

2. *H. rotundifolia*, Pursh. Nearly smooth, creeping; leaves round obovate, half-clasping ($\frac{1}{2}$ -1' long), entire, basally nerved; peduncles twice or thrice the length of the calyx; upper sepal ovate; corolla white or pale blue. — Margins of ponds, Ill. to Minn., Mo., and southward.

3. *H. amplexicaulis*, Pursh. Stems hairy, creeping at base; leaves ovate, clasping, entire, basally nerved; peduncles shorter than the calyx; upper sepal heart-shaped; corolla blue. — Margin of pine-barren ponds, N. J. and Md. to La. — Aromatic when bruised.

* * Corolla obscurely bilabiate, the limb subequally 5-lobed; stamens almost equal.

4. *H. Monnièra*, HBK. Glabrous, prostrate and creeping; leaves spatulate to obovate-cuneate, entire or somewhat toothed, nearly nerveless, sessile; corolla pale blue. — River-banks and shores near the sea, Md. to Tex.

11. LIMOSÉLLA, L. MUDWORT.

Calyx bell-shaped, 5-toothed. Corolla short, widely bell-shaped, 5-cleft, nearly regular. Stamens 4; anthers confluent 1-celled. Style short, club-shaped. Capsule globular, many-seeded; the partition thin and vanishing. — Small annuals, growing in mud, usually near the sea-shore, creeping by slender runners, without ascending stems; the entire fleshy leaves in dense clusters around the simple 1-flowered naked peduncles. Flowers small, white or purplish. (Name from *limus*, mud, and *sella*, seat.)

1. *L. aquatica*, L., var. *tenuifolia*, Hoffm. Leaves (with no blade distinct from the petiole) awl-shaped or thread-form. — Brackish river-banks and shores, Lab. to N. J., and far north and west. (Eu., Asia, etc.)

12. GRATIOLA, L. HEDGE-HYSSOP.

Calyx 5-parted, the narrow divisions nearly equal. Upper lip of corolla entire or 2-cleft, the lower 3-cleft. Fertile stamens 2, included, posterior; the anterior mere sterile filaments, or wanting. Style dilated or 2-lipped at the apex. Capsule 4-valved, many-seeded. — Low herbs, mostly perennials, some apparently annuals, with opposite sessile leaves, and axillary 1-flowered peduncles, usually with 2 bractlets at the base of the calyx. Flowering all summer; all inhabiting wet or damp places. (Name from *gratia*, grace or favor, on account of supposed excellent medicinal properties.)

§ 1. Anthers with a broad connective, the cells transverse; stems mostly diffusely branched, or creeping at base, soft viscid-pubescent or smooth; corollas 4-6" long; bractlets foliaceous, equalling the calyx.

* Sterile filaments minute or none; corolla whitish, with the tube yellowish.

1. *G. Virginiana*, L. Stem clammy-puberulent above (4-6' high); leaves lanceolate with narrow base, acute, entire or sparingly toothed; peduncles almost equalling the leaves ($\frac{1}{2}$ -1' long); pod ovoid (2" long). — Very common.

2. *G. sphærocarpa*, Ell. Smooth, rather stout (5-10' high); leaves lance-ovate or oblong to oval-obovate (1-2' long), toothed; peduncles scarcely longer than the calyx and the large (3") globular pod. — N. J. and Md. to Ill., south to Fla. and Tex.

* * Sterile filaments slender, tipped with a little head; leaves short ($\frac{1}{2}$ -1' long).

3. *G. viscosa*, Schwein. Clammy-pubescent or glandular; leaves ovate-lanceolate or oblong, acute, toothed, mostly shorter than the peduncles; corolla whitish, yellow within. — Ky. to N. C. and Ga.

4. *G. aurea*, Muhl. Nearly glabrous; leaves lanceolate or oblong-linear, entire, equalling the peduncles; corolla golden-yellow ($\frac{1}{2}$ long). — Sandy swamps, Vt. and N. H. to Ohio, and south to Fla.

§ 2. Anthers with no broad connective, the cells vertical; sterile filaments tipped with a head; hairy apparently annual plants, with erect rigid and more simple stems.

5. *G. pilosa*, Michx. Leaves ovate or oblong, sparingly toothed, sessile ($\frac{1}{2}$ long); flowers nearly sessile; corolla white, 3-4" long, scarcely exceeding the calyx. — Low ground, N. J. to Fla. and Tex.

13. ILYSÁNTHESS, Raf.

Calyx 5-parted, nearly equal. Upper lip of corolla short, erect, 2-lobed; the lower larger and spreading, 3-cleft. Fertile stamens 2, included, posterior; the anterior pair sterile, inserted in the throat, 2-lobed, without anthers; one of the lobes glandular, the other smooth, usually short and tooth-like. Stigma 2-lobed. Capsule ovate or oblong, many-seeded. — Small and smooth annuals, with opposite leaves, and small axillary (purplish) flowers, on filiform naked pedicels, or the upper racemed, produced all summer. (Name from *ίλυσ*, mud, or mire, and *άνθος* flower.)

1. *I. riparia*, Raf. (FALSE PIMPERNEL.) Much branched, diffusely spreading (4-8' high), or at first simple and erect, leafy; leaves ovate, rounded, or oblong, sparingly toothed or entire, the upper partly clasping; corolla 3" long. (*I. gratioides*, Benth.) — Wet places; common.

14. MICRÁNTHEMUM, Michx.

Calyx 4-lobed or 4- (rarely 5-) parted. Corolla short, 2-lipped, with the upper lip considerably shorter than the lower, or 1-lipped, the upper lip obsolete; lower lip 3-cleft, the middle lobe longest. Stamens 2, anterior, the short filaments with a glandular (mostly basal) appendage; anthers 2-celled, didymous; no sterile filaments. Style short; the stigma 2-lobed. Capsule globular, thin, with a very delicate or evanescent partition, several-many-seeded. — Small, smooth, depressed and tufted or creeping annuals, in mud or shallow water, with opposite and entire rounded or spatulate sessile leaves, and minute white or purplish flowers solitary in the axils of some of the middle leaves (usually one axil floriferous, that of the other leaf sterile). (Name formed of *μικρός*, small, and *άνθος*, flower.)

1. *M. Nuttallii*, Gray. Branches ascending, 1-2' high; leaves obovate-spatulate or oval; peduncles at length recurved, about the length of the calyx, which is bell-shaped, 4-toothed and usually split down on one side, in fruit becoming pear-shaped; middle lobe of the corolla linear-oblong, nearly twice the length of the lateral ones; appendage of the stamen nearly as long as the filament itself; stigmas subulate. — Tidal mud of rivers, N. J. to Fla. Aug.-Oct.

15. *SYNTHYRIS*, Benth.

Calyx 4-parted. Corolla somewhat bell-shaped, variously 2-4-lobed or cleft. Stamens 2, inserted just below the upper sinuses, occasionally with another pair from the other sinuses, exserted; anther-cells not confluent. Style slender; stigma simple. Capsule flattened, rounded, obtuse or notched, 2-celled (rarely 3-lobed and 3-celled), many-seeded, loculicidal; the valves cohering below with the axis. — Perennial herbs, with the simple stems beset with partly clasping bract-like alternate leaves, the root-leaves rounded and petioled, crenate. Flowers in a raceme or spike, bracteate. (Name from *σύν*, together, and *θύρα*, a little door; in allusion to the closed valves of the pod.)

1. *S. Houghtoniæ*, Benth. Hairy; root-leaves ovate, heart-shaped; spike dense (5-12' long); corolla (greenish-white or yellowish) not longer than the calyx, usually 2-3-parted. — Oak-barrens and prairies, Mich. to Minn., south to Ind., Ill., and Iowa.

16. *VERÓNICA*, L. SPEEDWELL.

Calyx 4- (rarely 3-5-) parted. Corolla wheel-shaped or salver-shaped, the border 4-parted (rarely 5-parted); the lateral lobes or the lower one commonly narrower than the others. Stamens 2, one each side of the upper lobe of the corolla, exserted; anther-cells confluent at the apex. Style entire; stigma single. Capsule flattened, obtuse or notched at the apex, 2-celled, few-many-seeded. — Chiefly herbs; leaves mostly opposite or whorled; flowers blue, flesh-color, or white. (Derivation doubtful; perhaps the flower of *St. Veronica*.)

§ 1. *LEPTÁNDRA*. Tall perennials, with mostly whorled leaves; racemes terminal, dense, spiked; bracts very small; tube of the corolla longer than its limb and much longer than the calyx; both sometimes 5-cleft.

1. *V. Virgínica*, L. (CULVER'S-ROOT. CULVER'S PHYSIC.) Smooth or rather downy; stem simple, straight (2-6° high); leaves whorled in fours to sevens, short-petioled, lanceolate, pointed, finely serrate; spikes paniced; corolla small, nearly white; stamens much exserted; capsule oblong-ovate, not notched, opening by 4 teeth at the apex, many-seeded. — Rich woods, Vt. to Minn., E. Kan., and southward. July, Aug.

§ 2. *VERONICA* proper. Corolla wheel-shaped; capsule more or less notched, strongly flattened except in n. 2 and 3; low herbs.

* Perennials, stoloniferous or rooting at base, with opposite usually serrate leaves; racemes axillary, mostly opposite; corolla pale blue.

+ Capsule turgid, orbicular, many-seeded.

2. *V. Anagállis*, L. (WATER SPEEDWELL.) Smooth, creeping and rooting at base, then erect; leaves sessile, most of them clasping by a heart-shaped base, ovate-lanceolate, acute, serrate or entire (2-3' long); pedicels spreading; corolla pale blue with purple stripes; capsule slightly notched. — Brooks and ditches, N. Eng. to N. J., west to the Rocky Mts. June-Aug. (Eu., Asia.)

3. *V. Americána*, Schweinitz. (AMERICAN BROOKLIME.) Smooth, decumbent at base, then erect (8-15' high); leaves mostly petioled, ovate or oblong, serrate, thickish, truncate or slightly heart-shaped at base; the slender pedicels spreading. — Brooks and ditches, common. June-Aug.

+ + Capsule strongly flattened, several-seeded.

4. *V. scutellata*, L. (MARSH SPEEDWELL.) Smooth, slender and weak (6-12' high); leaves sessile, linear, acute, remotely denticulate; racemes several, very slender and zigzag; flowers few and scattered, on elongated spreading or reflexed pedicels; capsule very flat, much broader than long, notched at both ends or didymous. — Bogs, common. June-Aug. (Eu., Asia.)

5. *V. officinális*, L. (COMMON SPEEDWELL.) Pubescent; stem prostrate, rooting at base; leaves short-petioled, obovate-elliptical or wedge-oblong, obtuse, serrate; racemes densely many-flowered; pedicels shorter than the calyx; capsule obovate-triangular, broadly notched. — Dry hills and open woods, N. Eng. to Mich., and southward. July. (Eu., Asia.)

V. CHAMÆDRYS, L. Stem pubescent, at least in two lines, ascending from a creeping base; leaves subsessile, ovate or cordate, incisely crenate; racemes loosely-flowered; pedicels little longer than calyx; capsule triangular-obcordate. — Sparingly introduced into Canada, N. Y., and Penn. (Adv. from Eu.)

* * Leaves opposite; flowers in a terminal raceme; the lower bracts leaf-like; capsules flat, several-seeded. Perennials (mostly turning blackish in drying).

6. *V. alpina*, L. Stem branched from the base, erect, simple (2-12' high); leaves elliptical, or the lowest rounded, entire or toothed, nearly sessile; raceme hairy, few-flowered, crowded; capsule obovate, notched. — Alpine summits of the White Mts. (Eu., Asia.)

7. *V. serpyllifolia*, L. (THYME-LEAVED SPEEDWELL.) Much branched at the creeping base, nearly smooth; branches ascending and simple (2-4' high); leaves ovate or oblong, obscurely crenate, the lowest petioled and rounded, the upper passing into lanceolate bracts; raceme loose; corolla whitish, or pale blue, with deeper stripes; capsule rounded, broader than long, obtusely notched. — Roadsides and fields, common; introduced and indigenous. May-July. (Eu., Asia.)

* * * Annuals; floral leaves like those of the stem (or somewhat reduced), the flowers appearing to be axillary and solitary, mostly alternate; corolla shorter than the calyx.

+ Flowers short-pedicelled; floral leaves reduced; corolla shorter than the calyx.

8. *V. peregrina*, L. (NECKWEED. PURSLANE SPEEDWELL.) Glandular-puberulent or nearly smooth, erect (4-9' high), branched; lowest leaves petioled, oval-oblong, toothed, thickish, the others sessile, obtuse; the upper oblong-linear and entire, longer than the almost sessile (whitish) flowers; capsule orbicular, slightly notched, many-seeded. — Waste and cultivated grounds, in damp soil; throughout U. S., and almost cosmopolite. April-June.

V. ARVÉNSIS, L. (CORN SPEEDWELL.) Simple or diffusely branched (3-8' high), hairy; lower leaves petioled, ovate, crenate; the uppermost sessile, lanceolate, entire; capsule inversely heart-shaped, the lobes rounded. — Cultivated grounds, Atlantic States to Tex., rather rare. (Nat. from Eu.)

+ + Flowers long-pedicelled in axils of ordinary leaves; seeds cup-shaped.

V. AGRÉSTIS, L. (FIELD SPEEDWELL.) Leaves round or ovate, crenate-toothed, the floral somewhat similar; calyx-lobes oblong; flower small; ovary many-ovuled, but the nearly orbicular and sharply notched capsule 1-2-seeded. — Sandy fields, N. Brunswick to La., near the coast. (Adv. from Eu.)

V. BUXBATHIL, Tenore. Leaves round or heart-ovate, crenately cut-toothed (3-1' long); flower large (nearly 4' wide, blue); calyx-lobes lanceolate, widely

spreading in fruit; capsule obcordate-triangular, broadly notched, 16-24-seeded. — Waste grounds, rare in Atlantic States. (Adv. from Eu.)

V. *hederæfolia*, L. (IVY-LEAVED SPEEDWELL.) Leaves rounded or heart-shaped, 3-7-toothed or lobed; calyx-lobes somewhat heart-shaped; flowers small; capsule turgid, 2-lobed, 2-4-seeded. — Shaded places, N. J., Penn., etc. April-June. (Adv. from Eu.)

17. BÜCHNERA, L. BLUE-HEARTS.

Calyx tubular, obscurely nerved, 5-toothed. Corolla salver-form, with a straight or curved tube and an almost equally 5-cleft limb, the lobes oblong or wedge-obovate, flat. Stamens 4, included, approximate in pairs; anthers one-celled (the other cell wanting). Style club-shaped and entire. Capsule 2-valved, many-seeded. — Perennial rough-hairy herbs (doubtless root-parasitic), turning blackish in drying, with opposite leaves, or the uppermost alternate; the flowers opposite in a terminal spike, bracted and with 2 bractlets. (Named in honor of I. G. Buchner, an early German botanist.)

1. *B. americana*, L. Rough-hairy; stem wand-like (1-2° high); lower leaves obovate-oblong, the others ovate-oblong to linear-lanceolate, sparingly and coarsely toothed, veiny; spike interrupted; calyx longer than the bracts, one third the length of the deep-purple corolla (1' long). — Moist sandy ground, western N. Y. to Minn., and southward. June-Aug.

18. SEYMÈRIA, Pursh.

Calyx bell-shaped, deeply 5-cleft. Corolla with a short and broad tube, not longer than the 5 ovate or oblong nearly equal and spreading lobes. Stamens 4, somewhat equal; anthers approximate by pairs, oblong, 2-celled; the cells equal and pointless. Capsule many-seeded. — Erect branching herbs, with the general aspect and character of Gerardia; leaves mostly opposite and dissected or pinnatifid, the uppermost alternate and bract-like. Flowers yellow, interruptedly racemed or spiked. (Named for Henry Seymer, an English naturalist.)

1. *S. macrophylla*, Nutt. (MULLEIN-FOXGLOVE.) Rather pubescent (4-5° high); leaves large, the lower pinnately divided, with the broadly lanceolate divisions pinnatifid and incised, the upper lanceolate; tube of the corolla incurved, very woolly inside, as are the filaments except at the apex; style short, dilated and notched at the point; capsule ovate, pointed. — Shady river-banks, Ohio to Iowa, south to Tex. July.

19. GERÁRDIA, L.

Calyx bell-shaped, 5-toothed or 5-cleft. Corolla campanulate-funnel-form, or somewhat tubular, swelling above, with 5 more or less unequal spreading lobes, the 2 upper usually rather smaller and more united. Stamens 4, strongly didynamous, included, hairy; anthers approaching by pairs, 2-celled, the cells parallel, often pointed at base. Style elongated, mostly enlarged and flattened at the apex. Capsule globular or ovate, pointed, many-seeded. — Erect branching herbs (more or less root-parasitic); stem-leaves opposite, or the upper alternate, the uppermost reduced to bracts and subtending 1-flowered peduncles, which often form a raceme or spike. Flowers showy, purple or yellow; in late summer and autumn. (Dedicated to the celebrated herbalist, John Gerard.)

§ 1. *DASYSTOMA*. Corolla yellow, the tube woolly inside, as well as the anthers and filaments; anthers alike, awn-pointed at base; leaves rather large, more or less incised or pinnatifid.

* Pubescence partly glandular and viscid; corolla pubescent outside.

1. *G. pedicularia*, L. Annual or biennial, smoothish or pubescent, much branched (2-3° high), very leafy; leaves ovate-lanceolate, pinnatifid, and the lobes cut and toothed; pedicels longer than the hairy mostly serrate calyx-lobes. — Dry copses; N. Eng. to Minn., south to Fla. and Ark.

** No glandular pubescence; corolla glabrous outside; perennial.

2. *G. grandiflora*, Benth. Minutely downy; stem much branched (2-4° high); leaves ovate-lanceolate, coarsely toothed or cut, the lower pinnatifid; pedicels rather shorter than the calyx; corolla (2' long) 4 times the length of the broadly lanceolate entire or toothed calyx-lobes. — Oak openings, Wisc. and Minn. to Tenn. and Tex.

3. *G. flava*, L. (DOWNY FALSE FOXGLOVE.) Pubescent with a fine close down; stem (3-4° high) mostly simple; leaves ovate-lanceolate or oblong, obtuse, entire, or the lower usually sinuate-toothed or pinnatifid; pedicels very short; calyx-lobes oblong, obtuse, rather shorter than the tube; corolla 1½' long. — Open woods, N. Eng. to Wisc. and Iowa, south to Ga. and Ark.

4. *G. quercifolia*, Pursh. (SMOOTH FALSE FOXGLOVE.) Smooth and glaucous (3-6° high), usually branching; lower leaves commonly twice-pinnatifid; the upper oblong-lanceolate, pinnatifid or entire; pedicels nearly as long as the calyx; calyx-lobes lance-linear, acute, as long as the at length inflated tube; corolla 2' long. — Dry woods, N. Eng. to Minn., south to Fla. and Ill.

5. *G. lævigata*, Raf. Smooth, not glaucous; stem (1-2° high) mostly simple; leaves lanceolate, acute, entire, or the lowest obscurely toothed; pedicels shorter than the calyx-tube; corolla 1' long. (*G. integrifolia*, Gray.) — Oak-barrens, etc., Penn. to Mich. and Ill., south in the mountains to Ga.

§ 2. *OTOPHYLLA*. Corolla purple (rarely white), naked within, as well as the very unequal filaments; anthers dissimilar, pointless, glabrous or sparingly hairy.

6. *G. auriculata*, Michx. Rough-hairy; stem erect, nearly simple (9-20' high); leaves lanceolate or ovate-lanceolate, sessile, the lower entire, the others with an oblong-lanceolate lobe on each side at the base; flowers nearly sessile in the axils (1' long). — Low grounds and prairies, W. Penn. to Minn., south to N. C. and Mo.

7. *G. densiflora*, Benth. More hispid and rough, very leafy; leaves rigid, pinnately parted into 3-7 narrowly linear acute divisions, those subtending the densely spicate flowers similar and crowded; corolla over 1' long. — Prairies, E. Kan. to Tex.

§ 3. *GERARDIA* proper. Corolla purple or rose-color (rarely white); calyx-teeth short; anthers alike, nearly pointless, pubescent; cauline leaves linear or narrower, entire.

* Perennial; leaves erect, very narrow; pedicels erect, as long as floral leaves.

8. *G. linifolia*, Nutt. Glabrous, 2-3° high, sparingly or paniculately branched; leaves flat, thickish, 1" wide; calyx-teeth minute; corolla 1' long.

minutely pubescent outside, villous within and lobes ciliate; anthers and filaments very villous. — Low pine barrens, Del. to Fla.

* * * Annuals; herbage blackish in drying (except n. 13).

+ Pedicels little if at all longer than the calyx and capsule.

9. *G. aspera*, Dougl. Sparingly branched (1–2° high); leaves long and linear, rough; pedicels (most of them alternate) equalling or moderately exceeding the calyx, which has triangular-lanceolate acute lobes about half as long as the tube; corolla over 1' long. — Plains and prairies, Mich. and W. Ind. to the Dakotas and W. Ark.

10. *G. purpurea*, L. (PURPLE GERARDIA.) Stem (1–2° high) with long and rigid widely spreading branches; leaves linear, acute, rough-margined; flowers large (1' long), bright purple, often downy; pedicels shorter than the calyx, mainly opposite; calyx-teeth sharp-pointed, from very short to about half as long as the tube. — Low grounds, mainly near the coast and in the region of the Great Lakes. Very variable. — Var. *PAUPÉRCULA*, Gray. Smoother, more simple; corolla usually only $\frac{1}{2}$ ' long, lighter rose-purple. — N. Eng. to Penn., N. Ill., Minn., and northward.

11. *G. maritima*, Raf. (SEA-SIDE G.) Low (4–12' high), with shorter branches; leaves and short broad calyx-teeth rather fleshy and obtuse; pedicels about as long as the calyx; corolla $\frac{1}{2}$ ' long. — Salt marshes along the coast.

+ + Pedicels usually exceeding the corolla; woolly anthers cuspidate at base.

12. *G. tenuifolia*, Vahl. (SLENDER G.) Leaves narrowly linear, acute, the floral ones mostly like the others; calyx-teeth very short, acute; capsule globular, not exceeding the calyx; corolla about $\frac{1}{2}$ ' long. — Low or dry ground, common. — Var. *MACROPHYLLO*, Benth. Stouter; larger leaves $1\frac{1}{2}$ –2' long and almost 2" wide, scabrous; pedicels ascending; calyx-teeth larger; corolla little over $\frac{1}{2}$ ' long. W. Iowa to W. La. and Col. — Var. *ASPÉRCULA*, Gray. Leaves all nearly filiform and upper face hispidulous-scabrous; inflorescence more paniculate; corolla small, the expanded limb only 6" in diameter. Dry bare hills, Mich. and N. Ind. to Minn. and Mo.

13. *G. Skinneriana*, Wood. Leaves bristle-shaped, as are the branchlets, or the lower linear; capsule ovate, mostly longer than the calyx, which has short setaceous teeth; corolla 4–6" long. (*G. setacea*, Gray, Man., not of Walt.) — Sandy low ground, Mass. to Minn., south to Fla. and La.

20. CASTILLEJA, Mutis. PAINTED-CUP.

Calyx tubular, flattened, cleft at the summit on the anterior, and usually on the posterior side also; the divisions entire or 2-lobed. Tube of the corolla included in the calyx; its upper lip (galea) long and narrow, arched and keeled, flattened laterally, enclosing the 4 unequal stamens; lower lip short, 3-lobed. Anther-cells oblong-linear, unequal, the outer fixed by the middle, the inner pendulous. Capsule many-seeded. — Herbs (root-parasitic), with alternate entire or cut-lobed leaves; the floral ones usually dilated, colored, and more showy than the yellow or purplish spiked flowers. (Dedicated to *Castillejo*, a Spanish botanist.)

1. *C. coccinea*, Spreng. (SCARLET PAINTED-CUP.) Hairy biennial or annual; stem simple; root-leaves clustered, mostly entire, obovate or

oblong; those of the stem incised; the floral 3–5-cleft, bright scarlet toward the summit (rarely yellow); calyx about the length of the pale yellow corolla, equally cleft both sides, the lobes quadrate-oblong, entire or retuse. — Low sandy ground, Maine to Minn., south to N. J., Tenn., and Tex.

2. *C. pallida*, Kunth, var. *septentrionalis*, Gray. Perennial, smooth or sparingly hairy, at the summit woolly; leaves mainly entire, the lower linear, upper broader; the floral oblong or obovate, greenish-white, varying to yellowish, purple, or red; calyx equally cleft, the lobes oblong or lanceolate, 2-cleft; corolla $\frac{1}{2}$ –1' long, the galea decidedly shorter than the tube, not over 2 or 3 times as long as the lip. — Alpine summits of N. Eng., N. shore of L. Superior, west and northward.

3. *C. sessiliflora*, Pursh. Perennial, 6–8' high, very leafy, cinereous-pubescent; leaves mostly 3–5-cleft, with narrow diverging sometimes cleft lobes; the floral similar or broader, not at all colored; calyx deeper cleft in front, the narrow lobes deeply 2-cleft; corolla 2' long, the short galea but twice as long as the slender-lobed lip. — Prairies, Wisc. and Ill. to N. Dak. and Tex.

21. ORTHOCARPUS, Nutt.

Corolla with the upper lip (galea) little longer and usually much narrower than the inflated 1–3-saccate lower one. Otherwise nearly as *Castilleja*. (Name from *ὀρθός*, upright, and *καρπός*, fruit.)

1. *O. luteus*, Nutt. Annual, pubescent and hirsute, sometimes viscid, erect, 1° high; leaves linear to lanceolate, occasionally 3-cleft; spike dense; bracts broader, mostly 3-cleft, about equalling the flowers, not colored; corolla golden-yellow, not 6" long, 2–3 times as long as the calyx. — Plains, N. Minn. to Col., and westward.

22. SCHWÁLBIA, Gronov. CHAFF-SEED.

Calyx oblique, tubular, 10–12-ribbed, 5-toothed; the posterior tooth much the smaller, the 2 anterior united higher than the others. Upper lip of the corolla arched, oblong, entire; the lower little shorter, erect, 2-plaited, with 3 very short and broad obtuse lobes. Stamens 4, included in the upper lip; anther-cells equal and parallel. Capsule ovate, many-seeded. Seeds linear, with a loose chaff-like coat. — A perennial minutely pubescent upright herb (1–2° high), with leafy simple stems, terminated by a loose spike of rather large dull purplish-yellow flowers; leaves alternate, sessile, 3-nerved, entire, ovate or oblong, the upper gradually reduced to narrow bracts; pedicels very short, with 2 bractlets under the calyx. (Dedicated to *C. G. Schwalbe*, an obscure German botanist.)

1. *S. Americana*, L. — Wet sandy soil, Mass. to La., near the coast. May–July.

23. EUPHRASIA, Tourn. EYEBRIGHT.

Calyx tubular or bell-shaped, 4-cleft. Upper lip of the corolla erect, scarcely arched, 2-lobed, and the sides folded back; lower lip spreading, 3-cleft, the lobes obtuse or notched. Stamens 4, under the upper lip; anther-cells equal, pointed at the base. Capsule oblong, flattened. Seeds numer-

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.