

ous.—Herbs, with branching stems, and opposite toothed or cut leaves. Flowers, small, spiked. (Name *εὐφρασία*, cheerfulness, in allusion to its reputed medicinal properties.)

1. *E. officinalis*, L. Low annual; leaves ovate or lanceolate, the lowest crenate, the floral bristly-toothed; lobes of the lower lip of the (whitish, yellowish, or bluish) corolla notched.—Coast of Maine and Lower Canada; perhaps introduced from Eu.—Var. *TATARICA*, Benth., a low form with small flowers (2–3" long), and mostly rounded leaves.—Alpine region of N. H., shore of L. Superior, and far northward.

24. BARTSIA, L.

Calyx equally 4-cleft. Corolla with upper lip entire and sides not folded back. Otherwise much as *Euphrasia*.—Herbs, with opposite sessile leaves, and subsessile flowers, in the upper axils and in a terminal leafy spike.

B. *ODONTITES*, Huds. A span or two high from an annual root, branching, scabrous-pubescent; leaves oblong-lanceolate, coarsely and remotely serrate; spikes elongated, loosely-flowered; corolla small, rose-red.—Coast of Maine and N. Scotia. (Nat. from Eu.)

25. RHINANTHUS, L. YELLOW-RATTLE.

Calyx membranaceous, flattened, much inflated in fruit, 4-toothed. Upper lip of corolla arched, ovate, obtuse, flattened, entire at the summit, but with a minute tooth on each side below the apex; lower lip 3-lobed. Stamens 4, under the upper lip; anthers approximate, hairy, transverse; the cells equal, pointless. Capsule orbicular, flattened. Seeds many, orbicular, winged.—Annual upright herbs, with opposite leaves; the yellow flowers crowded in a one-sided leafy-bracted spike. (Name composed of *ῥίς*, a snout, and *ἄνθος*, a flower, from the beaked upper lip in some species formerly of this genus.)

1. *R. Crista-galli*, L. Leaves narrowly oblong to lanceolate, coarsely serrate, the floral bracts more incised with bristle-tipped teeth; corolla 6" long; seeds broadly winged (when ripe they rattle in the inflated calyx, whence the popular name.)—Coast of N. Eng. and alpine region of N. H., to L. Superior, and northward. (Eu., Asia.)

26. PEDICULARIS, Tourn. LOUSEWORT.

Calyx various. Corolla strongly 2-lipped; the upper lip arched, flattened, often beaked at the apex; the lower erect at base, 2-crested above, 3-lobed; lobes commonly spreading, the lateral ones rounded and larger. Stamens 4, under the upper lip; anthers transverse; the cells equal, pointless. Capsule ovate or lanceolate, mostly oblique, several-seeded.—Perennial herbs, with chiefly pinnatifid leaves, the floral bract-like, and rather large flowers in a spike. (Name from *pediculus*, a louse; of no obvious application.)

1. *P. Canadensis*, L. (COMMON LOUSEWORT. WOOD BETONY.) Hairy; stems simple, clustered (5–12' high); leaves scattered, the lowest pinnately parted, the others half-pinnatifid; spike short and dense; calyx split in front, otherwise almost entire, oblique; upper lip of the (dull greenish-yellow and purplish) corolla hooded, incurved, 2-toothed under the apex; capsule flat, somewhat sword-shaped.—Copses and banks, common. May–July.

2. *P. lanceolata*, Michx. Stem upright (1–3° high), nearly simple, mostly smooth; leaves partly opposite, oblong-lanceolate, doubly cut-toothed; spike crowded; calyx 2-lobed, leafy-crested; upper lip of the (pale yellow) corolla incurved and bearing a short truncate beak at the apex, the lower erect, so as nearly to close the throat; capsule ovate, scarcely longer than the calyx.—Swamps, Conn. to Va., Ohio, and Minn.

3. *P. Furbishiae*, Watson. Tall (2–3° high) pubescent or glabrate; leaves lanceolate, pinnately parted and the short oblong divisions pinnatifid-incised, or the upper simply pinnatifid and the lobes serrate; bracts ovate, lacinate-dentate; calyx-lobes 5, rather unequal, linear-lanceolate, entire or toothed; upper lip of corolla straight and beakless, the truncate apex bicuspidate, the lower erect, truncately 3-lobed; capsule broadly ovate.—Banks of the St. John's, Aroostook Co., Maine (*Miss Kate Furbish*), and adjacent N. Brunswick.

27. MELAMPYRUM, Tourn. COW-WHEAT.

Calyx bell-shaped, 4-cleft; the taper lobes sharp-pointed. Tube of corolla cylindrical, enlarging above; upper lip arched, compressed, straight in front; the lower erect-spreading, biconvex, 3-lobed at the apex. Stamens 4, under the upper lip; anthers approximate, oblong, nearly vertical, hairy; the equal cells minutely pointed at base. Ovary with 2 ovules in each cell. Capsule flattened, oblique, 1–4-seeded.—Erect branching annuals, with opposite leaves, the lower entire, the upper mostly toothed at base. Flowers solitary in the upper axils. (Name from *μέλας*, black, and *πυρρός*, wheat; from the color of the seeds of some species as they appear mixed with grain.)

1. *M. Americanum*, Michx. Leaves lanceolate, short-petioled, the floral ones like the lower, or truncate at base and beset with a few bristly teeth; calyx-teeth linear-awl-shaped, not half the length of the slender tube of the pale greenish-yellow corolla (5" long).—Open woods; common, from the Atlantic to Minn. and Iowa, especially eastward. June–Sept.

ORDER 76. OROBANCHACEÆ. (BROOM-RAPE FAMILY.)

Herbs destitute of green foliage (root-parasites), monopetalous, didynamous, the ovary one-celled with 2 or 4 parietal placentæ; pod very many-seeded; seeds minute, with albumen and a very minute embryo.—Calyx persistent, 4–5-toothed or parted. Corolla tubular, more or less 2-lipped, ringent, persistent and withering; upper lip entire or 2-lobed, the lower 3-lobed. Stamens 4, didynamous, inserted on the tube of the corolla; anthers 2-celled, persistent. Ovary free, ovoid, pointed with a long style; stigma large. Capsule 1-celled, 2-valved; each valve bearing on its face one placenta or a pair. Seeds very numerous, minute.—Low, thick or fleshy herbs, bearing scales in place of leaves, lurid yellowish or brownish throughout. Flowers solitary or spiked.

* Flowers of two sorts, scattered along slender panicle branches.

1. *Epiphegus*. Upper flowers sterile, with a tubular corolla; the lower fertile, with the corolla minute and not expanding. Bracts inconspicuous.

* * Flowers all alike and perfect; stems mostly simple.

2. **Conopholis**. Flowers densely spicate. Calyx deeply cleft in front. Corolla 2-lipped. Stamens exserted.
3. **Aphyllon**. Flowers pedicellate, sometimes subsessile and thyrsoid-spicate. Calyx regularly 5-cleft. Corolla somewhat 2-lipped. Stamens included.
4. **Orobanche**. Flowers sessile, spicate. Calyx cleft before and behind almost to the base. Corolla 2-lipped. Stamens included.

1. EPIPHÈGUS, Nutt. BEECH-DROPS. CANCER-ROOT.

Flowers racemose or spiked, scattered on the branches; the upper sterile, with a long tubular corolla and long filaments and style; the lower fertile, with a very short corolla which seldom opens, but is forced off from the base by the growth of the pod; stamens and style very short. Calyx 5-toothed. Stigma capitate, a little 2-lobed. Capsule 2-valved at the apex, with 2 approximate placentæ on each valve. — Herbs slender, purplish or yellowish-brown, much branched, with small scattered scales, 6–12' high. (Name from *ἐπί*, upon, and *φηγός*, the Beech, because it grows on the roots of that tree.)

1. **E. Virginiana**, Bart. Corolla of the upper (sterile) flowers whitish and purple, 6–8" long, curved, 4-toothed. — Common under Beech-trees, parasitic on their roots; N. Brunswick to Wisc., south to Fla. and Ark. Aug. – Oct.

2. CONÓPHOLIS, Wallroth. SQUAW-ROOT. CANCER-ROOT.

Flowers in a thick scaly spike, perfect, with 2 bractlets at the base of the irregularly 4–5-toothed calyx; its tube split down on the lower side. Corolla tubular, swollen at base, strongly 2-lipped; upper lip arched, notched at the summit, the lower shorter, 3-parted, spreading. Stamens protruded. Stigma depressed. Capsule with 4 placentæ, a pair on the middle of each valve. — Upper scales forming bracts to the flowers, regularly imbricate, not unlike those of a fir-cone (whence the name, from *κῶνος*, a cone, and *φῶλις*, a scale).

1. **C. Americana**, Wallroth. — Oak woods, growing in clusters among fallen leaves; N. Eng. to Mich., south to Fla. and Tenn. May, June. — A singular plant, chestnut-colored or yellowish throughout, as thick as a man's thumb, 3–6' high, covered with fleshy scales, which become dry and hard.

3. APHYLLON, Mitchell. NAKED BROOM-RAPE.

Flowers perfect, pedicellate, sometimes subsessile and thyrsoid-spicate. Calyx 5-cleft, regular. Corolla somewhat 2-lipped; the upper lip more or less spreading and 2-lobed, the lower spreading, 3-lobed. Stamens included. Stigma broadly 2-lipped or crateriform. Capsule with 4 placentæ, equidistant or contiguous in pairs. Plants brownish or whitish. Flowers (purplish or yellowish) and naked scapes minutely glandular-pubescent. (Name from *α-privative* and *φύλλον*, foliage, alluding to the naked stalks.)

* Flowers solitary on long naked scapes or peduncles, without bractlets; corolla with a long curved tube and spreading 5-lobed limb.

1. **A. uniflorum**, Gray. (ONE-FLOWERED CANCER-ROOT.) Stem subterranean or nearly so, very short, scaly, often branched, each branch sending up 1–3 slender one-flowered scapes (3–5' high); divisions of the calyx lanceolate-shaped, half the length of the corolla, which is 1' long, with 2 yellow

bearded folds in the throat, and obovate lobes. — Damp woodlands, Newf. to Va. and Tex., and west to the Pacific. April–July.

2. **A. fasciculatum**, Gray. Scaly stem erect and rising 3–4' out of the ground, mostly longer than the crowded peduncles; divisions of the calyx triangular, very much shorter than the corolla, which has rounded short lobes. — Sandy ground, L. Michigan to Minn., southward west of the Mississippi, and westward. On *Artemisia*, *Eriogonum*, etc. May.

* * Caulescent; flowers densely spicate, with 1–2 bractlets at base of calyx; corolla 2-lipped, the upper lip less or not at all 2-cleft.

3. **A. Ludovicianum**, Gray. Glandular-pubescent, branched (3–12' high); corolla somewhat curved, twice the length of the narrow lanceolate calyx-lobes; the lips equal in length. (*Phelipæa Ludoviciana*, Walp.) — Minn. to Ill. and Tex., and westward.

4. OROBANCHE, Tourn. BROOM-RAPE.

Flowers spicate, sessile. Calyx cleft before and behind almost or quite to the base, the divisions usually 2-cleft. Corolla 2-lipped; upper lip erect, 2-lobed or emarginate, the lower spreading, broadly 3-lobed. Stamens included. — Old World parasites, on roots of various plants.

O. minor, L. A span to a foot high, pubescent, pale yellowish-brown, or with purplish-tinged flowers in a rather loose spike; corolla 6" long. — Parasitic on clover, N. J. to Va. Sparingly and probably recently introduced.

ORDER 77. LENTIBULARIACEÆ. (BLADDERWORT FAMILY.)

Small herbs (growing in water or wet places), with a 2-lipped calyx, and a 2-lipped personate corolla, 2 stamens with (confluently) one-celled anthers, and a one-celled ovary with a free central placenta, bearing several anatropous seeds, with a thick straight embryo, and no albumen. — Corolla deeply 2-lipped, the lower lip larger, 3-lobed and with a prominent palate, spurred at the base in front; the palate usually bearded. Ovary free; style very short or none; stigma 1–2-lipped. Capsule often bursting irregularly. Scapes 1–few-flowered. — The following are the two principal genera.

1. **Utricularia**. Calyx-lobes mostly entire. Upper lip of corolla erect. Filaments strongly incurved. Foliage dissected; bladder-bearing.

2. **Pinguicula**. Calyx with upper lip deeply 3- and lower 2-cleft. Corolla-lobes spreading. Filaments straighter. Terrestrial, with entire rosulate leaves next the ground.

1. UTRICULARIA, L. BLADDERWORT.

Lips of the 2-parted calyx entire, or nearly so. Corolla personate, the palate on the lower lip projecting, often closing the throat; upper lip erect. Anthers convergent. — Aquatic and immersed, with capillary dissected leaves bearing little bladders, which float the plant at the time of flowering; or rooting in the mud, and sometimes with few or no leaves or bladders. Scapes 1–few-flowered; usually flowering all summer. Bladders furnished with a valvular lid and usually with a few bristles at the orifice. (Name from *utriculus*, a little bladder.)

* *Upper leaves in a whorl on the otherwise naked scape, floating by means of large bladders formed of the inflated petioles; the lower leaves dissected and capillary, bearing small bladders; rootlets few or none.*

1. *U. inflata*, Walt. Swimming free; bladder-like petioles oblong, pointed at the ends and branched near the apex, bearing fine thread-like divisions; flowers 3-10 (large, yellow); the appressed spur half the length of the corolla; style distinct. — In still water, Maine to Tex., near the coast.

* * *Scapes naked (except some small scaly bracts), from immersed branching stems, which commonly swim free, bearing capillary dissected leaves with small bladders on their lobes; roots few and not affixed, or none. (Mostly perennial, propagated from year to year by tuber-like buds.)*

+ *Cleistogamous flowers along the submersed copiously bladder-bearing stems.*

2. *U. clandestina*, Nutt. Leaves numerous on the slender immersed stems, several times forked, capillary; scapes slender (3-5' high); lips of the yellow corolla nearly equal in length, the lower broader and 3-lobed, somewhat longer than the approximate thick and blunt spur. — Ponds, from N. Brunswick and N. Eng. to N. J., near the coast.

+ + *No cleistogamous flowers.*

+ + *Pedicels recurved in fruit; corolla yellow.*

3. *U. vulgaris*, L. (GREATER BLADDERWORT.) Immersed stems (1-3' long) crowded with 2-3-pinnately many-parted capillary leaves, bearing many bladders; scapes 5-12-flowered (6-12' long); corolla closed (6-9" broad), the sides reflexed; spur conical, rather shorter than the lower lip, thick and blunt in the European and the high northern plant; in the common American plant less thick and rather acute. — Common in ponds and slow streams, Newf. to Minn., south to Va. and Tex., and westward. (Eu., Asia.)

4. *U. minor*, L. (SMALLER B.) Leaves scattered on the thread-like immersed stems, 2-4 times forked, short; scapes weak, 2-8-flowered (3-7' high); upper lip of the gaping corolla not longer than the depressed palate; spur very short and blunt, or almost none. — Shallow water, E. Mass. to Minn., south to N. J. and Ark., and westward. (Eu.)

+ + *Pedicels erect in fruit, few and slender; corolla yellow.*

5. *U. gibba*, L. Scape (1-3' high) 1-2-flowered, at base furnished with very slender short branches, bearing sparingly dissected capillary root-like leaves and scattered bladders; corolla 3-4" broad, the lips broad and rounded, nearly equal; the lower with the sides reflexed, exceeding and approximate to the very thick and blunt conical gibbous spur. — Shallow water, Mass. to Mich., south to Va. and Ill., Mt. Desert (F. M. Day).

6. *U. biflora*, Lam. Scape (2-5' high) 1-3-flowered, at the base bearing somewhat elongated submersed branches with capillary root-like leaves and numerous bladders; corolla 4-6" broad, the spur oblong, equalling the lower lip; seeds scale-shaped. — Ponds and shallow waters, S. Ill. and Iowa to Tex.; also S. Va. (?), and Barnstable, Mass. (W. Deane).

7. *U. fibrosa*, Walt. Leaves crowded or whorled on the small immersed stems, several times forked, capillary; the bladders borne mainly along the stems; flowers 2-6 (6" broad); lips nearly equal, broad and expanded, the

upper undulate, concave, plaited-striate in the middle; spur nearly linear, obtuse, approaching and almost equalling the lower lip. (*U. striata*, LeConte.) — Shallow pools in pine barrens, L. Island and N. J. to Fla. and Ala.

8. *U. intermedia*, Hayne. Leaves crowded on the immersed stems, 2-ranked, 4-5 times forked, rigid, the divisions linear-awl-shaped, minutely bristle-toothed along the margins; the bladders borne on separate leafless branches; upper lip of corolla much longer than the palate; spur conical-subulate, acute, appressed to the very broad (6-8") lower lip and nearly as long as it. — Shallow pools, Newf. to N. J., west to Iowa, Minn., and northward. (Eu., Asia.)

+ + *Pedicels erect in fruit, rather long; corolla violet-purple.*

9. *U. purpurea*, Walt. Leaves whorled along the long immersed free floating stems, petioled, decompound, capillary, bearing many bladders; flowers 2-4 (6" wide); spur appressed to the 3-lobed 2-saccate lower lip of the corolla and about half its length. — Ponds, Maine and N. Penn. to Fla., mainly near the coast; also Lake Co., Ind.

* * * *Scape solitary, slender and naked, or with a few small scales, the base rooting in the mud or soil; leaves small, awl-shaped or grass-like, often raised out of the water, commonly few or fugacious; air-bladders few on the leaves or rootlets, or commonly none.*

+ *Flower purple, solitary; leaves bearing a few delicate lobes.*

10. *U. resupinata*, B. D. Greene. Scape (2-8' high) 2-bracted above; leaves thread-like, on delicate creeping branches; corolla (4-5" long) deeply 2-parted; spur oblong-conical, very obtuse, shorter than the dilated lower lip and remote from it, both ascending, the flower resting transversely on the summit of the scape. — Sandy margins of ponds, E. Maine to R. I., near the coast; also N. New York and Presque Isle, L. Erie.

+ + *Flowers 2-10, (chiefly) yellow; leaves entire, rarely seen.*

11. *U. subulata*, L. Stem capillary (3-5' high); pedicels capillary; lower lip of the corolla flat or with its margins recurved, equally 3-lobed, much larger than the ovate upper one; spur oblong, acute, straight, appressed to the lower lip, which it nearly equals in length. — Sandy swamps, and pine-barrens, Nantucket, Mass., to N. J., Fla., and Tex., near the coast.

Var. *cleistogama*, Gray. Only 1-2' high, bearing 1 or 2 evidently cleistogamous purplish flowers, not larger than a pin's head; capsule becoming 1" long. (The unnamed *Utricularia* in the Man., p. 320). — With the ordinary form; Barnstable and Nantucket, Mass., pine-barrens of N. J., and southward.

12. *U. cornuta*, Michx. Stem strict (3'-1' high), 1-5-flowered; pedicels not longer than the calyx; corolla 1' long, the lower lip large and helmet-shaped, its centre very convex and projecting, while the sides are strongly reflexed; upper lip obovate and much smaller; spur awl-shaped, turned downward and outward, about as long as the lower lip. — Peat-bogs, or sandy swamps, Newf. to Minn., south to Fla. and Tex.; common.

2. PINGUICULA, Tourn. BUTTERWORT.

Upper lip of the calyx 3-cleft, the lower 2-cleft. Corolla with an open hairy or spotted palate, the lobes spreading. — Small and stemless perennials, grow-

ing on damp rocks, with 1-flowered scapes, and broad and entire leaves, all clustered at the root, soft-fleshy, mostly greasy to the touch (whence the name, from *pinguis*, fat).

1. *P. vulgaris*, L. Leaves ovate or elliptical; scape and calyx a little pubescent; lips of the violet corolla very unequal, the tube funnel-form; spur straightish. — Wet rocks, northern N. Eng. and N. Y. to Minn., and far northward. (Eu., Asia.)

ORDER 78. BIGNONIACEÆ. (BIGNONIA FAMILY.)

Woody plants, monopetalous, didynamous or diandrous, with the ovary commonly 2-celled by the meeting of the two parietal placenta or of a projection from them, many-ovuled; fruit a dry capsule, the large flat winged seeds with a flat embryo and no albumen, the broad and leaf-like cotyledons notched at both ends. — Calyx 2-lipped, 5-cleft, or entire. Corolla tubular or bell-shaped, 5-lobed, somewhat irregular or 2-lipped, deciduous; the lower lobe largest. Stamens inserted on the corolla; the fifth or posterior one, and sometimes the shorter pair also, sterile or rudimentary; anthers of 2 diverging cells. Ovary free, bearing a long style, with a 2-lipped stigma. — Leaves compound or simple, opposite, rarely alternate. Flowers large and showy. — Chiefly a tropical family.

1. *Bignonia*. Pod flattened parallel with the partition. Leaves compound, tendril-bearing.
2. *Tecoma*. Pod flattish contrary to the partition. Leaves compound, without tendrils.
3. *Catalpa*. Pod terete. Fertile stamens only 2. Trees; leaves simple.

1. BIGNONIA, Tourn.

Calyx truncate, or slightly 5-toothed. Corolla somewhat bell-shaped, 5-lobed and rather 2-lipped. Stamens 4, often showing a rudiment of the fifth. Capsule linear, 2-celled, flattened parallel with the valves and partition. Seeds transversely winged. — Woody climbers, with chiefly compound leaves, terminating in a tendril. (Named for the *Abbé Bignon*.)

1. *B. capreolata*, L. (CROSS-VINE.) Smooth; leaves of 2 ovate or oblong leaflets and a branched tendril, often with a pair of accessory leaves in the axil resembling stipules; peduncles few and clustered, 1-flowered; corolla orange, 2' long; pod 6' long; seeds with the wing $1\frac{1}{2}$ long. — Rich soil, Va. to S. Ill. and south to Fla. and La. April. Climbing tall trees; a transverse section of the wood showing a cross.

2. TÉCOMA, Juss. TRUMPET-FLOWER.

Calyx bell-shaped, 5-toothed. Corolla funnel-form, 5-lobed, a little irregular. Stamens 4. Capsule 2-celled, with the partition at right angles to the convex valves. Seeds transversely winged. — Woody, with compound leaves, climbing by aerial rootlets. (Abridged from the Mexican name.)

1. *T. radicans*, Juss. (TRUMPET CREEPER.) Leaves pinnate; leaflets 9–11, ovate, pointed, toothed; flowers corymbed; stamens not protruded beyond the tubular-funnel-form orange and scarlet corolla ($2\frac{1}{2}$ –3' long); pod ob-lanceolate, 4–5' long. — Moist soil, Penn. to Ill., south to Fla. and Tex. Common in cultivation farther north.

✓ 3. CATÁLPA, Scop., Walt. CATALPA. INDIAN BEAN.

Calyx deeply 2-lipped. Corolla bell-shaped, swelling; the undulate 5-lobed spreading border irregular and 2-lipped. Fertile stamens 2, or sometimes 4; the 1 or 3 others sterile and rudimentary. Capsule very long and slender, nearly cylindrical, 2-celled, the partition at right angles to the valves. Seeds winged on each side, the wings cut into a fringe. — Trees, with ovate or cordate and mainly opposite leaves. (The aboriginal name.)

✓ 1. *C. speciosa*, Warder. A large and tall tree, with thick bark; leaves ample, heart-shaped, long-acuminate; corolla 2' long, nearly white, inconspicuously spotted, with obconical tube and slightly oblique limb, the lower lobe emarginate; capsule thick. — Low rich woodlands, S. Ind. to Tenn., Mo., and Ark. May.

C. BIGNONIODES, Walt., of Ga., Ala. and Miss., very widely cultivated, and formerly including the above species, is a low much branched tree, with thin bark, smaller ($1\frac{1}{2}$ long) thickly spotted corolla (with oblique limb and lower lobe entire), and a much thinner capsule.

ORDER 79. PEDALIACEÆ.

Herbs, with chiefly opposite simple leaves, and flowers as of the preceding Order, except in structure of ovary and fruit, the former being 1-celled, the latter fleshy-drupaceous, with wingless seeds and thick entire cotyledons. — Ovary (in ours) 1-celled, with 2 parietal intruded placenta expanded into 2 broad lamellæ or united into a central columella.

1. MARTÝNIA, L. UNICORN-PLANT.

Calyx 5-cleft, mostly unequal. Corolla gibbous, bell-shaped, 5-lobed and somewhat 2-lipped. Fertile stamens 4, or only 2. Fruit fleshy, the flesh at length falling away in 2 valves; the inner part woody, terminated by a beak, which at length splits into 2 hooked horns, and opens at the apex between the horns, imperfectly 5-celled, owing to the divergence of the two plates of each placenta, leaving a space in the centre, while by reaching and cohering with the walls of the fruit they form 4 other cells. Seeds several, wingless, with a thick roughened coat. — Low branching annuals, clammy-pubescent, exhaling a heavy odor; stems thickish; leaves simple, rounded; flowers racemed, large. (Dedicated to *Prof. John Martyn*, of Cambridge, England.)

1. *M. proboscidea*, Glox. Leaves heart-shaped, oblique, entire or undulate, the upper alternate; corolla dull white or purplish, or spotted with yellow and purple; endocarp of the fruit crested on one side, long-beaked. — Banks of the Mississippi and its lower tributaries, from S. Ind., Ill., and Iowa, to northern Mexico. Also cultivated and naturalized farther north.

ORDER 80. ACANTHACEÆ. (ACANTHUS FAMILY.)

Chiefly herbs, with opposite simple leaves, didynamous or diandrous stamens, inserted on the tube of the more or less 2-lipped corolla, the lobes of which are convolute or imbricated in the bud; fruit a 2-celled and few- (4–12-) seeded capsule; seeds anatropous, without albumen, usually flat and

supported by hooked projections of the placenta (retinacula).—Flowers commonly much bracted. Calyx 5-cleft. Style thread-form; stigma simple or 2-cleft. Pod loculicidal, usually flattened contrary to the valves and partition. Cotyledons broad and flat.—Mucilaginous and slightly bitter, not noxious. A large family in the warmer parts of the world; represented in gardens by THUNBERGIA, which differs from the rest by the globular pod and seeds, the latter not on hooks.

* Corolla not obviously bilabiate, the 5 lobes broad and roundish, spreading; stamens 4.

1. **Calophanes**. Calyx-lobes long-filiform. Capsule 2-4-seeded.

2. **Ruellia**. Calyx-lobes mostly linear or lanceolate. Capsule 6-20-seeded.

** Corolla bilabiate, upper lip erect and concave, lower spreading; stamens 2.

3. **Dianthera**. Capsule obovate, flattened, 4-seeded.

1. CALÓPHANES, Don.

Calyx deeply 5-cleft or parted; its lobes elongated setaceous-acuminate or aristiform. Corolla funnel-form, with ample limb, convolute in the bud. Stamens 4, the anthers mucronate or sometimes aristate at base. Ovules a single pair in each cell. Capsule oblong-linear, 2-4-seeded.—Low branching perennials, pubescent or hirsute, with proportionally large axillary nearly sessile flowers (solitary or few), and blue corolla. (Name from *καλός*, beautiful, and *φαίω*, to appear.)

1. **C. oblongifolia**, Don. Stems usually erect and simple, $\frac{1}{2}$ -1° high; leaves from narrowly oblong to oval, very obtuse, sessile (1' long or less); corolla blue, sometimes purple-dotted or mottled, seldom 1' long; calyx-lobes nearly distinct, filiform-setaceous, hirsute.—Pine-barrens, S. Va. to Fla.

2. RUÉLLIA, Plumier.

Calyx 5-parted. Corolla funnel-form, with spreading ample border, convolute in the bud. Stamens 4, the cells of the somewhat arrow-shaped anthers parallel and nearly equal. Capsule narrow, in our species somewhat flattened, contracted and seedless at the base, above 8-12-seeded. Seeds with a mucilaginous coat, when wet exhibiting under the microscope innumerable tapering short bristles, their walls marked with rings or spirals.—Perennials, with rather large and showy blue or purple flowers, mostly in axillary clusters, sometimes also with small flowers precociously close-fertilized in the bud. Calyx often 2-bracteolate. (Named for the early herbalist, John Ruelle.)

1. **R. ciliosa**, Pursh. Hirsute with soft whitish hairs (1-3° high); leaves nearly sessile, oval or ovate-oblong (1-2' long); flowers 1-3 and almost sessile in the axils; tube of the corolla (1-1½' long) fully twice the length of the setaceous calyx-lobes; the throat short.—Dry ground, Mich. to Minn., south to Fla. and La. June-Sept.—Var. *ambigua*, Gray. Sparingly hirsute-pubescent or glabrate; leaves ovate-oblong, usually short-petioled, larger; tube of corolla little exceeding the hardly hirsute calyx.—Va. and Ky. to Ala. Appearing like a hybrid with the next.

2. **R. strepens**, L. Glabrous or sparingly pubescent (1-4° high); leaves narrowed at base into a petiole, ovate, obovate, or mostly oblong (2½-5' long), tube of the corolla (about 1' long) little longer than the dilated portion, slightly

exceeding the lanceolate or linear calyx-lobes.—Rich soil, Penn. to Wisc., south to Fla. and Tex. July-Sept.—Var. *CLEISTANTHA*, Gray. Leaves commonly narrower and oblong; flowers for most of the season cleistogamous.—Common with the ordinary form.

3. DIANTHERA, Gronov. WATER-WILLOW.

Calyx 5-parted. Corolla deeply 2-lipped; the upper lip erect, notched; the lower spreading, 3-parted, external in the bud. Stamens 2; anthers 2-celled, the cells separated and somewhat unequal. Capsule obovate, flattened, contracted at base into a short stalk, 4-seeded.—Perennial herbs, growing in water or wet places, with entire leaves, and purplish flowers in axillary peduncled spikes or heads. (Name formed of *δῖς*, double, and *ἀνθήρα*, anther, the separated cells giving the appearance of two anthers on each filament.)

1. **D. Americana**, L. Stem 1-3° high; leaves linear-lanceolate, elongated; spikes oblong, dense, long-peduncled; corolla 4-5" long.—In water, N. W. Vt. to Wisc., south to S. C. and Tex. July-Sept.

ORDER 81. VERBENACEÆ. (VERVAIN FAMILY.)

Herbs or shrubs, with opposite leaves, more or less 2-lipped or irregular corolla, and didynamous stamens, the 2-4-celled (in *Phryma* 1-celled) fruit dry or drupaceous, usually splitting when ripe into as many 1-seeded indehiscent nutlets; differing from the following order in the ovary not being 4-lobed, the style therefore terminal, and the plants seldom aromatic or furnishing a volatile oil.—Seeds with a straight embryo and little or no albumen.—A large order in the warmer parts of the world, sparingly represented in cool regions.

Tribe I. VERBENEÆ. Ovary 2-4-celled, with an erect anatropous ovule in each cell.

1. **Verbena**. Flowers in spikes or heads. Calyx tubular. Fruit splitting into 4 nutlets.

2. **Lippia**. Flowers in spikes or heads. Calyx short, 2-cleft. Fruit splitting into 2 nutlets.

3. **Callicarpa**. Flowers in axillary cymes. Calyx short. Fruit berry-like, with 4 nutlets.

Tribe II. PHRYMEÆ. Ovary 1-celled; ovule erect, orthotropous.

4. **Phryma**. Flowers in slender spikes. Calyx cylindrical, 2-lipped. Fruit an achene.

1. VERBENA, Tourn. VERVAIN.

Calyx tubular, 5-toothed, one of the teeth often shorter than the others. Corolla tubular, often curved, salver-form; the border somewhat unequally 5-cleft. Stamens included; the upper pair occasionally without anthers. Style slender; stigma mostly 2-lobed. Fruit splitting into 4 seed-like nutlets.—Flowers sessile, in single or often paniced spikes, bracted; produced all summer. (The Latin name for any sacred herb; derivation obscure.)—The species present numerous spontaneous hybrids.

§ 1. *Anthers not appendaged; flowers small, in narrow spikes.*

* *Spikes filiform, with flowers or at least fruits scattered, naked, the inconspicuous bracts shorter than the calyx.*

V. OFFICINALIS, L. (EUROPEAN V.) Annual, glabrous or nearly so, loosely branched (1-3° high); leaves pinnatifid or 3-cleft, oblong-lanceolate,

sessile, smooth above, the lobes cut and toothed; spikes panicle; flowers purplish, very small. — Roadsides and old fields, N. J. to Minn., south to Tex., and westward. (Nat. from Eu.)

1. *V. urticæfolia*, L. (WHITE V.) Perennial, from minutely pubescent to almost glabrous, rather tall (3-5° high); leaves oval or oblong-ovate, acute, coarsely serrate, petioled; spikes at length much elongated, loosely panicle; flowers very small, white. — Waste or open grounds. (Trop. Am.)

* * Spikes thicker or densely flowered; the fruits crowded, mostly overlapping each other; bracts inconspicuous, not exceeding the flowers; perennial.

2. *V. angustifolia*, Michx. Low (6-18' high), often simple; leaves narrowly lanceolate, tapering to the base, sessile, roughish, slightly toothed; spikes few or single; the purple flowers crowded, larger than in the next. — Dry or sandy ground, Mass. to Minn., south to Fla. and Ark.

3. *V. hastata*, L. (BLUE Vervain.) Tall (4-6° high); leaves lanceolate or oblong-lanceolate, taper-pointed, cut-serrate, petioled, the lower often lobed and sometimes halberd-shaped at base; spikes linear, erect, corymbed or panicle; flowers blue. — Waste grounds and roadsides; common.

4. *V. stricta*, Vent. (HOARY V.) Downy with soft whitish hairs, erect, simple or branched (1-2° high); leaves sessile, obovate or oblong, serrate; spikes thick, somewhat clustered, hairy; flowers rather large, purple. — Barrens and prairies, Ohio to S. Dak., south to Tex. and N. Mex.

* * * Spikes thick, sessile and leafy-bracted; annual.

5. *V. bracteosa*, Michx. Widely spreading or procumbent, hairy; leaves wedge-lanceolate, cut-pinnatifid or 3-cleft, short-petioled; spikes single, remotely flowered; bracts large, the lower pinnatifid, longer than the small purple flowers. — Prairies and waste grounds, Ohio to Minn., south and westward.

§ 2. Anthers of the longer stamens glandular-tipped; flowers showy, from depressed-capitate becoming spicate.

6. *V. bipinnatifida*, Nutt. Hispid-hirsute, $\frac{1}{2}$ -1° high; leaves (1½-4' long) bipinnately parted, or 3-parted into more or less bipinnatifid divisions, the lobes commonly linear or broader; bracts mostly surpassing the calyx; limb of bluish-purple or lilac corolla 4-5" broad. — Plains and prairies, Kan. to Ark. and Tex., and westward.

7. *V. Aubletia*, L. Slender, 1° high or less, soft-pubescent or glabrate; leaves (1-2' long) ovate or ovate-oblong in outline, with a wedge-shaped base, incisely lobed and toothed, often more deeply 3-cleft; bracts shorter than or equaling the calyx; limb of reddish-purple or lilac (rarely white) corolla 6-8" broad. — Open woods and prairies, Ind. and Ill. to Fla., Ark., and N. Mex.

2. LIPPIA, Houst.

Calyx short, often flattened, 2-4-toothed, or 2-lipped. Corolla 2-lipped, upper lip notched, the lower much larger, 3-lobed. Stamens included. Style slender; stigma obliquely capitate. Fruit 2-celled, 2-seeded. (Dedicated to Augustus Lippi, an Italian naturalist and traveller.)

1. *L. lanceolata*, Michx. (FOG-FRUIT.) Creeping extensively, roughish, green; leaves oblanceolate or wedge-spatulate, serrate above; peduncles axillary, slender, exceeding the leaves, bearing solitary closely bracted heads of bluish-

white flowers; bracts mucronate or pointless. — River-banks, E. Penn. to Minn., south to Fla. and Tex. July-Sept.

2. *L. cuneifolia*, Steud. Diffusely branched from a woody base, procumbent (not creeping), minutely canescent throughout; leaves rigid, cuneate-linear, incisely 2-6-toothed above the middle; peduncles axillary, mostly shorter than the leaves; bracts rigid, broadly cuneate, abruptly acuminate; corolla white (?). — Plains, W. Neb. to central Kan. and Arizona.

3. CALLICARPA, L.

Calyx 4-5-toothed, short. Corolla tubular-bell-shaped, 4-5-lobed, nearly regular. Stamens 4, nearly equal, exserted; anthers opening at the apex. Style slender, thickened upward. Fruit a small berry-like drupe, with 4 nutlets. — Shrubs, with scurfy pubescence, and small flowers in axillary cymes. (Name formed of κάλλος, beauty, and καρπός, fruit.)

1. *C. Americana*, L. (FRENCH MULBERRY.) Leaves ovate-oblong with a tapering base, acuminate, toothed, whitish beneath; cymes many-flowered; calyx obscurely 4-toothed; corolla bluish; fruit violet-color. — Rich soil, Va. to Tex., thence north to Mo. May-July.

4. PHRYMA, L. LOPSEED.

Calyx cylindrical, 2-lipped; the upper lip of 3 bristle-awl-shaped teeth; the lower shorter, 2-toothed. Corolla 2-lipped; upper lip notched; the lower much larger, 3-lobed. Stamens included. Style slender; stigma 2-lobed. Fruit dry, in the bottom of the calyx, oblong, 1-celled and 1-seeded. Seed orthotropous. Cotyledons convolute round their axis. — A perennial herb, with slender branching stems, and coarsely toothed ovate leaves, the lower long-petioled; the small opposite flowers in elongated and slender terminal spikes, strictly reflexed in fruit. Corolla purplish or rose-color. (Derivation of the name unknown.)

1. *P. Leptostachya*, L. Plant 2-3° high; leaves 3-5' long, thin; calyx strongly ribbed and closed in fruit, the long slender teeth hooked at the tip. — Moist and open woods, common. (E. Asia.)

ORDER 82. LABIATÆ. (MINT FAMILY.)

† Chiefly herbs, with square stems, opposite aromatic leaves, more or less 2-lipped corolla, didynamous or diandrous stamens, and a deeply 4-lobed ovary, which forms in fruit 4 little seed-like nutlets or achenes, surrounding the base of the single style in the bottom of the persistent calyx, each filled with a single erect seed. — Nutlets smooth or barely roughish and fixed by their base, except in the first tribe. Albumen mostly none. Embryo straight (except in Scutellaria); radicle at the base of the fruit. Upper lip of the corolla 2-lobed or sometimes entire; the lower 3-lobed. Stamens inserted on the tube of the corolla. Style 2-lobed at the apex. Flowers axillary, chiefly in cymose clusters, these often aggregated in terminal spikes or racemes. Foliage mostly dotted with small glands containing a volatile oil, upon which depends the warmth and aroma of the plants of this large and well-known family.