

\* \* Fruit echinate with soft bristly green projections; seeds rough-wrinkled.

2. *A. Caroliniæna*, Ell. Leaves thin, ovate-cordate, sharply and closely serrate-toothed, abruptly acuminate, long-petioled; sterile spikes short, axillary; the fertile ones mostly terminal and elongated, their bracts deeply cut into many linear lobes. — N. J. to Fla., west to Ohio, Kan., and Tex.

### 9. *RÍCINUS*, Linn. CASTOR-OIL PLANT.

Flowers in racemose or paniced clusters, the fertile above, the staminate below. Calyx 5-parted. Stamens very numerous, with repeatedly branching filaments. Styles 3, united at base, each bifid, red. Capsule large, 3-lobed, with 3 large seeds. — A tall stately annual, with very large alternate peltate and palmately 7-11-cleft leaves (often 1-2° broad). (The ancient Roman name of the plant.)

*R. communis*, L. — Cultivated extensively for ornament, and sparingly escaped in Md., Mo., and southward. Very variable.

### 10. *TRÀGIA*, Plumier.

Flowers monœcious, in racemes, apetalous. *Ster. Fl.* Calyx 3-5 (chiefly 3-) parted, valvate in the bud. Stamens 2 or 3; filaments short; anther-cells united. *Fert. Fl.* Calyx 3-8-parted, persistent. Style 3-cleft or 3-parted; the branches 3, simple. Capsule 3-celled, 3-lobed, bristly, separating into three 2-valved 1-seeded carpels. Seeds not carunculate. — Erect or climbing plants (perennial herbs in U. S.), pubescent or hispid, sometimes stinging, with mostly alternate stipulate leaves; the small-flowered racemes terminal or opposite the leaves; the sterile flowers above, the few fertile at the base, all with small bracts. (Named for the early herbalist *Bock*, latinized *Tragus*.)

1. *T. innócuæ*, Walt. Erect, paniculate-branched, softly hairy-pubescent (6-12' high); leaves varying from obovate-oblong to narrowly linear, acute at base, obtusely or sinuately few-toothed or lobed, sometimes entire, short-petioled or sessile, paler beneath; sterile calyx usually 4-parted; stamens 2. (*T. urens*, L.) — Dry sandy soil, E. Va. to Fla. and La. May-Aug. — Not stinging.

2. *T. nepetæfólia*, Cav. Erect or reclining or slightly twining, hirsute with stinging hairs; leaves ovate-lanceolate or triangular-lanceolate, or the lower ovate, all somewhat cordate or truncate at base, coarsely cut-toothed, short-petioled; sterile calyx usually 3-parted and stamens 3. (*T. urticæfolia*, Michx.) — Virginia (*Pursh*), and common southward to Fla. and Tex., Mo., Kan., and westward. — *T. stylàris*, Muell., of the southwest, which is reported from Kan., may be distinguished by its 4-5-parted sterile calyx, 4-5 stamens, and elongated styles.

3. *T. macrocárpa*, Willd. Twining, somewhat hirsute; leaves deeply cordate, ovate, mostly narrowly acuminate, sharply serrate (3-5' long), all but the uppermost long-petioled; pod  $\frac{1}{2}$ ' broad. (*T. cordata*, Michx.) — Ky. to Ga., Fla., and La.

### 11. *STILLÍNGIA*, Garden.

Flowers monœcious, aggregated in a terminal spike. Petals and glands of the disk none. Calyx 2-3-cleft or parted; the divisions imbricated in the bud. Stamens 2 or 3; anthers adnate, turned outward. Style thick; stigmas 3,

diverging, simple. Capsule 3-celled, 3-lobed, 3-seeded. Seed carunculate. — Smooth upright plants, with the alternate leaves mostly 2-glandular at base; the fertile flowers few at the base of the dense sterile spike (rarely separate); the bract for each cluster with a large gland on each side. (Named for *Dr. B. Stillingfleet*.)

1. *S. sylvática*, L. Herbaceous (1-3° high); leaves almost sessile, oblong-lanceolate, serrulate; glands of the spike saucer-shaped. — Sandy and dry soil, Va. to Fla., west to Kan. and Tex. June-Sept.

### ORDER 99. URTICACEÆ. (NETTLE FAMILY.)

Plants with stipules, and monœcious or diœcious or rarely (in the Elm Family) perfect flowers, furnished with a regular calyx, free from the 1-celled (rarely 2-celled) ovary which forms a 1-seeded fruit; the embryo in the albumen when there is any, its radicle pointing upward; stamens as many as the lobes of the calyx and opposite them, or sometimes fewer. Cotyledons usually broad. Stipules often deciduous. — A large order (far the greater part tropical).

**Tribe I. ULMEÆ.** Flowers mostly polygamous, upon the last year's branches. Anthers erect in the bud, extrorse. Styles or stigmas 2. Fruit a winged samara or nut-like. Seed suspended. Embryo straight. — Trees, with alternate serrate pinnately veined leaves and fugacious stipules.

1. *Ulmus*. Flowers preceding the leaves. Ovary 1-2-ovuled. Fruit winged all around.  
2. *Planera*. Flowers appearing with the leaves. Ovule one. Fruit wingless, nut-like.

**Tribe II. CELTIDÆ.** As in Tribe I., but the diœcious-polygamous flowers upon branches of the same year; anthers introrse; fruit a drupe; embryo curved.

3. *Celtis*. Ovary 1-ovuled. Flowers appearing with the leaves. Leaves 3-nerved at base.

**Tribe III. CANNABINÆ.** Flowers diœcious; the sterile racemed or paniced; the fertile in clusters or catkins, the calyx of one sepal embracing the ovary. Filaments short, erect in the bud. Stigmas 2, elongated. Ovary 1-celled, with a pendulous-ovule, forming a small glandular achene in fruit. Embryo curved or coiled. — Erect or climbing herbs, with watery juice, mostly opposite lobed or divided leaves, persistent stipules, and a fibrous inner bark.

4. *Cannabis*. Fertile flowers spiked-clustered. Leaves 5-7-divided. Erect.

5. *Humulus*. Fertile flowers in a short spike forming a membranaceous catkin in fruit. Leaves 3-5-lobed. Climbing.

**Tribe IV. MOREÆ.** Flowers unisexual, racemose, spicate or capitate; calyx becoming fleshy or juicy in fruit. Anthers inflexed in the bud. Style undivided or 2-parted, filiform; ovule pendulous; fruit an achene, embryo curved. — Trees or shrubs, with milky juice, alternate leaves, and fugacious stipules.

6. *Maclura*. Sterile flowers in loose racemes; fertile in globose heads. Leaves entire.

7. *Morus*. Fertile and sterile flowers in separate spikes. Leaves dentate, 3-nerved.

**Tribe V. URTICEÆ.** Flowers unisexual. Filaments inflexed in the bud. Style or stigma simple. Ovary 1-celled, with an erect ovule, forming an achene in fruit. Embryo straight. — Herbs with watery juice, tough fibrous bark, and opposite or alternate leaves; often armed with stinging hairs.

\* Calyx in the fertile flowers of 2-5 separate or nearly separate sepals.

+ Plant beset with stinging bristles.

8. *Urtica*. Sepals 4 in both fertile and sterile flowers. Achene straight and erect, enclosed by the 2 inner and larger sepals. Stigma capitate-tufted. Leaves opposite.



9. *Laportea*. Sepals 5 in the sterile flowers, 4 in the fertile, or apparently only 2. Stigma long-subulate. Achene very oblique, deflexed, nearly naked. Leaves alternate.  
 +- Plant wholly destitute of stinging bristles. Leaves opposite
10. *Pilea*. Sepals 3 or 4, those of the fertile flowers unequal, all or all but one small. Achene partly naked, straight and erect. Stigma pencil-tufted. Smooth and shining.  
 \*\* Fertile calyx tubular or cup-shaped, enclosing the achene. Unarmed.
11. *Boehmeria*. Flower-clusters spiked, not involucre. Style long and thread-shaped, stigmatic down one side. Leaves opposite, serrate.
12. *Parietaria*. Flowers in involucre-bracted clusters. Stigma tufted. Leaves alternate, entire.

1. *ÚLMUS*, L. ELM.

Calyx bell-shaped, 4-9-cleft. Stamens 4-9, with long and slender filaments. Ovary 1-2-celled, with a single anatropous ovule suspended from the summit of each cell; styles 2, short, diverging, stigmatic along the inner edge. Fruit a 1-celled and 1-seeded membranaceous samara, winged all around. Albumen none; embryo straight; the cotyledons large. — Flowers polygamous, purplish or yellowish, in lateral clusters, in our species preceding the leaves, which are strongly straight-veined, short-petioled, and oblique or unequally somewhat heart-shaped at base. Stipules small, caducous. (The classical Latin name.)

\* Flowers nearly sessile; fruit orbicular, not ciliate; leaves very rough above.

1. *U. fúlva*, Michx. (SLIPPERY OR RED ELM.) Buds before expansion soft-downy with rusty hairs (large); leaves ovate-oblong, taper-pointed, doubly serrate (4-8' long, sweet-scented in drying), soft-downy beneath or slightly rough downward; branchlets downy; calyx-lobes and stamens 5-9; fruit (8-9" wide) with the cell pubescent. — Rich soil, N. Eng. to the Dakotas, and southward. March, April. — A small or middle-sized tree (45-60° high), with tough, reddish wood, and a very mucilaginous inner bark.

\*\* Flowers on slender drooping pedicels, which are jointed above the middle; fruit ovate or oval, fringed-ciliate; leaves smooth above, or nearly so.

2. *U. Americana*, L. (AMERICAN OR WHITE ELM.) Buds and branchlets glabrous; branches not corky; leaves obovate-oblong or oval, abruptly pointed, sharply and often doubly serrate (2-4' long), soft-pubescent beneath, or soon glabrous; flowers in close fascicles; calyx with 7-9 roundish lobes; fruit glabrous except the margins ( $\frac{1}{2}$ ' long), its sharp points incurved and closing the notch. — Moist woods, especially along rivers, in rich soil. April. — A large and well-known ornamental tree, variable in habit, usually with spreading branches and drooping branchlets.

3. *U. racemosa*, Thomas. (CORK OR ROCK ELM.) Bud-scales downy-ciliate and somewhat pubescent, as are the young branchlets; branches often with corky ridges; leaves nearly as in the last, but with veins more simple and straight; flowers racemed; fruit much as in the last, but rather larger. — River-banks, S. W. Vt. to Ont. and central Minn., south to Mo. and Ky. A large and very valuable tree.

4. *U. alata*, Michx. (WAHOO OR WINGED ELM.) Bud-scales and branchlets nearly glabrous; branches corky-winged, at least some of them; leaves downy beneath, ovate-oblong and oblong-lanceolate, acute, thickish, small

(1-2½' long); calyx-lobes obovate; fruit downy on the face at least when young. — Va. to S. Ind., S. Mo., and southward. March. A small tree.

2. *PLÁNERA*, Gmelin. PLANER-TREE.

Flowers monœciously polygamous. Calyx 4-5-cleft. Stamens 4-5. Ovary ovoid, 1-celled, 1-ovuled, crowned with 2 spreading styles which are stigmatose down the inner side, in fruit becoming coriaceous and nut-like, not winged. Albumen none; embryo straight. — Trees with small leaves, like those of Elms, the flowers appearing with them, in small axillary clusters. (Named for J. J. Planer, a German botanist.)

1. *P. aquática*, Gmel. Nearly glabrous; leaves ovate-oblong, small, fruit stalked in the calyx, beset with irregular rough projections. — Wet banks, N. C. to Ky., S. Ill., and southward. April. A rather small tree.

3. *CÉLTIS*, Tourn. NETTLE-TREE. HACKBERRY.

Flowers monœciously polygamous. Calyx 5-6-parted, persistent. Stamens 5-6. Ovary 1-celled, with a single suspended ovule; stigmas 2, long and pointed, recurved. Fruit a globular drupe. Embryo curved, nearly enclosing a little gelatinous albumen; cotyledons folded and crumpled. — Leaves pointed, petioled, inequilateral. Stipules caducous. Flowers greenish, axillary, the fertile solitary or in pairs, peduncled, appearing with the leaves, the lower usually staminate only, fascicled or racemose along the base of the branches of the season. (A name of Pliny's for an African species of Lotus.)

1. *C. occidentális*, L. (SUGARBERRY. HACKBERRY.) Leaves reticulated, ovate, cordate-ovate and ovate-lanceolate, taper-pointed, usually conspicuously and sharply so, more or less oblique at base, sharply serrate, sometimes sparingly so or only toward the apex, scabrous but mostly glabrous above, usually soft-pubescent beneath, at least when young; fruit reddish or yellowish, turning dark purple at maturity, its peduncle once or twice the length of the petiole. — Woods and river-banks, N. Eng. to Minn., and southward. April, May. — A small or sometimes large tree, with the aspect of an Elm, bearing sweet and edible fruits as large as bird-cherries, at first obovate, ripe in autumn; the flesh thin. Very variable in the form, texture, etc., of the leaves. — Var. *pùmila*, Gray. Low and straggling (4-10° high); leaves thin when mature, and smooth, slightly acuminate. River-banks, on rocks, from Maryland southward.

2. *C. Mississippiensis*, Bosc. Leaves entire (rarely few-toothed), very long taper-pointed, rounded at base, mostly oblique, thin, and smooth; fruit small. — Ill. to Tenn., and southward. A small tree with warty bark.

4. *CÁNNABIS*, Tourn. HEMP.

Flowers dioecious; the sterile in axillary compound racemes or panicles, with 5 sepals and 5 drooping stamens. Fertile flowers spiked-clustered, 1-bracted; the calyx of a single sepal enlarging at the base and folded round the ovary. Achene crustaceous. Embryo simply curved. — A tall roughish annual, with digitate leaves of 5-7 linear-lanceolate coarsely toothed leaflets, the upper alternate; the inner bark of very tough fibres. (The ancient Greek name, of obscure etymology.)

*C. sativa*, L. (HEMP.) Stem 4-8° high; leaves 4-8' broad; flowers green. — Waste and cultivated ground. (Adv. from Eu.)



5. *HUMULUS*, L. HOP.

Flowers dioecious; the sterile in loose axillary panicles, with 5 sepals and 5 erect stamens. Fertile flowers in short axillary and solitary spikes or catkins; bracts foliaceous, imbricated, each 2-flowered, in fruit forming a sort of membranaceous strobile. Calyx of a single sepal, embracing the ovary. Achene invested with the enlarged scale-like calyx. Embryo coiled in a flat spiral. — Twining rough perennials, with stems almost prickly downward, and mostly opposite heart-shaped and palmately 3-7-lobed leaves, with persistent ovate stipules between the petioles. (A late Latin name, of Teutonic origin.)

1. *H. lupulus*, L. (COMMON HOP.) Leaves mostly 3-5-lobed, commonly longer than the petioles; bracts, etc., smoothish; the fruiting calyx, achene, etc., sprinkled with yellow resinous grains, which give the bitterness and aroma to the hop. — Alluvial banks, N. Eng. to western N. Y., the Great Lakes and westward, and south in the mountains to Ga. July. (Eu., Asia.)

6. *MACLURA*, Nutt. OSAGE ORANGE. BOIS D'ARC.

Flowers dioecious; the staminate in loose short racemes, with 4-parted calyx, and 4 stamens inflexed in the bud; the pistillate in a dense globose head, with a 4-cleft calyx enclosing the ovary. Style filiform, long-exserted; ovule pendulous. Fruit an achene, buried in the greatly enlarged fleshy calyx. Albumen none. Embryo recurved. — Trees with milky juice, alternate entire pinnately veined leaves, caducous stipules, axillary peduncles, and stout axillary spines. (Named for the early American geologist, William Maclure.)

1. *M. aurantiaca*, Nutt. A tree 30-50' high; leaves ovate to oblong-lanceolate, pointed, mostly rounded at base, green and shining; syncarp globose, yellowish green, 2-3' in diameter. — E. Kan. and Mo. to N. Tex.: extensively used for hedges. Wood bright orange.

7. *MORUS*, Tourn. MULBERRY.

Flowers monœcious or dioecious; the two kinds in separate axillary and catkin-like spikes. Calyx 4-parted; lobes ovate. Stamens 4; filaments elastically expanding. Ovary 2-celled, one of the cells smaller and disappearing; styles 2, thread-form, stigmatic down the inside. Achene ovate, compressed, covered by the succulent berry-like calyx, the whole spike thus becoming a thickened oblong and juicy (edible) aggregate fruit. — Trees with milky juice and broad leaves; sterile spikes rather slender. (The classical Latin name.)

1. *M. rubra*, L. (RED MULBERRY.) Leaves heart-ovate, serrate, rough above, downy beneath, pointed (on young shoots often lobed); flowers frequently dioecious; fruit dark purple, long. — Rich woods, W. New Eng. to S. Ont., the Dakotas, E. Kan., and southward. May. — Large tree, ripening its black-berry-like fruit in July.

*M. alba*, L. (WHITE MULBERRY.) Leaves obliquely heart-ovate, acute, serrate, sometimes lobed, smooth and shining; fruit whitish. — Spontaneous near houses. (Adv. from Eu.)

8. *URTICA*, Tourn. NETTLE.

Flowers monœcious, or rarely dioecious, clustered, the clusters mostly in racemes, spikes, or loose heads. *Ster. Fl.* Sepals 4. Stamens 4, inserted around

the cup-shaped rudiment of a pistil. *Fert. Fl.* Sepals 4, in pairs; the 2 outer smaller and spreading; the 2 inner flat or concave, in fruit membranaceous and enclosing the straight and erect ovate flattened achene. Stigma sessile, capitate and pencil-tufted. — Herbs, armed with stinging hairs. Leaves opposite; stipules in our species distinct. Flowers greenish; in summer. (The classical Latin name; from *uro*, to burn.)

\* *Perennials; flower-clusters in branching paniced spikes, often dioecious.*

1. *U. gracilis*, Ait. Sparingly bristly, slender (2-6° high); leaves ovate-lanceolate, pointed, serrate, 3-5-nerved from the rounded or scarcely heart-shaped base, almost glabrous, the elongated slender petioles sparingly bristly; spikes slender and loosely paniced. — Fence-rows and moist ground, common. Stings few.

*U. dioica*, L. Very bristly and stinging (2-3° high); leaves ovate, heart-shaped, pointed, very deeply serrate, downy beneath as well as the upper part of the stem; spikes much branched. — Waste places and roadsides, rather rare. Canada and N. Eng. to S. C., west to Minn. and Mo. (Nat. from Eu.)

\*\* *Annuals; flower-clusters chiefly axillary and shorter than the petiole, androgynous.*

*U. urens*, L. Leaves elliptical or ovate, very coarsely and deeply serrate with long spreading teeth, the terminal teeth not longer than the lateral ones; flower-clusters 2 in each axil, small and loose. — Waste grounds, near dwellings, eastward; scarce. Plant 8-12' high, with sparse stings. (Nat. from Eu.)

2. *U. chamædryoides*, Pursh. Leaves ovate and mostly heart-shaped, the upper ovate-lanceolate, coarsely serrate-toothed; flower-clusters globular, 1-2 in each axil, and spiked at the summit. — Alluvial shaded soil, from Ky. to the Gulf States. Slender, 6-30' high, sparsely beset with stings.

9. *LAPORTEA*, Gaudichaud. WOOD-NETTLE.

Flowers monœcious or dioecious, clustered, in loose cymes; the upper widely spreading and chiefly or entirely fertile; the lower mostly sterile. *Ster. Fl.* Sepals and stamens 5, with a rudiment of an ovary. *Fert. Fl.* Calyx of 4 sepals, the two outer or one of them usually minute, and the two inner much larger. Stigma elongated awl-shaped, hairy down one side, persistent. Achene ovate, flat, extremely oblique, reflexed on the winged or margined pedicel, nearly naked. — Perennial herbs, with stinging hairs, large alternate serrate leaves, and axillary stipules. (Named for M. Laporte.)

1. *L. canadensis*, Gaudichaud. Stem 2-3° high; leaves ovate, pointed, strongly feather-veined (3-7' long), long-petioled; fertile cymes divergent; stipule single, 2-cleft. — Moist rich woods. July-Sept.

10. *PILEA*, Lindl. RICHWEED. CLEARWEED.

Flowers monœcious or dioecious. *Ster. Fl.* Sepals and stamens 3-4. *Fert. Fl.* Sepals 3, oblong, more or less unequal; a rudiment of a stamen commonly before each in the form of a hooded scale. Stigma sessile, pencil-tufted. Achene ovate, compressed, erect, partly or nearly naked. — Stingless, mostly glabrous and low herbs, with opposite leaves and united stipules; the staminate flowers often mixed with the fertile. (Named from the shape of the larger sepal of the fertile flower in the original species, which partly covers the achene, like the pileus, or felt cap, of the Romans.)



1. *P. pumila*, Gray. (RICHWEED. CLEARWEED.) Low (3-18' high); stems smooth and shining, pellucid; leaves ovate, coarsely toothed, pointed, 3-ribbed and veiny; flower-clusters much shorter than the petioles; sepals of the fertile flowers lanceolate, scarcely unequal. — Cool and moist shaded places. July-Sept.

# 11. BŒHMÈRIA, Jacq. FALSE NETTLE.

Flowers monœcious or diœcious, clustered; the sterile much as in *Urtica*; the fertile with a tubular or urn-shaped entire or 2-4-toothed calyx enclosing the ovary. Style elongated awl-shaped, stigmatic and papillose down one side. Achene elliptical, closely invested by the dry and persistent compressed calyx. — No stings. (Named after G. R. Boehmer, Professor at Wittenberg in the last century.)

1. *B. cylindrica*, Willd. Perennial, smoothish or pubescent and more or less scabrous; stem (1-3° high) simple; leaves chiefly opposite (rarely all alternate), ovate to ovate-oblong-lanceolate, pointed, serrate, 3-nerved; stipules distinct; petioles short or elongated; flowers diœcious, or the two kinds intermixed, the small clusters densely aggregated in simple and elongated axillary spikes, the sterile interrupted, the fertile often continuous, frequently leaf-bearing at the apex. — Moist or shady ground, common. Very variable.

# 12. PARIETÀRIA, Tourn. PELLITORY.

Flowers monœciously polygamous; the staminate, pistillate, and perfect intermixed in the same involucre-bracted cymose axillary clusters; the sterile much as in the last; the fertile with a tubular or bell-shaped 4-lobed and nerved calyx, enclosing the ovary and the ovoid achene. Style slender or none; stigma pencil-tufted. — Homely, diffuse or tufted herbs, not stinging, with alternate entire 3-ribbed leaves, and no stipules. (The ancient Latin name, because growing on old walls.)

1. *P. Pennsylvanica*, Muhl. Low, annual, simple or sparingly branched, minutely downy; leaves oblong-lanceolate, thin, veiny, roughish with opaque dots; flowers shorter than the involucre; stigma sessile. — Shaded rocky banks, E. Mass. and Vt. to Minn., and southward. June-Aug.

# ORDER 100. PLATANACEÆ. (PLANE-TREE FAMILY.)

*Trees, with watery juice, alternate palmately-lobed leaves, sheathing stipules, and monœcious flowers in separate and naked spherical heads, destitute of calyx or corolla; the fruit merely club-shaped 1-seeded nutlets, furnished with a ring of bristly hairs about the base; consists only of the following genus (of uncertain relationship).*

# 1. PLÁTANUS, L. SYCAMORE. BUTTONWOOD.

Sterile flowers of numerous stamens, with club-shaped little scales intermixed; filaments very short. Fertile flowers in separate catkins, consisting of inversely pyramidal ovaries mixed with little scales. Style rather lateral, awl-shaped or thread-like, simple. Nutlets coriaceous, small, tawny-hairy below, containing a single orthotropous pendulous seed. Embryo in the axis of

thin albumen. — Large trees, with the bark deciduous in broad thin brittle plates; dilated base of the petiole enclosing the bud of the next season. (The ancient name, from *πλατύς*, broad.)

1. *P. occidentalis*, L. Leaves mostly truncate at base, angularly sinuate-lobed or toothed, the short lobes sharp-pointed; fertile heads solitary, hanging on a long peduncle. — Alluvial banks, S. Maine to N. Vt., Ont., S. E. Minn., E. Kan., and southward. Our largest tree, often 90-130° high, with a trunk 6-14° in diameter.

# ORDER 101. JUGLANDACEÆ. (WALNUT FAMILY.)

*Trees, with alternate pinnate leaves, and no stipules; flowers monœcious, the sterile in catkins (aments) with an irregular calyx adnate to the bract; the fertile solitary or in a small cluster or spike, with a regular 3-5-lobed calyx adherent to the incompletely 2-4-celled but only 1-ovuled ovary. Fruit a kind of dry drupe, with a crustaceous or bony nut-shell, containing a large 4-lobed orthotropous seed. Albumen none. Cotyledons fleshy and oily, sinuous or corrugated, 2-lobed; radicle short, superior. Petals sometimes present in the fertile flowers. — A small family of important trees, consisting chiefly of the two following genera.*

# 1. JÜGLANS, L. WALNUT.

Sterile flowers in long and simple lateral catkins from the wood of the preceding year; the calyx adherent to the entire bracts or scales, unequally 3-6-cleft. Stamens 12-40; filaments free, very short. Fertile flowers solitary or several together on a peduncle at the end of the branches, with a 4-toothed calyx, bearing 4 small petals at the sinuses. Styles 2, very short; stigmas 2, somewhat club-shaped and fringed. Fruit with a fibrous-fleshy indehiscent epicarp, and a mostly rough irregularly furrowed endocarp or nut-shell. — Trees, with strong-scented or resinous-aromatic bark, few-scaled or almost naked buds (3 or 4 superposed, and the uppermost far above the axil), odd-pinnate leaves of many serrate leaflets, and the embryo sweet and edible. Pith in plates. (Name contracted from *Jovis glans*, the nut of Jupiter.)

1. *J. cinerea*, L. (BUTTERNUT. WHITE WALNUT.) Leaflets 5-8 pairs, oblong-lanceolate, pointed, rounded at base, downy, especially beneath, the petioles and branchlets downy with clammy hairs; fruit oblong, clammy, pointed, the nut deeply sculptured and rough with ragged ridges, 2-celled at the base. — Rich woods, N. Eng. to the mountains of Ga., west to Minn., E. Kan., and Ark. Tree 50-75° high, with gray bark, widely spreading branches, and lighter brown wood than in the next.

2. *J. nigra*, L. (BLACK WALNUT.) Leaflets 7-11 pairs, ovate-lanceolate, taper-pointed, somewhat heart-shaped or unequal at base, smooth above, the lower surface and the petioles minutely downy; fruit spherical, roughly dotted, the nut corrugated, 4-celled at top and bottom. — Rich woods, W. Mass. and Conn. to Fla., west to Minn., E. Neb., E. Kan., and southward. A large and handsome tree (often 90-150° high), with rough brown bark, and valuable purplish-brown wood turning blackish with age.



2. *CÁRYA*, Nutt. HICKORY.

Sterile flowers in slender lateral and clustered catkins; calyx naked, adherent to the bract, unequally 2-3-parted. Stamens 3-10; filaments short or none, free. Fertile flowers 2-5 in a cluster or short spike, on a peduncle terminating the shoot of the season; calyx 4-toothed; petals none. Stigmas sessile, 2 or 4, large, papillose, persistent. Fruit with a 4-valved, firm and at length dry exocarp (involucre), falling away from the smooth and crustaceous or bony endocarp or nut-shell, which is incompletely 2-celled, and at the base mostly 4-celled. — Fine timber-trees, with hard and very tough wood, and scaly buds, from which in spring are put forth usually both kinds of flowers, the sterile below and the fertile above the leaves. Nuts ripen and fall in October. (*Kapúa*, an ancient name of the Walnut.)

§ 1. Sterile catkins fascicled (no common peduncle or sometimes a very short one) from separate lateral scaly buds near the summit of shoots of the preceding year; bud-scales few; fruit elongated-oblong; the thin-shelled nut 2-celled below; seed sweet; leaflets short-stalked, numerous.

1. *C. olivæfórmis*, Nutt. (PECAN-NUT.) Minutely downy, becoming nearly smooth; leaflets 13-15, oblong-lanceolate, tapering gradually to a slender point, falcate, serrate; nut olive-shaped. — River bottoms, S. Ind., S. Ill., and Iowa, to La. and Tex. A large tree (90-160° high), with delicious nuts.

§ 2. Sterile catkins in threes (rarely more) on a common peduncle from the axil of the inner scales of the common bud, therefore at the base of the shoot of the season, which, then bearing 3 or 4 leaves, is terminated by the fertile flowers; fruit globular or oval; nut 4-celled at base; leaflets sessile or nearly so.

\* Bud-scales numerous, about 10, successively enveloping, the inner ones accrescent, becoming thin and membranaceous and rather tardily deciduous; husk of the fruit splitting promptly into 4 more or less thick and when dry hard or woody valves; seed sweet and delicious. (The hickory nuts of the market.)

2. *C. álba*, Nutt. (SHELL-BARK or SHAG-BARK HICKORY.) Bark of trunk shaggy, exfoliating in rough strips or plates; inner bud-scales becoming large and conspicuous, persistent till the flowers are fully developed; leaflets 5-7, when young minutely downy beneath, finely serrate, the three upper obovate-lanceolate, the lower pair much smaller and oblong-lanceolate, all taper-pointed; fruit globular or depressed; nut white, flattish-globular, barely mucronate, the shell thinnish. — N. Eng. to N. shore of L. Erie and S. E. Minn., south to Fla., E. Kan., and Tex. Large and handsome tree (70-90° high, or more), of great economic value. The principal hickory-nut of the markets.

3. *C. sulcata*, Nutt. (BIG SHELL-BARK. KING-NUT.) Bark, etc., as in n. 1; leaflets 7-9, more downy beneath; fruit oval or ovate, 4-ribbed above the middle, the husk very thick; nut large (1½-2' long) and usually angular, dull white or yellowish, thick-walled, usually strongly pointed at both ends. — Central N. Y. and Penn. to S. Ind., E. Kan., and Ind. Terr. Tree 70-90° high, or more, in rich soil of bottom lands.

4. *C. tomentosa*, Nutt. (MOCKER-NUT. WHITE-HEART HICKORY.) Bark close, rough, but not shaggy and exfoliating on old trunks; catkins, shoots, and lower surface of the leaves tomentose when young, resinous-scented,

leaflets 7-9, lance-obovate or the lower oblong-lanceolate, pointed; fruit globular or ovoid, with a very thick and hard husk; nut globular, not compressed, 4-ridged toward the slightly pointed summit, brownish, very thick-shelled, 1' in diameter or smaller. — N. Eng. to N. shore of L. Erie, E. Neb., and south to the Gulf. Tree 70-100° high, usually on rich upland hillsides.

5. *C. microcarpa*, Nutt. With rough close bark, small ovate buds, and the glabrous foliage, etc., of n. 6; fruit small, subglobose, with rather thin husk; nut thin-shelled, not angled. — N. Y. to Del., west to Mich. and Ill.

\* Bud-scales numerous or few; husk of the fruit thin and rather friable at maturity, 4-valved only to the middle or tardily to near the base; seed more or less bitter; bark of old trunk not exfoliating.

6. *C. porcina*, Nutt. (PIG-NUT or BROOM H.) Bud-scales nearly as in n. 4, but smaller, caducous; shoots, catkins, and leaves glabrous or nearly so; leaflets 5-7, oblong- or obovate-lanceolate and taper-pointed, serrate; fruit pear-shaped, oblong, or oval; nut oblong or oval (1½-2' long), with a thick bony shell; the oily seed at first sweet in taste, then bitterish. — S. Maine to Fla., west to Minn., E. Neb., and Tex. Tree 70-90° high (rarely 120°), on dry hills and uplands.

7. *C. amara*, Nutt. (BITTER-NUT or SWAMP H.) Scales of the small yellowish buds about 6, valvate in pairs, caducous in leafing; catkins and young herbage more or less pubescent, soon becoming almost glabrous; leaflets 7-11, lanceolate or oblong-lanceolate; fruit globular, narrowly 6-ridged; nut globular, short-pointed, white (barely 1' long), thin-walled; seed at first sweet-tasted, soon extremely bitter. — Moist soil, N. Eng. to Fla., west to Minn., E. Neb., and Tex. Tree 50-75° high; husk and nut-shell thinner and less hard than in other species.

## ORDER 102. MYRICACEÆ. (SWEET-GALE FAMILY.)

Monœcious or diœcious shrubs, with both kinds of flowers in short scaly catkins, and resinous-dotted often fragrant leaves, — differing from the Birches chiefly in the 1-celled ovary with a single erect orthotropous ovule, and the drupe-like nut. Involucre and perianth none.

1. *MYRICA*, L. BAYBERRY. WAX-MYRTLE.

The only genus. — Flowers solitary under a scale-like bract and with a pair of bractlets, the sterile in oblong or cylindrical, the fertile in ovoid or globular catkins, from axillary scaly buds; stamens 2-8; filaments somewhat united below; anthers 2-celled. Ovary with 2-8 scales at its base, and 2 thread-like stigmas. Fruit a small globular or oblong nut, or dry drupe, coated with resinous grains or wax. (*Myrica*, the ancient name of the Tamarisk or some other shrub; perhaps from *μυρίσσω*, to perfume.)

\* Mostly diœcious; fertile catkins ovoid; ovary with 2-4 scales at base; nut globular; leaves entire or somewhat serrate.

1. *M. Gale*, L. (SWEET GALE.) Shrub 3-5° high; leaves wedge-lanceolate, serrate toward the apex, pale, later than the flowers; sterile catkins closely clustered; nuts in imbricated heads, 2-winged by the two thick ovate



scales which coalesce with its base. — Wet borders of ponds, Newf. to N. Eng. and along the Great Lakes to Minn., south in the mountains to Va.

2. *M. cerifera*, L. (BAYBERRY. WAX-MYRTLE.) Leaves oblong-lanceolate, narrowed at the base, entire or wavy-toothed toward the apex, shining and resinous-dotted both sides, somewhat preceding the flowers, fragrant; sterile catkins scattered, oblong; scales wedge-shaped at the base; nuts scattered and naked, bony, and incrustated with white wax. — Sandy soil near the coast, from Nova Scotia to Fla. and Ala.; also on L. Erie. Shrub 3–8° high, but sometimes a tree 35° high; fruit sometimes persistent for 2 or 3 years.

\* \* Frequently monœcious; fertile catkins globular; ovary surrounded by 8 long linear-awl-shaped persistent scales; nut ovoid-oblong; leaves pinnatifid with many rounded lobes.

3. *M. asplenifolia*, Endl. Shrub 1–2° high, with sweet-scented fern-like linear-lanceolate leaves; stipules half heart-shaped; scales of the sterile catkins kidney-heart-shaped, pointed. (*Comptonia asplenifolia*, Ait.) — Sterile hills, N. Eng. to N. C., west to Minn. and Ind. Known as Sweet Fern.

#### ORDER 103. CUPULIFERÆ. (OAK FAMILY.)

Monœcious trees or shrubs, with alternate simple straight-veined leaves, deciduous stipules, the sterile flowers in catkins (or capitate-clustered in the Beech), the fertile solitary, clustered, spiked, or in scaly catkins, the 1-celled and 1-seeded nut with or without an involucre. Ovary more or less 2–7-celled, with 1 or 2 pendulous anatropous ovules in each cell; but all the cells and ovules except one disappearing in the fruit. Seed with no albumen, filled with the embryo.

**Tribe I. BETULÆ.** Flowers in scaly catkins, 2 or 3 to each bract. Sterile catkins pendulous. Stamens 2–4, and calyx usually 2–4-parted. Fertile flowers with no calyx, and no involucre to the compressed and often winged small nut. Ovary 2-celled, 2-ovuled.

1. *Betula*. Stamens 2, bifid. Fertile scales thin, 3-lobed, deciduous with the nuts.

2. *Alnus*. Stamens 4. Fertile scales thick, entire, persisting after the nuts have fallen.

**Tribe II. CORYLÆ.** Sterile catkins pendulous, with no calyx; stamens 3 or more to each bract and more or less adnate to it, the filaments often forked (anthers 1-celled). Fertile flowers in a short ament or head, 2 to each bract, and each with one or more bractlets which form a foliaceous involucre to the nut. Ovary 2-celled, 2-ovuled.

\* Bract of staminate flower furnished with a pair of bractlets inside; fertile flowers few

3. *Corylus*. Involucre leafy-coriaceous, enclosing the large bony nut.

\* \* Bract of staminate flower simple; fertile flowers in short catkins; nut small, achene-like

4. *Ostrya*. Each ovary and nut included in a bladder and closed bag.

5. *Carpinus*. Each nut subtended by an enlarged leafy bractlet.

**Tribe III. QUERCINEÆ.** Sterile flowers with 4–7-lobed calyx and stamens indefinite (3–20). Fertile flowers 1 or few, enclosed in a cupule consisting of consolidated bracts, which becomes indurated (scaly or prickly) and surrounds or encloses the nut.

\* Sterile flowers in slender catkins.

6. *Quercus*. Cupule 1-flowered, scaly and entire; nut hard and terete.

7. *Castanea*. Cupule 2–4-flowered, forming a prickly hard bur, 2–4-valved when ripe.

\* \* Sterile flowers in a small head.

8. *Fagus*. Cupule 2-flowered, 4-valved, containing 2 sharply triangular nuts.

#### 1. BÉTULA, Tourn. BIRCH.

Sterile flowers 3, and bractlets 2, to each shield-shaped scale or bract of the catkins, consisting each of a calyx of one scale bearing 4 short filaments with 1-celled anthers (or strictly of two 2-parted filaments, each division bearing an anther-cell). Fertile flowers 2 or 3 to each 3-lobed bract, without bractlets or calyx, each of a naked ovary, becoming a broadly winged and scale-like nutlet (or small samara) crowned with the two spreading stigmas. — Outer bark usually separable in sheets, that of the branchlets dotted. Twigs and leaves often spicy-aromatic. Foliage mostly thin and light. Buds sessile, scaly. Sterile catkins long and drooping, terminal and lateral, sessile, formed in summer, remaining naked through the succeeding winter, and expanding their golden flowers in early spring, with or preceding the leaves; fertile catkins oblong or cylindrical, peduncled, usually terminating very short 2-leaved early lateral branches of the season. (The ancient Latin name, of Celtic origin.)

\* Trees, with brown or yellow-gray bark, sweet-aromatic as well as the twigs, membranaceous and straight-veined Hornbeam-like leaves heart-shaped or rounded at base, on short petioles, and sessile very thick fruiting catkins; their scales about equally 3-cleft, rather persistent; wing of fruit not broader than the seed-bearing body.

1. *B. lenta*, L. (CHERRY B. SWEET OR BLACK BIRCH.) Bark of trunk dark brown, close (outer layers scarcely laminate), very sweet-aromatic; leaves ovate or oblong-ovate from a more or less heart-shaped base, acuminate, sharply and finely doubly serrate all round, when mature shining or bright green above and glabrous except on the veins beneath; fruiting catkins oblong-cylindrical (1–1½' long), the scales with short and divergent lobes. — Rich woodlands, Newf. to N. Del., and south in the mountains, west to Minn., and S. Ind. Tree 50–75° high, with reddish bronze-colored spray; wood rose-colored, fine-grained, valuable for cabinet-work.

2. *B. lutea*, Michx. f. (YELLOW OR GRAY BIRCH.) Bark of trunk yellowish- or silvery-gray, detaching in very thin filmy layers, within and the twigs much less aromatic; leaves (3–5' long) slightly or not at all heart-shaped and often narrowish toward the base, duller-green above and usually more downy on the veins beneath; fruiting catkins oblong-ovoid (1' or less in length, 6–9" thick), the thinner scales (5–6" long) twice as large as in n. 1, and with narrower barely spreading lobes. — Rich moist woodlands, Canada and N. Eng. to Del., west to Minn.; also along high peaks to Tenn. and N. C. Often 60–90° high at the north; wood whiter and less valuable.

\* \* Trees, with chalky-white bark separable in thin sheets, ovate or triangular leaves of firmer texture, on long slender petioles; fruiting catkins cylindrical, usually hanging on rather slender peduncles; their scales glabrous, with short diverging lobes, freely deciduous; wing of the fruit much broader than its body.

3. *B. populifolia*, Ait. (AMERICAN WHITE BIRCH. GRAY BIRCH.) Trunk usually ascending (15–30° high); leaves triangular (deltoid), very taper-pointed (usually abruptly), truncate or nearly so at the broad base, smooth and shining both sides, except the resinous glands when young. (*B. alba*, var.