

long, 5-13 Mm. ($\frac{1}{2}$ - $\frac{3}{4}$ ') broad, entire, slightly revolute, apex obtuse, rounded, base cuneate, tapering into short, stout petiole; dark green, glaucous, shiny, finely reticulate; under surface yellowish-green, slightly pubescent, especially on midrib, coriaceous; fracture short; odor aromatic, tea-like; taste astringent, somewhat bitter. POWDER, olive-green—irregular fragments, epidermal cells polygonal, elliptical stomata surrounded by 5-18 neighboring cells, mesophyll with chloroplastids, irregular masses of carbohydrates, fibro-vascular bundles, spiral tracheæ, sclerenchymatous fibers, crystal-fibers, cells with yellowish-brown content, bluish-black with ferric chloride T. S.



Arctostaphylos Uva-ursi.

uliginosum, *Bog Whortleberry*, *Great Bilberry*—leaves crenate, much thinner, under surface pubescent; *Den'drionum (Leiophyllum) buxifolium*, *Sand Myrtle*, N. J., southward; small shrub, leaves oval, shining, margin revolute, reticulate; *Buxus semper-virens*, *Box*, *Bush-tree Dudgeon*, cultivated in gardens, leaves ovate, narrower toward apex than near the base; contain buxine and parabuxine (both giving bitterness), tannin, volatile oil, bitter extractive; *Epigæa repens*, *Trailing Arbutus (Mayflower)*, *Ground Laurel*, *Gravel Plant*, and *Chimaphila umbellata*, *Pipsissewa*; leaves resemble and both contain the three active constituents of uva ursi; used in lithic acid gravel. Dose, gr. 15-60 (1-4 Gm.).

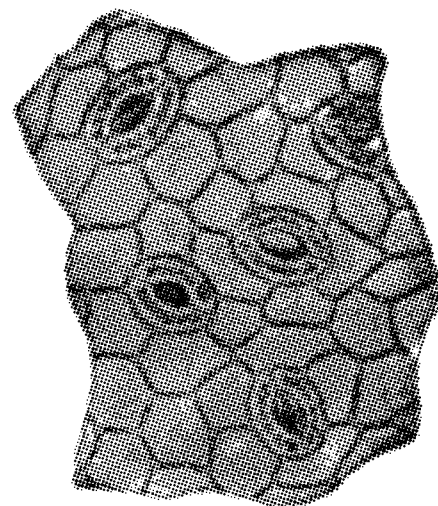
CONSTITUENTS.—Arbutin, $C_{12}H_{16}O_7$, Ericolin, $C_{34}H_{56}O_{22}$, Urson, $C_{10}H_{16}O$, Tannin 6-7 p. c., ericinol, $C_{10}H_{16}O$, gallic acid, ellagic acid, coloring matter, ash 3 p. c.

Arbutin.—A glucoside obtained by precipitating the decoction with lead subacetate, treating filtrate with hydrogen sulphide, and evaporating to crystallize. It is in needles, bitter, soluble in alcohol or hot water, insoluble in ether, blue with diluted ferric chloride; with sulphuric acid yields glucose, arctuin (hydroquinone), $C_6H_6O_2$, and methyl-hydroquinone, $C_7H_8O_2$. Dose, gr. 3-5 (.2-.3 Gm.).

Tests: 1. Cover over .1 Gm. (powder) on watch-crystal with another watch-crystal, heat gently—crystalline sublimate (hydroquinone) forms in long rods, feather-like aggregates, polarizing light with brilliant colors. 2. Macerate 1 Gm. with boiling water 10 cc., shake occasionally until cold, filtrate with a few drops of ferrous sulphate T. S.—grayish-purple precipitate; collect in autumn. **Solvents:** diluted alcohol; boiling water. Dose, gr. 15-60 (1-4 Gm.).

ADULTERATIONS. — *Vaccinium Vit'is-Idæ'a*, *Wineberry*, *Cowberry*, *Red Whortleberry*—leaves resemble uva ursi, but blackish, bristly points on under surface, and *V.*

Ericolin.—This is left in the mother-liquor from arbutin; it is a bitter glucoside, yellow, soluble in water, alcohol; yields glucose and ericinol (volatile oil).



Arctostaphylos Uva-ursi. Section of leaf epidermis (lower surface) showing large stomata.

Urson.—Crystalline principle, resinous, obtained by exhausting with ether, evaporating, recrystallizing from alcohol; occurs in tasteless needles, insoluble in water, sparingly in alcohol, ether.

PREPARATIONS.—1. *Fluidextractum Uvæ Ursi.* Fluidextract of Uva Ursi. (Syn., *Fldext. Uvæ Ursi*, Fluid Extract of Uvæ Ursi; Fr. *Extrait fluide de Busserole*; Ger. *Bärentraubenblätterfluidextrakt.*)

Manufacture: Similar to Fluidextractum Ergotæ, page 63; 1st menstruum: water 50 cc., alcohol 30, glycerin 10; 2d menstruum: 33 p. c. alcohol; reserve first 80 cc. Dose, $\mathfrak{m}\text{xv}$ -60 (1-4 cc.).

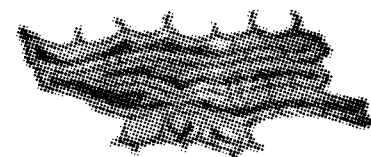
Unoff. Preps.: *Decoction*, dose, $\mathfrak{z}\text{j}$ -2 (30-60 cc.). *Extractum Uvæ Ursi* (alcohol 30 p. c.), dose, gr. 5-15 (.3-1 Gm.). *Infusum Uvæ Ursi* (Br.), 5 p. c., dose, $\mathfrak{z}\text{ss}$ -2 (15-60 cc.).

PROPERTIES.—Astringent, diuretic, nephritic, tonic, disinfectant (due to the hydroquinone formed); large doses vomit, purge, oxytocic.

USES.—Cystitis, gravel, chronic nephritis, urethritis, incontinence of urine, dysuria, strangury, uterine hemorrhage, gleet, leucorrhea, menorrhagia, urinary calculi, bronchitis, diarrhea, cardiac dropsy.

Allied Plants:

1. *Arctostaphylos glaucæ*, *Manzanita*.—California mountains, small tree; leaves 5 Cm. (2') long; contains arbutin, tannin 10 p. c., ash 6 p. c. *A. polifolia* and *A. mucrocifera*, Mexico; both used like uva ursi.



Arctostaphylos Uva-ursi. Bast-fibers and parenchyma from part of leaf without chlorophyll, containing a single crystal.

Areca catechu

Ar'eca Cat'echu, Areca Nut.—East Indies; cultivated. Large palm tree 15–18 M. (50–60°) high, fruit orange-color, size of hen's egg, contains 1 seed (nut), roundish, conical, 25 Mm. (1') long, 9 Mm. ($\frac{3}{8}$ ') thick, brown, with many reddish veins, inside horny, white, odor faint, taste astringent; contains fat 14 p. c., tannin, resin, arecoline, $C_8H_{13}O_2N$ (poisonous, tæniifuge), arecaine, guvacine; astringent, tæniifuge. Dose, $\zeta ij-3$ (8–12 Gm.).



Areca Catechu.

Argemone

Argemo'ne mexicana, Prickly Poppy.—Capsules and leaves contain berberine, protopine (macleyine, fumarine), but no morphine; seed have a bland, light yellow fixed oil 36 p. c.; substitute for castor oil. Dose, $\mathfrak{m}xv-45$ (1–3 cc.).

Arisaema

Arisæ'ma (A'rum) triphyllum, Indian Turnip.—The cormus, U. S. P. 1820–1860; N. America. Plant acaulescent, leaves 2, 3-divided, 5–17.5 Cm. (2–7') long, 2.5–7.5 Cm. (1–3') wide. Corm 2.5–5 Cm. (1–2') broad, brownish-gray, inside white, mealy, taste burning, acrid: contains volatile acrid principle, starch, fat, gum, resin, calcium oxalate (gives acidity). Stimulant, expectorant, diaphoretic; irritant; colic, flatulence, asthma, whooping cough, chronic catarrh, rheumatism, bronchitis, aphthous sores, ringworm; in honey, syrup, ointment. Dose, gr. 5–15 (.3–1 Gm.).

Aristolochia serpentaria

SERPENTARIA. SERPENTARIA, U.S.P.

Aristolochia { *Serpentaria,*
Linne,
reticulata,
Nuttall. } The dried rhizome and roots, with not more than 10 p. c. over-ground stems nor 2 p. c. other foreign organic matter, yielding not more than 10 p. c. acid-insoluble ash.

Habitat. United States, in hilly woods: 1. W. Pennsylvania, Virginia, Ohio, Indiana, Kentucky. 2. S. W. States, Louisiana to Texas.

Syn. Serpent., Virginia Snakeroot, Texas Snakeroot, Snakeroot (-weed), Serpentry, Sangrel, Snagrel, Sangree Root, Pelican Flower, Birthwort, Thick Birthwort; Br. *Serpentariae Rhizoma (radix)*, Serpentry Rhizome; Fr. Couleuvre de Virginie, Serpentaire (Vipérine) de Virginie; Ger. Virginische Schlangenwurzel.

Ar-is-to-lo'chi-a. L. see etymology, page 174, of Aristolochiaceæ.

Ser-pen-ta'ri-a. L. *serpen(t)s*, serpent—*i. e.*, having power of rendering harmless serpent bites.

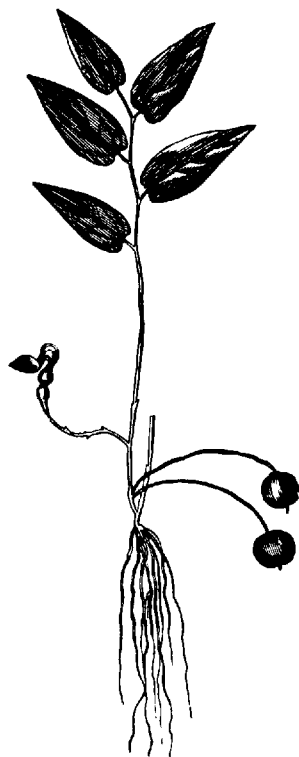
Re-tic-u-la'ta. L. *reticulatus*, fr. *rete*, a net—*i. e.*, leaves strongly netted.

Virginia Snakeroot. Root from Virginia, once thought a valuable antidote for snake bites.

PLANTS.—Perennial herbs; stems sometimes several, slender, erect, zigzag, jointed .3 M. (1°) high, purple below; leaves cordate, ovate, 5–7.5 Cm. (2–3') long, pale green, entire; flowers June–July, few, purple, due to the calyx, which is tubular, inflated at both ends and bent like letter S; corolla absent; leaves (*A. Serpentina*)—petiolate, pointed, thin, pubescent; leaves (*A. reticulata*)—sessile, obtuse, thickish, reticulate, hairy. **RHIZOME**, oblique, subcylindrical, more or less curved, 10–30 Mm. ($\frac{2}{3}$ –1 $\frac{1}{2}$ ') long, 1–2 Mm. ($\frac{1}{2}$ – $\frac{1}{2}$ ') thick, dark brown, upper portion with short stem-bases, lower and lateral portions with many long, thin, nearly straight, yellowish-brown roots having 4–6-rayed stele (stem 6–10 fibro-vascular bundles); fracture short; internally yellowish-white, wood with broad, eccentric wedges; odor camphoraceous, terebinthinate; taste bitter, aromatic. **POWDER**, grayish-brown—numerous starch grains, .003–.018 Mm. ($\frac{1}{300}$ – $\frac{1}{1885}$ ') broad, tracheæ, wood-fibers, medullary ray cells, pith cells, occasionally few non-glandular hairs of the stem. **Solvents:** alcohol; diluted alcohol; boiling water. Dose, gr. 5–30 (.3–2 Gm.).

ADULTERATIONS.—Rhizomes of: 1, *Spigelia marylandica*—only slightly aromatic and bitter, no projecting stem-remnants, but indistinct, medullary rays in the wood; 2, *Hydrastis canadensis*—yellow interior, odorless, oblique growth; 3, *Aristolochia Serpentina* var. *hastata*, S. Carolina, La.—Leaves auriculate, stems smaller, more simple and slender; 4, *Cypripedium hirsutum (pubescens)* and *C. parviflorum*—scars circular, roots coarse; 5, *Polemonium reptans*—resemble serpentaria, but nearly white; 6, Roots of *Panax quinquefolium*, *Ginseng*.

Commercial.—Plants grow in rich shady woods from which the rhizomes are taken and dried, sometimes having been washed; enters market in bags, casks, more commonly bales of 100 pounds (45 Kg.), often mixed with leaves, stems and adhering earth. There are two varieties: 1, *Virginia Snakeroot (A. Serpentina)*, exterminated practically from many former sections, and now largely from mountainous districts, south of Pennsylvania and the Ohio River, being brought eastward chiefly by the routes of Wheeling and Pittsburgh; 2, *Texas Snakeroot (Red River—A. reticulata)*, rhizome usually larger, roots fewer, thicker, less interlaced than preceding.



Aristolochia Serpentaria.

CONSTITUENTS.—Volatile oil .5–1 p. c., Aristolochine, Aristolochin (clematitin, bitter principle), Serpentarin (bitter principle, poisonous), resin 5 p. c., aristinic acid (resinous), tannin, starch, sugar, mucilage, albumin, ash 11 p. c.

Volatile Oil.—Obtained by distilling with water; contains a terpene (probably pinene), $C_{10}H_{16}$, also borneol ester, $C_{18}H_{28}O$, 60 p. c., and a green or bluish-green fraction.

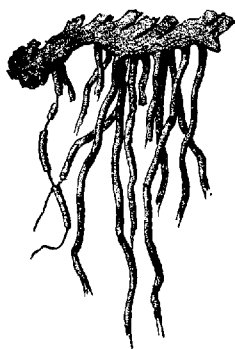
Aristolochine, $C_{32}H_{22}O_{18}N$.—Obtained by precipitating decoction with lead acetate, exhausting precipitate with hot alcohol, evaporating, dissolving bitter principle (alkaloid) by shaking with water; it is yellow, amorphous or in needles; soluble in water, alcohol, ether, precipitated by tannin.

PREPARATIONS.—1. *Tinctura Cinchonæ Composita*, 2 p. c. 2. *Fluidextractum Serpentariæ, N.F.* (80 p. c. alcohol). Dose, $m\bar{v}$ -30 (.3–2 cc.); 3. *Tinctura Serpentariæ, N.F.*, 20 p. c. (67 p. c. alcohol). Dose, $\bar{3}ss$ -2 (2–8 cc.).

Unoff. Prep.: Infusion, 5 p. c., dose, $\bar{3}j$ -2 (30–60 cc.).

PROPERTIES.—Stimulant, tonic, diaphoretic, diuretic, emmenagogue, aphrodisiac, antiperiodic; like calumba promotes appetite, digestion, increases bronchial and intestinal secretions, heart action, mental exhilaration. Large doses are irritant, causing vomiting, vertigo, colic, purging, tenesmus.

USES.—As a stimulating expectorant in typhoid pneumonia, exanthematous diseases, intermittents, dyspepsia, diphtheria. Fluidextract good locally against poison-ivy rash.



Serpentaria: rhizome with roots.



Rhizome: transverse section.

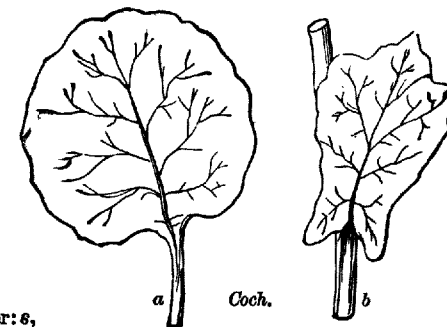
Armoracia rusticana

Rori'pa (Cochlea'ria) Armora'cia, Armoracia Radix, Horseradish Root (Br.—U.S.P. 1820–1850).—The fresh root collected from cultivated plants; E. Europe, naturalized elsewhere. Plant .6–1 M. (2–3°) high, in most places; leaves 20–30 Cm. (8–12') long, 10–12.5 Cm. (4–5') wide, toothed; flowers white; fruit 2-celled pod, each 4–6-seeded; root 30 Cm. (12') long, 12–25 Mm.

($\frac{1}{2}$ –1') thick, conical, yellowish, scaly, warty, inside white, many stone cells, central pith, pungent odor when bruised; taste sharp, acrid; contains volatile oil .05 p. c. (isomeric with mustard oil, C_3H_5CNS), resin. Condiment, rubefacient, stimulant, diuretic; dyspepsia, rheumatism, dropsy, palsy, scurvy, hoarseness, vomiting; in infusion, spirit (*Spiritus Armoraciæ Compositus* (Br.), 12.5 p. c.), cataplasm. Dose, gr. 20–30 (1.3–2 Gm.); spirit, $\bar{3}j$ -2 (4–8 cc.).



Roripa Armoracia: flower: s, calyx; p, corolla; a, stamen; g, fruit carpel; n, stigma.



Roripa Armoracia: leaves; a, radical; b, cauline.

Arnica

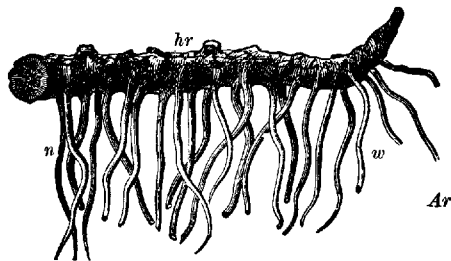
Ar'nica monta'na, Arnica (Flowers), Leopards-bane, N.F.—The dried flower-head with not more than 3 p. c. of foreign organic matter; Europe—Germany, N. Asia, N. America. Perennial herb .3 M. (1°) high, hairy, striate; leaves bright green, pubescent—radical oblong-ovate, entire—cauline lanceolate; rhizome 5 Cm. (2') long, 2–4 Mm. ($\frac{1}{2}$ – $\frac{1}{6}$ ') thick, brown wrinkled under surface with numerous fragile roots; achenes with hairy pappus. Flower-heads, chiefly tubular, ligulate with involucre and receptacle (convex, pitted, short-hairy); ray-flowers yellow, 3-toothed, pistillate; disk-flowers tubular, perfect, reddish-yellow, stamens without tail-like appendage (dist. from *Inula Helenium*—with 2 bristles or long tails at the base); achenes fusiform, striate, glandular-pubescent, surmounted by long pappus of barbellate bristles; odor characteristic, agreeable; taste bitter, acrid. Powder, yellowish-brown—many pollen grains, 3 kinds of non-glandular hairs, 3 kinds of glandular hairs, pappus with multicellular axis and unicellular branches; solvents: diluted alcohol, hot water; contains arnicin (soluble in alcohol, alkalies) 4 p. c., volatile oil .04–.07 p. c., resin, fat, salt, arnidol (phytosterol), ash 6–9 p. c. Stimulant, tonic, carminative, diuretic, irritant, sternutatory, vulnerary—slows the heart, increases arterial tension; large doses (poisonous) emetic, cathartic, causing

abdominal pains, headache, increased pulse and respiration, finally dilated pupils, muscular spasms (rare), cold extremities, infrequent pulse, death—resembling aconite—best antidote: atropine; typhoid condition, brain concussion, intermittents, diarrhea, gout, nephritis, rheumatism, dropsy, chronic catarrh, nervous affections—locally: paralysis, sprains, bruises, abrasions. Dose, gr. 5–20 (.3–1.3 Gm.); 1. *Fluidextractum Arnicae* (67 p. c. alcohol), dose, ℥v–10 (.3–6 cc.). 2. *Tinctura Arnicae*, 20 p. c. (diluted alcohol), dose, ℥xv–45 (1–3 cc.).

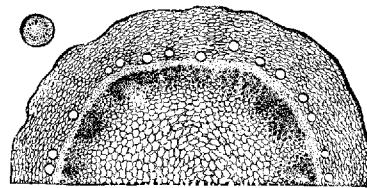


Arnica montana: 1, rhizome and stem; 2, flowering stem; 3, vertical section of disk-flower; 4, ray-floret.

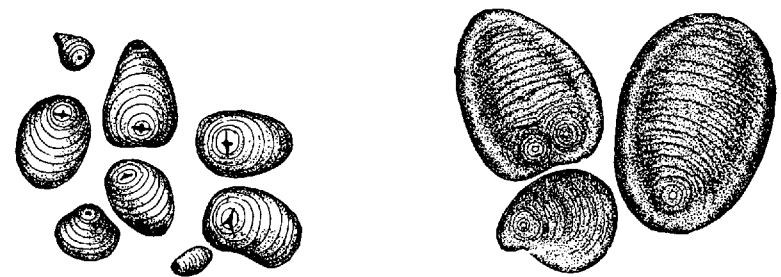
Infusion, 5 p. c., ℥ss–1 (15–30 cc.). Fomentation. Rhizome—Decoction. Extract—Plaster; Fluidextract, Tincture, all having same strength and doses as those from flower-heads. *A. foliosa*, *A. alpina*, and *A. Chamissoensis*, California to Maine, produce closely resembling flower-heads.



Arnica montana: hr, rhizome; n-w, roots.



Arnica: transverse section of rhizome, natural size, and magnified 12 diam.



Maranta starch.

Canna starch.

Arrowroot

Maranta arundinacea, *Arrow-root*.—The fecula of the rhizome, U. S. P. 1820–1870; W. Indies, Bermudas, Brazil. Plant slender, 1–2 M. (3–6°) high, leaves 7.5–12.5 Cm. (3–5') long, lanceolate, flowers white, rhizome perennial, tuberous, fleshy, scaly, 15–30 Cm. (6–12') long. Arrow-root in powder or lumps 4 Mm. ($\frac{1}{8}$ ') thick, white, opaque; under microscope consists of oval granules of fine-lined layers, nucleus at broad end. The rhizome when 1–2 years old is dug, washed, deprived of scales, ground under water, kneaded, strained, and the fecula allowed to subside; fresh rhizome yields starch 13–20 p. c.; root contains starch 27 p. c., fat .2 p. c. Used as demulcent, nutritive food for infants, convalescents, bowel or urinary troubles; in 5 p. c. solution with water or milk by boiling and flavoring with vanilla, lemon juice, etc.; also used in puddings. The jelly is more tenacious than that of all other starches, except Canna.

Canina edulis, *Canna (Tous-les-mois)*.—The fecula of rhizome, U.S.P. 1860–1870; Peru, Brazil. Perennial herb 2.5 M. (8°) high; stem green; leaves parallel-veined, bluish-green; flowers few, in pairs, red; yellow, purple, bract; fruit round capsule, 12 Mm. ($\frac{1}{2}$ ') thick; rhizome creeping, fleshy, thick joints. Canna starch white powder, satiny; under microscope granules largest of all, potato coming next, $\frac{1}{2}$ – $\frac{1}{8}$ Mm. ($\frac{1}{8}$ – $\frac{1}{2}$ ') long, flat, ovate, hilum at narrow end, encircled by many unequally distant rings. Grind rhizome under water, knead, strain, allow to subside. Used as demulcent, nutritive food for urinary and bowel affections, infants, invalids in convalescence.

Artemisia abrotanum

A. Abrotanum, *Southern-wood*, *Old Man*.—Asia, Europe; hairy, segments of the pinnatifid leaves capillaceous, lemon odor. *A. vulgaris*, *Mugwort*, Africa, Europe, spontaneous in United States; stem purple; epilepsy, amenorrhea. *A. gnaphalodes* (*A. Ludoviciana* var. *gnaphalodes*), *Western Mugwort*, Mich. to Oregon; febrifuge. *A. abyssinica*, Abyssinia; has woolly involucre, whitish florets; aromatic odor.

Artemisia absinthium

Artemisia Absin'thium, Absinthium, Wormwood.—The dried leaves and flowering tops with not more than 5 p. c. of foreign matter, U.S.P. 1830–1890; Europe, N. Asia, N. Africa. Perennial herb; stem .6–1 M. (2–3°) high. Leaves, 2.5–7.5 Cm. (1–3') long, hoary, grayish-green; flowers, in heads, racemose, subglobose, with involucre, receptacle convex, hairy; florets yellow; fruit achene, obovoid without pappus; odor aromatic; taste very bitter. Powder, brownish, yellowish-green; solvents: diluted alcohol, water partially; contains volatile oil 1 p. c., absinthin, anabsinthin, tannin, resin, absinthic (succinic) acid, salts, ash 7–10 p. c. Tonic, stomachic, stimulant, febrifuge, anthelmintic; used for atonic dyspepsia, lumbricoid worms; oil in form of *absinthe liqueur* (oil + anise oil + alcohol) as a narcotic, stimulant in cerebral exhaustion, alone locally as an anesthetic for rheumatism, neuralgia. Dose, gr. 15–60 (1–4 Gm.); infusion, 5 p. c., ʒj–2 (30–60 cc.; tincture, 20 p. c. (diluted alcohol), ʒj–2 (4–8 cc.).



Artemisia Absinthium.

Artemisia pauciflora SANTONICA. SANTONICA.

Santoninum. **Santonin,** $C_{15}H_{18}O_8$, U.S.P.

Artemisia pauciflora, { The inner anhydride (lactone) of santoninic acid, obtained from the dried unexpanded flower-heads (santonica).
(Ledebour) Weber.

Habitat. N. Turkestan, Russia, on the vast plains of Kirghiz.

Syn. Levant Wormseed, Aleppo, Alexandria or European Wormseed, Tartarian Southern Wood, Semen Santonici—Cinæ—Sanctum—Contra; Anhydrous Santoninic Acid; Fr. Semen-contra d'Alep, Barbotine; Santonine, Lactone santonique; Ger. Flores Cinæ, Zitwerblüten(samen), Wurmsamen; Santonin.

Ar-te-mis'i-a. L. fr. Gr. 'Apreus, the goddess; Roman Diana, to whom *Artemisia Absinthium* was dedicated, owing to its use in hastening puberty.

Pau-ci-fl'o-ra. L. *paucus*, few, + *florus*, flower—i. e., has few blooms, mostly only buds.

San-ton'i-ca. L. *santonicus*, pertaining to the Santoni, people of Aquitania (Gr. *σατονικόν*, their wormwood), named in commemoration, which name survives to the place Saintes, in France.

PLANT.—Small, semi-shrubby, perennial, with knotty, fibrous rootstocks, branching from crown, from which many erect, flowering stems arise, .3 M. (1°) high; stems 6–8, woolly or glabrous, at first leafy; leaves bipinnatisect, 12 Mm. (½') long, woolly when young, afterward grayish. Flowers, 2–4 Mm. (¼–½') long, 1 Mm. (¼') wide, oblong-ovoid, slightly flattened, obtuse, smooth, glossy, grayish-green, after exposure to light—brownish-green, consisting of an involucre of 12–18 closely imbricated, glandular scales, with broad midribs, enclosing

4–5 rudimentary florets; odor strong, peculiar, camphoraceous; taste aromatic, bitter. **Solvents:** diluted alcohol; hot water partially. Dose, gr. 15–60 (1–4 Gm.).

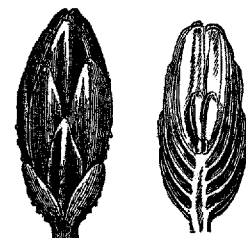
CONSTITUENTS.—Santonin 2.5–3.5 p. c., Volatile oil 2–3 p. c., artemisin, $C_{15}H_{18}O_4$ (in santonin mother-liquor, recrystallizing pure from chloroform), resin, gum, ash 7 p. c.

Santoninum. **Santonin.**—Discovered in 1830, and may be obtained by mixing powdered santonica (5) with slaked lime (1), exhausting with hot water, concentrating filtered solution containing calcium santonate, decomposing with hydrochloric acid, giving calcium chloride in solution, and santonin precipitated along with resinous matter, from which freedom may be obtained by washing with dilute ammonia water, or recrystallizing from hot alcohol. It is in colorless, shining, flattened rhombic prisms, crystalline powder, odorless, nearly tasteless at first, afterward developing bitterness, permanent; yellow on exposure to light, which may be converted into colorless crystals by recrystallization from alcohol, soluble in alcohol (43), boiling alcohol (6.5), chloroform (1.7), ether (110), slightly in water or boiling water; solutions levorotatory, melts at 170° C. (338° F.). **Tests:** 1. Heat .2 Gm. with 2 cc. of alcoholic potassium hydroxide T. S.—red color; incinerate—ash .1 p. c. 2. Shake .01 Gm. with a cooled mixture of sulphuric acid and distilled water, each 1 cc., heat to boiling, add 1 drop of dilute ferric chloride solution (1 in 10)—violet color. **Impurities:** Alkaloids,

readily carbonizable organic substances. Should be kept dark, in well-closed containers. Dose, gr. 1–4 (.06–.26 Gm.); child, gr. ¼–1 (.016–.06 Gm.).

Volatile Oil.—Obtained by distilling with water or steam; yellowish, disagreeable odor; consists mainly of cineol, $C_{10}H_{18}O$, some dipentene, sp. gr. 0.930, when shaken with iodine get greenish crystals.

ADULTERATIONS.—**SANTONICA:** Mustard hulls (large brown fragments recognized by microscope), exhausted birch bark. **SANTONIN:** Salicin, boric acid, strychnine, picric acid. With sulphuric



Santonica: head and longitudinal section, magnified 10 diam.

acid at first colorless (abs. of salicin, which turns red). Boric acid insoluble in chloroform, non-volatile—green color to alcohol flame, and heated upon foil—glassy mass, the solution of which turns turmeric paper brown. Picric acid—explodes by heat or percussion; forms yellow salts and precipitates gelatin in aqueous solution.

Commercial.—The source *Artemisia maritima* var. *pauciflora* is preferred by some writers, although it has escaped far from its original maritime habitat. Flowers exposed to light and air soon become brown and inactive, hence should be preserved in tight containers. There are two varieties: 1, *Aleppo, Alexandria, Levant*, collected July–August, forwarded to the great fair of Nizhnee-Novgorod, and thence to market via Moscow, Leningrad (Petrograd, St. Petersburg), W. Europe; 2, *Barbary (A. Siebe'ri, + A. ramo'sa)*, rarely met here, as it (flowerheads) does not contain santonin.

PREPARATIONS.—1. *Tabellæ Santonini, N.F.*, gr. $\frac{1}{2}$ (.03 Gm.) each—santonin 3 Gm., gluside .06, cocoa 6, sucrose 21, tr. vanill. 1.5 cc.: compress 100 tablets, dose, 1–2 tablets. 2. *Tabellæ Santonini Compositæ, N.F.*, $\frac{1}{2}$ gr. (.03 Gm.) each—santonin 3 Gm., mild mercurous chloride 3, gluside .06, cocoa 6, sucrose 18, tr. vanill. 1.5 cc.: compress 100 tablets, dose, 1–2 tablets. As both tablets suggest candy, physicians should not order more than 3, since 2 gr. (.13 Gm.) has caused the death of a 5-year-old child.

Unoff. Preps.: FLOWER-HEADS: Electuary. Extract. Infusion. SANTONIN: *Trochiscus Santonini* (Br.) 1 gr. (.06 Gm.). *Sodium Santoninas*, U.S.P. 1880, gr. 2–10 (.13–.6 Gm.). *Trochisci Sodii Santoninatis*, U.S.P. 1880, 1 gr. (.06 Gm.), 1–4 troches. *Santoninic Acid*, gr. 1–4 (.06–.26 Gm.).

PROPERTIES.—Anthelmintic, stimulant, emmenagogue. The Crusaders introduced santonica into Europe, and it has been used there ever since, mostly now as santonin. It is absorbed as sodium santoninate, and eliminated by the kidneys; large doses dilate pupils, cause gastric oppression, nausea, vomiting, diarrhea, thirst, cold, clammy skin, giddiness, cerebral congestion, yellow vision (xanthopsia) changing to purplish-red, convulsions, death. Santonin in gr. 5 (.3 Gm.) doses is a strong diuretic, imparting to normal acid urine a saffron color (as does rhubarb), which, by age, hence alkalinity, becomes violet-purple.

USES.—For round worms (*Ascaris lumbricoides*), sometimes for thread-worms (*Oxyuris vermicularis*), but never for tape-worm. Santonin kills the round worms that inhabit the small intestine; therefore, purgatives having specific action here should be selected. Give the powder in honey, molasses, to which calomel or jalap has been added, at bedtime, having fasted that day; follow this next morning, before food, with a draught of senna (infusion) or a dose of castor oil; a suppository is serviceable for thread-worms; may reserve entire cathartic until next morning if desirable. Useful in incontinence of urine, eye affections due to inflammatory changes of optic nerve and retina. Never give to children with fever nor while constipated, owing to possible toxic results, which are combated by ammonia, strychnine, eliminants, artificial respiration. *A. ramo'sa*, *Barbary Wormseed*, N. W. Africa—unexpanded flower-heads rounder than those of *A. pauciflora*, and covered with whitish down, by which they may readily be recognized; *Indian Wormseed*, Europe, are only half the size of santonica, hairy and more yellow; *American Wormseed* (*Chenopodium*), in spite of slight resemblance, are often substituted for santonica.

Asagraea (Cebadilla)

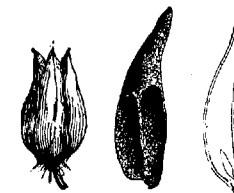
Asagraea officinalis, Sabadilla, Cevadilla; Veratrina, Veratrine, Veratria, N.F.—A mixture of alkaloids obtained from the seed; Mexico. Bulbous perennial herb; bulb ovoid covered with black scales; scape 1.2–1.5 M. (4–5°) high; fruit 3-celled capsule (follicle). Seed 6 Mm. ($\frac{1}{4}$ ') long, dark brown, fusiform; contains veratrine (cevadine, veratridine, cevadilline, sabadine, sabadinine), angelic acid, methylcrotonic acid, cevadic acid, veratric acid, fixed oil, ash 3.5 p. c.

Veratrina. Veratrine, $C_{37}H_{53}O_{11}N$.—This mixture of alkaloids is obtained by exhausting seed with alcohol, evaporating to syrupy consistency, adding water to remove resin, oil, coloring matter, etc., precipitating the filtrate containing veratrine veratrate with ammonia water in excess; or may boil alcoholic extract in acidulated water (HCl or H_2SO_4), decompose with magnesium oxide, take up alkaloids with acidified alcohol, evaporate, filter through animal charcoal, precipitate with ammonia water. Commercial or medicinal veratrine usually consists of veratrine, cevadine (most important, sternutatory, with

potassium hydroxide splitting into methylcrotonic acid and amorphous cevine, $C_{27}H_{43}O_3N$), veratridine, cevadilline (amorphous, insoluble in ether, benzene), sabadine (non-sternutatory, crystallizes from ether in needles and, like the preceding alkaloids, is colored yellow, then red by sulphuric acid), sabadinine (resembles sabadine, but turns red at once with sulphuric acid), and their derivatives. It is a white, grayish-white, amorphous



Asagraea officinalis:
a, fruit-bearing stem; b, root, bulb, and leaves.



Sabadilla: a, fruit, natural size; b, seed and longitudinal section, magnified.

powder, odorless, but causing intense irritation and sneezing; slightly hygroscopic, soluble in water (1760), hot water (1345), alcohol (2.8), chloroform (.7), ether (4.2), insoluble in purified petroleum benzin; alcoholic solution alkaline; with sulphuric acid—yellow, orange-red, greenish fluorescence, intensified by sulphuric acid; alcoholic solution + platinic chloride T. S.—clear (abs. of foreign alkaloids). Sedative, powerful irritant, sternutatory, errhine, great depressant, reduces force and rate of pulse; externally—muscular and articular rheumatism, neuralgia, sciatica, headache, pneumonia. *Poisoning*: same as aconite. Must be cautious in handling it—never use on abraded surface, and should be kept dark, in well-closed containers. Dose, gr. $\frac{1}{32}$ – $\frac{1}{12}$ (.002–.005 Gm.—seldom given internally); 1. *Oleatum Veratrinae*, 2 p. c.; 2. *Unguentum Veratrinae*, 4 p. c.

Asarum

Asarum canadense, *Asarum*, *Canada Snake-root*, *Wild Ginger*, *N.F.* The dried rhizome and roots with not more than 5 p. c. of foreign organic matter, North America. Small plant with dividing stem; leaves 2, reniform; flowers brownish-purple, woolly; fruit capsule, 6-celled. Rhizome 5-17 Cm. (2-7') long, 2-4 Mm. ($\frac{1}{12}$ - $\frac{1}{4}$ ') thick, 2-edged (young), quadrangular (old), finely striate, nodes with irregular scars, internodes with annular scars, purplish-brown, fracture short, whitish, few starchy or resinous roots; odor ginger-like or recalling serpentaria, non-irritating upon heating; taste pungent, bitter. Powder, brownish—starch grains, tracheæ, epidermal tissue, parenchyma and numerous oil cells; contains volatile oil 1.5-3.5 p. c., resin, asarin. Stimulant, carminative, tonic, diaphoretic, diuretic; whooping cough, colic, febrile affections. Dose, gr. 30 (2 Gm.); 1. *Syrupus Asari Compositus*, 6.2 p. c., + fldext. ipecac $\frac{3}{10}$ p. c., potassium carbonate $\frac{1}{4}$ p. c., +, dose, ʒss-1 (2-4 cc.). *Infusion*. *Tincture*.

Asclepias curassavica

Asclepias curassavica, *Bastard Ipecac.*—C. and S. America; has short rootstock abruptly divided into many yellowish rootlets.

Asclepias incarnata

Asclepias incarnata, *Swamp Milkweed.*—The root (rhizome), U.S.P. 1820-1830, 1840-1850, 1870; Canada, United States. Perennial herb, smooth or pubescent, .6-1 M. (2-3°) high, with 2 downy lines above; very leafy; leaves lanceolate, cordate base, 10-17.5 Cm. (4-7') long, 2.5-5 Cm. (1-2') wide; flowers rose-purple, sweet-scented; root 2.5 Cm. (1') long, knotty, oblong, brownish, bark thin, central pith, sweet, then acrid bitter, emits milky juice when wounded; contains volatile oil, 2 acrid resins, asclepiadin. Alterative, emetic, cathartic, diuretic, like *Asclepias tuberosa*; decoction, infusion, tincture. Dose, gr. 15-40 (1-2.6 Gm.).

Asclepias syriaca

Asclepias syriaca, *Common Milkweed*, *Silkweed.*—The root (rhizome), U.S.P. 1820-1850, 1870; United States. Herb 1-1.5 M. (3-5°) high, stout, pubescent, finely soft; leaves oblong, 10-20 Cm. (4-8') long, downy beneath; flowers large, purplish-white, sweet-scented, hoods ovate with a tooth each side of stout, claw-like horn; fruit prickly pods containing much silky seed-down; root 2.5-15 Cm. (1-6') long, 6-12 Mm. ($\frac{1}{4}$ - $\frac{1}{2}$ ') thick, in sections, wrinkled, knotty, brownish; bark tough, thick, with laticiferous vessels, wood-wedges yellow, bitter, nauseous; contains asclepion (tasteless), bitter, crystalline principle, caoutchouc (6 p. c. of milk-juice), resin, tannin, starch. Used like preceding, also to coat over wounds, ulcers, etc., to promote cicatrization. Dose, gr. 15-40 (1-2.6 Gm.). *A. curassavica*, *Bastard Ipecacuanha*, C. and S. America; flowers bright red; the glossy seed-hairs, called vegetable silk, firmer than the preceding; contains asclepiadin; used natively as we do *Asclepias tuberosa*.

Asclepias tuberosa

Asclepias tuberosa, *Asclepias*, *Pleurisy Root*, *N.F.*—Asclepiadaceæ. The dried root with not more than 5 p. c. of foreign organic matter; United States, Canada. Perennial plant with numerous stems .6-1 M. (2-3°) high, hairy, green or reddish, differing from other asclepiades in not emitting milky juice; flowers beautiful orange-red. Root, irregularly fusiform, 10-20 Cm. (4-8') long, .5-5 Cm. ($\frac{1}{2}$ -2') thick, occasionally branched, usually in pieces; orange-brown, annulate above, numerous intersecting grooves; bark thin; fracture tough, granular and white, yellowish wood bundles and medullary rays; odor slight; taste bitterish, disagreeable, acrid. Powder, yellowish-brown—many starch grains, calcium oxalate rosettes, abundant parenchyma cells, many filled with starch grains; stone cells, tracheæ, bordered pores, few fibers; solvent: diluted alcohol; contains asclepiadin—the active glucoside, volatile oil, 2 resins, mucilage, starch, tannin, ash 9 p. c. Diaphoretic, expectorant, carminative, sudorific, anodyne, irritant, large doses emetic, cathartic; pleurisy (hence name), pneumonia, consumption, rheumatism of chest, colic, dyspepsia, asthma, scrofula, ulcers, wounds, Dose, gr. 15-30 (1-2 Gm.); 1. *Fluid-extractum Asclepiadis* (diluted alcohol), dose, ʒss-1 (2-4 cc.).

Aspidium

ASPIDIUM. ASPIDIUM. U.S.P.

Dryopteris Filix-mas, { The rhizome and stipes, yielding not less than
(*Linné*) *Schott.* { 6.5 p. c. oleoresin, nor more than 3 p. c.
acid-insoluble ash.

Habitat. N. America, N. Asia, Europe, N. Africa. (Canada, westward to Rocky Mountains, Mexico, S. America, Andes, Himalaya Mountains, Polynesian Islands).

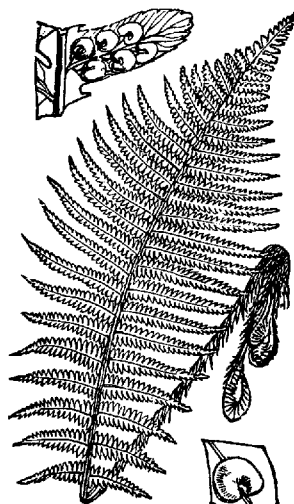
Syn. Male Fern, Male Shield Fern, Bear's Paw Root, Sweet Brake, Knotty Brake, Shield Root; Br. Filix Mas, Radix Filicis maris; Fr. Fougère mâle; Ger. Rhizoma Filicis, Farnwurzel, Wurmfarne, Waldfarne, Johanniskraut.

Dry-op'te-ris. L. fr. Gr. *δρυοπτερίς* - *δρύς*, of the oak, growing among trees, in thickets, + *πτερίς*, a feather, wing or fern—*i. e.*, their favored place of growth.

Fil'ix-mas'. L. *filix*, a fern, fr. Gr. *πτερίς*, a fern, frond, etc., + *mas*, male—*i. e.*, referring to its asexual fructification.

As-pid'i-um. L. fr. Gr. *ασπίδιον*, a little shield—*i. e.*, shape of the indusium.

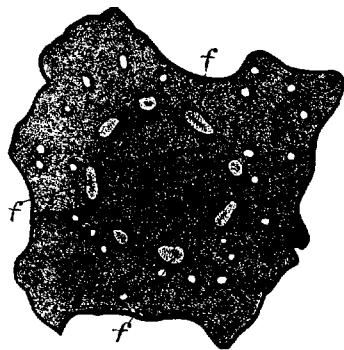
PLANT.—Tall, handsome, perennial fern; frond .3-1 M. (1-3°) high or long, bipinnate, pinnae lanceolate, circular fruit dots situated on the veins, near the midrib, covered by a heart-shaped indusium. RHIZOME, horizontal, 15-30 Cm. (6-12') long, 5-7.5 Cm. (2-3') thick, covered with stipe-bases, "fingers," which remain green several years and often constitute the greater bulk of the official



Dryopteris Filix-mas.

chlorophyll, fixed oil, all occurring in the official oleoresin. Dose, ʒss-2 (2-8 Gm.).

ADULTERATIONS.—Rhizomes of many indigenous ferns (chiefly *Osmunda* species) resembling the official, although such are thinner, free from chaff, and have stipes rarely closely imbricate, but when peeled and mixed practically defy detection; composition and properties are less subject to change in the unpeeled, while adult-



Filix-mas; transverse section magnified 3 diam.; f, fibro-vascular bundles.



Filix-mas; surface of peeled rhizome.

erations are recognized more easily; carelessness often renders the drug unreliable.

Commercial.—The “uncomminuted rhizome” covered with stipes (fingers) should be collected when strongest, autumn, freed from roots and dead portions of rhizome and stipes (only such parts being retained as have green fracture), dried at 70° C. (120° F.), and quickly made into preparations, as it deteriorates rapidly, usually becoming inert in 1-2 years; soil and climate have greater influence upon amount of filicic acid than time of collection, etc.; the richest yield being from plants growing on strata of volcanic origin.

CONSTITUENTS.—Filicic acid 5-10 p. c., Filicin 19-31 p. c. (rohfi-

drug; when peeled (deprived of stipes, roots) the rhizome itself is 7.5-15 Cm. (3-6') long, 1-3 Cm. ($\frac{2}{3}$ -1 $\frac{1}{2}$ ') thick, cylindraceous, nearly straight, or curved, tapering toward one end, usually split longitudinally, roughly scarred with remains of the stipe bases, or bearing several coarse longitudinal ridges and grooves; stipes nearly cylindrical but tapering toward one end, nearly straight or somewhat curved, 3-5 Cm. (1 $\frac{1}{2}$ -2') long, 8 Mm. ($\frac{1}{3}$ ') thick; brownish-black, if peeled—light brown; fracture short, pale green (inner half), spongy, exhibiting an interrupted circle of 6-12 small vascular bundles (steles); odor slight; taste sweetish, astringent, bitter, acrid. **POWDER**, greenish, brownish—must be prepared freshly.

Solvents: alcohol; acetone; ether—extracting filicic acid, filicin, volatile oil, resin,

licin), fixed oil 6-7 p. c., filitannic acid 10 p. c., filix red, chlorophyll, volatile oil, 2 resins, ash 3 p. c. Böhm isolates aspidin (2-3 p. c.), albaspidin, aspidimin, aspidinol, and flavaspidic acid, and claims virtue to be chiefly in aspidin and filicic acid combined; Kraft and Jaquet believe the virtue to reside in filmaron. Dose, gr. 7-10 (.5-.6 Gm.).

Filicic (Filicinic) Acid, C₃₅H₄₂O₁₃.—Most active constituent, white, amorphous or crystalline, tasteless, more soluble than its anhydride, poisonous. Dose, gr. 10-20 (.6-1.3 Gm.).

Filicin (Filicic Anhydride), C₃₅H₄₀O₁₂.—Yellowish-white, non-poisonous, inactive, crystalline, soluble in most solvents except aqueous; yields with fusing potassium hydroxide butyric acid and phloroglucin.

PREPARATIONS.—1. *Oleoresina Aspidii*. Oleoresin of Aspidium. (Syn., Oleores. Aspid., Oleoresin of Male Fern, Oil of Fern; Br. Extractum Filicis Liquidum, Oleum Filicis Maris; Fr. Extrait (oléo résineux) de Fougère mâle; Ger. Extractum Filicis, Farnextrakt, Wurmfarneextrakt, Wurmfarneöl.)

Manufacture: Percolate slowly, in a covered glass percolator, 100 Gm. with ether, added in successive portions, until exhausted, reclaim most of the ether on water-bath, transfer residue to a dish, allow remaining ether to evaporate spontaneously in a warm place; yield 10-15 p. c. (acetone 18 p. c.). It is a dark green, thick liquid containing filicic acid 5-10 p. c., some of which deposits in granular crystals on standing, and must be mixed thoroughly with the liquid portion before dispensing. Should be preserved in well-stoppered bottles. Dose, ʒss-1 (2-4 cc.); more than ʒiss (6 cc.) is dangerous, while death has occurred from ʒvj (24 cc.).

Unoff. Preps.: *Extract*, gr. 15-30 (1-2 Gm.). *Fluidextract*, ʒj-2 (4-8 cc.).

PROPERTIES.—Tæniifuge, tonic, astringent, poisonous.

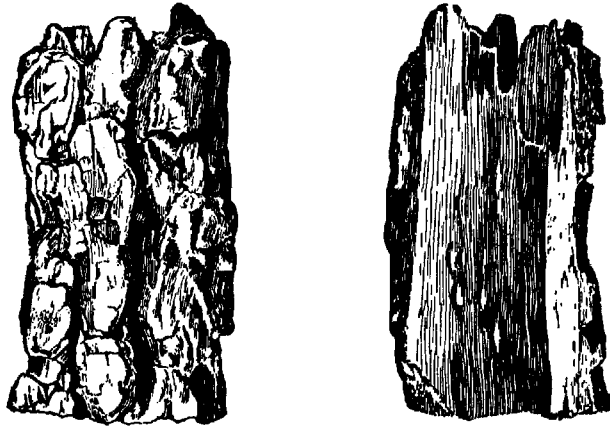
USES.—This was known to the ancients as a vermifuge, being mentioned by Dioscorides, Galen, Pliny, Theophrastus, etc. In 1775 the King of France bought and made public this secret tapeworm remedy from the Swiss surgeon Nouffer's widow. It is next to pelletierine in reliability, and valuable in uncinariasis. In giving it for tapeworm the patient should fast the previous day, being nourished only by a little bread and milk; at night take ʒj (30 cc.) of castor oil, to expel nidus, and on the following morning a full dose of oleoresin, still fasting, and 2 hours later a full dose of Epsom salt; a full dose of calomel, jalap, gamboge, or saline enema may also clear away the dead worm.

Poisoning: Excessive doses may produce gastro-enteritis, abdominal pain, muscular relaxation, vomiting, purging, somnolence, albuminuria, glycosuria, paralysis, temporary blindness, convulsions, collapse, coma, death. Strong coffee, tea, tannin, empty stomach if vomiting has not been free (zinc sulphate, mustard, etc.), cardiac and respiratory stimulants—brandy, whisky, aromatic spirit of ammonia, strychnine, atropine, digitalis, morphine, artificial heat—avoid castor oil.

Allied Plants:

1. *Dryopteris marginalis*.—Canada, United States, Rhizome, U.S.P. 1880-1910, similar to that of *D. Filix-mas*, except it has 6 steles instead

of 10–20, and the round fruit dots are nearer the margin than the midrib. *D. rig'ida* (*Aspidium rig'idum*); S. Europe, California. Rhizome longer, thinner, with 6 vascular bundles. *D. athaman'tica* (*A. athaman'ticum*); S. Africa. Rhizome thicker, firmer than official, inside brownish, with black resin dots, broader vascular bundles.



Aspidosperma

Aspidosperma (one-half natural size).

Aspidosper'ma Quebra'cho-blan'co, *Aspidosperma*, *Quebracho Bark*.—The dried bark with not more than 2 p. c. of wood or other foreign matter, U.S.P. 1890–1910; S. America, Argentine Republic, Chile. Evergreen tree, 25–30 M. (80–100°) high, drooping branches; wood brownish; leaves lanceolate, small, coriaceous, rigid, glaucous; flowers campanulate, yellowish, 5's; fruit dehiscent capsule, pericarp thick, woody. Bark, in irregular pieces, 5–14 Cm. (2–6") long, 10–35 Mm. ($\frac{3}{8}$ – $1\frac{1}{2}$ ') thick, 2-layers—outer corky, 3–25 Mm. ($\frac{1}{4}$ – $1'$) thick, reddish-brown, deeply furrowed, frequently reticulate with longitudinal and shallow transverse fissures; outer surface of bark (after removing cork) reddish-brown, rough, inner surface yellowish-brown, sometimes with adhering wood, striate, porous; fracture short, fibrous, revealing 2 well-defined strata of near equal thickness marked with dots, stone cells and striæ; nearly inodorous; taste bitter, slightly aromatic. Powder, reddish-brown—bast-fibers, crystal-fibers, stone cells, cork cells, starch grains; solvent: diluted alcohol; contains aspidospermine, aspidospermatine, aspidosamine (amorphous), quebrachine, quebrachimine, hypoquebrachine (amorphous), quebrachit (sugar), tannin 3–4 p. c. Cardiac and respiratory stimulant, slows and deepens breathing, antispasmodic, antiperiodic—poisonous, death from asphyxia, solutions protective to wounds; cardiac and asthmatic dyspnea, phthisis, asthma from bronchitis or chronic pneumonia, shortness of breath. Dose, gr. 15–30 (1–2 Gm.); Fluidextract, Extract, Tincture, 20 p. c., Wine. *Quebracho Colorado* (*Loxopteryg'ium Lorent'zii*—Red Quebracho).—S. America, Bark checkered, wood red, light brown (Colorado); contains tannin 20 p. c., loxopterygine; resinous exudation of bark resembles kino; resembles aspidosperma but deeper color, largely used in tanning. *Quebracho flo'ja* (*Iodi'na rhombifo'lia*), S. America, and *Copalchi Bark* (*Croton ni'vens*), Mexico. All three collected and sold as aspidosperma.

Astragalus
gummifer

TRAGACANTHA. TRAGACANTH, U.S.P.

Astragalus gummifer, *Labillardière*, } The dried gummy exudation.
or other Asiatic species.

Habitat. W. Asia—Asia Minor, Armenia, Kurdistan, Persia, Syria, Greece; mountainous districts.

Syn. Trag., Gum Tragacanth, Goat's Thorn Gum, Doctor's Gum, Hog Gum; Fr. Gomme Adragante; Ger. Traganth.

As-trag'a-lus. L. fr. Gr. *ἀστράγον*, bone, + *γάλα*, milk—*i. e.*, the milky then horny exudation, or from the seed squeezed into a square-like form similar to vertebrae (*αστραγάλος*) in some species.

Gum'mif-er. L. *gummi*, gum, + *ferre*, to bear—*i. e.*, plant produces gum.

Trag-a-can'tha. L. fr. Gr. *τράγος* a goat, + *ἄκανθα*, thorn—a goat thorn—*i. e.*, plant thorny like goat's head, and hedges made of it resist their onslaughts.

Trag'a-can'th, natively called first: "gum adragant," then "gum dragant," next "gum dragan," finally "gum dragon."

PLANT.—Shrub .6–1 M. (2–3°) high; stem naked with many straggling, much ramified branches; bark reddish-gray, rough, and marked with leaf-scars, young twigs woolly; leaves 3 Cm. ($1\frac{1}{2}$ ') long, closely placed, pinnate, rachis hard, stiff, persistent for some years as a woody spine, yellow, very sharp-pointed; leaflets 10–15 pairs, 3 Mm. ($\frac{1}{8}$ ') long, obovate, grayish-green; flowers small, pale yellow; stamens 10, upper one free, others united in a sheath; fruit small, oblong pod, covered with white hairs; seed 1, reniform, smooth, pale brown. GUM (tragacanth), in flattened, lamellated, frequently curved fragments, straight or spirally twisted pieces, .5–2.5 Mm. ($\frac{1}{20}$ – $\frac{1}{10}$ ') thick, whitish, brownish, translucent, horny; fracture short, rendered more easily pulverizable by heat (50° C.; 122° F.); inodorous; taste insipid, mucil-



Astragalus gummifer
(natural size of branch).

aginous. POWDER, whitish, forming with water a translucent mucilage—numerous starch grains, .003-.025 Mm. ($\frac{1}{8325}$ — $\frac{1}{1000}$) broad, occasional 2-4 compound, many swollen and more or less altered, due to excessive heat used in drying before powdering, by which it loses 15 p. c. *Tests*: 1. Add 1 Gm. to 50 cc. of distilled water—swells and forms a smooth, nearly uniform, stiff, opalescent mucilage free from cellular fragments (Indian gum—uneven mucilage with few reddish-brown fragments, separating on stirring in coarse, uneven strings). 2. Shake 2 Gm. with 100 cc. of water, when fully swollen and free from lumps add 2 Gm. of powdered sodium borate, shake until dissolved—mucilage does not lose transparency, change consistency, or appear slimy or stringy on pouring, even after standing 24 hours (abs. of foreign gums). 3. Boil 1 Gm. with water 20 cc. until a mucilage results, add hydrochloric acid 5 cc. boil for 5 minutes—no pink or red color develops (abs. of Indian gum). *Solvents*: hot water; cold water best. Dose, gr. 5-30 (.3-2 Gm.).

ADULTERATIONS.—*Cherry Gum* (cherry, almond, plum, etc.)—in irregular brownish nodules, insoluble portion not identical with bassorin; *Indian (Bassora, Kutera, Hogg) Gum*, Persia—broken up in Smyrna and mixed with tragacanth; occurs in yellowish-brown (sometimes whitened with lead carbonate), angular, tasteless masses, swelling with water; *Cashew Gum*—brownish-yellow, translucent, iridescent, partly soluble in water.

Commercial.—Tragacanth is not a simple plant juice, but a degenerative product due to the transformation of the cell-walls of pith and medullary rays in the stem and older branches, and exudes spontaneously, July-August, through natural, or artificial punctures, longitudinal and transverse incisions (near the base of stem) into the medullary part which alone yields juice; it only flows at night, the shape of opening and rate determining its final congealed outline, the time of hardening for collection (1-2 weeks, dry weather 3-4 days) governing its color—white if congealed rapidly, yellow to brown if slowly, from long exposure to changeable weather—heavy rains darkening and washing it off upon the ground causing admixture of impurities; the surface lines indicate the daily concretion while the whiter and more translucent possess greatest value. There are several varieties: 1. *Flake (Leaf, Smyrna)*, usually in broad, thick, yellowish flakes, prominently ridged; the ribbon-like and white flakes are produced in Kurdistan, Persia, often being designated as Syrian; 2, *Vermiform (Vermicelli)*, in very narrow contorted string-like pieces, or confluent coils; 3, *Common (Sorts)*, called in Europe *traganton*, being the result of spontaneous exudation and incidental collection while gathering higher grades; occurs in tear-like pieces, rounded or irregular, brownish, waxy, and, like the preceding varieties, encloses starch. Enters commerce from ports of Asia Minor (Smyrna, Constantinople), Persian Gulf, Bagdad, etc.

CONSTITUENTS.—Cellulose, Soluble gum, Bassorin (traganthin, adraganthin), $C_{12}H_{10}O_{10}$, Polyarabinantrigalactan-geddlic acids, Starch, nitrogenous matter, α -tragacanthan-xylan-bassoric acid, xylan-bassoric acid, bassoric acid, β -tragacanthan-xylan-bassoric acid, ash 3.5 p. c.

(more than one-half being calcium carbonate).

Cellulose.—The portion of gum insoluble in boiling water, in cold diluted acids and alkalis; when treated with boiling diluted sulphuric acid yields arabinose, and a cellulosic residue which is soluble in ammonia and bromine.

Soluble Gum.—Not identical with arabin, although its solution is precipitated by alcohol and ammonium oxalate; yields a series of gum acids having the nature of the “geddic acids,” but are levorotatory, whereas geddic acids are dextrorotatory.

Bassorin.—This is an acid—soluble in hydrochloric acid, ammonia water; when acted upon by an excess of alkali yields a barium salt and two isomeric acids— α - and β -tragacanthan-xylan-bassoric acid, the former soluble in cold water and yielding sparingly soluble salts of barium, calcium, and silver; when digested with diluted sulphuric acid yields tragacanthose and xylan-bassoric acid, which when further acted on by 5 p. c. sulphuric acid yields xylan and bassoric acid.

PREPARATIONS.—1. *Mucilago Tragacanthæ*. Mucilage of Tragacanth. (Syn., Mucil. Trag.; Fr. Mucilage de Gomme Adragante; Ger. Tragantischleim.)

Manufacture: 6 p. c. Mix glycerin 18 Gm. with water 75 cc. in a tared vessel, heat to boiling, remove heat, add tragacanth 6 Gm., macerate 24 hours, stirring occasionally, add water q. s. 100 Gm., heat until uniform consistence, strain forcibly through muslin. Dose, \mathfrak{z} j-2 (30-60 cc.).

2. *Glyceritum Tragacanthæ*, N.F., 12.5 p. c., + glycerin 77.5, water 18.5. 3. *Pilulæ Ferri Carbonatis*, $\frac{1}{8}$ gr. (.01 Gm.). 4. *Trochisci Acidi Tannici*, $\frac{1}{8}$ gr. (.02 Gm.). 5. *Trochisci Ammonii Chloridi*, $\frac{1}{8}$ gr. (.02 Gm.). 6. *Emulsum Olei Morrhuæ cum Malto*, N.F., $\frac{3}{10}$ p. c. 7. *Stili Acidi Salicylici*, N.F., 5 p. c. 8. *Syrupus Trifolii Compositus*, N.F., $\frac{1}{10}$ p. c. 9. *Trochisci Eucalypti Gummi*, N.F., 1 gr. (.06 Gm.). 10. *Trochisci Ulmi*, N.F., $\frac{1}{8}$ gr. (.1 Gm.).

Unoff. Preps.: Pills, Troches—various kinds.

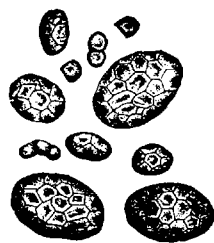
PROPERTIES.—Demulcent, emollient, protective, nutritious.

USES.—Was not known to the Greeks until 4th-5th century, when its uses were as now—expectorant, for cough, hoarseness, similar to acacia; its superior adhesiveness over the latter renders it a better protective in excoriated surfaces, ulcers, burns, etc. Employed largely for suspending resins, oils, heavy powders, etc., in emulsion. Also to cohere pills (paste: \mathfrak{z} j + glycerin \mathfrak{z} j; 4 Gm., + 30 Gm.), troches, etc.; its partial insolubility in the stomach restricts somewhat its popularity.

Allied Plants:

1. *Astragalus bæ'ticus*.—Mediterranean basin; seed used for coffee. *A. exscâ'pus*; C. and S. Europe, mountains; root mucilaginous, astringent, bitter, diuretic. *A. glycyphyl'los*, Europe; leaves and seed sweetish, diuretic. *A. crotala'riæ*, *Loco Weed*, *Rattle Weed*, and *A. mollis'simus*, N. America (Cal., Neb., Tex.); poisonous to cattle, horses, etc., causing spinal tetanic action.

Ave'na sati'va, *Oat*, *N.F.*—The grain with not more than 5 p. c. of other seeds or of foreign organic matter; Asia, Europe. Plant .6–1.3 M. (2–4°) high, culm smooth, leaves linear, veined, rough, panicles loose, spikelets 2–3-flowered, paleæ (husk) cartilaginous. Grain pale yellow, up to 1.5 Cm. ($\frac{3}{8}$ ') long, 3 Mm. ($\frac{1}{8}$ ') thick, fusiform, scar at base, apex showing lemma and palet, groove on ventral side having 2-veined palet or scale, straight or slightly twisted awn (strongly twisted—*Wild Oat*), caruncle at micropylar end, dense hairs at apex; odor slight; taste starchy. Powder, whitish—epicarp, pointed hairs, frag-



Oat starch:
magnified 250 diam.

ments of lemma and palet, coarse unicellular hairs, endosperm, starch grains up to .06 Mm. ($\frac{1}{1600}$ ') broad, polygonal or fusiform individual grains up to .01 Mm. ($\frac{1}{25000}$ ') broad. Grain composed of husk 25 p. c., grain (kernel) 75 p. c.; the former contains fixed oil 1–1.5 p. c., sugar and gum .25–.75 p. c., proteins 2 p. c.; the latter starch 64–66 p. c., fat 5–7 p. c., proteins 18–21 p. c. (mainly avenin), salts 1–3 p. c. The grains when ground yield—oatmeal, when deprived of paleæ—groats.

Oatmeal (*Farina Avenæ*) is not uniform, but is yellowish-white, with gluten and husk present, bitterish, starch granules polyhedral, muller-shaped. Demulcent, laxative, dietetic, nutritive; indigestible husks act as a mechanical irritant, exciting peristalsis, but may constipate by compaction; porridge or gruel may ferment and impair digestion. Dose, *ad libitum*; 1. *Fluidextractum Avenæ Sativæ* (33 p. c. alcohol), dose, ʒj–2 (4–8 cc.). Prep.: 1. *Elixir Hydrastis Compositum*, 1.75 p. c.

Baptisia

Baptis'ia tincto'ria, *Baptisia*, *Wild (False) Indigo*, *N.F.*—The dried root with not more than 10 p. c. of stem-bases and overground parts nor 2 p. c. of other foreign organic matter; N. America. Plant .6–1 M. (2–3°) high, smooth, succulent, glaucous, disagreeable odor, when bruised—repellent to insects, etc.; flowers yellow. Root (most active), fleshy, .5–4 Cm. ($\frac{1}{2}$ – $1\frac{3}{4}$ ') thick, usually cut into elongated cylindrical pieces; crown 5–8 Cm. (2– $3\frac{1}{2}$ ') thick, warty, stem-scars, dark brown, wrinkled, corky layer, few branching rootlets; fracture tough, whitish, radiate, porous; nearly odorless, bark bitter, acrid, wood nearly tasteless. Powder, light grayish—numerous starch grains, tracheæ, lignified fibers, medullary ray tissue, parenchyma, cork cells; solvent: 75 p. c. alcohol; contains cytisine (baptitoxine—acrid, poisonous), baptisin (non-active bitter glucoside), baptin (purgative glucoside), ash 5 p. c. Hepatic, nervous and intestinal stimulant, antipyretic, emeto-cathartic—death by respiratory paralysis; typhus, enteric and scarlet fevers, epidemic dysentery; locally—aphthous stomatitis, chronic ulcers, gangrene. Dose, gr. 5–15 (.3–1 Gm.); 1. *Fluidextractum Baptisicæ* (75 p. c. alcohol): Prep.: 1. *Dentifricium*, .875 p. c. Infusion, Tincture, Baptisin, gr. 2–6 (.13–4 Gm.).

Barosma

Barosma { *betulina*, (Thunberg)
Bariling et Wendland,
crenulata, (Linné) Hooker,
serratifolia, (Curtis) Willdenow.

{ The dried leaf with not more than 8 p. c. stems nor 2 p. c. other foreign organic matter.

Habitat. S. Africa, Cape Colony (Cape of Good Hope, Cape Town); mountains. *Syn.* Bookoo, Buku, Bucku, Bucco; Br. Buchu Folia, Folia Bucco, Diosmæ or Barosmæ; Fr. Feuilles de Bucco (Booko, Buchu); Ger. Bucco or Buchublätter.

Bar-ros'ma. L. fr. Gr. *βαψις*, heavy + *βουή* odor—*i. e.*, its powerful smell.

Be-tu-li'na. L. *betulinus*, fr. Celtic *betu*, their name for birch—*i. e.*, leaves resembling birch leaves.

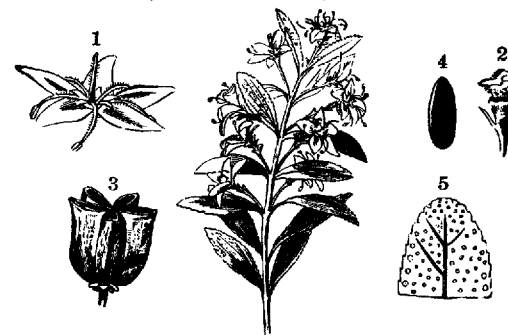
Cren-u-la'ta. L. *crenulatus*, *crena*, notched, notch; *i. e.*, leaf margins crenulate.

Ser-ra-ti-fo'li-a. L. *serratus*, notched like a saw, + *folium*, a leaf—*i. e.*, leaves with margins saw-like, serrated.

Buchu (bu'ku). African plant name; *Diosma*, old name, meaning "divine odor."

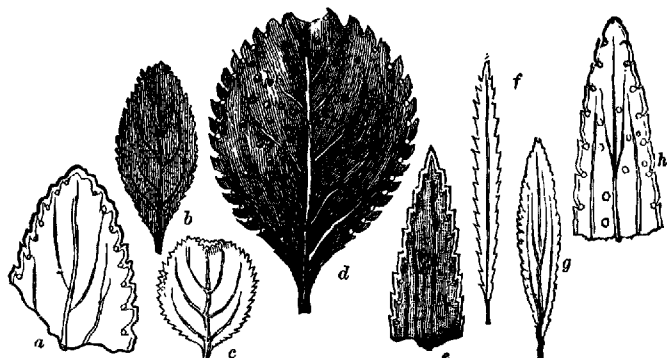
PLANTS.—Woody shrubs, .3–1.2 M. (1–4°) high, branches many, stiff, angular, bark smooth, purple; young twigs covered with immersed oil-glands; flowers solitary, pink; calyx 5 segments, deeply cut; petals 5, glandular-punctate; stamens 5; fruit 5-coccus capsule, adherent by inner margins, 9 Mm. ($\frac{3}{8}$ ') long, 12 Mm. ($\frac{1}{2}$ ') broad, 5-seeded. **LEAVES, LEAF,** (*B. betulina* + *B. crenulata*): *Short*, rhomboidally oval, obovate, 9–30 Mm. ($\frac{3}{8}$ – $1\frac{1}{2}$ ') long, 4–20 Mm. ($\frac{1}{8}$ – $\frac{4}{8}$ ') broad, apex obtuse, rounded, recurved, base wedge-shaped (cuneate), or obtuse, dentate, glandular-punctate, oil gland at the base of each tooth, papillose, longitudinally striate beneath, coriaceous, petiole 1 Mm. ($\frac{1}{16}$ ') long, yellowish-green; odor aromatic, mint-like; taste camphoraceous; (*B. serratifolia*): *Long*, linear, lanceolate, 12–40 Mm. ($\frac{1}{2}$ – $1\frac{3}{8}$ ') long, 4–10 Mm. ($\frac{1}{8}$ – $\frac{2}{8}$ ') broad; apex acute, rounded, serrate, otherwise resembling the preceding. **POWDER**, light green—epidermal cells with spherocrystals, crystal aggregates of hesperidin, rosette aggregates of calcium oxalate, few simple hairs, numerous stomata, oil secretion cavities, oil globules, fragments of fibro-vascular bundles. **Solvents:** Alcohol; boiling water partially. Dose, gr. 15–30 (1–2 Gm.).

ADULTERATIONS.—Leaves, branchlets, flowers and non-aromatic capsules of allied species, also leaves of *Empleurum serrulatum*, which are yellowish-green, acute, different odor and taste, less mucilaginous and contain volatile oil 1 p. c., without any crystalline content. *Karoo buchu* (*B. pulchella*), leaves 6 Mm. ($\frac{1}{4}$ ') long, half as broad, thick, ovate, acute, nearly entire, apex recurved, oil gland not superficial; another variety (*Agathos'ma varia'bile*), leaves strong anise odor; *Psora'lea obli'qua*, leaves minutely dentate, hairy, brown dotted.



Barosma crenulata: 1, calyx; 2, style and stigma; 3, fruit; 4, seed; 5, dots on leaf.

Commercial.—Grows in stony, hilly valleys; cultivated in gardens, since 1774, for persistent attractive flowers. There are two varieties: 1, *Short* (*B. betulina*, *B. crenulata*), and 2, *Long* (*B. serratifolia*); the latter usually containing less of the active constituent—volatile oil .66 p. c., which is without diosphenol. Imported chiefly in large bales.



Buchu: a, b, *Barosma crenulata*; c, d, *B. betulina*; g, h, *B. serratifolia*; e, f, *Empleurum serrulatum*; b, c, f, g, natural size.

CONSTITUENTS.—Volatile oil 1–1.6 p. c., bitter glucoside (barosmin), hesperidin, resin, gum, salts, ash 4–7 p. c.

Volatile Oil, $C_{10}H_{16}O$.—This gives the medicinal properties, and is obtained by distillation and rectifying over sodium; sp. gr. 0.969; contains some $C_{10}H_{18}O$ (a body having peppermint-like odor), and upon cooling separates 30 p. c. barosma camphor, or phenol *diosphenol*, $C_{10}H_{16}O_2$, a stearoptene occurring in white needle-like crystals, blackish-green with ferric salts.

Barosmin (*diosmin*, *rutin*).—Soluble in ether, volatile oils, dilute acids and alkalies, sparingly in alcohol, crystallizes in microscopic needles.

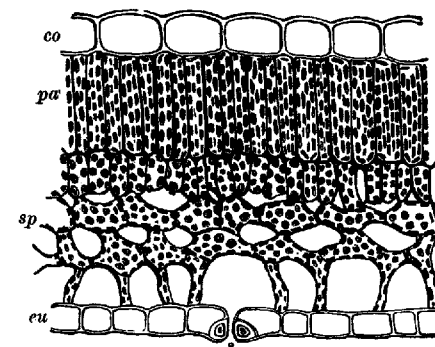
PREPARATIONS.—1. *Fluidextractum Buchu*. Fluidextract of Buchu. (Syn., Fldext. Buchu, Fluid Extract of Buchu; Fr. Extrait fluide de Bucco; Ger. Buchufluidextrakt.)

Manufacture: Similar to Fluidextractum Sarsaparillæ, page 126, menstruum: alcohol. Dose, ℥xv–30 (1–2 cc.).

Preps.: 1. *Elixir Buchu*, *N.F.*, 12.5 p. c.: Preps.: 1. *Elixir Buchu et Potassii Acetatis*, *N.F.*, 8.5 p. c. (pot. acet.). 2. *Elixir Buchu, Juniperi et Potassii Acetatis*, 15 p. c., + fldext. junip. 7.5, pot. acet. 5.

2. *Fluidextractum Buchu Compositum*, *N.F.*, 62.5 p. c., + cubeb, juniper berries, uva ursi, āā 12.5 (80 p. c. alcohol). Dose, ℥xv–30 (1–2 cc.): Prep.: 1. *Elixir Buchu Compositum*, *N.F.*, 25 p. c. + aromatic elixir q. s. 100. Dose, ℥j–2 (4–8 cc.).

Unoff. Preps.: *Infusum Buchu* (Br.), 5 p. c., ℥ss–2 (15–60 cc.).



Buchu leaf: portion of a cross-section; pa, palisade cells; sp, spongy parenchyma; co, upper epidermis; eu, under epidermis; s, stomata.

Tinctura Buchu (Br.), 20 p. c. (60 p. c. alcohol), ℥j–2 (4–8 cc.).

PROPERTIES.—Diuretic, tonic, stimulant, carminative, diaphoretic; increases the fluids and solids of the urine, imparting peculiar odor; acts as a tonic, astringent, and disinfectant to the urinary tract, diminishing secretions. Large doses emetic, cathartic, causing burning in stomach, strangury; eliminated by the kidneys and bronchial mucous membrane.

USES.—Gravel, lithemia, vesical catarrh, irritated urethra, gonorrhea, gleet, chronic bronchitis, inflamed prostate, dropsy, retention or incontinence of urine, feeble digestion, flatulency; should not be given when inflammation is severe; often combined with alkalies, potassium hydroxide, etc. The native Hottentots, from whom the English and Dutch physicians learned its virtues, use an ointment as vulnerary, and a vinous tincture in gastric and vesical affections; they also value it as a perfume, rubbing the powdered leaves upon their greased bodies. *B. Ecklonia'na*, leaves oval, 2.5 Cm. (1') long, rounded at base, crenate, growing from pubescent shoots, have similar properties.



Berberis vulgaris

Berberis (Mahonia)

Berberis Aquifo'lium, *Berberis*, *Oregon Grape Fruit*, N.F.—The dried rhizome and roots with not more than 5 p. c. of overground parts or other foreign organic matter—rejecting pieces over 45 Mm. (1½') thick, or with bark removed; United States, Oregon, California, mountains. Tall shrub, 1.5–2 M. (5–6°) high; leaves coriaceous, evergreen, shining, flowers small, numerous, yellowish-green; fruit purple berry with acid pulp. Rhizome cylindrical, knotty, branched, cut into pieces of varying length, up to 45 Mm. (1½') in thickness, splitting on drying, yellowish-brown, wrinkled; fracture hard, tough; bark 1 Mm. (½') thick, separable into layers, wood yellow, radiate, pith small, sometimes excentric, odor slight; taste distinctive, bitter, on chewing—saliva yellow. Powder, yellowish-brown—medullary rays, wood-fibers, few tracheæ, starch grains; solvent: diluted alcohol; contains (bark) berberine 2.35 p. c., oxyacanthine 2.82 p. c., resin, tannin, phytosterin. Alterative, diuretic, antiperiodic, tonic, laxative; scrofulous and syphilitic cachexia, chronic eczema, psoriasis, uterine diseases, dyspepsia with constipation. Dose, gr. 10–30 (.6–2 Gm.); 1. *Fluidextractum Berberidis* (diluted alcohol), dose, ℥x–30 (.6–2 cc.); 2. *Fluidextractum Trifolii Compositum*, 10.8 p. c.

Berberis

B. vulga'ris (canaden'sis).—The fruit, U.S.P. 1830; the bark of the root, 1860–1870. Spreading shrub, 1–2 M. (3–6°) high, thorny branches, bark gray, wood yellow, leaves toothed, spiny; flowers, yellow racemes; fruit, oval, scarlet berry; root-bark yellowish-gray, separable into laminae, bitter, astringent; contains berberine, resin, tannin, fat. Used in febrile diseases, diarrhea; bark in dysentery, dropsy, dyspepsia, to lessen size of spleen; similar to calumba. Dose (bark), gr. 2–10 (.13–.6 Gm.); infusion, decoction; fruit juice sometimes made into syrup, preserves, etc.

Betula alba

Bet'ula al'ba, *White Birch*.—Betulaceæ; *Oleum Betulae Empyreumaticum Rectificatum*, *Rectified Oil of Birch Tar*, N.F. The pyroligneous oil obtained by dry distillation of the bark and wood, rectified by steam distillation; Europe, Asia, N. America. Large handsome tree. Oil is a limpid, dark brown liquid; odor penetrating, empyreumatic—resembling Russia leather; soluble in ether, chloroform, glacial acetic acid, amyl alcohol, oil of turpentine, benzene, carbon disulphide, dehydrated alcohol (3); mixed with alcohol (3) or purified petroleum benzene (3)—slight turbidity, but with methyl alcohol—decided turbidity, sp. gr. 0.918; aqueous filtrate 4 cc., + a drop of dilute ferric chloride solution (1 in 100)—green coloration, then brown, turbid (dist. from oil of cade); contains guaiacol, creosol, cresol, xylecrol, phenol. Antiseptic, counter-irritant; sore and stiffened muscles, joints; 1. *Unguentum Resorcinolis Compositum*, 6 p. c. *B. len'ta*, *Sweet Birch*—is one of the sources (bark) of U.S.P. Methyl Salicylate, see page 460; *B. papyrif'era*, *Paper (Canoe) Birch*, *White Birch*; Canada, New York, has cordate leaves, tough white bark which separates into papery layers, and was used by the Indians in making canoes.

Boldus

Bol'du Bol'dus, *Boldus*, *Boldo*, *Boldo Leaves*, N.F.—Monimiaceæ. The dried leaf with not more than 2 p. c. of stems or other foreign organic matter, yielding not more than 6 p. c. of acid-insoluble ash; S. America, Chile. A large aromatic evergreen diocious shrub. Leaves ovate, 3–7 Cm. (1½–3') long, 1–4 Cm. (¾–1½') broad, base and apex rounded or indented, entire, revolute, thick coriaceous, rigid, brittle, pale green, papillose, petiole stout; odor peculiar, disagreeable (crushed) chenopodium-like; taste bitter, warm, pungent, camphoraceous, terebinthinate. Powder, greenish—parenchyma, volatile oil cells, calcium carbonate cystoliths, hairs, numerous stomata; contains volatile oil, resin, boldine, boldoglucin (glucoside—liquid), tannin. Sedative, hypnotic; tonic; atonic dyspepsia, nervousness, hepatitis, rheumatism, urethritis. Dose, gr. 5–10 (.3–.6 Gm.); 1. *Fluidextractum Boldi* (alcohol). *Tincture*, 20 p. c. ℥v–20 (.3–1.3 cc.), boldine—local anesthetic, gr. 3 (.2 Gm.).

Boletus

P. (Bole'tus) fomenta'rius, *Agaric of the Oak (Touch Wood)*.—The fungus, U.S.P. 1830; Europe, on *Quercus* and *Fagus* species. It is formed by an additional layer of fibers each year; is collected Aug.–Sept., and resembles the horse's hoof, being 15–25 Cm. (6–10') wide. When young is soft, velvety, but becomes hard and ligneous; when deprived of outside ligneous portion, brownish above and yellowish-white beneath, porous, fibrous, tough, inodorous, tasteless; when for use is deprived of harder rind, sliced, boiled in lye, washed, beaten, until soft and pliable, then absorbs twice its weight of water; contains extractive, resin, nitrogenous matter, KCl, CaSO₄; the ash—Fe, Ca, Mg, phosphate. Used locally with pressure to arrest hemorrhage. Agaric steeped in nitre solution yields spunk or tinder.

Boswellia

Boswel'lia Carte'rii, *Olibanum*, *Frankincense*.—E. Africa, S. Arabia. This gum-resin exudes from incisions made in the bark; occurs in yellowish-brown tears covered with white dust; odor balsamic, terebinthinate; taste balsamic, bitter; partly soluble in alcohol; yields with water milk-white emulsion; contains volatile oil 4–7 p. c. (mostly *olibene*, C₁₀H₁₆), resin 56–72 p. c., gum (resembles arabin) 30 p. c., bitter principle, ash 3 p. c. Stimulant, expectorant. Dose, gr. 15–30 (1–2 Gm.), in emulsion, plaster, or fumigation.

SINAPIS NIGRA. BLACK MUSTARD, U.S.P.

Brassica { **nigra**,
(Linné) Koch,
juncea,
Linné (Cosson),
and related
varieties. } The dried ripe seed, with not more than 5
p. c. other seeds or other foreign organic
matter, yielding not less than .6 p. c.
volatile oil (allyl isothiocyanate).

Habitat. Asia, S. Europe, Africa, cultivated in gardens; wild in United States.

Syn. 1. Sinap. Nig., Brown Mustard, Cadlock, Kerlock; Sinapis Nigræ Semina; Fr. Moutarde noire (grise); Ger. Semen Sinapis, Schwarzer Senf, Senfsamen. 2. Sarepta, Indian or Russian Mustard.

Si-na'pis. L. fr. Gr. (σι)ναπι, Celtic *nap*, a turnip.

Bras'si-ca. L. for cabbage, fr. Celtic *bresic*, cabbage—*i. e.*, the fruit resemblance.

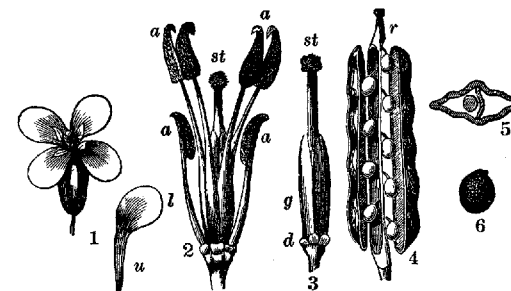
Jun'ce-a. L. *juncus*, a rush, reed—*i. e.*, from resemblance to rush (bulrush).

Ni'gra. L. *niger*, black—*i. e.*, the seed.

Mus'tard. L. *mustrum*, must—*i. e.*, seeds were once pounded with must or vinegar.

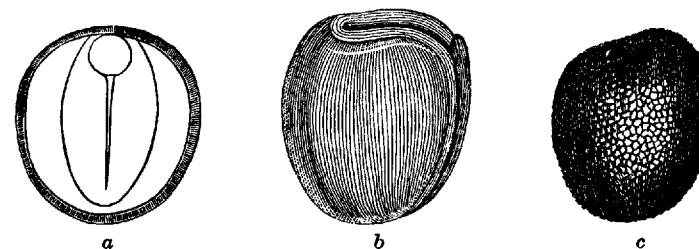
PLANTS.—*Brassica nigra*, erect annual, 1.3 M. (4°) high, smooth above, branched; leaves irregularly pinnatifid, faintly toothed; flowers 6 Mm. ($\frac{1}{4}$ ') broad, yellow, racemes; fruit silique, 18 Mm. ($\frac{3}{4}$ ') long, 1 Mm. ($\frac{1}{25}$ ') broad, appressed, somewhat quadrangular, beak short, tapering, 3-7-seeded; *B. juncea*, glabrous or pubescent, glaucous, upper leaves oblong, subentire, attenuate at the base, lower lyrate, pedicels slender spreading, smaller than preceding; flowers 1.2-1.8 Cm. ($\frac{2}{5}$ - $\frac{4}{5}$ ') broad, not appressed; fruit (pod) 2-5 Cm. ($\frac{4}{5}$ -2') long. **SEED**, spheroidal, irregularly spheroidal, 1-1.6 Mm. ($\frac{1}{25}$ - $\frac{1}{16}$ ') broad; testa dark reddish-brown, sometimes yellowish-brown, with grayish tinge, minutely pitted or reticulate; embryo greenish-yellow, dark yellow, oily, 2 large cotyledons; odor slight (dry); when crushed and moistened, very irritating, strongly pungent, characteristic; taste strongly pungent, acrid. **POWDER**, light brown, greenish-brown—tissues of embryo, the cells containing small aleurone grains and fixed oil, the latter forming in large globules on adding chloral hydrate T. S.; fragments of seed-coat conspicuous, with yellow areas and small yellowish stone cells, few or no starch grains. In preparing powdered black mustard, some of its fixed oil may be removed to facilitate reduction. Should be kept, when powdered, in tightly-closed containers. **Solvents:** water; alcohol slightly. **Dose**, gr. 15-60 (1-4 Gm.).

ADULTERATIONS.—**SEEDS:** Those of allied species—radish, turnip, rape, the latter most common, but easily recognized by larger size and peculiar bluish-red tint; **POWDER:** Flour, starchy substances (blue with iodine), turmeric—rendering white mustard whiter (reddish-brown with borax or boric acid), red pepper (increasing pungency), sawdust (microscope); out of 27 samples examined only 8 were free of admixtures; white mustard recognized by not giving pungent fumes when mixed with water unless heated; **OIL:** Alcohol, carbon disulphide, castor oil, petroleum, artificial allyl isosulphocyanate, etc.



Brassica nigra: 1, flower; 2, pistil and stamens; 3, pistil; 4, silique; 5, cross-section of same; 6, seed; a, stamen; st, stigma; g, pistil carpels; d, nectar tubes; r, replum.

Commercial.—Plants are cultivated largely in England, United States, etc., and grow wild—the *white* (*Sinapis alba*), occasionally, the *black* commonly. The seed of each on grinding and sifting yield a yellow powder of characteristic odor and taste, and by mixing equal quantities of the two we obtain *mustard*, *flour of mustard* (*Sinapis*, Br.), which by trituration with water (vinegar) and spices yields the semi-solid *French mustard*.



Sinapis, magnified: a, transverse section; b, embryo; c, entire seed.

CONSTITUENTS.—Fixed oil 30-35 p. c., Sinigrin (potassium myronate) .7-1.3 p. c., Sinapine sulphocyanide, lecithin, albumin 30 p. c., gum and mucilage 20 p. c. (mainly in testa), myrosin, other proteins, starch 1-2.5 p. c., ash 4-9 p. c.

Fixed Oil.—Usually termed "oil of mustard" is obtained by crushing seeds and expressing; it is yellowish-green, non-drying, sp. gr. 0.916, congeals at -18° C. (0° F.), slight odor, bland, mild taste; consists of glycerides of oleic, stearic, erucic (brassic) and behenic acids.

Sinapine.—Alkaloid, here only as sulphocyanide, in colorless, bitter prisms, soluble in water, alcohol. Sinapine boiled with alkalies gives choline or sinkaline, C₆H₁₅O₂N, and sinapic acid, C₁₁H₁₂O₅.

Myrosin.—This ferment is an albuminoid body that becomes inert at 70° C. (158° F.), hence mustard heated to this point will not yield the volatile oil, owing to which the plasters should not be moistened with water warmer than the body temperature.

Sinigrin, C₁₀H₁₈KNS₂O₁₀.—Silky, white needles, or golden-yellow crystals, soluble in water, slightly in alcohol, insoluble in ether, chloroform; with water and the ferment myrosin it splits into glucose, acid potassium sulphate, and allyl sulphocyanide (isosulphocyanate—volatile oil of mustard) .5-1 p. c.

Oleum Sinapis Volatile. Volatile Oil of Mustard, U.S.P.—(Syn., Ol. Sinap. Vol., Mustard Oil, Oleum Sinapis Æthereum, Oil of Mustard; Fr. Essence de Moutarde; Ger. Oleum Sinapis, Senföl, Ätherisches Senföl.) This oil, like oil of bitter almond and to a great extent oil of gaultheria, does not preëxist in the plant, being obtained by macerating with warm water the crushed black mustard seeds (*B. nigra*, *B. juncea*), after the removal of fixed oil by expression, when a reaction (fermentation) sets in between sinigrin (potassium myronate) and myrosin (albuminoid ferment), provided the temperature does not exceed 70° C. (158° F.), at which the ferment becomes inert and ceases to act— $C_{10}H_{16}KN_2S_2O_9$ (sinigrin) + $H_2O = C_3H_5CNS$ (volatile oil of mustard) + $C_6H_{12}O_6$ (glucose) + $HKSO_4$; also have formed allyl cyanide, carbon disulphide, allyl thiocyanate, and higher boiling compounds, which are always in the oil; when fermentation is completed the mixture is distilled with steam; this oil also is produced to a large extent synthetically by decomposing allyl iodide, C_3H_5I , with potassium sulphocyanate in alcoholic solution. It is a colorless, pale yellow, strongly refractive liquid, very pungent, irritating odor, acrid taste (in both exercise great caution, examining it only when highly diluted), optically inactive, sp. gr. 1.017, soluble in alcohol, carbon disulphide, volatile at 150° C. (302° F.); contains at least 93 p. c. of allyl isothiocyanate (isosulphocyanate), with traces of allyl cyanide, carbon disulphide, etc. *Tests*: 1. Distills completely between 148–154° C. (298–310° F.), first and last 10 p. c. portions have nearly the same sp. gr. as original oil (abs. of alcohol, chloroform, petroleum, fatty oils). 2. Dilute 1 cc. of oil with alcohol (5) + 1 drop of ferric chloride T. S.—no blue color (abs. of phenols). The label must indicate definitely its specific source, whether from black mustard or made synthetically. Should be kept cool, dark, in well-stoppered, amber-colored bottles. Dose, $m\frac{1}{8}$ – $\frac{1}{4}$ (.008–.016 cc.).

PREPARATIONS.—SEEDS: 1. *Emplastrum Sinapis*. Mustard Plaster. (Syn., Emp. Sinap., Mustard Paper; Charta Sinapis, Fr. Papier moutarde (sinapisé), Moutarde en feuilles; Ger. Charta sinapisata, Senf papier.)

Manufacture: Percolate black mustard 100 Gm. with petroleum benzin until percolate gives no greasy stain on blotting paper, dry the powder; dissolve rubber 10 Gm. in petroleum benzin and carbon disulphide each 100 cc., and with this mix the purified mustard to produce a semi-liquid magma, spread on paper, cotton cloth, or other fabric; it is a uniform mixture of black mustard, deprived of its fixed oil, and a solution of rubber, spread on paper, cotton cloth, or other fabric; 100□Cm. contain 2.5 Gm. of black mustard deprived of its fixed oil. Before applying to the skin moisten thoroughly with tepid water, when it will produce a decided warmth and redness within 5 minutes. Should be kept in tightly-closed containers.

OIL: 1. *Linimentum Sinapis Compositum, N.F.*, 3 p. c. + fliext. mezereum 20 p. c., camphor 6, menthol 2, castor oil 15, alcohol q. s. 100. 2. *Spiritus Sinapis, N.F.*, 2 p. c., + alcohol q. s. 100. 3. *Unguentum Sinapis, N.F.*, 2 p. c., + white wax 15, lard 83.

Unoff. Preps.: SEED: *Infusion*, 5 p. c., dose, *ad libitum*. OIL: *Linimentum Sinapis (Br.)*, 3.5 p. c.

PROPERTIES.—Stimulant, emetic, tonic, diuretic, laxative, rube-facient, irritant, epispastic, carminative, condiment, vesicant; dilates the vessels, causing redness, warmth, and irritates sensory nerves, giving burning pain.

USES.—Atonic dyspepsia with constipation, delirium tremens, atonic dropsy, hiccough, narcotic poisoning. Externally—rheumatism, gout, atrophy, neuralgia, colic, gastralgia, inflammation of throat or lungs, toothache, earache, headache, vomiting, diarrhea, dysentery, amenorrhea, dysmenorrhea, stimulant to heart, respiration, and vascular system.

For mild action: Dilute mustard with equal quantity of flaxseed meal or flour, and make with water into a pasty plaster—poultice, cataplasm, or sinapism; should be applied enveloped in very thin muslin to prevent sticking, and is superseded almost entirely by the whole- and half-strength *mustard leaves*, which, in order to use, should be dipped into warm water for 15 seconds and applied for $\frac{1}{2}$ –1 hour. The volatile oil may be used locally, well diluted (3ss; 2 cc.) + Stokes' liniment, alcohol, or almond oil ʒij; 60 cc. Good in scabies, hysteria, swooning convulsions.

Mustard foot-baths, valuable in headache, cerebral and other internal congestion, pneumonia, amenorrhea, for diaphoresis.

The infusion, made by stirring a tablespoonful to a cream with warm water, is a popular emetic in poisoning, etc., giving the entire mixture.

Brunfelsia

Brunfel'sia Hopea'na, Manaca, Mercurio Vegetal, N.F.—The dried root; S. America, Amazon valley. A large shrub. Root nearly cylindrical, tortuous, variable length, 3 Cm. ($1\frac{1}{2}$ ') thick, dark brown, wrinkled, yellowish cork patches easily removed from thin cortex adhering closely to hard yellowish wood; fracture short, very tough; odor slight; taste bitter. Powder, pale yellow—lignified fibers, medullary ray cells, tracheæ, few cork cells, cortical parenchyma with brownish amorphous content, starch grains, stone cells, calcium oxalate rosettes; solvent: diluted alcohol; contains resin, alkaloid (? manacine). Motor depressant (spinal centers); full doses—difficult breathing, profuse sweating, depression, nausea, vomiting, urination, purgation; over-doses—acrid depressing poison; chronic muscular rheumatism, syphilis (substitute for mercury). Dose, gr. 15–30 (1–2 Gm.); 1. *Fluid-extractum Manacæ* (75 p. c. alcohol), dose, $m\text{xv}$ –30 (1–2 cc.): Prep.: 1. *Elixir Manacæ Compositum*, 16.5 p. c., + sodium salicylate 14, lithium salicylate 1.75, salicylic acid 5.5, potassium bicarbonate 3.97 +, dose, ʒj–2 (4–8 cc.).

Bryonia

Bryo'nia al'ba or *B. dioi'ca*, *Bryonia*, *Bryony*, *N.F.*—The dried root with not more than 2 p. c. of foreign organic matter; C. and S. Europe. Perennial climbers, the former monœcious, the latter dioecious; leaves heart-shaped, 5-lobed; flowers small, greenish-white or yellowish; fruit, berries, size of a pea, the former black, the latter red (hence names black and red bryony). Root, spindle-shaped, .3–.6 M. (1–2°) long, lactescent, fleshy, usually in circular slices 1.5–10 Cm. ($\frac{3}{8}$ –4') broad, 3–15 Mm. ($\frac{1}{8}$ – $\frac{3}{8}$ ') thick, yellowish, whitish, rough, striate, thin cortex, wood with projecting fibro-vascular bundles in concentric zones; fracture short, mealy, whitish; odor faint, distinct, characteristic, taste bitter, nauseous. Powder, light yellow—starch grains, central cleft, tracheal pores, large yellow cork cells; with sulphuric acid—reddish-brown, then brownish-purple; contains alkaloid (amorphous), bryonol (dihydric alcohol)—both purgative, volatile oil; resin, glucoside (inactive), enzyme, sugar, phytosterol; solvents: alcohol, hot water. Hydragogue cathartic, emmenagogue, vesicant, emetic (large doses). Used in dropsy, epilepsy, hysteria, bronchitis, whooping-cough, rheumatism, swollen glands, scabies; large doses poisonous. Dose, gr. 10–60 (.6–4 Gm.); 1. *Tinctura Bryoniæ*, 10 p. c. (alcohol), dose, $\mathfrak{m}\text{xv}$ –60 (1–4 cc.). Infusion, 5 p. c., $\mathfrak{J}\text{j}$ –2 (30–60 cc.). Mother Tincture (Homeopathic), $\mathfrak{m}\text{v}$ –40 (.3–2.6 cc.); Bryonin, gr. $\frac{1}{8}$ – $\frac{1}{4}$ (.01–.02 Gm.).



Bryonia dioica.

Calendula

Calen'dula officina'lis, *Calendula*, *Marigold*, *N.F.*—The dried ligulate-florets with not more than 2 p. c. of foreign organic matter; S. Europe, Levant, cultivated as ornament (flowers). Annual herb .3–.6 M. (1–2°) high, roughish-hairy; leaves toothed, oblanceolate; flower-heads terminal, 5 Cm. (2') broad, involucre hemispherical, 2-rowed; disk-florets tubular, 5-cleft, yellow. Ligulate (ray) florets 15–25 Mm. ($\frac{3}{8}$ –1') long, 3–6 Mm. ($\frac{1}{8}$ – $\frac{1}{4}$ ') broad, yellowish, 1–3-toothed, short-hairy tube occasionally enclosing remnant of filiform style and bifid stigma; odor slight, somewhat heavy; taste slightly bitter, faintly saline. Powder, yellowish—few non-glandular hairs, double row of thin-walled cells; elongated epidermal wavy-walled cells with chromo-

plasts and oil-like globules; pollen grains with spinose projections, 3-pored; tracheæ; calcium oxalate rosettes or prisms; solvents: alcohol, boiling water partially; contains volatile oil, bitter principle, calendulin (analogous to bassorin), fat, resin, sugar, gum, ash 8–11 p. c. Stimulant, tonic, febrifuge, anthelmintic, resolvent; jaundice, amenorrhea, scrofula, low fevers, vomiting; cancer, ulcers, wounds, otitis—Homeopathic remedy instead of tincture of arnica or myrrh. Dose, gr. 15–60 (1–4 Gm.); 1. *Fluidextractum Calendulæ* (67 p. c. alcohol), dose, $\mathfrak{m}\text{xv}$ –60 (1–4 cc.); 2. *Tinctura Calendulæ*, 20 p. c. (alcohol), dose, $\mathfrak{J}\text{ss}$ –2 (2–8 cc.).

Camphora

CAMPHORA. CAMPHOR, *U.S.P.*

Cinamomum Camphora, { The dextrorotatory ketone (concrete volatile oil).
(*Linne*) *Nees et Ebermaier*.

Habitat. China, Japan, Formosa. Tree cultivated in Italy as an ornament, and may yield profitably in California, Florida, etc., wherever frosts are light.

Syn. Camph., Camphor Laurel, Gum Camphor Tree; Fr. Camphre du Japon—droit; Ger. Kampher, Kampher, Campher.

Campho-ra. L. fr. Ar. *kafur* or *kapur*, chalk, lime—*i. e.*, its resemblance.

PLANT.—Handsome evergreen tree, 9–12 M. (30–40°) high, .3–.6 M. (1–2°) thick, much branched above, fragrant; bark smooth, green; leaves 7.5–15 Cm. (3–6') long, 2.5–7.5 Cm. (1–3') broad, attenuated toward both ends, entire, smooth, shining, ribbed, bright yellowish-green above, paler and glaucous beneath, thick; flowers, June–July,



Cinnamomum Camphora.

small, whitish; fruit, Nov.-Dec., purple berry, 6 Mm. ($\frac{1}{4}$ ') thick, 1-seeded. DEXTROROTATORY KETONE (camphor), in white, translucent, tough masses, granules, penetrating, characteristic odor, pungent, aromatic taste, soluble in alcohol (1), chloroform (1), ether (1), carbon disulphide, petroleum benzin, fixed or volatile oils, water (800), sp. gr. 0.990; readily pulverized with a little alcohol, chloroform, ether, and liquefied with equal quantity of chloral hydrate, menthol, phenol, thymol; volatilizes at ordinary temperature, melts at 175° C. (347° F.). *Tests*: 1. Heat 2 Gm.—sublimes without carbonization, leaving about .05 p. c. of non-volatile matter. 2. Solution in petroleum benzin (1 in 10)—clear (abs. of water). 3. A copper spiral 6 Mm. ($\frac{1}{4}$ ') in diameter and 6 Mm. ($\frac{1}{4}$ ') long held in flame until it glows without coloring flame green, then dipped into camphor; ignited, burned outside of flame; then in lower outer edge—no green color—(abs. of chlorinated products); alcoholic solution precipitates with water. *Impurities*: Chlorinated products, water. Should be kept cool, in well-closed containers. Dose, gr. 1-5 (.06-.3 Gm.).

Commercial.—Tree, resembling sassafras and linden, is of slow growth but flourishes up to 600 M. (2,000°) elevation in the tropics—Cape of Good Hope, Brazil, Jamaica, Madeira, Mediterranean region, etc. The wood is valuable, being white, fragrant and repellent to insects, and while all parts contain camphor, along with its strong odor, it is obtained only from the root, trunk, and branches of trees fifty or more years old—by sublimation. In Japan roots and small branches are chipped and put, with some water, in large vessels surmounted by earthen domes lined with rice-straw; on applying heat the camphor, volatilized by steam, rises to the domes and condenses upon the straw—flowers of camphor—from which it is shaken and packed in double-tubs, 100 pounds (45 Kg.). In China the comminuted plant is boiled with water until camphor adheres to the ladle and the strained liquid concentrates upon cooling, which then is sublimed with alternating layers of earth. In Formosa (island) a long wooden trough, coated with clay and fixed over a crude furnace, is half-filled with water and, upon a perforated board luted to the top, chips are placed, that in turn are covered with inverted pots; on applying heat steam is produced, which, rising, passes through the perforations and chips, thereby becoming camphor-vapor that condenses in the upper part of the pots—flowers of camphor—from which it is scraped every few days. This industry here has been monopolized and revolutionized by Japan since her last war with China, to the effect of improving quality, the government purchasing from all producers their product of a recognized standard, and refining it at Taihoku, using several thousand pounds at a charge—the oil and water being first driven off at low heat, then the camphor sublimed at higher temperature, and pressed hydraulically into blocks for exporting. The crude is forwarded often in leaf-lined baskets, 70 pounds (32 Kg.), to Tamsui, Takow, etc., there stored in vats, or packed in chests, tubs (lead- or tin-lined), 100 pounds (45 Kg.), which prior to shipping, are saturated with water to prevent loss of weight by evaporation in transit, causing it to reach us somewhat moist. When in vats a yellowish-brown

volatile oil—oil of camphor—drains out, the amount increasing with pressure. There are two varieties: 1, *Japan* (*Tub, Dutch*—they being the first to introduce it), lighter pink, larger grained, higher priced, cleaner, dryer; usually from Batavia; 2, *China* (*Formosa*), cheapest, most abundant; usually from Canton. As such “crude camphor” contains 2-10 p. c. of *impurities*—vegetable matter, gypsum, salt, sulphur, chips, ammonium chloride, chlorinated products, etc.—which must be removed before suitable for medicine.

Refining.—Formerly done exclusively in Europe, but now largely in Formosa and our country, by mixing crude camphor with $\frac{1}{5}$ part of quicklime (iron filings, sand, or charcoal) to remove resin, empyreumatic oil, moisture, etc., then resubliming at 175-204° C. (347-400° F.) in iron, copper or glass retorts, and pressing into rectangular blocks or circular cakes.

ADULTERATIONS.—Rare: Stearic acid 25-50 p. c., insoluble in alcohol except when hot, crystallizing therefrom upon cooling; cane-sugar (sucrose) 20 p. c.

CONSTITUENTS.— $C_{10}H_{16}O$. When heated with zinc chloride yields cymol, $C_{10}H_{14}$; with nitric acid yields camphoric acid, $C_{10}H_{16}O_4$, and camphoronic acid, $C_9H_{12}O_3$; the former acid forms colorless, inodorous prisms (see page 232); the latter acid melts at 136° C. (277° F.) with decomposition and is freely soluble in water or alcohol.

PREPARATIONS.—1. *Aqua Camphoræ*. Camphor Water. (Syn., Aq. Camph., Aqua Camphorata, Mistura Camphoræ; Fr. Eau camphré; Ger. Kampherwasser.)

Manufacture: $\frac{1}{2}$ p. c. Triturate powdered camphor .2 Gm. with purified talc 1.5 Gm. + distilled water 100 cc., agitate well, set aside 24 hours, filter repeatedly until clear; it is a saturated solution. Dose, ʒj-8 (4-30 cc.).

2. *Linimentum Camphoræ*. Camphor Liniment. (Syn., Lin. Camph., Camphorated Oil, Linimentum Camphoratum; Fr. (Liniment) Huile camphré; Ger. Oleum Camphoratum, Kampheröl, Kampherliniment.)

Manufacture: 20 p. c. Heat in a flask on water-bath cottonseed oil 80 Gm., add camphor 20, stopper container and agitate occasionally until dissolved without further heating; used externally.

Prep.: 1. *Ceratum Camphoræ, N.F.*, 10 p. c.

3. *Spiritus Camphoræ*. Spirit of Camphor. (Syn., Sp. Camph., Tinctura Camphoræ, Tincture of Camphor, Alcohol Camphoratus; Fr. (Esprit de) Alcool camphré; Ger. Spiritus camphoratus, Kampher-spiritus.)

Manufacture: 10 p. c. Dissolve 10 Gm. camphor in alcohol 80 cc., add alcohol q. s. 100 cc., sp. gr. 0.825. *Test*: 1. To 5 cc. add .05 Gm. of anhydrous potassium carbonate—latter does not liquefy or adhere to bottom of container (abs. of added water). Dose, ʒv-60 (.3-4 cc.).

Preps.: 1. *Lotio Ammoniacalis Camphorata, N.F.*, 1 p. c. 2. *Mistura Opii et Chloroformi Composita, N.F.*, 20 p. c. 3. *Mistura Opii et Rhei Composita, N.F.*, 20 p. c. 4. *Tinctura Opii et Gambir Composita, N.F.*, 4 p. c.

4. *Linimentum Saponis*, 4.5 p. c. 5. *Linimentum Chloroformi*, 3.15

p. c. 6. *Tinctura Opii Camphorata*, $\frac{2}{3}$ p. c. 7. *Ampullæ Camphoræ*, N.F., $3\frac{1}{2}$ gr. 8. *Chloral Camphoratum*, N.F., each, 50 p. c. 9. *Emplastrum Fuscum Camphoratum*, N.F., 1 p. c. 10. *Linimentum Saponato-Camphoratum*, N.F., 2.5 p. c. 11. *Menthol Camphoratum*, N.F., 47.5 p. c. 12. *Petrozolinum Chloroformi Camphoratum*, N.F., 20 p. c. 13. *Petrozolinum Phenolis Camphoratum*, N.F., 37.5 p. c. 14. *Pilulæ Opii et Camphoræ*, N.F., 2 gr. 15. *Unguentum Camphoræ*, N.F., 22 p. c. 16. *Linimentum Belladonnæ*, N.F., 5 p. c. 17. *Linimentum Opii Compositum*, N.F., 1.75 p. c. 18. *Linimentum Sinapis Compositum*, N.F., 6 p. c. 19. *Nebula Aromatica*, N.F., $\frac{3}{10}$ p. c. 20. *Nebula Mentholis Composita*, N.F., 1 p. c. 21. *Pilulæ Antiperiodicæ*, N.F., $\frac{1}{8}$ gr. 22. *Tinctura Antiperiodica*, N.F., $\frac{1}{5}$ p. c.

Unoff. Preps.: *Linimentum Camphoræ Ammoniatum* (Br.) 12.5 p. c., + stronger ammonia water 25 p. c.; *Vinum Camphoratum*. *Camphora Phenolata*, *Camphora Salicylata*, etc. Enters universally into camphoric, dentifrices, etc.

PROPERTIES.—Antispasmodic, stimulant, carminative, stomachic, (an)aphrodisiac, antipyretic, nervine, sedative, diaphoretic, rubefacient, resolvent, antiseptic. Has great healing powers; dilates vessels, increases flow of gastric juice and peristalsis.

USES.—Camphor was not known to Greeks or Romans, we having derived it from the Arabians, who use it solely as a refrigerant and to lessen sexual desire. Now employed in hysteria, dysmenorrhea, nervousness, diarrhea, colic, flatulence, rheumatism, gout, tenesmus, asthma, cough, coryza, toothache, headache, spasms, chorea, epilepsy, nausea, typhoid condition, mania. Externally as a wash, liniment, or ointment for ulcers, gangrene, scabies, sprains, bruises, rheumatic pains, convulsions.

Poisoning: Have burning pain, vomiting, weak pulse, giddiness, debility, pallor, cold, clammy skin, faintness, confused ideas, delirium, convulsions, death from collapse; does not kill healthy adults. Give water at once if camphor taken in alcoholic solution, induce vomiting, follow with alcohol in small but frequent doses, coffee, cold, arterial sedatives, ether, artificial heat, castor oil; opium and bromides for the convulsions.

Incompatibles: Aconite, acids, neutral salts, water precipitates all solutions.

Synergists: Antispasmodics, alcohol, opium, narcotics, aromatics, all in small quantity.

Allied Products:

1. *Camphora Monobromata*. *Monobromated Camphor*, $C_{10}H_{16}BrO$.—This ortho-monobromcamphor is obtained by heating together in a flask or retort camphor and bromine in molecular proportions (preferably with a little water or chloroform) until reaction ceases, allowing yellowish solution to crystallize, heating until mass becomes white, recrystallizing from alcohol or petroleum benzin. It is in colorless prismatic needles, scales, or powder, mild, characteristic, camphoraceous odor and taste, permanent, decomposed by exposure to sunlight, soluble in alcohol (6.5), chloroform (.5), ether (1.6), almost insoluble in water; melts at $75^{\circ} C.$ ($167^{\circ} F.$). Nervous sedative in

nervous irritation, insomnia, headache—no advantages over camphor. Dose, gr. 1–5 (.06–.3 Gm.), in pill, emulsion.

2. *Acidum Camphoricum*, *Camphoric Acid*, $C_{10}H_{16}O_4$, U.S.P. 1900.—This dibasic organic acid is obtained by oxidizing camphor 150 Gm. with hot nitric acid 2000 cc., until crystallization takes place, dissolving crystals in water (5) containing sodium carbonate, allowing solution of sodium camphorate to crystallize, dissolving crystals in water (10), decomposing with hydrochloric acid, when camphoric acid crystallizes out. It is in colorless, odorless, monoclinic prismatic crystals, plates, acid taste, melting at $187^{\circ} C.$ ($369^{\circ} F.$), soluble in alcohol, ether, chloroform, fatty oils, water (125). Antihydrotic, antiseptic, intestinal disinfectant, anticatarrhal; bronchitis, catarrh, cystitis, night-sweats of phthisis, diarrhea, sore throat, pyelitis, eczema, acne. Dose, gr. 5–30 (.3–2 Gm.); locally in 2–6 p. c. aqueous solutions, with 11 p. c. of alcohol to each 1 p. c. of acid.

3. *Borneol*, *Borneo*, *Sumatra*, or *Barus Camphor* (*Dryobalanops aromatica* (*Camphora*)), $C_{10}H_{18}O$, has different odor from official camphor, heavier than water, less volatile, with nitric acid yields ordinary camphor.

4. *Ngai Camphor* (*Blumea balsamifera*).—This is a tall weed of India, China, Formosa. Its camphor has same composition as Borneo, but is levorotatory, and natively is prized higher than our official.

5. *Artificial Camphor*.—Although this can be made by oxidizing camphene, $C_{10}H_{16}$, with chromic acid mixture, yet the more recent process is based upon the interaction of anhydrous turpentine and anhydrous oxalic acid at 120 – $130^{\circ} C.$ (248 – $266^{\circ} F.$), yielding pinyl oxalate and formate, which treated with lime gives borneol, and this by oxidation becomes camphor; however, the products terpin hydrate and terpene hydrochloride are recognized generally under this name—the latter being prepared by saturating oil of turpentine, dissolved in twice its volume of carbon disulphide, with hydrochloric acid gas, distilling with lime to form calcium chloride and camphene, oxidizing latter with nitric acid yielding camphor.

6. *Oleum Camphoræ*, *Camphor Oil*, U.S.P. 1860–1870.—This is a yellowish-brown volatile oil obtained from camphor by sublimation and expression; has camphor odor and taste, sp. gr. 0.940, dextro-rotatory; contains pinene, phellandrene, cineol, dipentene, terpineol, safrol, eugenol, cadinene—at low temperature deposits camphor; used by Chinese for rheumatism, etc. Should not be confounded with *Linimentum Camphoræ*, U.S.P., which also often is called oil of camphor (Ger. *Oleum Camphoratum*).

Canarium

Canarium commu'ne, *Manila Elemi*, *Elemi*.—Philippine Islands. The oleoresin exudes from incisions in the bark of a tall tree; it is soft, yellowish, granular crystalline, when cold friable; odor strong, resembling fennel and lemon, terebinthinate; taste bitter, pungent; contains volatile oil 10–15 p. c., amorphous resin (*breïn*) 60 p. c. (soluble in cold alcohol), crystalline resin (*amyrin*) 25 p. c., bryoidin, breidin, elemic acid, $C_{35}H_{46}O_4$ (crystalline). Stimulant, irritant; in plaster and ointment.

Canella

Canella Winterana (alba), Canella, Canellæ Cortex, White Cinnamon, N. F.—Canellaceæ. The dried rossed bark with not more than 2 p. c. of foreign organic matter; W. Indies. Tree 9–15 M. (30–50°) high, recognized by whitish bark, leaves thick; flowers white, aromatic; fruit, berries 12 Mm. ($\frac{1}{2}$ ') long, blackish. Bark, in quills, usually 5–15 Cm. (2–6') long, 1–4 Cm. ($\frac{2}{3}$ –1 $\frac{1}{2}$ ') broad, irregular fragments, periderm mostly removed, pale orange-brown, scaly, shallow fissures, ridges; inner surface pale yellow, smoothish; fracture short and sharp; odor slight; unless heated—cinnamon-like; taste aromatic, warm, bitter, mucilaginous. Powder, light brown—numerous stone cells, calcium oxalate rosettes, starch grains, oil cells; solvent: diluted alcohol; contains volatile oil (having eugenol) 1 p. c., resin 8 p. c., bitter principle, calcium oxalate, starch. Aromatic stimulant, tonic, condiment; atonic dyspepsia, menorrhagia, amenorrhœa—due to anemia. Dose, gr. 5–30 (.3–2 Gm.); 1. *Pulvis Aloes (80) et Canellæ (20)*, *Hiera Picra*, dose, gr. 5–10 (.3–.6 Gm.).

Cannabis

CANNABIS. CANNABIS, U.S.P.

Cannabis sativa,
Linné.

{ The dried flowering tops of pistillate plants with not more than 10 p. c. fruits, large foliage leaves, stems over 3 Mm. ($\frac{1}{8}$ ') thick, nor 2 p. c. other foreign organic matter, yielding not more than 5 p. c. acid-insoluble ash.

Habitat. Asia, Persia, hills of N. India; cultivated in India, Europe, C. and S. Russia, Brazil, W. and S. United States.

Syn. Cannab., Cannabis Indica, U. S. P. 1900, Guaza, Ganjah, Indian Hemp, Black Indian Hemp, Tristram's Knot, Bangué, Hashish, Halish, Gallow Grass Hemp, Neck or Nick Weed, St. Andrew's-lace, Welsh Parsley, Bang, Bhang, Gunjah Churrus, Charas, Ganja (dried flowers); Fr. Chanvre (Indien); Ger. Hanf, Indischer Hanf.

Can'na-bis. L. Gr. *kánnaβis*, hemp, fr. *ganeh*, its Arabic name. Celtic *can*, reed + *ab*, small—*i. e.*, its slender stems.

Sa-ti'va. L. *sativus*, that which is sown or planted—*i. e.*, in the gardens and fields for use.

In'di-ca. L. *Indicus*. Gr. *Índukos*, pertaining to India—*i. e.*, its habitat.

PLANT.—Annual herb; stem 1–3 M. (3–10°) high, angular, tomentose; leaves palmate-compound; leaflets 5–7 linear-lanceolate, serrate; flowers dioecious, yellow spikes. **FLOWERING TOPS**, separate, or in more or less agglutinated masses, fragments consisting of short stems with leaf-like bracts, pistillate flowers or somewhat developed fruits, greenish-brown; odor agreeable, heavy, narcotic; taste acid, pungent. **POWDER**, dark green—leaf epidermis with oval stomata beneath, numerous non-glandular hairs usually with calcium carbonate masses, glandular hairs 2 kinds, yellowish-brown laticiferous vessels, calcium oxalate rosette aggregates, tracheæ and phloem, embryo and endosperm tissues with numerous oil globules, aleurone grains (crystalloids, globoids); on slide—effervesces with diluted hydrochloric acid; alcoholic solution bright green; alcoholic extractive 8 p. c. Should not be kept longer than 1 year, when it usually is only one-fourth as strong

as the fresh, and in 2 years it practically is inert. *Solvent:* alcohol. Dose, gr. 1–5 (.06–.3 Gm.).

Commercial.—Plant was known to the Romans, but not to the Egyptians, and has been cultivated universally many centuries for fiber, seed, and medicine—that for the latter at present being grown mostly



Cannabis sativa.

in the two districts, Bogra and Rajshahi, north of Calcutta, in rows, the richest in resin at 1,800–2,400 M. (6,000–8,000°) elevation. When mature (indicated by brown color and falling of leaves) the flowering branches are cut off, May–June, cured by wilting, pressing, rolling, and shaking out of leaves and fruits (if any of the latter have developed), and as such is recognized natively by the Hindustani names, *ganja*, *gunjah*; the rolling and treading are performed by human feet, an art demanding training, the object being possibly to work resinous matter from stems into inflorescence tips. There are

two kinds: 1, *Round ganja*, requiring 4 days for kneading each branch into a cylindrical or terete mass; 2, *Flat ganja*, requiring 2 days for working into a flat form; the Bengal (Calcutta) *ganja* (best) is brownish or dusty, the Bombay bright green. Variability in the drug may be due to the presence of staminate flowers, leaves, fruits, cold weather, inopportune collecting (not later than 4 days after maturing), intentional removal of resin, excessive age (losing most of its properties within a year). Great care is taken to prevent the flowering tops becoming fertilized by suppressing the male plants, as a single one is claimed to spoil an entire field; however, when for fiber or seed both male and female plants are cultivated together. Our plant, often called *Cannabis americana*, having escaped from native country, may possess slight variations owing to colder climate, but under proper cultivation and care may be as active as the India product, in spite of which it is regarded generally as being about one-fourth weaker.

CONSTITUENTS.—Cannabinol, Cannabin 15–20 p. c., choline (bilinearine—trimethylamine), volatile oil (chiefly sesquiterpene—cannabinene), C₁₀H₁₆, .3 p. c., bitter principle, paraffin, C₂₉H₆₀, chlorophyll, gum, sugar, potassium nitrate, ash 5–15 p. c.

Cannabinol, C₂₁H₃₆O₂.—This, to which the activity of the drug is due, may be obtained by exhausting cannabis with petroleum benzine, reclaiming latter, evaporating residue to dryness, and subjecting it, under pressure to fractional distillation at 210–240° C. (410–464° F.), when the distillate contains cannabinol and paraffin, the latter being removed with alcohol. It is a poisonous, yellow or brownish syrupy liquid, darkening on exposure to air into inert, brittle, pitchy mass, consequently must be kept, as well as preparations of the drug, in sealed containers; possibly same as Kobert's cannabinon.

Cannabin.—Resin constituent (resinoid), to which formerly was attributed all of the drug's activity, that now known to be due solely

to its contained cannabinol; it may be obtained by treating cannabis with water and a solution of sodium carbonate, washing residue with water, drying, exhausting with alcohol, treating tincture with milk of lime, precipitating lime with sulphuric acid, adding animal charcoal to filtrate, filtering, concentrating, and precipitating with water; it is a brown, amorphous resin, burning without ash, soluble in alcohol, ether, from the former being precipitated white by water.

PREPARATIONS.—1. *Extractum Cannabis*. Extract of Cannabis. (Syn., Ext. Cannab., Extract of (Indian) Cannabis (Hemp); Fr. *Extrait de Chanvre (Indien)*; Ger. (Indisch) *Hanfextrakt*.)

Manufacture: Macerate, percolate 100 Gm. with alcohol until exhausted, reclaim alcohol, evaporate residue at 70° C. (158° F.), stirring frequently, to pilular consistence, mix thoroughly; after assay add enough storax or substandard extract of cannabis for biological standard; yield 12–14 p. c. Dose, gr. $\frac{1}{6}$ –1 (.01–.06 Gm.): Prep.: 1. *Mistura Chloralis et Potassii Bromidi Composita*, N.F., $\frac{1}{2}$ p. c.

2. *Fluidextractum Cannabis*. Fluidextract of Cannabis. (Syn., *Fldext. Cannab.*, Fluid Extract of Cannabis; Fr. *Extrait fluide de Chanvre (Indien)*; Ger. (Indisch) *Hanffluidextrakt*.)

Manufacture: Similar to *Fluidextractum Colchici*, page 111; menstruum: alcohol; after dissolving soft extract in the reserve, assay and adjust finished volume to its biological standard—amount producing incoördination in a dog; .1 cc. for every 2 pounds (1 Kg.) of body weight. Dose, mij–5 (.13–.3 cc.): Preps.: 1. *Collodium Salicylicum Compositum*, N.F., 10 p. c. 2. *Mistura Chloroformi et Morphinae Composita*, N.F., 1.85 p. c.

Unoff. Prep.: *Tincture*, 10 p. c. (alcohol), m_v–30 (.3–2 cc.).

These preparations give varying results, but usually their value can be recognized by the color of the precipitate formed when added to water; if olive-green, it is active; if yellowish-brown, it is inert; thus, whatever there is that destroys chlorophyll injures the active principle.

PROPERTIES.—Anodyne, nervine, sudorific, narcotic, aphrodisiac, increases appetite. It excels even belladonna in perverting perception, condition, and relation of objects; some subjects become pugnacious, others have delightful intoxicating dreams, in which time, distance, and sound are magnified—a few minutes' dream extends over weeks, near objects as in infinite space, whispering as cannonading. Large habitual doses bloat the face, inject eyes, make limbs tremulous, weak, mind imbecilic, death by marasmus.

USES.—Neuralgia, distressing cough, quiets tickling in throat, does not constipate or depress like opium; gout, delirium tremens, tetanus convulsions, chorea, hysteria, mental depression, epilepsy, morphine and chloral habits, softening of the brain, nervous vomiting.

Poisoning: Have pleasurable intoxication, double consciousness followed by drowsiness, unconsciousness, collapse, insensibility, dilated pupils, rapid pulse, slow respiration, debility, pale, clammy, insensitive skin, catalepsis, excited passion; effects usually last 24 hours, and closely resemble those of opium, differing, however, in not constipating and in not lessening secretions; increases appetite. Give emetics, lemon

juice to neutralize its effects, tannin, coffee, ammonia, strychnine, atropine, electricity, spirit of nitrous ether, artificial respiration; similar to chloral hydrate and opium.

Incompatibles: Strychnine, caustic alkalies, acids.

Synergists: Alcohol, ether, bromides, cocaine, narcotics.

Allied Native Products:

These are mostly used for smoking, beverages, or electuaries, etc.

1. *Bhang (Sidhee, Subjee, Siddhi)*.—Consists of the dried coarsely broken leaves and fruit (dark green), resembles *ganja* in odor and taste; used by natives in their sweet-meat (*majoon*), also smoked with or without tobacco; its cold infusion (tea) as an intoxicant.

2. *Churrus, Churras, Charas*.—This is the resin (practically the active constituent) which exudes spontaneously from the entire plant in minute drops. It is collected in several different ways: 1. By men, wearing leather suits, brushing forcibly against growing plants, whereby resin adheres and afterward is scraped off. 2. By rubbing green portions between the hands and then scraping off adhering resin. 3. By frequent stirring around that put away in barns to cure, thus causing the resin to rise in the form of dust, and to deposit upon the roof and sides of the building, from which it can afterward be collected. Owing to this being more or less impure it is not used in medicine, but solely smoked in pipes; contains usually cannabinol 33 p. c.

3. *Hashish (Hashish, Haschisch, Hasash, Hasheesh—Majoon)*.—The Arabic name for hemp, signifying “green intoxicating liquor” fr. Heb. *shesh*, to be joyous. This may consist of the dried tops collected before seed ripen, thereby resembling *ganja, gunjah*, but usually is more complex, being prepared by heating tender leaves and tops 4 parts, butter 3, water 4, until latter is dissipated, straining, washing twice the greenish extract with water, adding this to syrup (sugar 16. water 32. little milk, boil), heating, mystifying by incorporating stramonium or nuxvomica; in Bengal a small amount of rose oil, musk, cardamom seed, cantharides, or opium (to which mostly is due the deliriums, manias, dreams, sensualism), boiling half an hour, allowing to solidify, cutting into cakes; the Russians prefer it formed into cakes with the resinous extract.

4. *Hemp Seed (Cannabis Semen)*.—These are achenes 3 Mm. ($\frac{1}{8}$) long, roundish, smooth, greenish, taste sweet, oily. Used for birds chiefly, but, owing to the fixed oil, an emulsion becomes a valuable demulcent and anodyne; contain protein 22–24 p. c., fixed oil 28–36 p. c., suitable for painting, varnishing, etc.

5. *Hemp Oil*.—A greenish fixed oil, lighter and brownish on exposure; odor hemp-like, taste mild. Demulcent, protective; chiefly extracted for its possible use in the domestic arts; neither this nor seed possess narcotic properties.

6. *Hemp Fiber*.—Used for cordage, sacking, sail cloths, clothing, etc. The colder climates produce the best fibers, and the tropics that which is most medicinal and intoxicating. Russia produces most of the hemp fiber, but Italy the best; that grown in the United States and India is inferior to that of the other two countries.