ADULTERATIONS.—Allied species, also gillenia, triosteeum (rhizome and roots), American gentians (rootlets), often to 25 p. c.—result of careless collection and intentional fraud; in Europe occasionally the underground portion of Cynanchum Vincentozicum. Of these none has a keel, some contain starch, and all differ in odor, color, and taste.

Commercial.—The official root, as well as some of the growing plants of this genus emit a slight wintergreen odor; the southern root is smaller and usually paler, while the Manitoba is larger and stouter, often dark, with purple discoloration about the crown; the large, broad-leaved form is considered var. latifolia. Root should be collected in the autumn, and comes chiefly from Minnesota and northward.

CONSTITUENTS.—Saponin-like compound 5-6 p. c., composed of senegin 1.5 p. c., and polygalac acid 4 p. c. (analogous to saponin and components, quillaja-saponin, quillaja acid, of quillaja), fixed oil 8-9 p. c., volatile oil .12 p. c., methyl salicylate (increasing with age), resin, polygale, sugar 7 p. c., pectin and albuminoids 18.40 p. c., malates, yellow coloring matter, ash 4-5 p. c.

Senegin (polygalin, saponin), C_{42}H_{60}O_{18}.—Obtained by exhausting root with 60 p. c. alcohol, concentrating, precipitating with alcohol and ether; mother-liquor contains the salt of an organic acid. It is a neutral glucoside, white, amorphous, inodorous powder, insoluble in alcohol, not precipitated by normal lead acetate, and forms soapy emulsion with boiling water; by hydrochloric acid decomposed into glucose and sapogenin, C_{42}H_{63}O_{17}.

Polygalac Acid, C_{42}H_{60}O_{19}.—Sparingly soluble in alcohol, insoluble in ether or chloroform, precipitated by neutral and basic lead acetates.

Fixed Oil.—Obtained from root by ether; contains virgineic acid which gives disagreeable aroma.

Volatile Oil.—This is a mixture of valerianic ether and methyl salicylate.

PREPARATIONS.—1. Fluidextractum Senega. Fluidextract of Senega. (Syn., Fldext. Seneg., Fluid Extract of Senega; Fr. Extrait fluide de Polygale de Virginie; Ger. Senegarfluideextrakt.)

Manufacture: Macerate, percolate 100 Gm. with alcohol 200 cc. + water 100 cc., proceed with menstruum (same strength) until exhausted, reserve first 80 cc., evaporate remainder to soft extract, which dissolve in the reserve, add ammonia water gradually until faintly alkaline (slight odor of ammonia), and menstruum q. s. 100 cc. Dose, m 3 v-30 (3-2 cc).

Prep.: 1. Syrupus Senega. Syrup of Senega. (Syn., Syr. Seneg.; Fr. Sirop de Polygale; Ger. Senegasirup.)

Manufacture: 20 p. c. Mix ammonia water 1 cc. with fluidextract of senega 20 cc., add syrup q. s. 100 cc.; mix well. Dose, 3j-2 (4-8 cc).

2. Syrupus Scilla Compositus, 8 p. c. 3. Mistura Pectoralis, N.F., 3.5 p. c.


PROPERTIES.—Stimulating expectorant, diuretic, diaphoretic, irritant. Produces throat and gastro-intestinal irritation, some salivation with inclination to cough, increased bronchial secretion; large doses vomit and purge. Insufflation causes sneezing, coughing, and nasal catarrh. Externally—an irritant to the skin. Senegen is a violent irritant, heart depressant, likewise same to vascular, nervous, and muscular systems. It is excreted by kidneys, skin, bronchial mucous membrane, all being stimulated and irritated by it.

Uses.—Secondary stage of acute and in chronic bronchitis, in typhoid pneumonia, asthma, croup, renal dropsy, promotes expectoration; no value when mucus tough and scanty, or unless the primary acute inflammation has been subdued; slight value in dropsy. In amenorrhea, give decoction two weeks before each menstruation. Chronic rheumatism, rheumatic paralysis; senegen in gr. 2 (.13 Gm.) doses for uterine hemorrhage. Popular with North American Indians for rattlesnake and other snake-bites.

Polygala alba

Polygala alba, White, Texas or False Senega.—West of Mississippi River; root 6 Mm. (.2") thick, resembling official, but has a lighter color internally, also a cylindrical wood, and is destitute of keel; contains polygalac acid 3 p. c.; yields light-colored infusion and tincture. P. Boyke'sii, Southern States; like the P. alba, only thinner, yet some consider both to be one and the same species.

Polygala spp.

Polygala polyg'ama (rubell'a), Bitter Polygala.—The root and herb, U.S.P. 1820-1870; Canada-Florida. Plant 15-22.5 Cm. (6-9") high; leaves mucronate; flowers purple; keel crested, shorter than the wings; fruit 2-seeded, capsule oblong; contains bitter principle analogous to senegen; similar to P. ama'tra of Europe. Tonic in bronchial catarrh; large doses laxative, diaphoretic.

Polygonatum

Polygonatum (Convallaria) multiflorum, European Solomon's Seal, and P. commuta'tum (gigante'um), American Solomon's Seal.—Rhizome similar and contains convallarin, asparagin, mucilage, starch.

Polygonatum bistorta

Polyg'ontum Bistorta', Bistort.—Europe, Asia, N. America, in meadows. Produces an S-shaped rhizome, bent upon itself—bistorted. 5 Cm. (2") long, 15 Mm. (.6") thick, flattened or channeled, upper side transversely striate, root-scars on under side, red-brown; contains tannin 20 p. c., starch, calcium oxalate; tonic, astringent. Dose, gr. 5-30 (.3-2 Gm.).

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**Potentilla tormentilla**

*Potentilla tormentilla, Tormentil.*—The rhizome, U.S.P. 1820-1870; Europe. Plant resembles *P. canadensis*, *Cinquefoil*, perennial, 25-30 Cm. (10-12') high, green or reddish leaves, trifoliate; leaflets cuneate; flowers yellow; fruit achenes, reniform. Rhizome 5 Cm. (2') long, 12 Mm. (3/8) thick, tuberculate, brownish-red; bark thin, wood-wedges small, distant; pith large, inodorous, astringent; contains tannin 25 p. c., red coloring matter (tormentil-red), matrin, acid, ellagic acid. Astringent, tonic like kino and catechu; diarrhea, dysentery, spongy gums (gargle), ulcers, gleet; decoction, infusion. Dose, gr. 10-30 (.6-2 Gm.).

**Prunus laurocerasus**

*P. laurocerasus, Cherry Laurel, Laurocerasi Folia* (Br.).—Fresh leaves; W. Asia. Ornamental shrub or tree, 3-6 M. (9-20") high; leaves 15 Cm. (6") long, obovate, oblong, serrate, coriaceous; bitter almond odor; aromatic, bitter taste; contains prufularin, C_{16}H_{20}O_{6}N (similar to amygdalin), emulsin, tannin, sugar, fat, wax, phylline acid (crystalline, occurring also in leaves of almond, apple, maple, peach); yields hydrocyanic acid, .12 p. c., and oil of bitter almond (benzaldehyde) .5 p. c., in which spring leaves are richest. Sedative, narcotic; used to make cherry laurel water (*Aqua Laurocerasi, Br.*) by distilling 400 cc. from leaves 320 Gm. + water 1000 cc. Dose, 5-ss-2 (2-8 cc.).
Prunus persica

Amygdalus (Prunus) Persica, Peach.—Persia, cultivated largely in the United States, etc. Fruit edible, abounding in sugar, juice ferment, and upon distillation yields peach brandy; kernels poisonous from yielding HCN, often substituted for bitter almonds, also contain fixed oil resembling that of almond, for which it is an adulterant; leaves mild sedative in doses of gr. 15–90 (1–2 Gm.), in infusion.

Prunus serotina

PRUNUS VIRGINIANA. WILD CHERRY, U.S.P.

Prunus serotina, Ehrhart.

Habitat. N. America (Can. to Fla., to Minn., Neb., Kan., La., to Texas), in woods.


Prunus. L. fr. προνύμιον, a plum tree; prunum, a plum—i. e., classic name.

Serotina. L. serotinus, fr. serus, late—i. e., the latest of the genus to bloom and fruit.

Vir-gi-ni-a-na. L. of, or belonging to Virgin-i-a—i. e., Virginian.

PLANT.—Large tree 9–24 M. (30–80') high; trunk regular, straight, with blackish, rugged outside bark, that of young branches smooth, red or purplish; leaves 5–12.5 Cm. (2–5') long, oval, petiolate, serrate, teeth glandular, glabrous, shining, bright green, with 2 small glands on the margin at the base; flowers May–June, appearing after the leaves, small, white, racemes; fruit August, drupe, size of a pea, purplish-black, pulp, sweet, acidulous, slightly astringent and bitter—bitter cherries; seed subglobose bitter almond flavor, containing bland, yellowish-green fixed oil 25 p. c. Bark, usually in transversely curved pieces, 2.5–8 Cm. (1–3½') long, 12–25 Mm. (½–1') broad, 0.8–8 Mm. (½–1½') thick; outer surface (rossed bark) light brown, greenish-brown, smooth, except numerous lenticle-sears (unrossed bark), reddish-brown, glossy, smooth, with light colored, transversely elongated lenticels, roughened, flaky with gray lichens; inner surface light brown, with delicate, reticulate striations, numerous minute fissures; fracture short, granular; odor distinct, resembling bitter almond when macerated in water; taste astringent, aromatic, agreeable bitter. Powder, light brown—fragments of yellow-brown cork, stone cells, few fiber fibers, not greatly elongated, frequently accompanied by crystal-bearing fibers, calcium oxalate prisms, rosette aggregates, starch grains .002–.015 Mm. (.00008–.00060) broad. Young, thin bark best, and that from very large or small branches should be rejected. Should be kept dark, in tightly-closed containers. Solvents: hot or cold water. Dose, 5–8 g (2–4 Gm.).

ADULTERATIONS.—Unrossed bark, that of old stems, also that of choke cherry, which closely resembles the official, but as a rule is either thinner or thicker, and breaks with a very tough fracture like slippery elm.

Commercial.—The Latin official name, from its long usage, has been retained, although misleading; Prunus virginiana was given early by Linnaeus to Choke Cherry, a shrub 2.5–3 M. (8–10') high, having more sharply-toothed leaves, shorter racemes, and astringent, dark red, crimson fruit, size of wild cherry. It has received various names at different times, as Prunus rubra, P. obovata, P. virginiana, P. serotina, Cerberas serotina, C. virginiana. The true official Prunus serotina grows in fertile soil in fields, woods, along fences, seldom in clusters; wood is valuable for furniture, being hard, red, fine-grained, and easily polished. Bark after collection is (rossed) deprived of outside layer (periderm or ross—cork and parenchymatous cells), exposing green phellem, and then dried; while that from all portions of the tree is used, that from the root is strongest, yet it all soon deteriorates, consequently only the fresh-dried should be employed; the average bark collected in April yields most starch, but least tannin, and hydrocyanic acid—.0478 p. c.; in June—.0956 p. c.; in Oct.—.1436 p. c. or ½ gr. (.0009 Gm.) from 100 gr. (6.5 Gm.) bark, which equals 7–8 Ml. (5 c.c.) of 2 p. c. acid; some bark reverse these seasonal percentages; young bark may yield of acid 183–250 p. c.; old bark 159–335 p. c.

CONSTITUENTS.—Amygdalin, Emulsin, Bitter principle, tannin 2–4.5 p. c., gallic acid, resin, starch, (volatile oil, hydrocyanic acid, benzoic acid from oxidation of benzaldehyde).

Amygdalin.—Cyanogenetic glucoside, similar to laurocerasin (prulaurasin) obtained by the action of alcohol; it is bitter, non-crystalline, and not precipitated by ether, hence in this differs from that in bitter almond.
Emulsion.—Enzyme or ferment, identical with emulsion or synthapte, extracted by water; white powder when pure, and by its action on amygdalin, in the presence of water, develops hydrocyanic acid and the volatile oil of bitter almond, neither of which, as such, existed previously in the bark. These two are obtained also by distilling the seed with water, when they come over more or less mixed. The poisonous property of the oil depends largely upon the amount of acid present, and when freed of this, the oil becomes a bland, colorless liquid resembling that from bitter almond. Some think the ferment neither emulsion nor synthapte, but a closely analogous compound.

Bitter Principle.—Obtained by mixing soft aqueous extract with alcohol, shaking with milk of lime, evaporating filtrate, boiling residue with alcohol, evaporating, getting brown, bitter, gelatinous mass, which is insoluble in ether; soluble in alcohol, brownish-red with sulphuric acid.


Manufacture: 15 p. c. Mix glycerin 5 cc. with water 20, moisten wild cherry bark 15 Gm., with 10 cc. of mixture, pack in percolator, add remainder of mixture, and enough water to saturate and leave stratum above, macerate for 24 hours, percolate with water into sucrose 80 Gm., q. s. 100 cc., dissolve by agitation without heat. Should be kept cool, in non-metallic, tightly-closed containers, as it rapidly loses hydrocyanic acid under favorable conditions. Dose, 5j–4 (4–15 cc.); mainly for flavoring.


3. Syrupus Pini Alba Compositus, N.F., 8.5 p. c.

Unoff. Prep.: Infusion, 4 p. c., dose, 5ss–2 (15–60 cc.). Tinctura Pruni Virginiana (Br.), 20 p. c. + alcohol 62.5 p. c., finally add glycerin 10 p. c., dose, 5ss–1 (2–4 cc.).

Properties.—Sedative, pectoral, aromatic bitter tonic, astringent; increases appetite, digestion. Volatile oil—local stimulant on alimentary canal like cascarilla, serpentaria, etc. Hydrocyanic acid—sedative, nerve, large doses decrease heart action. Tannin is astringent.

Uses.—Consumption, cough, bronchitis, scrofula, heart palpitation, stomach atony, dyspepsia, hectic fever, debility; cold infusion in opthalmia. It is much inferior to cinchona in intermittents.

Ptelea trifoliata, Wafer-ash, Hop-tree, Swamp-Dogwood, Wingseed, Shrubby Trefoil.—Root-bark; N. America—N.Y.—Fla.—Texas—rocky places. Handsome shrub, 2.4–3.6 M. (8–12") high, branches dark brown; leaves petiolate, light green, trifoliolate; leaflets sessile, ovate, short-acuminate, crenulate, lateral ones inequilateral, terminal one cuneate at base, finely pellucid-punctate; root-bark one or more inches long, light brown, wrinkled, with thin epidermis, internally yellowish-white, darker by exposure, odor peculiar, aromatic, taste bitter, pungent, acid; contains berberine (bitter, tonic), tannin, gallic acid, resin. Aromatic, tonic, stimulant, antiperiodic; dyspepsia, low fevers with gastro-intestinal irritation, typhoid conditions. Dose, gr. 15–30 (1–2 Gm.); infusion, 5ss–1 (15–30 cc.); fluidextract. Leaves and young shoots anthelmintic; fruit (samara) aromatic, bitter, good substitute for hop.

Pterocarpus marsupium KINO. KINO, U.S.P.

Pterocarpus Marsupium, Roxburgh.

Habitat. E. India, in forests; C. and S. India (Malabar), Ceylon, Bengal.

Sym. Gummí (Resinus) Kino, Vengay, Bastard Tenak, Bijia, Ambayoyna Kino Tree; Br. Kino, Kino Eucalypti (Eucalyptus (Red) Gum); Fr. Kino de l'Inde; Ger. Kino.

Mar.‐sprī·um. L. marsupium, a pouch, bag, purse—i. e., shape of the fruit. K’ño. E. India name as given the extract.

Plant.—Large tree, 18–24 M. (60–80") high, 6–1 M. (2–3") thick, many spreading branches; bark brownish-gray, internally red and fibrous; leaves alternate, imparipinnate, deciduous; leaflets 5–7, alternate, 5–10 Cm. (2–4") long, ovulate, emarginate, coriaceous; flowers May–June, pale yellow; fruit indehiscent pod, orbicular, 2.5–4 Cm. (1–2") broad; seed 1, kidney-shaped. Juice (kino), in small, brittle, angular fragments, usually less than 10 Mm. (1") broad, dark reddish-brown, reddish-black; inodorous; taste very astringent; upon mastication coloring saliva pink. Powder, dark red—angular fragments, with glass-like, conchoidal surface, thinner pieces translucent, yellowish-red, brownish-red; mounted in water—fragments rounded, gradually disintegrate, leaving colorless, granular particles, some being rod-shaped bacteria and a few cellular fragments; mounted in alcohol—red color of fragments deepens, translucency increases, the angular outlines being preserved while solution takes place. Tests: 1. Add boiling water, cool, filtrate faintly acid; with ferric chloride T. S.—dark green precipitate; with alkalies—reddish-violet color. Solvents: alcohol, to the extent of 90 p. c.; boiling water to the extent of 40–80 p. c.; alkalies, with impairment of astrigency. Dose, gr. 5–20 (3–1.3 Gm.).

Adulterations.— Inferior juices, catechu, dragon’s blood (insoluble in water), kinos containing gum (swelling in water, alcohol), etc.

Commercial.—Plant, called natively Buja, is prized for fine timber and juice, the privilege of tapping trees for the latter being granted by the government to highest bidders; it is collected to some extent the entire year, but chiefly during inflorescence, dry season, February–March (when it is better and easier dried), by cutting into the tree-trunk to the cambium a perpendicular incision and lateral feeders; the juice, resembling currant-jelly, exudes freely into clay cups, bamboo-joints, etc., placed at the bottom of main incision, when it is dried in
the sun and air (inspissated) or boiled to the consistency of a thick extract, occasionally skimming off impurities, then poured into shallow pans to dry until crumbly (half-inch layer requiring a week) and packed in wooden boxes for market. Trees yield most at night and when small often are killed by excessive bleeding, which may be averted by resting alternate years; each produces about 24 ounces (.7 Kg.) that upon evaporation becomes half as much kino. Liquid preparations, especially in diluted alcohol tend to gelatinize (with loss of astringency) from presence of an enzyme—destroyed by boiling—and should be kept in small bottles and seldom opened; the menstruum making a permanent solution is alcohol 65, water 20, glycercin 15 volumes, although alcohol 50, water 25, glycercin 25 usually gives satisfaction.

There are several varieties: 1. Malabar (E. India), official, described above, rarely found on the market; 2. African (Gambia—P. erinae/oecus), similar to preceding, not in our market but common in England; contains tannin 50–60 p. c.; 3. Bengal (Palas, Buttea Gummi (Br.)—Buttea frondoasa) in transparent ruby-red tears, fragments, often with leaf-vein impressions, brittle, not adhesive on mastication, yields pyrocatechin on dry distillation, one-third to one-half soluble in hot alcohol, the remainder being mucilaginous matter; contains tannin 15–35 p. c.; 4. Australian (Botany Bay, Kino Eucalyptus (Br.)—Eucalyptus rostrata, E. amygdalina, E. resinifera, and other species of Myrtaceae), not very brittle, adheres to teeth, tingles saliva red, soluble in alcohol, 80–90 p. c., in water, lessening with age, furnishes much of the present commercial kino; contains tannin 45–50 p. c.; 5. W. India (Jamaica, Caracas—Coccoloba usitifera, Polygonaceae), obtained by boiling the violet-brown wood and bark of the large tree, evaporating the decoction; resembles official but has brownish tint, less glossy, bitter, soluble in water, alcohol (90 p. c.); contains tannin 70 p. c.

Constituents.—Kino-tannic acid, C₅H₅O₂, 40–50 p. c., Kino-red, C₂₅H₂₄O₂₉, Pyrocatechin (pyrocatechic acid, catechol), C₆H₅O₆, Kino-in, C₁₀H₁₂O₅, gum, ash 1.3–3 p. c.

Kino-tannic Acid.—Similar to catechuic acid, always mixed with coloring matter and pectin in extraction; with ferric salts—greenish-black, with ferrous salts in neutral solutions—violet color.

Kino.—Obtained by exposing cold aqueous solution to the air, when red precipitate slowly forms, hastened by heating, or heat koino to 130° C. (266° F.); it is amorphous, tasteless, nearly insoluble in water, and is the anhydride of koino: 2C₂₅H₂₄O₂₉–H₂O=C₂₅H₂₄O₂₉.

Pyrocatechin.—Obtained by treating kino with ether, or the product of dry distillation of kino contains much of it, which may be purified by resublimation; soluble in ether, water.

Kino.—Boil kino with diluted hydrochloric acid, kino-red immediately separates, now agitate clear solution with ether; occurs in white crystals, slightly soluble in ether, cold water, red with ferric chloride.


Manufacture. 10 p. c. Agitate thoroughly in a flask 10 Gm. with boiling water 50 cc., heat for 1 hour on water-bath containing boiling water, shaking frequently, cool, add recently boiled water 5 cc., then add alcohol 30 cc., stopper flask, set aside in cool place for 24 hrs, decant through cheesecloth. Should be kept cool, dark, in small, tightly-stoppered bottles. Dose: 3.5–2.5 cc (2–8 cc).


Owing to gum (pectin) cosugulating the liquid preparations are very unstable, consequently catechu often is used instead with equally good results.

Properties.—Astringent, tonic, hemostatic; similar to but less powerful than tannin; locally inferior to other astringents.

Uses.—Diarrhea, pyrosis, menstruation, dysentery, leucorrhoea, ulcers, sore throat, epistaxis, hemorrhages, diabetes, manufacture of wines. Useful in dyeing and tanning, but rather too expensive.

Incompatible: Aqueous solution is precipitated by gelatin, soluble salts of iron, silver, lead, antimony, mercuric chloride, sulphuric, nitric, and hydrochloric acids.

Pterocarpus santalinus

SANTALUM RUBRUM. RED SAUNDERS, U.S.P.

Pterocarpus santalinus. The heart-wood.

Habit. Madras; cultivated in S. India, Ceylon, Philippines.


Pter-o-carpus. L. from Gr. πτερος wing, + καρπος fruit—i. e., its winged fruit pods or legumes girdled with a broad crimped wing.

San-da-lus. L. adj. fr. sandal, Pers. sandal, useful; Gr. οὐραλος.

San-ta-um. L. n. form; sandalwood, sanders.

Rub-brum. L. ruber, red, ruddy—i. e., the color of the wood.
PLANT.—Tree 6–9 M. (20–30°) high, 3–5 M. (12–18°) thick, some trunks hollow; leaves trifoliolate; leaflets broadly oval, emarginate, 5–15 Cm. (2–6°) long, hoary beneath; flowers yellow, papillo-naceous corolla, spikes; fruit orbicular legume, wing slightly crisped, 2-seeded. Heart-wood, in billets, logs, 1–1.6 M. (3–5°) long, 10–20 Cm. (4–8°) thick, deprived of light-colored sap-wood, hard, heavy, dark reddish-brown, splitting coarse-splinterly; usually in coarse powder, purplish to brownish-red, nearly odorless and tasteless. Powder, reddish-brown—numerous wood-fibers of irregular outline and sharp pointed ends, occasionally forked, lumina filled with fine, granular protoplasmic content, occasional trachee filled with yellow, resinous masses, medulary rays 1 cell wide, 3–6 deep, crystal-fibers with prisms of calcium oxalate; mounts in chloral hydrate T. S.—deep, rich red color. Tests: 1. Mix 5.5 gm. with ether 10°—solution orange-yellow; with greenish fluorescence in bright light: 5 gm. with water 10°—solution distinctly red. 2. Mix 5.5 gm. with water 10°—liquid clear and colorless. Solvents: alcohol; ether; acetic acid; alkaline solutions; boiling water or diluted alcohol partially.

PREPARATION.—1. Tinctura Loeandule Composita, 1 p. c.


Santal (santalac acid), C_{17}H_{16}O_3.—Coloring matter, obtained by precipitating alcoholic tincture with lead acetate, washing precipitate with hot alcohol, decomposing it with hydrogen sulphide in the presence of alcohol, evaporating; occurs in red needles, inodorous, tasteless, resinous, soluble in alcohol (blood-red), ether (yellow), sulphuric acid (deep red), alkalies (violet), also in oils of clove, cinnamon, bergamot, bitter almond.

Santal, C_{17}H_{18}O_3, Pterocarpin, C_{22}H_{26}O_6, Homoptericarpin, C_{23}H_{26}O_6.—All occur in colorless scales—the latter soluble in carbon disulphide and when fused with potassium hydroxide yields phloroglucin.

Uses.—Red Saunders has no important medicinal properties, being used only for imparting color. Employed natively as an abrading and with sapan wood for dyeing silk, cotton, wool, giving various reds according to mordants used.

Punica

Punica GRANATUM. POMEGRANATE, U.S.P.

Punica GRANATUM, Linné.

The dried bark of the stem or root, with not more than 2 p. c. wood, or other foreign organic matter.

Habitat. S. W. Asia, India, Persia, Arabia, China, Japan, E. and W. Indies, naturalised in subtropics, S. United States, etc.; cultivated for fruit, ornamental flowers.

Syn. Granat, Pomegranate Bark, Grenadier, Punic (Carthaginian, Garnet) Apple; Granati Cortex; Fr. Écorce de (Grenadier) Balaustier; Ger. Granatrinde.

Punica. L. punica, of or belonging to Carthage, near which city it is said to have first been found, or fr. puniceus, scarlet—i. e., the color of its flowers.

Granatum. L. granatus, having many grains or seeds, fr. granum—i. e., the many-seeded fruit.

Pomegranate. L. pomeum, a fruit, + granatum, grained.

PLANT.—Shrub or small tree, 4.5 M. (15°) high, branches angular, with spiny ends; young shoots and buds red; leaves 2.5–5 Cm. (1–2°)

long, shining, lanceolate, entire, half evergreen; flowers June–Sept., large; calyx shining, scarlet, tubular, 3 cm. (1½”) long; corolla crimson, 5–7 petals; fruit (balustra), 5–10 cm. (2–4”) broad, resembles an orange, quince, or tomato, 5–8 angled over the disseminations, short-necked at top. Internally, below the median line, divided by a diaphragm into two stories—upper with 3–9 irregular cells, lower and smaller with 1–3 vertical partitions (cells); seed angular 12 mm. (¾”) long, so numerous that they, with the thin surrounding edible pulp, fill entire fruit. Bark (stem), in pieces 2–8 cm. (¾–3¾”) long, 5–3.5 mm.

Punica Granatum: 1, longitudinal cross-section; 2, transverse cross-section; a. inner rind and ovals; c. the remaining calyx.

(½–¾”) thick, yellowish-brown, with patches of grayish lichens, elliptical lenticels, furrows or abraded patches of cork, wrinkled; inner surface light yellow, finely striate; fracture short, phellogen dark green; inner bark yellowish-green; (root) in transversely curved pieces yellowish-brown, conchoidal depressions, irregular patches of cork; internally dark yellow, medullary rays extending nearly to the outer surface; odor slight; taste astringent, bitter, nauseous. Powder, yellowish-brown—calcium oxalate in rosette aggregates, numerous starch grains, 0.002–0.01 mm. (1/25–1/250”) broad, whitish cork, stone cells, long wood fibers, tracheae. Taste: 1. Macerate 1 gm. for 1 hour in distilled water 100 cc., add to 10 cc. of yellow filtrate 1 drop of ferric chloride T.S.—bluish-black precipitate; to another 10 cc. add 40–50 cc. of calcium hydroxide T. S.—orange-brown flocculent precipitate. Should be kept in tightly closed containers. Solvents: boiling water; diluted alcohol. Dose, 3–5–2 (2–8 gm.).

Substitutions. — 1, Buxus sempervirens, Boxwood Bark; 2, Berberis vulgaris, Barberry Bark; neither contain tannin, hence infusions do not precipitate blue-black with iron like pomegranate bark; they also are very bitter, and the former has a nearly white inner surface; 3, Granati Fructus Cortex; this contains tannin 19–28 p. c., extractive 21 p. c., gum 34 p. c., and has the same effect as the bark.

Commercial. — Root-bark is three times stronger in alkaloids than stem-bark, but both deteriorate rapidly with age owing to the alkaloids undergoing decomposition; the white-flowered plant yields the richest bark which is imported chiefly in the dry state from France, Italy, although we use much of our native product. In addition to bark occasionally the flowers, fruit, rind, and acidulous seed-coating are employed domestically; some prefer the bark from uncultivated plants.

Constituents. — Tannic acid 20–22 p. c., Alkaloids 1.71 (black-flowered)–2.43 (red-flowered)–3.75 p. c. (white-flowered)—Pelletierine (punicine) 0.5–1.5 p. c., iso-pelletierine, methyl-pelletierine, pseudo-pelletierine (granatone), manumine (punicin, granatin), gallic acid, sugar, gum, pectin, calcium oxalate, ash 10–16 p. c.

Tannic Acid, C₃₆H₄₃O₁₉. — This is a mixture of gallotannic acid and punicotannic acid (granatotannic) acid, the latter insoluble in alcohol, ether, precipitates gelatin, tartar emetic, iron salts, with dilute acids splits into sugar and ellagic acid.

Pelletierine, C₃₆H₄₃O₁₉ (in honor of Pelletier). — This is obtained by mixing bark with milk of lime, displacing with water, exhausting percolate with chloroform. It is regarded by Tanret, its discoverer, to be the anthelmintic constituent, and is a colorless, oily, aromatic alkaloid, resinsifying on exposure, soluble in water, alcohol; forms crystalline salts (nitrate, sulphate, tannate, etc.)—considered to be a mixture of the several alkaloids. Dose, gr. 3–8 (2–5 gm.).
Pyrola  

*Pyrola rotundifolia*, Round-leaved Wintergreen; *P. elliptica*, Shin-leaf, and *P. chlorantha*, Greenish-flowered Wintergreen.—These three have racemes of nodding wax-like flowers; leaves resembling and containing same as *Chimaphila umbellata*, and used similarly.

**Quercus alba**

*Quercus alba*, *Quercus*, White (Tanner's) Oak Bark, N. F.—The dried inner bark of the trunk and branches with not more than 2 p. c. of outer bark or wood or other foreign organic matter; N. America. Stately tree 18-25 M. (60-80') high, 1-2.5 M. (3-8') thick, branched; leaves large, 4-6-lobed, petiolate, smooth, light green, glaucous with prominent veins beneath, brownish when dry; flowers monocious—staminate, catkins; pistillate, followed by 1-seeded ovoid fruit (nut, acorn), base in cupule. Bark, flat pieces, 2-10 Mm. (1/4-3') thick, light brown, rough-fibrous, fracture uneven, coarsely fibrous; odor distinct; taste strongly astringent; does not tinge saliva yellow when chewed; solvents: alcohol, water; contains tannin 6-11 p. c., oak-red, quercin, resin, fat, quercite. Astringent, tonic, hemostatic, similar to tannin; diarrhea, dysentery, cholera infantum, hemoptysis, hemorrhages, leucorrhoea, gonorrhoea, intermittent fever, phthisis, relaxed parts, ulcers; galls — prolapsed uvula, etc.; poultice — gangrene, etc.; powder — tooth powders and washes; tanning leather; wood durable, valuable. Dose, gr. 15-60 (1-4 Gm.); decoction, 5 p. c., 15-30 cc. (15-30 cc.); extract, gr. 2-10 (0.13-6 Gm.); fluid extract (alcohol 50, water 40, glycerin 10), mxv—60 (1-4 cc.).

*Quercus alba*: a, staminate catkins; b, magnified staminate flower; c, pistillate flower with stigmas magnified; d, acorn in embryo; e, section of young acorn; f, cotyledon with radicle.
Quercus infectoria  

GALLA. NUTGALL, U.S.P.

Quercus infectoria, Olivier. The gall from the young twigs and other allied species.


Quercus. L. oak, fr. Celtis querc-er, fine + cueae, a tree—fine, stately tree; or fr. Gr. yuktos, a pig—t. a., pigs love and feed on the acorns.

In-fec-tor’i-a. L. infectorius, dyeing, staining; in, in + facere, to do, make, taint—t. e., species easily infected or stained, thereby yielding dyeing product.

Galla. L. for gall, fr. Eng. gellen, galled = chafed, as a horse, or from its galls tough taste.

Plant.—Polymorphous shrub, 1.3–2 M. (4–6°) high; leaves obovate, shallow rounded lobed, 5–7.5 Cm. (2–3”) long; flowers May, catkins; fruit Sept., acorn, 2.5–4 Cm. (1–1½”) long. Nutgall (excrement) nearly globular, .8–2.5 Cm. (½–1”) broad, heavy, mostly sinking in water, olive-green, dark grayish, tuberculated above; basal portion smooth, contracted to short stalk; fracture short, hornly; internally grayish, dark brown, with a central radiate portion, occasionally a central cavity connected by narrow radial canal to exterior, odor slight taste strongly and persistently astrangent. Powder, brownish-yellow—starch grains up to .03 Mm. (a ¹⁄₉₉), few stone cells with narrow cavities and branched pore-canals; occasionally reticulate tracheae, tannin masses, calcium oxalate prisms and rosettes. Solvents: alcohol, water. Dose, gr. 5–30 (0.3–2 Gm).

Commercial.—Plant differs from Q. alba, N. F., in seldom being tree-like, in having less indented leaves, larger acorns, and dissimilar cupules. The leaf-buds and tender bark of shoots are stung (punctured) easily by the hornv ovipositors of the female hymenopterous insects (Cym’ips tintor’ia) which deposit one or more eggs in such galled places (wounds), and thereby establishes morbid growth that quickly leads to the formation of a small tumor of hypertrophied tissue enclosing the egg; upon the gall reaching full development the egg hatches into a larva or grub that at once begins feeding on juices of the central cavity, which, never larger than the larva, soon becomes lined with a wall of hard cells that gradually extend to the periphery, causing the gall to harden. The grub when grown passes into the pupa (chrysalis) stage, thence into a 4-winged fly, 6 Mm. (¼”) long, that must either die or cut itself out with its mandibles, thus making a small round opening midway the gall; should this not be accomplished the insect remains will be revealed upon cracking open the unpunctured gall. Color is the guide to quality—the whitish, light, and spongy being rejected. There are several varieties: 1. Aleppo (Syrian), best, bluish, usually collected before the fly escapes; 2. Smyrna, grayish-olive, intermixed with white galls (least valuable, generally with large perforation); 3. Sorant, blackish, size of a pea; all three varieties exported from Trebizond. Smyrna, Bassora, Calcutta, Bombay; 4. European, light-color, more spongy, produced by a different cynips; much tannin; 5. American: (a) Q. alba, light, spongy; little tannin; (b) Q. virginiana (cirene), Texas—resembles Aleppo but not tuberculated; tannin 40 p. c.; (c) Q. lobata, California, 5 Cm. (2”) broad, orange-brown, glossy, soft, spongy interior; much tannin.

Constituents.—Tannin 50–60 p. c. (white galls 20–30 p. c.), Gallic acid 2–3 p. c., mucilage, sugar, fat, resin; in the nucleus starch.

Acidum Tannicum. Tannic Acid. HC₅O₄. U.S.P.—(Syn. Acidin Tan., Gallo-tannic Acid, Tannin, Digallic Acid; Fr. Tannin officinale, Acide tannique, Ger. Gerbsäure.) Obtained by exhausting powdered nutgall with warm water, cooling, agitating the filtrate with one-fourth volume of ether; the emulsion separates in 10 days, yielding an upper ethereal layer (coloring matter, fat, resin, gallic and ellagic acids), which is discarded, and a lower aqueous fluid, containing tannin, which under reduced pressure, is concentrated in a still to syrupy consistence, cooled, and spread on thin glass plates to dry—these being placed on a steam table and covered over to produce puffy, spongy character. It is a yellowish-white, light brown amorphous powder, glistening scales, spongy masses, darker on exposure to light and light, odorless, faint characteristic odor; strongly astrangent taste, acid reaction; soluble in water, acetone, alcohol, diluted alcohol, slightly in dehydrated alcohol, glycine (1) heated, almost insoluble in ether, chloroform, benzene, petroleum benzine; owing to weak combination with variable proportions of glucose once considered a glucoside. Tests: 1. Aqueous solution + ferric chloride T. S.—bluish-black color or precipitate. 2. Aqueous solution precipitates nearly all alkalioids, glucosides, solutions of gelatin, albumin, starch (dist. from gallic acid). 3. On drying—loses 12 p. c.; incinerates—ash .5 p. c. Impurities: Gum, dextrin, resinous substances. Incompatibles: Alkalies, alkaloids, emulsions, gelatin, ferric salts, mineral acids, salts of antimony, lead and silver. Should be kept cool, dark, in well-closed containers. Dose, gr. 1–20 (0.06–1.3 Gm.).

Acidum Gallicum. Gallic Acid, HC₅O₄. This organic acid is prepared usually from tannic acid by boiling 15 minutes 1 part (or 2 parts nutgall) with sulphuric acid (1) and water (5); strain while hot, set aside for crystallization; a once popular method consisted in exposing to the air a mixture of nutgall and distilled water in a thin paste for a month, adding water occasionally to keep semi-fluid, expressing, rejecting liquid, boiling residue with distilled water, filtering hot through animal charcoal, setting aside to crystallize. It is in white, pale fawn-colored, silky, interlaced needles or triclinic prisms;
odorless; astringent, slightly acidulous taste; permanent, soluble in water (87), boiling water (3), alcohol (4.6), glycercin (10), ether (100), almost insoluble in chloroform; on drying loses 12 p. c.; saturated aqueous solution—acid; incinerate—ash .1 p. c. Tests: 1. Neutralize saturated aqueous solution with few drops of sodium hydroxide T. S.—gradually a deep green, changing to reddish by acids. 2. With ferrous solutions—neither colors nor precipitates; with ferric solutions—bluish-black precipitate. 3. Cold, saturated aqueous solution with alkaloids, glucosides, albumin, gelatin T. S., starch T. S.—no precipitate (abs. of tannic acid). It is the hydride of tannic acid, the latter being the anhydride of gallic acid, a relationship and convertibility shown by the equations: (1) $2\text{HC}_6\text{H}_4\text{O}_4\text{H} = \text{H}_2\text{O} = \text{HC}_6\text{H}_4\text{O}_4\text{H}$. (2) $\text{HC}_6\text{H}_4\text{O}_4\text{H} + \text{H}_2\text{O} = 2\text{HC}_6\text{H}_4\text{O}_3\text{H}$. Impurities: Tannic acid, etc. Incompatibles: Ferric and other heavy metallic salts, spirit of ethyl nitrite. Dose, gr. 5–20 (3.1–1.3 Gm.).


Unoff. Prep.: Fluidextract, $\text{mg}=30$ (3–2 cc.). Infusion, 5 p. c., $\text{g}=2$ (30–60 cc.). Unguentum Galles cum Opio (Br., nutgall 18 p. c., + opium 7.5 p. c.).


2. Trichisaci Acidis Tannici. Troches of Tannic Acid. (Syn., Troch. Acid. Tan.; Fr. Tablettes (Pastilles) de Tannin; Ger. Tanninpastillen.)

Manufacture: Rub together until thoroughly mixed tannic acid 6 Gm., sucrose 65, tragacanth 2, form mass with orange flower water q. s., divide into 100 troches. Dose, 1–3 troches.


Manufacture: 20 p. c. Dissolve tannic acid 20 Gm. in glycercin 20 Gm., with gentle heat, mix solution thoroughly with ointment 60 Gm., avoiding iron utensils.

4. Collodium Stypicum, N.F., 16 p. c., + flexible collodium q. s. 100.

5. Syrupus iodotannicus, N.F., .54 p. c., + iodine .27 p. c. Unoff. Prep.: Supportioria Acidis Tannici (Br., each 3 gr. (.2 Gm.)).

III. Gallic Acid.—1. Pyrogallol. Pyrogallol, $\text{C}_6\text{H}_4\text{O}_3\text{H}$, U.S.P. (Syn., Pyrogall., Pyrogallol Acid, Acidum Pyrogallicum; Fr. Acide pyrogallique; Ger. Pyrogallolium, Pyrogallussäure.) This trihydroxybenzene (triatomic phenol) is obtained by heating gallic acid for half an hour under pressure with water (3), boiling with animal charcoal, filtering, evaporating—$\text{HC}_6\text{H}_4\text{O}_4\text{H} + \text{heat} = \text{C}_6\text{H}_4\text{O}_3\text{H} + \text{CO}_2$; yield 75 p. c. It is in light, white, nearly white leaflets, fine needles, odorless, bitter taste, acquiring grayish tint on exposure, soluble in water (1.7), alcohol (1.3), ether (1.6), melts at 131° C. (268° F.). Tests: 1. Aqueous solution (1 in 10) reduces solutions of silver, gold and mercury salts, even in the cold; incinerate—ash .1 p. c. 2. Aqueous solution (1 in 20) neutral, slightly acid, colorless, yellowish, brown on exposure from absorbing oxygen; with a few drops of ferric chloride T. S.—brownish-red; with fresh ferrous sulphate T. S.—blue color. Should be kept dark, in well-closed containers.

Properties.—1. Nutgall: Astringent, tonic; constricts muscular tissue, thus checking secretions, hemorrhages, local inflammations, etc.

II. Tannic Acid: Local astringent. Internally—contracts blood-vessels, restrains peristalsis (constipates), coagulates mucous secretions, prevents secretion of gastric and intestinal juices, precipitates pepsin, etc.; it is converted into gallic acid in the intestines, and until this change is effected it cannot become absorbed to act as a remote or systemic astringent, simply being able to control locally gastric and intestinal bleeding. Externally—astringent, coagulates blood (forming a clot), albumin, and gelatin (tans tissues), is hemostatic, antiseptic, depressant, irritant; the salts have no astringency.

III. Gallic Acid: Mild astringent, does not coagulate blood, hence recognized only as remote astringent, but not to raw and bleeding surfaces; internally—controls systemic hemorrhages (contracts blood-vessels), decreases secretion of urine and sweat; does not constipate like tannic acid, and is eliminated by the kidneys unchanged.

IV. Pyrogallol: Violent irritant, depressing poison (large quantities); causes vomiting, purging, abdominal pain, quick pulse, low temperature, cyanosis (lips), convulsions, coma, death; urine dark (albumin, methemoglobin), blood chocolate colored, red corpuscles disorganized, liver changed as by phosphorus.

Uses.—I. Nutgall: Chronic diarrhea, dysentery, gleet, leucorrhea, antidiode to tartar emetic and alkaloids (emetine, morphine, colchicine, strychnine, etc.), constringes the stomach, thus delaying absorption, forming of the alkaloids insoluble tannates. In cases of poisoning give infusion freely. Locally infusion as gargle for relaxed mucous membrane of mouth, throat, vagina, rectum; ointment with 5–10 p. c. opium, good in hemorrhoids after inflammatory stage. Chiefs used for obtaining tannin and gallic acids, for ink, dyeing, tanning.

II. Tannic Acid: Hemorrhages (epistaxis, uterine, etc.), diarrhea, dyspepsia, cholera, relaxed uvula, coryza, inflamed fauces, diphtheria, toothache, aphtha, excessive salivation, leucorrhea, chapped nipples, gleet, gonorrhea, ulcers, piles, chilblains, chronic bronchitis, whooping-cough, phthisis, influenza, ozena, fissures, hemorrhoids, prolapsus ani and uteri, vesical catarrh, hemorrhage after extracting teeth, spongy gums (contracts vessels, checks absorption, hence loosening of teeth), obtunds sensitive dentine, either alone or combined with morphine and creosote, to toughen mucous membranes, skin around nipples, conjunc-
tivitis, erectile tumors, ingrowing toe-nails; aqueous solutions (1 to 50) may be injected into urethra and bladder, but should never be used hypodermically.

III. GALLIC ACID: Menorrhagia, purpura, epistaxis, hemoptysis, hematemesis, hemorrhage of stomach, intestines, lungs, kidneys, night-sweats, polyuria, Bright's disease, dyspepsia, bronchitis, hemorrhoids, chronic ulcers, pyrosis, alopecia.

IV. PYROGALLOL: Psoriasis, syphilitic ulcers, lupus, epithelioma, parasiteicide for ringworm. Should not be applied over extensive surface, as absorption may poison; not used internally; ointment 1–5–10 p. c.

Allied Products:

1. Chinese Nutgalls (Rhus semialata) by sting of A'phis s(ch)inen'sia.
   —Galls 4–5 Cm. (1½–2') long, ovate, irregular, tuberculate, grayish-downy, hollow; shell thin, fragile, containing many insect-remains.

   Chinese nutgalls.

   —The tannic acid of these differs from that of official galls.

3. Vallonea, Acorn Cups of many Quercus species (Q. Robur, Q. Vallo'nea, Q. B'gileo), 2.5 Cm. (1') in diameter, with thick, spreading scales, strongly astringent taste, largely used in tanning.

4. Tamarisk Galls (Tam'arix articula'ta (orienta'tis), T. a'frica'na, T. gal'lica').—Asia, Africa, 3–12 Mm. (½–2') thick, subglobular, knotty, contain tannin 40–50 p. c.

5. American Nutgalls (Q. alba, Q. virgina'na (vir'ena), Q. lob'ata), first poor in tannin; second (Texas) like Aleppo, but not tuberculate, tannin 40 p. c; third (California), 5 Cm. (2') thick, glossy, orange-brown, rich in tannin.

Quercus misc.

Quercus velutina (co'cina' e var. tineto'ria), Black (Scarlet) Oak (Querc'etin).
 —The (inner) bark, U.S.P. 1820–1870. Trees 24–30 M. (80–100°) high, 1–1.2 M. (3–4') thick, leaves oblong, lobed, 15–20 Cm. (6–8') long, mucronate; fruit, acorns, 12–18 Mm. (½–2') long, 12 Mm. (½') thick, cupule thick, shallow; bark resembles the preceding, only reddish-brown, gives saliva brownish-yellow color; contains tannin 6–12 p. c., quercitrin (red-brown coloring matter, dyeing yellow wool, silks, etc.), C_{6}H_{12}O_{6}, with diluted acids yields isodulcite, C_{6}H_{12}O_{6}, and yellow quercetin, C_{6}H_{12}O_{6}. In the South banks of Q. nigra and Q. digitata (falcata), used for this, although these have a much coarser texture and a deep reddish-brown color.

Quercus Ro'bur, Common European or English Oak.—Tall tree, 24–30 M. (80–100°) high, having 3 forms: (a) Q. pubes'cens (old leaves hairy); (b) Q. peduncula'ta (leaves smooth, pistillate flowers, and fruit on peduncles; (c) Q. sessili'fior'ra (leaves smooth, flowers and fruit sessile, petioles long). These have many varities, all resembling Q. alba.

Quercus digita'ta (fa'cata, L. falcatus—i. e., leaf-lobes scythe-shaped), Spanish or Red Spanish Oak.—Maryland-Florida. Tree 18–21 M. (60–70°) high, leaves grayish, 3–5-lobed, finger- or scythe-shaped. Bark rich in tannin, wood reddish, coarse-grained; used in tanning, sometimes called quercitron.

Quercus maryland'ica (ni'gra, ferrorg'in'ea), Black, Barren, or Iron Oak (Black Oak).—Southern States. Tree 9–12 M. (30–40°) high, leaves cuneate, 3–5-lobed, rusty, pubescent beneath, shining above. Of little value.

Quercus virginia'na (ni'rens, L. vi'reo, green, fresh, flourishing), Live Oak.—Maryland-Florida. Tree 12–18 M. (40–60°) high. Bark rich in tannin, wood fine-grained; used in shipbuilding.

Quercus su'ber, Cork Oak, Alcornoque (Savanna Bark).—Mediterranean Basin, S. United States. Small tree, 9–15 M. (30–50°) high, leaves toothed, ovate; bark with an elastic suberous layer 2.5–5 Cm. (1–2') thick, collected every 8–10 years, and constitutes our cork of commerce. When finely powdered, sold as suberin for absorbent purposes, which name is applied to one of its constituents (fat). There are about 80 species of Quercus, ranging from shrubs to trees; one-half of these grow in the United States, and may, with their acorns, be used similarly. Acorns sometimes are roasted = semen quercus to'stum, and used as a substitute for coffee; contain fixed oil, starch, citric acid, uncrystallized and quercetin sugars.
Quillaja

*Quilla'ja Sapon'aria, Quillaja, Soap (Tree) Bark, N.F.*—The dried inner bark with not more than 5 p. c. of outer bark nor 1 p. c. of foreign organic matter; Chile, cult. in N. Hindustan. Tree 15–18 M. (50–60°) high; leaves oval, evergreen, coriaceous; flowers white, monoeccious; fruit capsule with persistent calyx, many seeded. Bark in flat pieces of variable length, 3–8 Mm. (1–4”) thick, or small chips, brownish-white, often with cork patches, nearly smooth, occasional depressions, conical projections or channels; inner surface yellowish-white; fracture uneven, strongly fibrous; odor slight, taste acid. Powder, pinkish-white, very sterna-tary—elongated calcium oxalate prisms, irregular crystal-fibers with thick lignified walls, medullary rays, stone cells, starch grains, cork cells with brownish walls; solvents: alcohol, hot water; contains saponin (quillajic acid, C_{16}H_{26}O_{10} + quillaja-sapotoxin, C_{38}H_{68}O_{18}, 9 p. c., starch, gum, sucrose, calcium oxalate and sulphate. Stimulant, diuretic, expectorant, irritant, sterna-tary, detergent, local anesthetic, antipyretic, paralyzant to heart and respiration, irritant to respiratory passages, poison to voluntary muscles; like senega; bronchitis, coryza, rhinitis, emulsifying agent, eruptions, scalp sores, fetor of feet, hair tonics, washing silks. Dose, gr. 15–30 (1–2 Gm.); 1. *Tinctura Quillaja*, 20 p. c. (boiling water, then 35 p. c. alcohol); dose, 3ss–1 (2–4 cc.); 2. *Liquor Picis Carbonis*, 10 p. c. Fluidextract, 3v–15 (3–1 cc.).

Quillaja Saponaria, longitudinal section: bf, bast-fiber; bp, sieve-parenchyma; s, sieve-tube; m, medullary ray; K, crystal.

Ranunculus

*Ranunc'ulus bulb'osus, Bulbous Buttercup.*—The corm and herb, U.S.P. 1820–1870, Europe, N. America. Plant hairy, 15–45 Cm. (6–18’) high, bulb at stem base, flowers May, yellow, 5’s; contains volatile oil (anemonin + anemonic acid). Irritant, diuretic, narcotic; externally—bronchitis, rheumatism, sciatica; in decoction, infusion. Dose, 3ss–1 (2–4 Gm.).
Ranunculus

*Ranunculus bulbosus*, Bulbous Buttercup.—The corn and herb, U.S.P. 1820–1870, Europe, N. America. Plant hairy, 15–45 cm. (6–18") high, bulb at stem base, flowers May, yellow, 5’s; contains volatile oil (anemonin + anemonic acid). Irritant, diuretic, narcotic; externally—bronchitis, rheumatism, sciatica; in decoction, infusion. Dose, 3 ss–1 (2–4 Gm.).

*Raphanus sativus*

*Raphan'us Raphanistrum*, Wild Radish, Jointed Charlock, and *R. sativus*, Garden Radish.—Both contain a fixed oil resembling that from mustard, but the sulphurretted volatile oil of the latter differs in some respects.

*Rhamnus cathartica*

*R. cathart'ica*, Buckthorn Berries, Bacca Spinae Ceruina, N.F.—The dried ripe fruit with not more than 5 p. c. of unripe fruit or other foreign organic matter; Europe, N. Asia—naturalized in N. America. Small tree 3–4.5 M. (10–15") high, short branches, thorny; leaves 2.5–5 cm. (1–2") long, 2.5 cm. (1") broad; flowers greenish. Fruit, Sept., size of a pea, flattened, globose, 4–8 Mm. (1/4–1/2") broad, purplish-black, wrinkled, 3–4-celled, each cell with a brown seed-like nutlet—pedicel lacking; odor faint, unpleasant; taste sweetish, then nauseating, bitter; colors saliva—purplish-red; unripe fruit—discarded, greenish-brown, firm, furrowed, pedicel attached, very bitter. Powder, dark brown—epidermal cells, parenchyma—some with an amorphous substance, calcium oxalate rosettes, sarcocarp cells, some with yellow oily content; stone cells, calcium oxalate prisms, fixed oil, aleurone grains; solvent: diluted alcohol; contains emodin-autanol, gesterin, rhamnino-

(cathartic (a glucoside of emodin)—emodin, rhammonigrin, resin (containing emodin), rhamnose, glucose, fixed oil, quercetin and rhamninin (yellow coloring matter), ash 5 p. c. Cathartic—similar to cascara sagrada; chiefly in veterinary practice. Dose, 3 ss–1 (2–4 Gm.); 1.

*Fluidextractum Rhamni Catharticae* (diluted alcohol), dose, 3 ss–1 (2–4 cc.): Prep. 1. *Syropus Rhamni Catharticae*, 20 p. c., + ol. fennici, \( \frac{1}{3} \) ol. cinnamon. \( \frac{1}{2} \), syrup q. s. 100, dose, 3 j–3 (4–12 cc.). Decoction, 5 p. c.—expressed juice made into syrup. Fresh juice with alum or lime yields the pigment—*sap green*. *R. caroliniana*, Carolina (Southern) Buckthorn, New York-Texas, is a shrub or small tree; leaves oblong, serrate; flowers short-peduncled; fruit purple, 3-seeded.

*Rhamnus Frangula*

bark, natural size.

*Rhamnus Frangula*, Frangula, Buckthorn Bark, N.F.—The dried bark with not more than 2 p. c. of foreign organic matter; Europe, N. Asia—hedges. Slender straggling bush, 3–4.5 M. (10–15") high, non-thorny; leaves oval, entire; flowers whitish; fruit (berry) size of a pea; green, white, yellow, pink, red, finally black; 2–3-seeded. Bark, varying length quills, frequently flattened, crushed, 5–1 Mm. (1/4–1/2") thick, purplish-black, numerous light-colored transverse lenticels, occasional lichen; inner surface smooth, brownish, purplish blotches, striate—red with solution of alkalies; fracture short, inner layer fibrous; odor distinctive; taste slightly bitter. Powder, yellowish-brown—cork and parenchyma tissue, calcium oxalate rosettes, bast-fibers with yellow lignified walls, crystal-fibers with calcium oxalate prismatic crystals, starch grains; no stone cells (dist. from *R. Purshiana*); solvent: diluted alcohol; contains frangulin, C<sub>9</sub>H<sub>10</sub>O<sub>5</sub> (rhamnoxanthin) .04 p. c.—by hydrolysis yields emodin and rhamnose, C<sub>6</sub>H<sub>12</sub>O<sub>5</sub>, while emodin, C<sub>9</sub>H<sub>10</sub>O<sub>4</sub> + rhamnose = frangulin + water; also emodin 1–3.8 p. c., isomedin, frangulic acid, chrysophan, resin, tannin, ash 5–6 p. c. Purgative, tonic, diuretic—when fresh emetic, severe intestinal irritant causing much pain, when modified by age resembles rhubarb, senna, although milder; dropsy, costiveness, constipation of pregnancy (fluid. ext. 1.3 cc. ter die); parasitic skin affection—itch, etc. (ointment of fresh bark). Dose, 3 ss–1 (2–4 Gm.); 1. *Fluidextractum Frangulae* (extract with boiling water, add one-fourth alcohol—preservative), dose, 3 ss–1 (2–4 cc.): Prep.: 1. *Eliziv Catharticum Compositum*, 12.5 p. c., + fluid. ext. 10, fluid. rhei 6.2, liq. pot. hydrox. 1.4, sp. menth. pip. 1.4, al coh. 100, dose, 3 j–4 (4–15 cc.). Decoction, 5 p. c., 3 ss–1 (15–30 cc.); Extract, gr. 2–8 (.13–.5 Gm.).
Cascara Sagrada. Cascara Sagrada, U.S.P.

Rhamnus Purshiana, De Candolle.

The dried bark, collected at least one year before being used for making medicinal preparations.

Habitat. N. Idaho, west to the Pacific (N. California).

Syn. Cac. Sag., Rhamnus Purshiana, U. S. P., 1900; Chittlem Bark, Sacred-Persian, Persiana or Purchiana Bark, Beaverberry, Bear (Shittim) Wood; Rhamn Purshian Cortex.

Rhamnus. L. see etymology, above, of Rhamnaeae.


Cas-ca-ra Sag-raf-da. L. sp. cascarca, bark, + sagrada, sacred—holy bark—i. e., so considered by many natives, on account of its medicinal properties.

Plant.—Small tree, 4.5-6 M. (15-20°) high; twigs pubescent; leaves 5-15 Cm. (2-6°) long, 2.5-7.5 Cm. (1-3') wide, thin, elliptic, apex obtuse, base rounded, pubescent beneath, dull green, dentate, petioles short, downy; flowers large, umbellate cymes; fruit drupe, black, obovoid, 8 Mm. (4') long, 3-lobed, 3-seeded. Bark, usually flattened, transversely curved pieces, occasionally quills, 1-5 Mm. (2-5'-7') thick; dark brown, brownish-red, longitudinally ridged, grayish or whitish lichen patches, sometimes numerous lenticels, occasionally moss; inner surface longitudinally striate, light yellow, dark reddish-brown, dark brown (old matured bark); fracture short with projections of bast-bundles in inner bark; odor distinct; taste bitter, slightly acid. Powder, light brown, olive-brown—broken bast-bundles, crystal-fibers containing calcium oxalate monoclinic prisms; stone cells, more or less adhering; fragments reddish-brown cork; masses of parenchyma and medullary ray cells, red upon addition of alkali; starch grains spheroidal, .003-.008 Mm. (2-4'-6') broad. Tests: 1. Shake 1 Gm. + hot water (10°) occasionally until cold, filter + ammonia T.S. (10°)—orange-yellow. 2. Macerate 1 Gm. + alcohol (10 drops), boil with water (10 cc.), cool, filter; shake filtrate + ether (10 cc.)—yellow ethereal layer separates; of this shake 3 cc. + ammonia T.S. 3 cc.—separated ammoniacal solution + water (20 cc.)—retains distinct yellowish-red. Solvent: diluted alcohol. Dose, gr. 15-60 (1-4 Gm.).

Adulterations.—Barks of allied species: Formerly the smaller quills of R. californica, with medullary rays irregularly curved and grouped; in powder often find R. Frangula, which, owing to absence of stone cells and its longer bast-fibers, may be recognized; to this latter ammonia imparts deeper color.

Commercial.—Obtain bark in the spring from young trunks and large branches, dry carefully; should not be taken from old trunks, as that has different taste and characteristics. The emetic action of green bark is due to a hydrolytic ferment, which is destroyed either by aging or moderately heating (38° C.; 100° F.) for 48 hours.

Constituents.—Emodin (non-laxative), isoemodin, resin, tannin 2 p. c., glucose, volatile oil (yellowish-green, odorous), fixed oil (rhamnol arachidate, glycerides of linolic and myristic acids) 2 p. c., rhamnol (alcohol identical with quebrachol), C_{20}H_{20}O, hydrolytic ferment (non-gripping), syringic acid (not preexisting in the bark, but from a substance of unknown nature by the action of acids), ash 6-8 p. c. The active principle, undetermined chemically, but possibly a glucosidal derivative, is obtained by precipitating aqueous solution of the alcoholic
extract with lead subacetate, treating precipitate with ethyl-acetate, thereby yielding a non-crystalline, sticky mass containing laxative constituent. The “cascarin” and “purshianin” of previous investigators are regarded now simply as emodin with impurities, these latter constituting the medicinal entity, as purshianin gr. $\frac{1}{3}$ (0.013 Gm.) is purgative. The constituents of fresh (1-year) and matured (3-year) bark seem not to differ.


Manufacture: Macerate 3 hours 90 Gm. with boiling water 400 cc., percolate until exhausted (500 cc.), evaporate to dryness, pulverize, add dried starch q. s. 30 Gm. (to preserve powdered condition); mix powders thoroughly, pass through fine sieve and transfer to small, wide-mouthed bottles and stopper them tightly. Dose, gr. 2-8 (0.13-0.5 Gm.).


Manufacture: Similar to Fluidextractum Glycyrrhiza, page 317; evaporate to 75 cc., cool, add gradually alcohol 25 cc., and, if necessary, water q. s. 100 cc. Dose, mX-30 (0.6-2.2 cc.).


Manufacture: Slake lime 6 Gm. with water q. s., mix it with cascara sagrada 100 Gm. + magnesium oxide 6 Gm. (to remove bitterness), moisten uniformly with boiling water 200 cc., macerate in shallow dish for 48 hours, percolate with boiling water until exhausted, evaporate to 50 cc.; while warm dissolve in its pure extract of glycyrrhiza 4 Gm., cool, add glycine 20 cc., alcohol 20 cc. in which have been dissolved gluside 1 Gm., oil of anise .25 cc., oil of cinnamon .02 cc., oil of coriander .01 cc., methyl salicylate .02 cc., and water q. s. 100 cc. Here the magnesium oxide forms with the bitter principle (acid resin) a magnesium salt, insoluble in the menstruum, while the oxyethylanthraquinone is soluble. Dose, mX-30 (0.6-2 cc.).

Preps.: 1. Elixir Cascareae Sagradae, N.F., 50 p. c., + elix. glycyrh. q. 50. 2. Elixir Cascareae Sagradae Compositum, N.F., 12.5 p. c., + f. ext. sern. 7.5, f. ext. jugland. 6.5, elix. arom. q. s. 100. Dose, each, $\frac{1}{2}$-2 (4-8 cc.).


Unoff: Preps. Aromatic Syrup of Cascara (Br.), 40 p. c. $\frac{3}{8}$-2 (2-8 cc.), Cordial, $\frac{1}{2}$-2 (4-8 cc.), Tincture, 15 p. c. $\frac{3}{8}$-2 (2-8 cc.).

Properties.—Purgative, tonic, febrifuge, increases secretions of stomach, liver, pancreas; not usually given as a single cathartic, but where frequent repetition is required; it operates in 6-10 hours, and wears well, as generally increased quantities are not needed when habitually used; it regulates action of the bowels, and acts best when given on empty stomach in concentrated form. Fresh bark nauseates and gripes, owing to a ferment which in time changes, so that matured official bark and its preparations should be without these properties. The purgative action is claimed by some to be due largely to resins, tonic to bitter principle.

Uses.—Habitual constipation due to torpor of the colon, dyspepsia, hemorrhoids.

Rheum

**RHEUM. RHUBARB, U.S.P.**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rheum officinale, Bolten, palmatum, Linn., and var.</td>
<td>The dried rhizome and roots deprived of periderm tissues, yielding not less than 30 p. c. of diluted alcohol-soluble extract.</td>
</tr>
<tr>
<td>Rheum bicolor, Rhei Rhizoma, etc.</td>
<td>Habitant, W. and C. China, Thibet, Chinese Tartary; mountains, southern exposure—light, loose, sandy and rich black forest soil.</td>
</tr>
<tr>
<td>Palmae</td>
<td>Syn. Turkey or China Rhubarb; Br. Rhei Rhizoma; Fr. Rhubarbe de Chine; Ger. Rhizoma Rhei, Rhubarber.</td>
</tr>
<tr>
<td><em>Rheum</em></td>
<td><em>Rheum</em> R. Rha, the river Volga, upon whose banks it grows and was first found, fr. Gr. ῥῆος, ῥόος, to flow—i. e., it causes purgation.</td>
</tr>
<tr>
<td>Palmae</td>
<td><em>Palmae</em></td>
</tr>
</tbody>
</table>

Rhubarb, contraction of rhubarbarum—*rheum* + barbarum—i. e., barbarian plant from the Rha (Volga), whence name *rha* Ponticum—*Pontic-ra*, *R. ponticum*, Fr. Pontic or Euxine Sea.

Plants.—Large compact perennial herbs; aërial stem persisting through the winter, after a few years 30 Cm. (1') high, 10-15 Cm. (4-6') thick, branches 25-37.5 Cm. (10-15') long, blunt summit, brown coat from withered scales (oreas) and leaf-bases; internally fleshy (semi-pulpy) with yellowish juice; leaves very large, petiole .3-5 M. (12-18') long, 2.5-4 Cm. (1-1½') thick, solid, lamina .6-1.3 M. (2-4') long and broad, suborbicular, palmate-veined, 5-7-lobed, reticulate, pubescent, pale green; stipules very large; flowering branches (stems) several, 1.5-3 M. (5-10') high, hollow, thick, green, striate, smooth; flowers May-June, 6 Mm. (¼) long, clusters of 7-10, catkin-like compound panicles, greenish-white; fruit August, small clusters, 12 Mm. (¼) long, 6 Mm. (¼) broad, triangular, wing at each angle, crimsoned; seed solitary. Rhizome, subcylindrical, barrel-shaped, conical, round, or flattened pieces, flat, frequently with a perforation; hard, moderately heavy, 5-17 Cm. (2-7') long, 4-10 Cm. (1½-4') thick, or cut into variable shape and size; yellowish-brown, with lighter stria-
slightly stains the paper, while the European, or dark-colored Chinese, imparts a deep yellow stain; now on adding a few grains of borax + a drop of hydrochloric acid, if pure rhubarb—stain not changed, if tumeric present—get a distinct red.

Commercial.—Plants, resembling our garden rhubarb—pie-plant, grow wild and largely under cultivation in Chinese Empire, where a number of species, chiefly the two recognized, furnish the official product. Rhizome, when 8–10 years old, is dug in the autumn (Tartary, spring, China, Sept.–Oct.), and, after removing roots and corky layer, is divided into segments (to aid drying), perforated, strung on cords, and suspended in the shade or under cover (house roofs and eaves) to be cured by circulating air, a process that often requires a year and a loss of 80 p. c.; frequently that dried by the sun, heated stones, stones, ovens, kilns, or brushwood fires, high dried (usually having broad ridges, blackish grooves, heavy disagreeable odor) and the larger roots, tails, are included, but both are more or less inferior. Variety and quality are distinguished, in experienced hands, by odor (bouquet), while all kinds are subject to insect attack, which is prevented best by keeping in tightly-closed containers having a tuft of cotton saturated with chloroform or carbon tetrachloride. Most of our supply comes from Hankow, on the Upper Yang-tze, that from Haining (Tse-chuen and Shensi products) commanding the highest price. There are three varieties: 1. Russian (Turkish, Crown—R. palmatum), no longer on the market, but consisted of the best rhizome, from Chinese Tartary via Siberia, trimmed to beneath the cambium, perforated with large conical hole (for easy examination), inspected rigorously at Kiachta, refuse burned, the reserve sewed in linen sacks, covered with hide, and sent to Leningrad (Petrograd St. Petersburg); Turkish ports once supplied it (hence name), being brought from Tartary by caravans through Persia and Anatolia; 2. Chinese (E. Indian—R. officinale, R. palmatum, var. tanguicum, etc.), our official rhizome, having inner bark, and sometimes patches of rough corky layer and twine fibers; color less bright and odor less aromatic than Russian; flourishes best at
2,400–3,000 M. (8,000–10,000°) elevation in the Himalaya and other mountains, on the shady side of damp ravines, with northern exposure; distinguished natively as “northern” and “southern,” also as “Shensi” (best, most expensive-orange color, agreeable odor), “Canton” (smoky odor, bitter, ochre-yellow), “Shanghai” (smoky odor, light yellow; exported chiefly from Canton, occasionally via India); 3, European (*Rhaponticum*: R. palmatum, R. rhaponticum, R. compactum, R. undulatum, R. Emodi +), cultivated in England, France, Austria (Moravia), the rhizome being cut to resemble the Chinese, but differing in having the outside nearly or entirely without white meshes, the medullary rays interrupted, narrow, nearly straight, with paler color, weaker odor, and less gritty but more mealsinaceous taste; rarely imported.

**Constituents.**—Resin, Aloe-emodin, Chrysophanic acid, rhein, emodin, emodin monomethyl ether, rheinolic acid (new anthraquinone derivative), volatile oil, rheotannic acid, gallic acid, cinnamic acid, palmitic acid, stearic acid, oleic acid, linolic acid, verosterol (phytosterol), dextrose, levalose, calcium oxalate 2–40 p. c. (the greater the amount, the greater the activity of the drug, the two going hand in hand); starch, ash 12–13 p. c. —very inferior 35–45 p. c.

**Resin.**—Chief purgative principle; amorphous, non-glucoside—obtained from alcoholic extract, after removing volatile oil by separating from greenish-yellow residue in still the dark aqueous liquid, extracting it with ether, then with amyl alcohol, evaporating to get brown tarry liquid and yellowish granules, crystals (aloe-emodin, chrysophanic acid, rhein, emodin, emodin monomethyl ether, rheinolic acid—all of which the resin yields upon hydrolysis); evaporate brown tarry filtrate, dissolve in alcohol and precipitate with equal quantity of chloroform.

**Aloe-emodin and Chrysophanic Acid.**—Both slightly purgative, obtained by concentrating above ethereal liquid, heating residue with ethyl acetate, adding petroleum, decanting from tarry precipitate, evaporating petroleum solution, dissolving in ether, extracting with 10 p. c. aqueous solution of sodium carbonate (aloe-emodin), or with 10 p. c. aqueous solution of potassium hydroxide (chrysophanic acid). Aloe-emodin is the rhabarberon and iso-emodin of some writers.

**Preparations.**—


**Manufacture.** Macerate, percolate 100 Gm. with 80 p. c. alcohol until exhausted, reclaim alcohol, continue distillation until residue syrupy consistency, transfer to a dish, rinse still with little warm menstruum, which add to dish and evaporate to dryness at 70° C. (150° F.), stirring frequently; add dried starch enough for extract to weigh 50 Gm., pulverize, mix thoroughly, pass through fine sieve; 1 Gm. represents 2 Gm. of the drug. Should be kept in small, wide-mouthed, tightly-stoppered bottles. Dose, 3–10 (2–6 Gm.).

2. *Fluidextrahum Rhei.* Fluidextract of Rhubarb. (Syn., Fludext Rhei, Fluid Extract of Rhabarbar; Fr. Extrait fluide de Rhubarbe; Ger. Rhabarberfluidextrakt.)

**Manufacture.** Similar to fluidextractum Sarsaparillae, page 126; menstruum: 80 p. c. alcohol. Dose, 3–4 (3–2 cc.).

Preps.: 1. *Syrupus Rhei.* Syrup of Rhubarb. (Syn., Syr. Rhei; Fr. Sirop de Rhubarbe; Ger. Rhabarbersirup (soft)).

**Manufacture.** 10 p. c. Mix fluidextract of rhubarb 10 cc., spirit of cinnamon 4 cc., add potassium carbonate 1 Gm., dissolved in water 5 cc., and to this mixture add syrup q. s. 100 cc. Dose, 5j–4 (4–15 cc.).


**Manufacture.** 25 p. c. Triturate together rhubarb 25 Gm., ginseng 10, add gradually magnesium oxide 65; mix thoroughly, pass through No. 60 sieve. It is pinkish-white, mobile, darker on exposure to moisture; it exhibits fine particles of magnesium oxide, numerous elliptical starch grains (ginseng). 005–006 Mm. (THO–THO) broad, and fragments of vegetable tissues; polygonal starch grains (rhubarb), 002–002 Mm. (THO–THO) broad. Dose, 3–4 (2–4 Gm.).

4. *Tinctura Rhei.* Tincture of Rhubarb. (Syn., Tr. Rhei; Fr. Tincture de Rhubarbe; Ger. Rhabarberentwirk.)


5. *Tinctura Rhei Aromatic.* Aromatic Tincture of Rhubarb. (Syn., Tr. Rhei Aram.; Fr. Tincture de Rhubarbe aromate; Ger. Aromatische Rhabarbertinktur.)

**Manufacture.** 20 p. c. Similar to tinctura Veratri Viridis, page 104—using rhubarb 20 Gm., cinnamon 4, clove 4, myristica 2; 1st menstruum: glycerin 10 cc., alcohol 50, water 40, 2d: diluted alcohol q. s. 100 cc. Dose, 3–4 (2–15 cc.).

Preps.: 1. *Syrupus Rhei Aromaticus.* Aromatic Syrup of Rhubarb.
(Syn., Syr. Rhei. Arom., Spiced Syrup of Rhubarb; Fr. Sirop de Rhubarbe aromatique; Ger. Gewürzter Rhabarbersirup (saut.) Manufacture: 3 p. c. Dissolve potassium carbonate .1 Gm. in aromatic tincture of rhubarb 15 cc., to this add syrup q. s. 100 cc. Mix thoroughly. Dose, for a child with diarrhea, 5-2 (4-8 cc.).


Unoff. Preps.: Aromatic Fluidextract, mxv-60 (1-4 cc.). Infusum Rhei (Br.), 5 p. c., 34v-8 (15-30 cc.). Liquor Rhei Concentratns, 50 p. c., 3v-1 (2-4 cc.). Vinum Rhei Compositum, 8 p. c., +, 3-4 (15-25 cc.). Torrefactum Rhubarbe.—By roasting, the cathartic principle is volatilized and the full astringency left behind; long boiling will effect the same result.

Properties.—Aperient, purgative, astringent, stomachic, tonic. It increases saliva, gastric juice, bile, peristalsis, vasodilatation, and absorption. The astringent effect comes first (4-8 hours), due to resins (mainly rheoeticin), emodin, etc.; then follows astringency from rheo-tannic acid; both actions being chiefly on the duodenum. The milk, urine, and sweat become colored, the first also acquiring bitterness and purgative properties. Purging may result from its application to ulcers, abraded skin, or in poultices to abdomen.

Uses.—Diarrhea, hemorrhoids, cholera infantum, chronic dysentery, dyspepsia, thread worms. With calomel good in bilious fevers; with magnesium oxide for stomach and bowel disorders. By association with other cathartics both rendered more efficient; sometimes used with opium.

Allied Plants:
1. Rheum rhaponticum. Asia Minor, Siberia, Russia. This is cultivated as pie-plant, the leaf-petioles being used, as they possess pleasant acidulous properties; this species is the source of the cultivated European rhizome, and that of Moravia (Austria), Hungary, England, and Banbury, which is usually less than half the size of official rhubarb, conical, harder, lighter color, more bitter and astringent, less gritty; contains rhapontin, C_{4}H_{2}O_{4}. R. undulatum, R. compactum, R. Emo’di, R. austral’e, R. hybridum.—All produce handsome, but smaller, less valuable, and lighter-colored rhizomes.

Rhus aromatica

Rhus aromatica, Fragrant (sweet-scented) Sumac(h), 1.5-2.5 M. (6-8") high; given in extract, fluidextract (alcoholic), tincture, and for hematuria, leucorrhoea, but mainly for incontinence of urine (enuresis). Dose, gr. 10-30 (.6-2 Gm.). R. copallina, Black, Dwarf, Mountain Sumac(h), 1-2.5 M. (3-8") high; downy branches; leaflets entire; excels all in yield of tannin. R. hirta (typhina), Staghorn Sumac(h), 4.5-9 M. (15-30") high; hairy; leaflets serrate. All three indigenous to N. America. R. Coriaria, European Sumac(h), Mediterranean Basin; leaflets elliptic, woolly, serrate. R. semialata and R. japònica, China, Japan; these furnish galls which are used in Germany largely for obtaining tannin and gallic acid (see pages 157, 160). The fruits of all these are red, hairy, and acidulous, while the leaves are astringent.

Rhus glabra

Rhus glabra, Rhus glabra, U.S.P.

Rhus glabra, The dried ripe fruit with not more than 5 p. c. stems or other foreign organic matter.

Habitat. N. America, west to California, Idaho; on barren or rocky soil.

Syn. Rh. Glab., Sumac Berries, Sumach, Mountain, Dwarf, Smooth, Unbark, Scarlet, or Pennsylvania Sumach, Indian salt (powder on the berries); Fr. Sumac, Sumac; Ger. Sumach.

Rhus. L. fr. Gr. rhous; Celtic rhaud, red—i.e., color of the fruit, also the leaves of the same species in autumn.

Glabra. L. fr. glaber, smooth, hairless—i.e., its leaves and branches.

Sumac. L. fr. Ar. summac—i.e., their native name for the plant.

Plant.—Woody shrub 1.5-4.6 M. (5-15") high; stem more or less bent, dividing into many straggling branches, pith large, wood thin, white; bark smooth, grayish or reddish, with small scattered warts; leaves imparipinnate; leaflets 11-31, lanceolate, acuminate, serrate, whitish beneath, changing to a beautiful red in autumn; flowers June—July, greenish-red, terminal panicles. Fruit, Sept., drupes in small clusters, flattened ovoid, nearly globular, somewhat reniform; 3.5-5.5 Mm. (.12") long, nearly as broad, usually somewhat less; apex with raised scar, five-parted calyx occasionally with short pedicel at base; dark red, velvety with short hairs; endocarp smooth, shiny, crimson—yellowish-red; 1-locular, 1-seeded; seed brown, very hard; inodorous; taste acridulous, astringent. Powder, brownish-red—numerous non-glandular hairs, usually several celled, uniseriate, filled with pink or red dried sap, occasionally rod-shaped crystals; few slender 1-celled, colorless, non-glandular hairs; numerous brownish glandular hairs, fragments red-celled epicarp with adhering mesocarp having spiral trachee; stone cells of endocarp small, fragments of embryo with cells having aleurome grains and fixed oil. Solvent: diluted alcohol. Dose, 5-2—4 Gm.

Adulterations.—Fruits of allied species—R. hirta (typhina)—shaggy coating of long, straight hair), R. aromatica (smaller, less compressed, nearly spherical), R. Coriaria (rouger, hispid).

Commercial.—Sumac grows in waste fields, along fences, woods, etc., the bark, galls, and leaves are very astringent, being collected during summer or fall for use in tanning and dyeing, while from these an extract is made containing 25-30 p. c. tannin, and this is its most convenient form for all trade and chemical purposes. For this extract sumac is cultivated in Virginia and other States.


Manufacture: Similar to Fluidextractum Ergotae, page 63—macerate, percolate 100 Gm. with 1st menstruum: glycerin 10 cc., alcohol 50, water 40; finish with 2d: diluted alcohol. Dose, 3 ss–1 (2–4 cc.).


Properties.—Astringent, refrigerant, diuretic; resembles tannin.

Uses.—Catarrhal affections of stomach and bowels, pharyngitis, tonsillitis, mercurial sphygmos, spongy gums, and other mouth affections (as a gargle), ulcers, wounds, etc. (as a wash).

Rhus tox

R. radicans, Rhus Toxicodendron, Poison Ivy.—The fresh leaflets, U.S.P. 1870–1890; N. America. Climbing plant over fences, rocks, trees, etc.; flowers small; fruit smooth drupe. Leaflets, collected May–June, trifoliate, petiolate, entire, glabrous, the 2 lateral nearly sessile, 10 Cm. (4") long, obliquely ovate and pointed; when dry brittle, inodorous, astringent, when fresh with acid juice blackening on exposure, applied to skin produces swelling, inflammation, etc.—hence should not handle unglowed or confound with the harmless Ptelea trifoliata, Three-leaved Hoptree, whose leaflets are sessile, thicker, paler green; contains toxicodendrol 3.3 p. c., tannin, acetic acid (formerly considered toxicodendric acid); toxicodendrol, the active, irritating, poisonous principle, is a viscid, non-volatile oil (or freed fat acid, or complex glucoside), agreeably odorous, soluble in alcohol, benzene, ether, chloroform, decomposed by heat. Irritant, rubefacient, narcotic, poisonous; internally produces gastro-intestinal inflammation, vertigo, nausea, muscular debility, delirium, mydriasis, convulsions, death. Poisoning: The fresh leaves, juice or flying pollen produce external itching, burning, redness, tumefaction, vesication, desquamation, lasting 1–2 weeks. Apply at once soap and water with scrubbing-brush, lead water and laudanum, alkaline solutions (sodium bicarbonate—8 p. c. solution 3–4 times daily, sulphite, chlorinated, thiosulphate, diluted ammonia, soapsuds, alum curd), or hot aqueous saturated solution of magnesium sulphate (frequently), or fresh bruised leaves of either fire weed (Erechtites hieracifolia), touch-me-not (Impatiens aurea, biflora) or burdock (Arctium Lappa), or solution of sodium salicylate (2), + fidiex. hydrastis (1) + water (3), or tincture or infusion of lobelia, grindelia, or sassafras, cocaine solution 4–8 p. c. (to relieve burning and itching), aristol, glicerine of phenol, opium—no oils, vaselin, alcohol, these being solvents of poison serve to disseminate it, low diet, saline purgatives, quietness. Used in chronic eczema, skin diseases, erysipelas, rheumatism, incontinence of urine, etc. Dose, gr. 2—5 (3–12 Gm.); tincture (fresh leaves bruised and macerated with equal weight of alcohol), m. Cs–1 (.006–.06 cc.); juice (expressed from leaves and preserved with alcohol) is soluble in ether and possesses all the virtues of the plant; fluidextract, m. 30 (3–2 cc.). R. Toxicodendron, properly more or less shrubby, 6–1 M. (2–3") high, erect, leaflets crenately lobed, pubescent, called also Poison Ivy (Oak)—merely a variety of R. radicans. R. diversi'loba, Pacific coast; leaves with 3–5-lobed, pinnatifid leaflets. R. Ver'nis (senen'ata), Canada, United States, swamps, 3–6 M. (10–20") high; leaves of 7–13 entire leaflets; fruit yellow; called poison-samac(h), -dogwood, -elder, and yields most toxicodendrol. R. pal'milla, S. Carolina, procumbent shrub; leaves pinnate with 11 toothed acuminate leaflets; fruit red, hairy. All of these are poisonous, but R. Ver'nis the most so, as when in flower it so taints the surrounding air that sensitive persons become poisoned by simple exposure to the effluvium.

Ricinus

RICINUS. CASTOR OIL PLANT.

Oleum Ricini. Castor Oil, U.S.P.

Ricinus communis. A fixed oil obtained from the seeds.

Habitat. India; cultivated in tropics; India, Italy, Spain, Sicily, United States. Sgm. Palma Christi, Castor Bean, Mexico Seed, Oil Plant, Oil Seed (Nu); Fr. Ricin (Grain); Ger. Wunderbaum; Ol. Rici., Oleum Palmae Christi; Fr. Oleum e Semini Rici, Huile de Rici; Ger. Rizinnöl.

Ric'in-nus. L. a bug, dog-tick—i. e., from the resemblance of the seed.

Com-nu'sis. L. common, general—i. e., it is the ordinary common species.

Plant.—This is quite variable in habit and appearance—in tropics a tree 9–12 M. (30–40") high, in warm or temperate regions a woody
liquid, faint, mild odor, bland, slightly acid, usually nauseating taste, miscible with dehydrated alcohol or glacial acetic acid; sp. gr. 0.955; at 0° C. (32° F.) separates into crystalline flakes, at —18° C. (—4° F.) congeals into yellow mass; contains mostly triricinolein (the glyceride of ricinoleic acid), C₂₉H₄₈(C₁₈H₃₄O₉)₈, also palmitin, ricinoleic acid (ricinic acid), C₁₈H₃₂O₆, which is a viscid oil readily converted by nitrous acid into ricinelaidic acid, crystalline, melting at 50° C. (122° F.). Tests: 1. Only partly soluble in petroleum benzine (diff. from most other fixed oils). 2. Soluble (clear) in an equal volume of alcohol (abs. of foreign fixed oils). Should be kept in well-closed containers. Dose, 5—8 (4—30 cc.).

Adulterations.—Rare: Cottonseed, rapeseed, sesame, and mineral oils—detected by decreased solubility in alcohol and preceding tests.

Commercial.—Plant, called Palma Christe from supposed shape of leaves resembling Christ's hand, is cultivated extensively in the United States for the oil which is extracted from the seed by: 1. Expression; 2, Decoction; 3. Solution (benzin, carbon disulphide, chloroform, ether). The first method is preferred, and consists in crushing and freeing seed of the integuments, dark skin, etc., and expressing at 60° C. (140° F.), or in heating clean seed in shallow tanks short of scorching, 65° C. (150° F.), to render oil more fluid, and expressing them hydraulically in hempen bags between hot iron plates; while this affords the greatest yield of oil it is of inferior quality, the best being from hand-screw presses. This white oil now is run into iron vats with water, boiled to separate impurities (albumin being coagulated and removed by skimming, mucilage and starch being dissolved in water), strained, reboiled (to destroy acidity), strained, and, if opaque, treated with fuller's earth, or magnesium oxide (1 p. c.) and animal charcoal (2.5 p. c.), filtered through paper and felt, and put into cans or barrels, constituting as such cold-pressed castor oil; by grinding marc with water and expressing, may obtain 6—8 p. c. additional good oil; the yield by cold expression is 25—30 p. c., with heat 35—45 p. c. The method by decoction, owing to water dissolving poisonous ricin and heat increasing

Constituents.—Seeds (testa 23.82 p. c., kernel 69.09 p. c.) yield fixed oil 35—45 p. c., gum (mucilage) 2.4 p. c., starch and lignin 20 p. c., albumin 5 p. c., ricinole, proteins (emulsins), sugar, ash (testa 10 p. c., kernel 4 p. c.). The poisonous principle, ricin, is an albuminoid, soluble in a 10 p. c. solution of sodium chloride, precipitated by acids, coagulated by heat; harmless to chickens.

Oleum Ricini. Castor Oil.—This fixed oil, obtained from the seed chiefly by expression, is a pale, almost colorless, transparent, viscid

bush 3.6—4.5 M. (12—15°) high; in Middle United States with herbaceous stems 1.6—3 M. (5—10°) high, hollow, smooth, glaucous, purplish bloom above; leaves with blade 15—20 Cm. (6—8°) broad, palmately divided (1/2 depth) into 7—11 lanceolate, serrate segments, smooth, bluish-green, paler beneath on long, curved, cylindrical, purplish petioles; flowers July, monocious, large, apetalous, racemes, staminate below, pistillate above; fruit tricoccous capsule 2.5 Cm. (1") long, blunt, greenish, deeply grooved, sometimes smooth, usually spinescent on the 3 projecting sides, 5-celled, each cell 1-seeded, which is expelled in Aug.—Sept. by capsule dehiscing into 6 valves. Seed 12 Mm. (1") long, 6 Mm. (1") broad, 3 Mm. (1") thick, size of a coffee grain, with caruncle, raised raphe, grayish, marbled with blackish spots or bands of various tints and shapes, smooth, shining.

a, Ricinus fruit; b, seed; c and d, longitudinal sections.

oil's acidity, is not so desirable, consisting in crushing the seed after removing husks (testa), boiling with water (oil floating on surface), straining, reboiling to dissipate acid principle, straining, filtering; this oil usually is brownish, acid, irritating, and comes from E. and W. Indies. The method by solution causes the oil to turn rancid quicker, in spite of which it is preferred in France and Italy, being