation, tingling in tongue, increased cardiac action and arterial tension, also secretion from stomach, intestines, liver, and pancreas; resembles mezereum, guaiac, sanguinaria and stillingia in action; chronic rheumatism, myalgia, lumbago, dropsies, atonic dyspepsia, diarrhea, syphilis, pharyngitis—masticatory for toothache, paralysis of tongue; externally: counter-irritant in female pelvic diseases. Dose, gr. 15–30 (1–2 Gm.); Root: 1. *Fluidextractum Xanthoxyli* (75 p. c. alcohol), dose, \mathfrak{m} xv–30 (1–2 cc.); Preps.: 1. *Elixir Corydalis Compositum*, 3 p. c.; 2. *Elixir Hydrastis Compositum*, 1.75 p. c. Decoction, 5 p. c., \mathfrak{z} ss–2 (15–60 cc.), Extract, gr. 3–10 (.2–.6 Gm.); Fruit (berry): 1. *Fluidextractum Stillingiae Compositum*, 6.2 p. c.: Prep.: 1. *Syrupus Stillingiae Compositus*. *Z. floridanum*, *Satin Wood*, identical with *Z. caribaeum*; *Z. pterota*, Florida, Texas, Brazil—wood yellow, hard, bark and leaves pungent,

Zingiber officinale,
Roscoe.

The dried rhizome, with outer cortical layers often partially or completely removed, yielding not less than 2 p. c. non-volatile ether-soluble extractive nor 12 p. c. cold water extractive.

Habitat. India, Hindustan (cultivated in W. Indies, Africa).

Syn. Zingib., Jamaica, Black, African or Race Ginger; Fr. Gingembre (gris et blanc); Ger. Rhizoma (Radix) Zingiberis, Ingwer.

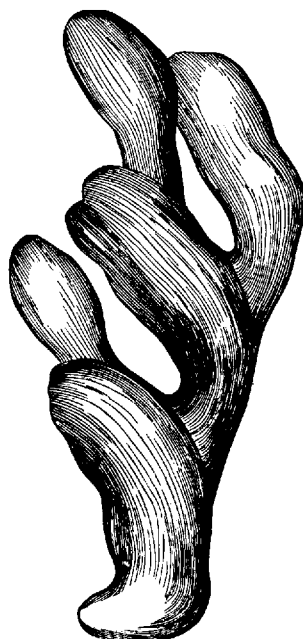
Zin'gi-ber. L. fr. Skt. *gringavera*—*gringa*, horn, + *vera*, body, horn-shaped—*i. e.*, shape of roots; Ar., Pers. *zanjabul zenjebil*; Eng. *ginger*.

Of-fi-ci-na'le. L. *officina*, workshop; *opus*, work, + *facere*, to do—*i. e.*, used in the shop or store.

PLANT.—Perennial herb; stem barren, leafy, 1–1.3 M. (3–4°) high, entirely covered with the leaf-sheaths, solid; round: leaves 15–30 Cm. (6–12') long, 2.5–4 Cm. (1–1½') wide; flowering stalk from stem 15–30 Cm. (6–12') long, terminating in a spike; flowers dingy yellow, 2–3 at a time. **RHIZOME:** *Jamaica*, horizontal, cork wholly removed, laterally compressed, irregularly branched, 4–16 Cm. (1½–6½') long, 4–20 Mm. (¼–½') thick, light brown, longitudinally striate, ends of branches with depressed stem-scars; fracture short-fibrous; starchy, resinous; internally yellowish, light brown; odor agreeably aromatic; taste aromatic, pungent; *Cochin*, most of corky layer removed on flattened sides, light brown, grayish-yellow; fracture shorter, less fibrous more starchy than other varieties; internally yellowish-white, oil and resin cells, yellowish,



Zingiber: A, entire plant (½ nat. size); B, flower; C, labellum; D, transverse section of ovary.



Jamaica ginger; uncoated.

brownish-red; odor aromatic; taste pungent; *African*, cork partly removed on flattened sides, areas without cork smooth, light brown, portions with cork longitudinally or reticulately wrinkled and grayish-brown; fracture short-fibrous; internally light yellow, brown; odor strongly aromatic; taste aromatic, strongly pungent, otherwise resembling Jamaica. **POWDER**, light yellow (Jamaica), light brown (Cochin), light brown, (African)—numerous starch grains .005–.04 Mm. (5000–5250') broad, nearly spherical, ovoid, elliptical, pyriform, hilum excentric near smaller end, fibers long, non-lignified, oblique pores, occasional cells with brownish resin-like contents; tracheæ; yellowish, brownish cork cells, thin-walled, occasional in Jamaica, fairly numerous in Cochin and African. *Solvents:* alcohol; acetone; ether; boiling water partially. Dose, gr. 5–20 (.3–1.3 Gm.).

ADULTERATIONS.—**RHIZOME:** Fibrous, light, friable, worm-eaten pieces (all discarded); **POWDER:** Rice starch, flour, curcuma, brick-dust, chalk, capsicum, mustard (detected by microscope, iodine T. S., ash), "spent ginger"—that partially or wholly exhausted.

Commercial.—Plant reed-like, is propagated by rhizome segments, thrives best on new forest soil, and yields when one or more years old (the younger the better) very acceptable rhizomes, which are dug after the stems have withered, Jan.–Feb., cleaned carefully to avoid bruising, hence discoloration, washed in boiling water to hydrate starch and prevent germination, and then rapidly dried, constituting as such *black, coated, unpeeled, unscraped ginger*, in contradistinction to the further prepared *white, uncoated, peeled, scraped, race, hand ginger*—the former, owing to most oil and resin residing in the periderm, being richer and stronger. May bleach artificially by sulphur fumes (SO₂), chlorinated lime (Cl), milk of lime, or gypsum. There are several varieties, three being given pharmacopoeial prominence: 1, *Jamaica*, sometimes steeped in milk of lime, and covered with calcium carbonate, thereby preventing insect attack; least pungent, most delicate and handsome; reaches us via England, or direct from W. Indies; 2, *Cochin (Chinese)*, resembles somewhat the Jamaica, but seldom enters our market commercially; 3, *African*, generally recognized as possessing greater pungency but less acceptable aroma than the preceding, with shorter rhizome and broadly linear or oblong lobes; yields 8–10 p. c. of oleoresin; 4, *Calcutta (E. India)*, resembles closely the African; reaches us via Calcutta; yields 8 p. c. of oleoresin; 5, *Calicut (E. India)*, resembles closely the African; reaches us from Calicut; yields 8 p. c. of oleoresin; 6, *Japanese*, resembles closely the Cochin, and seldom becomes a commercial article with us. The *green* (lobed branches recently dug and marketed without drying), and *preserved* (fresh rhi-



Calcutta ginger; coated.

zome steeped in hot syrup, becoming soft, brownish, translucent, efflorescent) are popular trade forms.

CONSTITUENTS.—Volatile oil 1–3 p. c., Gingerol .5–1.5 p. c., Resin (2), starch 20 p. c., mucilage, ash 4–8 p. c.

Volatile Oil.—Mostly phellandrene, $C_{15}H_{24}$, and *d*-camphene $C_{10}H_{16}$; thickish, greenish-yellow; sp. gr. 0.885; gives aromatic odor and flavor, but not the pungency.

Gingerol.—Not a glucoside, but a straw-colored, viscid, inodorous, non-volatile, pungent liquid, imparting the hot taste; soluble in fat, benzene, carbon disulphide, volatile oils, alcohol, ether.

PREPARATIONS.—*Fluidextractum Zingiberis*. Fluidextract of Ginger. (Syn., Fldext. Zingib., Fluid Extract of Ginger; Fr. Extrait fluide de Gingembre; Ger. Ingwerfluidextrakt.)

Manufacture: Similar to Fluidextractum Sarsaparillæ, page 126; menstruum: alcohol. Dose, $\mathfrak{m}\nu$ –20 (.3–1.3 cc.).

Preps.: 1. *Syrupus Zingiberis*. Syrup of Ginger. (Syn., Syr. Zingib.; Fr. Sirop de Gingembre; Ger. Ingwersirup.)

Manufacture: 3 p. c. Mix fluidextract of ginger 3 cc. and alcohol 2, triturate liquid with magnesium carbonate 1 Gm., sucrose 6, gradually add, constantly triturating, water 43 cc., filter, dissolve in clear filtrate, gently heating, sucrose 76 Gm., strain syrup (hot), when cold add through strainer water q. s. 100 cc. Dose, $\mathfrak{z}\text{ss}$ –2 (2–8 cc.).

2. *Elixir Hydrastis Compositum*, *N. F.*, 875 p. c.

2. *Tinctura Zingiberis*. Tincture of Ginger. (Syn., Tr. Zingib., Tincture of Jamaica Ginger; Fr. Teinture de Gingembre; Ger. Ingwertinktur.)

Manufacture: 20 p. c. Similar to Tinctura Veratri Viridis, page 104; menstruum: 85 p. c. alcohol. *Impurities*: Capsicum, similar pungent substitutes. Dose, $\mathfrak{m}\text{xx}$ –60 (1.3–4 cc.).

Prep.: 1. *Acidum Sulphuricum Aromaticum*, 5 p. c.

3. *Pulvis Rhei Compositus*, 10 p. c. 4. *Pulvis Aromaticus*, *N. F.*, 35 p. c. 5. *Pulvis Aromaticus Rubefaciens*, *N. F.*, 20 p. c. 6. *Pulvis Myricæ Compositus*, *N. F.*, 30 p. c. 7. *Tinctura Antiperiodica*, *N. F.*, $\frac{1}{8}$ p. c. 8. *Tinctura Aromatica*, *N. F.*, 4 p. c.

Unoff. Preps.: *Infusion*, 5 p. c., $\mathfrak{z}\text{j}$ –2 (30–60 cc.). *Oleoresin* (ether)—yield 5–10 p. c., $\mathfrak{m}\text{ss}$ –2 (.03–.13 cc.).



Ginger starch granules: magnified 250 diam.

PROPERTIES.—Like other aromatics, carminative, stimulant, sternutatory, rubefacient, anodyne, sialagogue. This was introduced from Asia, through Arabia into Greece and Europe. The Arabian and Greek physicians used it as a condiment, carminative, stimulant, aphrodisiac.

USES.—Atonic dyspepsia, flatulent colic, atonic gout, diarrhea, cholera, chronic bronchitis, alcoholic gastritis, corrective to nauseous medicines. Externally—colic, rheumatism, neuralgia, toothache, headache; in cataplasms,

fomentations. The infusion for relaxed uvula, masticated for paralysis of tongue. *Zingiber Zerum'bet*, Java (rhizome fleshy, spongy, ginger odor and taste), and *Z. Cassumu'nar*, India (root 5 Cm. (2") long, fleshy radicles, white tubers, scaly, brown; odor and taste camphoraceous)—both used in their respective countries. *Z. Mio'ga*, cultivated in China, Japan—bergamot taste, slightly pungent.